thematic maps

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outline

basics again

classification methods: 2 useful references

thematic mapping

heatmaps

layers-properties: labels and metadata

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basics again

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thematic mapping

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layers-properties: labels and metadata

variable definitions

- be <u>very</u> clear about what you are measuring
- put on the map, in description, or into appendix, but have
  to have it somewhere!
- eg do we have small breweries that are at some bars?
  how exactly is a brewery defined?
- eg what is exactly a bike lane–incl paths in parks?
  does it have to be designated for bikes only?
  and paths not for bikes but used by bikes?
- ideally map them all!

map labeling: clarity and simplicity!

- always have a self explanatory title/caption and legend
- self-explanatory means a random person will understand what it's about
- in other words it will pass "a grandma test"
- give it to your grandma and she'll get it
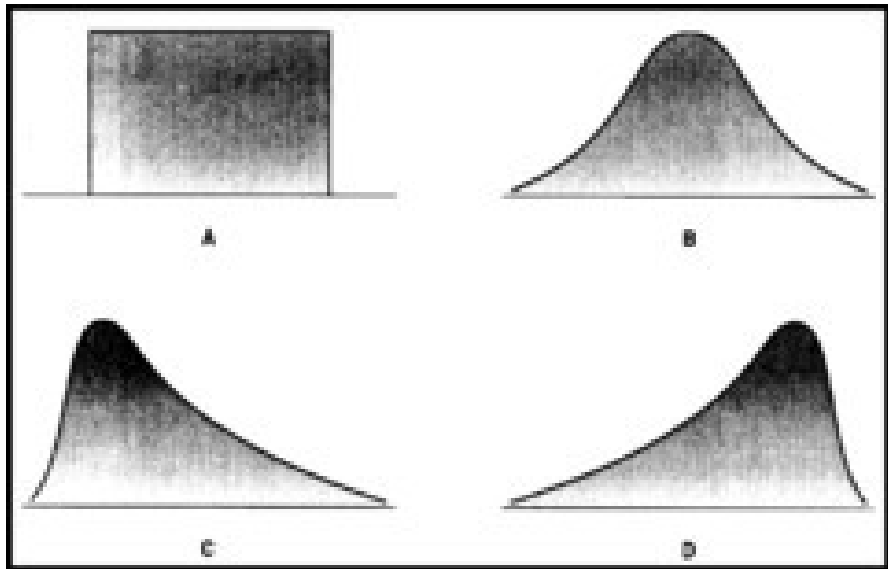- if she doesn't, then it isn't clear enough

__outline__

Properties-Style-histogram tab; skew

A

B

C

D

references: very useful!

- let's open both and do 2nd pdf: 7,8: creating classes
- and then do each classification type one by one from BOTH docs; and s15 from 2nd on counts v ratios
- http://www.gitta.info/Statistics/en/html/ StandClass_learningObject2.html
- http://www.geo.umass.edu/courses/geo494a/ thematic_map_design.pdf

○ [*] afficionados may do value-by-area

https://magrawala.github.io/cs448b-fa17/assets/docs/Dent-Chap11.pdf

outline

always think abt the meaning; interpret!

- always interpret the map, think about what it means
- usually want to standardize to achieve meaningfullness
- standardize by area ("per sq km") or by pop ("per capita")
- or even: specific (eg habitable) area; specific (eg disadvantaged) pop
- eg much of area may be water or forest, so hydrants/inhabited sq km
- similar with populations-they may only work or sleep in some area, (Cherry Hill is a bedroom city) etc
- eg Cape May has many liquor stores per capita (just because nobody lives there)

standardize: gen a new variable

- nj counties
  https://drive.google.com/open?id=1xJDhcRCkgv7k4tNCa72Oog5bohV6dTB2

- map POP2010

- duplicate the layer so can easily compare

- "Open Field Calculator"

- "Output filed name": "pd10" [qgis doesn't like long var nam]

- "Output field type": "Decimal number (real)

- ○ and bump up precision to say 10 (decimal points)

- $POP2010/SQ\_MILES$ (can select from vars drop-down)

- map it: equal interval, and compare to the original

- different! next to NYC much more dense than others

what do we see ? (distribution, skew)

- but wait! this map is not very useful because there is not much variability in it
- this happens when data are skewed–the county next to NYC is much more dense than anything else (right-skewed, draw distribution)
- Properties-Style, "Histogram" tab, hit "Load values"
- try more classes and see how distr changes
- but even if we have 10 classes it doesn't help much
- better pick some other classification technique
- try NATURAL BREAKS (JENKS)
- **note!** almost alwasy have to move cutoff lines manually so that clusters are colored same col!!!

level of analysis

- remember i was repeating myself over and over again that the level matters
- and that usually the lower (finer) the better
- and that the higher, the more information you loose
○ but more data available at greater aggregation
- here's an example

level of analysis: example

- load NJ_MUNIS
- and map with 5 quantiles $POP\_DEN2010$
- a huge difference! [and same data!!]
- note many areas next to Philadelphia, NYC and some coastal areas
- the previous map did not showed that at all !
- Only one county next to NYC showed up because it were small and ALL densely populated
- but the rest of the counties were densely populated only in few subareas

classification methods

- always understand the distribution–use hist!
- ○ have a hist in ps (at least of main var)
- ○ think about it, discuss and motivate classification meth
- ○ (i'll cut points)
- i like NATURAL BREAKS/JENKS or QUANTILES
- usually more "truthful" than equal intervals
- start with many, say 7, then shrink it to say 5 or 3 without loosing too much detail
- ○ make it as parsimonious, clean, and simple as possible

choice of classification method is critical

- be as objective as possible
- never choose classification forcing your story
- ○ let the data speak, listern carefully, don't force it
- scientist must be objective
- play with it: explore the distribution and categorize differently
- then pick the most parsimonious AND best representing the pattern
- ○ (put the alternative ones into appendix, so can always compare)
- let the data speak! do not force your story

let the data speak, but you pick the story!

- data have always many stories to tell
- and you choose which one you want to present
- say may emphasize exteremes with dramatic colors
- eg purple for values way different from everything else
- (for intervention, disaster response, etc)
- or paint the gradient, where values raise and level off etc
- like my urban-rural happiness gradient
- also in space: clusters of happiness: `https://link. springer.com/content/pdf/10.1007/s11205-010-9671-y.pdf`
- (still using alt classifications for robustness)
- (and std dev in addition to levels)

categorized symbology

- good for categorical data
- what are categorical data ?
- examples ?
- continuous vs ordinal, nominal (multinomial and binary)

- categorized symbology–how it works?
- pick colors (or symbols) for levels of a variable

bring in universities

- load `https://docs.google.com/uc?id=1bb9KES6QDE7cleE4L38yQ7939LlXUHB5&export=download`
- layer-Properties-Style; select "Categorized"
- do CATEGORIZED classify by $NAICSDESCR$ and pick some big symbol for "universities" level
- then can easily see there are only 2 univ in SJ
- use IDENTIFY TOOL (arrow with i) to identify
- Aha! RU and Rowan–maybe then should merge them

more than one var: dots, hashed lines

- map additional var with empty fill as hashed lines or dots
- lets try it: colored pop and hashed/dotted pop den
- nj counties

  https://docs.google.com/uc?id=1xJDhcRCkgv7k4tNCa72Oog5bohV6dTB2&export=download

○ btw can just click symbol under main layers in main
  window

outline

- **too many points? heatmap! or clusterer!**

- we got a map, but mess! make them smaller:
- under style, change size to say .4

- better a heatmap:
- right click layer-Properties-Style: Heatmap
- play with Radius to achieve desired heat
- (at home: overlay with county bounds etc to locate better)
- or clusterer: increase clustering distance to 10mm
- make symbol bigger and font smaller

- refs:
- http://www.qgistutorials.com/en/docs/creating_heatmaps.html
- https://docs.qgis.org/2.8/en/docs/user_manual/plugins/plugins_heatmap.html

- http:
//www.digital-geography.com/create-point-density-raster-in-qgis/#.VrtsS_F0kUE

outline

what else under layers-properties?

- we've covered STYLE...
- let's stick in some LABELS
- can pick ANY text you get when you use IDENTIFY FEATURES TOOL, ie any text from properties table
- from NJ_COUNTIES display COUNTY_LAB
- select a "buffer" to have nice outline–easier to read
- note: can put as label any var, incl numeric, letter, etc!
- ○ so it is a way of having 2 vars in one map: thematic+label

label only certain features

- can subset a shapefile, that is select features of interest
  and save them and load again and then label,
○ lets do it say with South Jersey
- or there is also another way: http://anitagraser.com/2015/12/04/

  how-to-label-only-selected-features-in-qgis-2-8-and-up/