

**maptile**

**mapping in Stata, made easy**

**Michael Stepner**

**MIT**

Data Editor (Browse) - census.dta

Edit    Browse    Filter    Variables    Properties    Snapshots

state[1]    AL

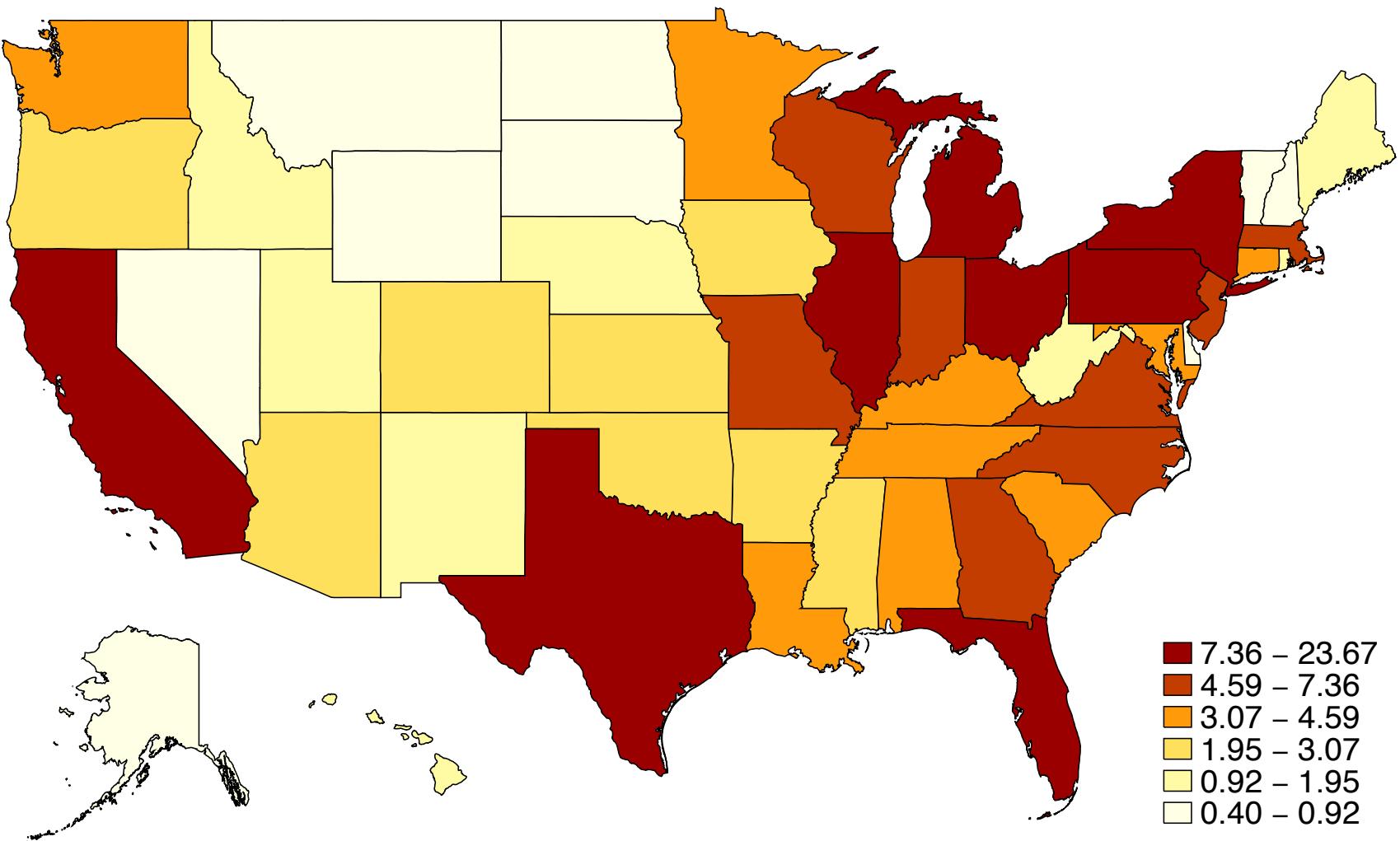
	state	population
1	AL	3.893888
2	AK	.401851
3	AZ	2.718215
4	AR	2.286435
5	CA	23.667902
6	CO	2.889964
7	CT	3.107576
8	DE	.594338
9	FL	9.746324
10	GA	5.463105
11	HI	.964691
12	ID	.943935
13	IL	11.426518
14	IN	5.490224
15	IA	2.913808
16	KS	2.363679
17	KY	3.660777
18	LA	4.2059
19	ME	1.12466

Variables

Enter filter text here

Name	Label
<input checked="" type="checkbox"/> state	Two-letter state abbreviation
<input checked="" type="checkbox"/> population	Population, in millions

Vars: 2    Obs: 50    Filter: Off



- `maptile population, geo(state)`

# Ingredients for creating a map

## 1) Install maptile

The installation command is posted at:

[www.michaelstepner.com/maptile/](http://www.michaelstepner.com/maptile/)

maptile depends on the Stata program spmap

- . ssc install spmap
- . maptile population, geo(state)

# Ingredients for creating a map

## 2) Install a maptile geography template

Install templates from:

[www.michaelstepner.com/maptile/geographies](http://www.michaelstepner.com/maptile/geographies)

Region	Units	Vintage	Geography Name	Author	Creation files
+ United States	Counties	1990	county1990	Michael Stepner	<a href="#">Link</a>
+ United States	Commuting Zones	1990	cz	Michael Stepner	<a href="#">Link</a>
+ United States	States	2010	state	Michael Stepner	<a href="#">Link</a>
+ United States	3-digit ZIP Code Tabulation Areas	2000	zip3	Michael Stepner	<a href="#">Link</a>
+ United States	5-digit ZIP Code Tabulation Areas	2000	zip5	Michael Stepner	<a href="#">Link</a>

- `maptile population, geo(state)`

# Ingredients for creating a map

## 2) Install a maptile geography template

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[www.michaelstepner.com/maptile/geographies](http://www.michaelstepner.com/maptile/geographies)

Region	Units	Vintage	Geography Name	Author	Creation files
 United States	Counties	1990	county1990	Michael Stepner	<a href="#">Link</a>

**Installation:**

```
maptile_install using "http://files.michaelstepner.com/geo_county1990.zip"
```

**Geographic ID variable:**

county (containing FIPS codes)

**Options:**

`stateoutline(linewidthstyle)` overlay the map with a (potentially thicker) line on state boundaries

# Ingredients for creating a map

## 3) Data with a geographic ID variable

The screenshot shows the SPSS Data Editor window titled "Data Editor (Browse) - census.dta". The main area displays a table with two columns: "state" and "population". The "state" column contains two-letter abbreviations, and the "population" column contains numerical values. A filter bar at the top indicates "state[1]" and "AL". The "Variables" pane on the right lists "state" and "population" with their respective labels: "Two-letter state abbreviation" and "Population, in millions".

	state	population
1	AL	3.893888
2	AK	.401851
3	AZ	2.718215
4	AR	2.286435
5	CA	23.667902
6	CO	2.889964
7	CT	3.107576
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17	KY	3.660777
18	LA	4.2059
19	ME	1.12466

Vars: 2      Obs: 50      Filter: Off

# Ingredients for creating a map

## 3) Data with a geographic ID variable

Geographic ID in dataset must be compatible with template.

Region	Units	Vintage	Geography Name	Author	Creation files
+ United States	Counties	1990	county1990	Michael Stepner	<a href="#">Link</a>

**Installation:**

```
maptile_install using "http://files.michaelstepner.com/geo_county1990.zip"
```

**Geographic ID variable:**

county (containing FIPS codes)

**Options:**

`stateoutline(linewidthstyle)` overlay the map with a (potentially thicker) line on state boundaries

# Ingredients for creating a map

## 3) Data with a geographic ID variable

To learn template requirements and options, run:

```
. maptile_geohelp state
```

Dialog ▾ | Also See ▾ | Jump To ▾

**maptile — Geography: state**

**Description**

**state** generates a map of U.S. states.

It displays Alaska and Hawaii rescaled and moved to the bottom left of the map, below the continental US, for ease of viewing.

**Geographic ID variables**

<b>state</b>	2-letter state abbreviations
<b>statefips</b>	2-digit state FIPS codes
<b>statename</b>	unabbreviated state names

**Geography-Specific Options**

**geoid(varname)** specifies the geographic ID variable to use; default is **geoid(state)**

# Making maps

“More an art than a science.”

Mac OS X window title bar: Data Editor (Browse)

Toolbar icons: Edit (pencil), Browse (grid), Filter (blue funnel), Variables (up/down arrows), Properties (document), Snapshots (camera).

Table header: statecode[1] 1

	statecode	state	mort_white	mort_black	
1	1	Alabama	908.3	1013.6	
2	2	Alaska	670.1	645.3	
3	4	Arizona	669.1	793.3	
4	5	Arkansas	884	1014.8	
5	6	California	661.4	815	
6	8	Colorado	661	743.6	
7	9	Connecticut	650.1	685.3	
8	10	Delaware	729	759.1	
9	12	Florida	656.7	752.4	
10	13	Georgia	793.9	878.1	
11	15	Hawaii	624.4	491.5	
12	16	Idaho	733.3	519	
13	17	Illinois	708.6	916.9	
14	18	Indiana	825.9	964.6	
15	19	Iowa	721.4	930.6	
16	20	Kansas	748.4	922.8	
17	21	Kentucky	904.4	902.3	
18	22	Louisiana	853.4	1028.4	
19	23	Maine	757.9	578.3	
20	24	Massachusetts	688	881.7	

Variables panel:

Name	Label
<input checked="" type="checkbox"/> statecode	State FIPS code
<input checked="" type="checkbox"/> state	State name
<input checked="" type="checkbox"/> mort_white	White age-adjusted mortality: per 100,000
<input checked="" type="checkbox"/> mort_black	Black age-adjusted mortality: per 100,000

Status bar: Vars: 4 Obs: 50 Filter: Off

## **maptile — Geography: state**

### **Description**

**state** generates a map of U.S. states.

It displays Alaska and Hawaii rescaled and moved to the bottom left of the map, below the continental US, for ease of viewing.

### **Geographic ID variables**

<b>state</b>	2-letter state abbreviations
<b>statefips</b>	2-digit state FIPS codes
<b>statename</b>	unabbreviated state names

### **Geography-Specific Options**

**geoid(*varname*)** specifies the geographic ID variable to use; default is **geoid(state)**

- `maptile_geohelp state`

Data Editor (Browse)

Edit    Browse    Filter    Variables    Properties    Snapshots

	statefips	statename	mort_white	mort_black	
1	1	Alabama	908.3	1013.6	
2	2	Alaska	670.1	645.3	
3	4	Arizona	669.1	793.3	
4	5	Arkansas	884	1014.8	
5	6	California	661.4	815	
6	8	Colorado	661	743.6	
7	9	Connecticut	650.1	685.3	
8	10	Delaware	729	759.1	
9	12	Florida	656.7	752.4	
10	13	Georgia	793.9	878.1	
11	15	Hawaii	624.4	491.5	
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15	19	Iowa	721.4	930.6	
16	20	Kansas	748.4	922.8	
17	21	Kentucky	904.4	902.3	
18	22	Louisiana	853.4	1028.4	
19	23	Maine	757.9	578.3	
20	24	...	...	...	

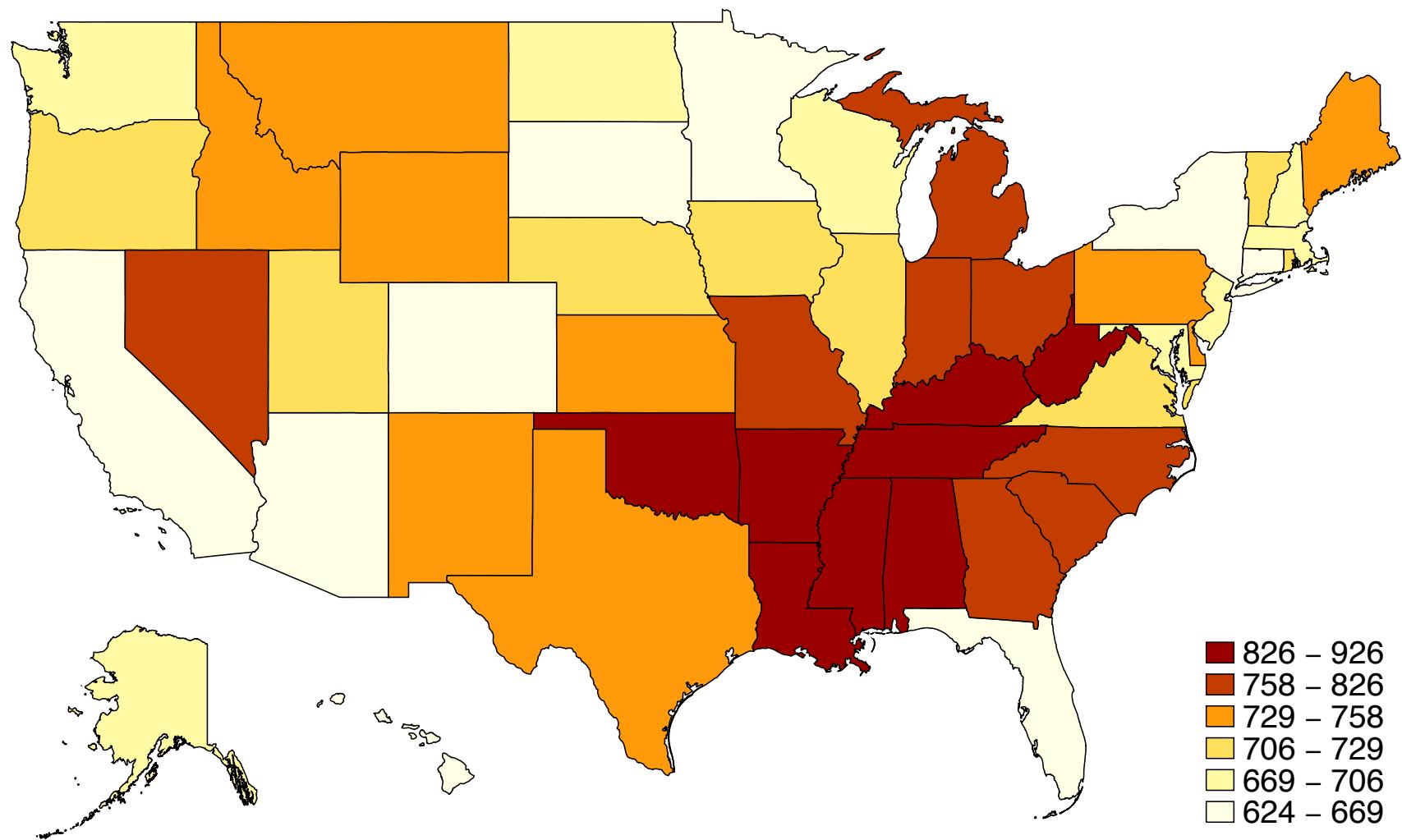
Variables

Q Enter filter text here

Name	Label
<input checked="" type="checkbox"/> statefips	State FIPS code
<input checked="" type="checkbox"/> statename	State name
<input checked="" type="checkbox"/> mort_white	White age-adjusted mortality: per 100,000
<input checked="" type="checkbox"/> mort_black	Black age-adjusted mortality: per 100,000

Vars: 4    Obs: 50    Filter: Off

- rename statecode statefips
- rename state statename



• `maptile mort_white, geo(state) geoid(statefips)`

# What's happening under the hood

- Equal-sized bins
    - Same number of states in each bin  
(up to integer rounding)
  - “Equal-spaced” colors
    - The color assigned to each bin depends only on the bin number, not on the values of the data in the bin
- N.B.** Color “spacing” is not well-defined except on a fixed color spectrum.
- Colors are ordinal, not cardinal

AZ

CA HI

AK NJ

IL RI

DE

CO MN

MD ND

IA UT

CT NY

MA WA

NE VT

FL SD

NH WI

OR VA

Q<sub>1</sub>

Q<sub>2</sub>

Q<sub>3</sub>

624

669

706

729

758

826

926

. xtile cutpoints\_white=mort\_white, nq(6)

AZ

CA HI

AK NJ

IL RI

DE

CO MN

MD ND

IA UT

CT NY

MA WA

NE VT

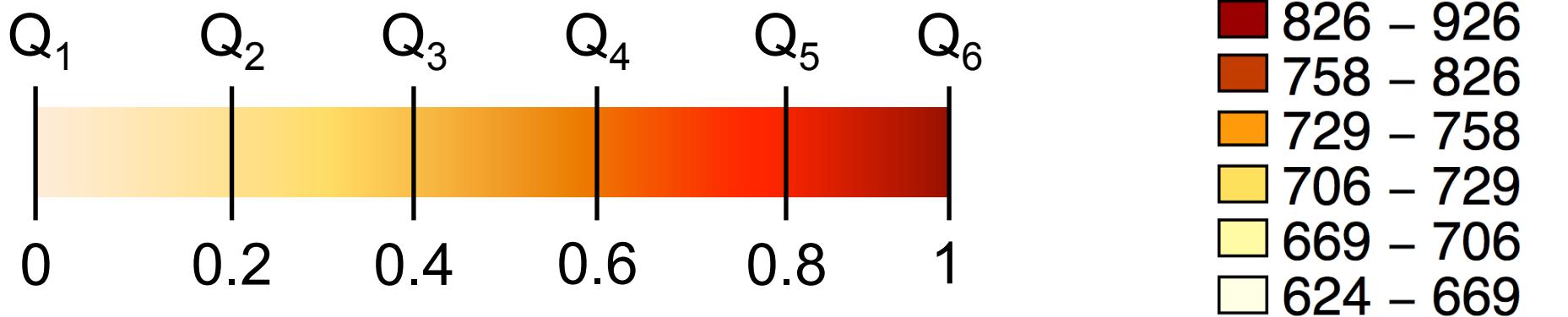
FL SD

NH WI

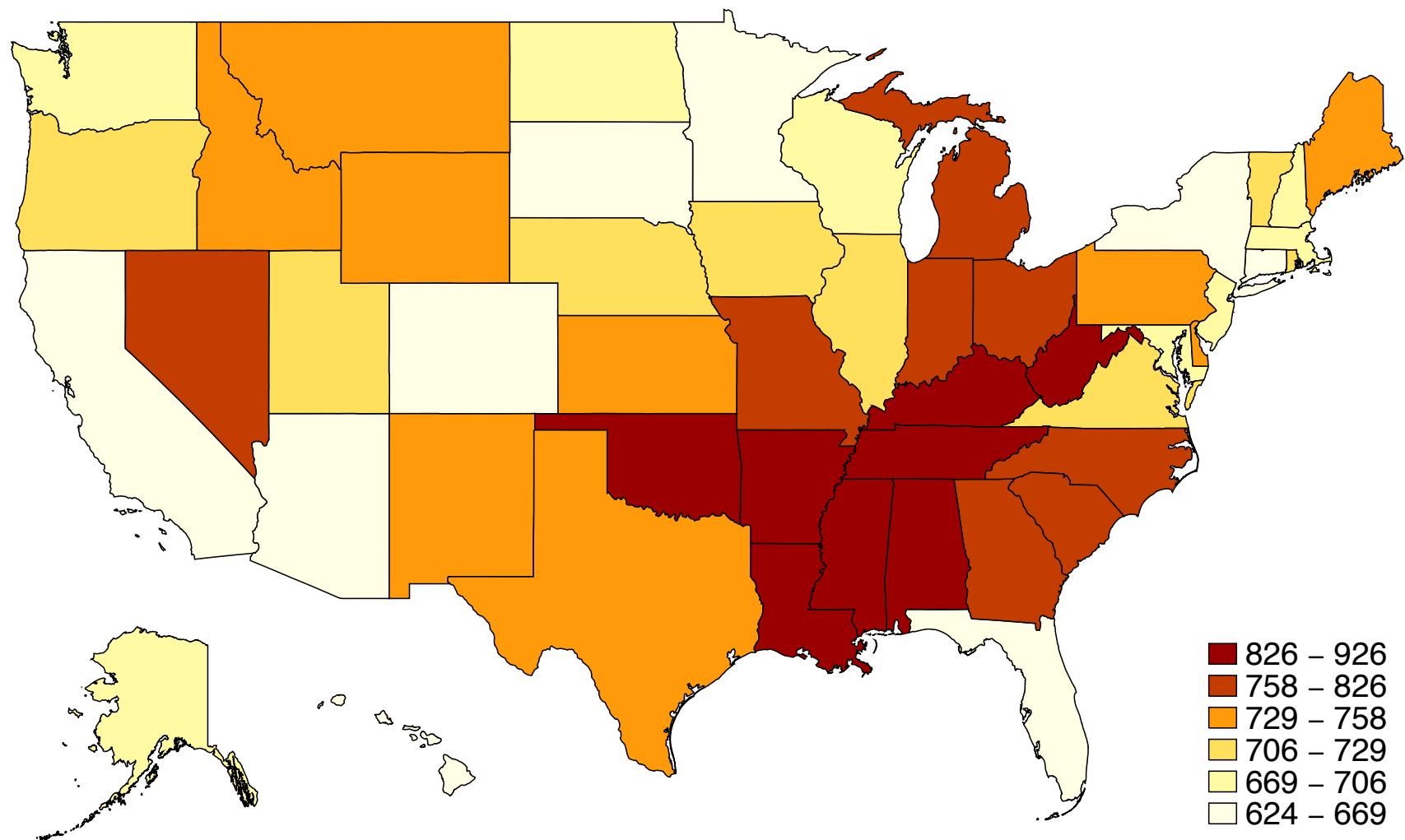
OR VA



624      669      706      729      758      826      926



. maptile mort\_white, geo(state)



• `maptile mort_white, geo(state)`

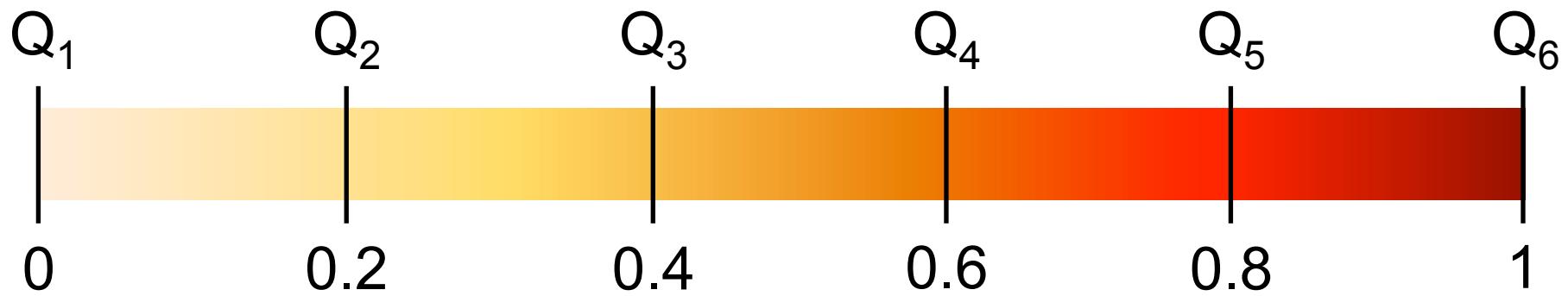
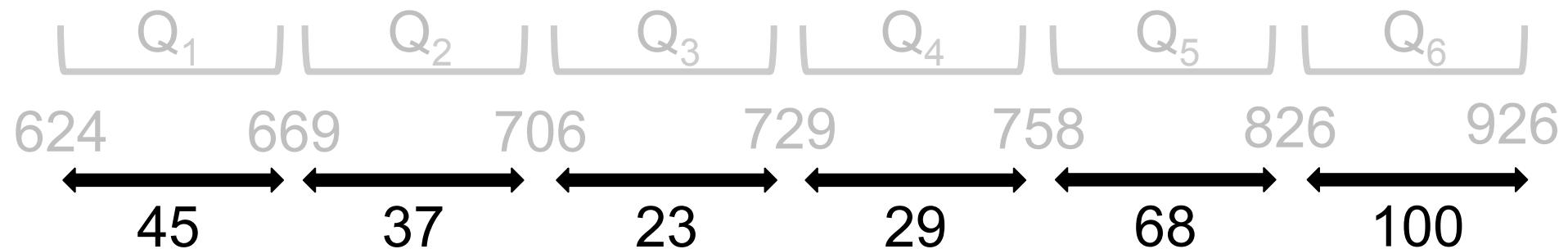
# Proportional color spacing: captures dispersion

- Equally-spaced colors are:
  - Informative about order
  - Uninformative about dispersion
- Can use “proportionally-spaced colors” instead:
  - 1) Compute the median value in each bin
  - 2) Place the lowest bin at the left, highest at the right
  - 3) Color the middle bins proportionally to the distance between them

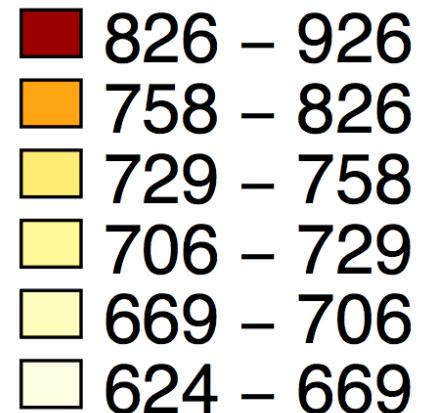
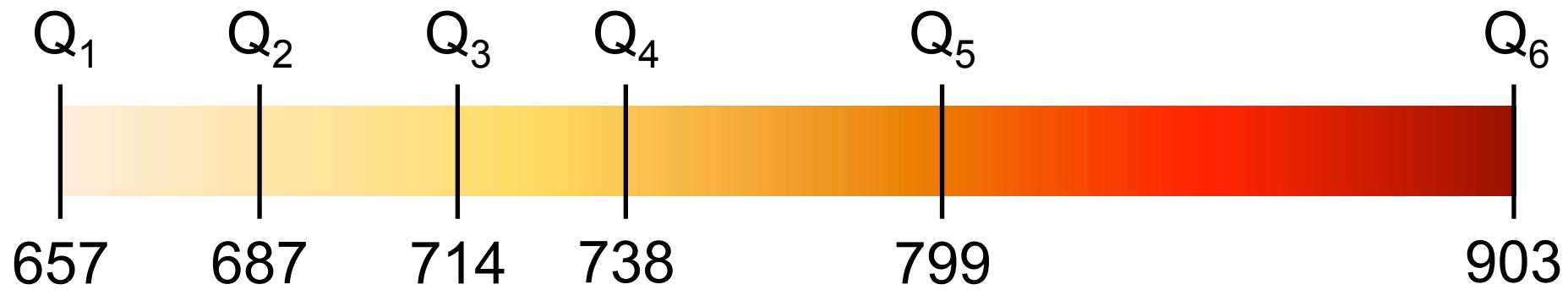
→ Bins containing similar values will have similar colors

**N.B.** There is nothing objective about color spacing.

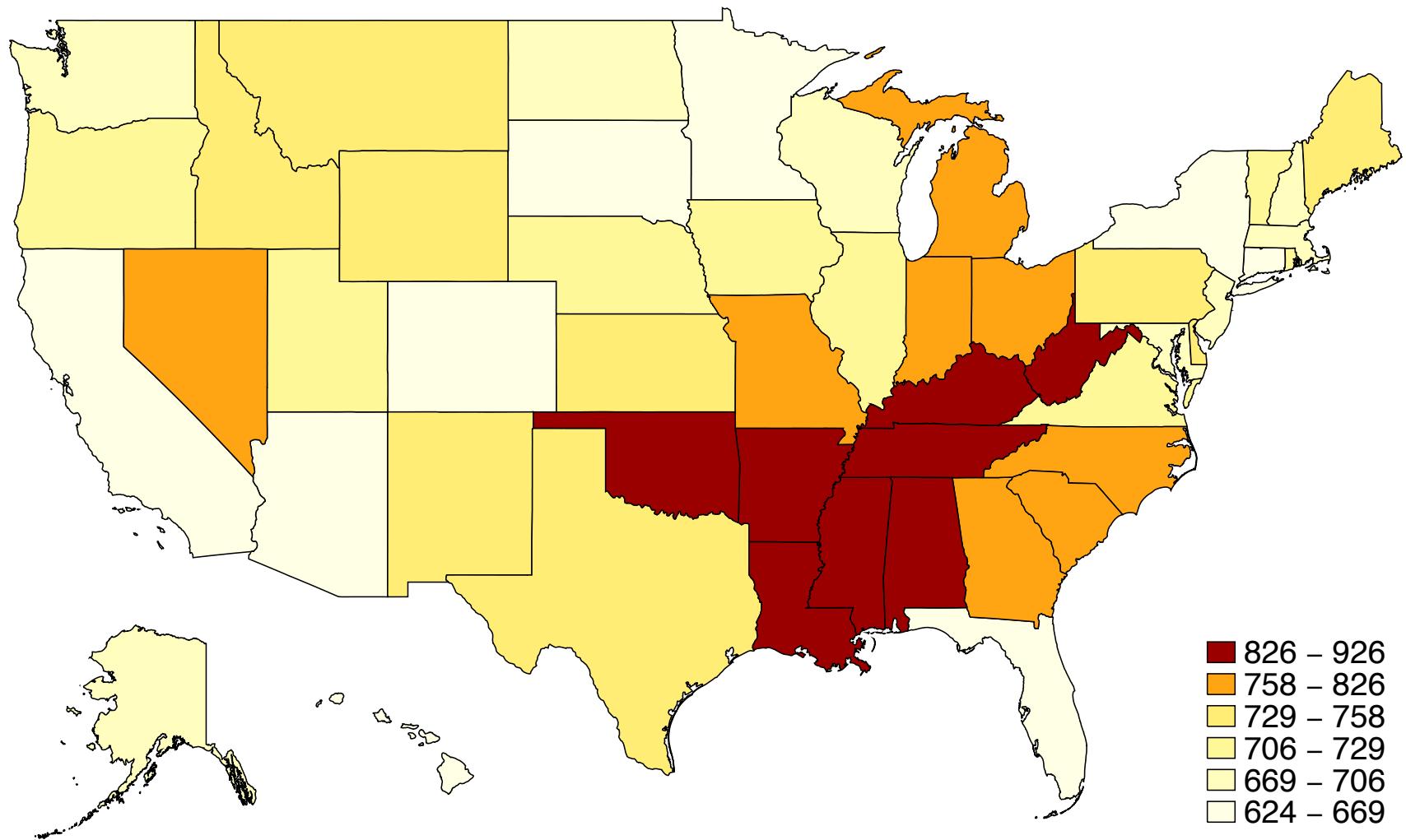
Proportionally-spaced colors on one color spectrum are equivalent to equally-spaced colors on a different spectrum.



. maptile mort\_white, geo(state)



. maptile mort\_white, geo(state) propcolor



- `maptile mort_white, geo(state) propcolor`

# Equal-spaced bins: directly represent values

- **Equal-sized** bins split the data into quantiles.
- **Equal-spaced** bins split the data into fixed ranges.

AZ

DE

CA HI

AK NJ

IL RI

ID NM

GA NV

AL MS

CO MN

MD ND

IA UT

KS PA

IN NC

AR OK

CT NY

MA WA

NE VT

ME TX

MI OH

KY TN

FL SD

NH WI

OR VA

MT WY

MO SC

LA WV

 $Q_1$  $Q_2$  $Q_3$  $Q_4$  $Q_5$  $Q_6$ 

624

669

706

729

758

826

926

DE

AK

ID OR

AZ MA

IL RI

CA NH

IA UT

CO NJ

KS VT

GA

HI

CT NY

MT VA

ME NC

AL

MN

FL ND

NE WI

MI PA

IN OH

AR

KY OK

SD

MD WA

NM WY

MO TX

NV SC

LA TN

MS WV

 $B_1$  $B_2$  $B_3$  $B_4$  $B_5$  $B_6$  $B_7$ 

624

650

700

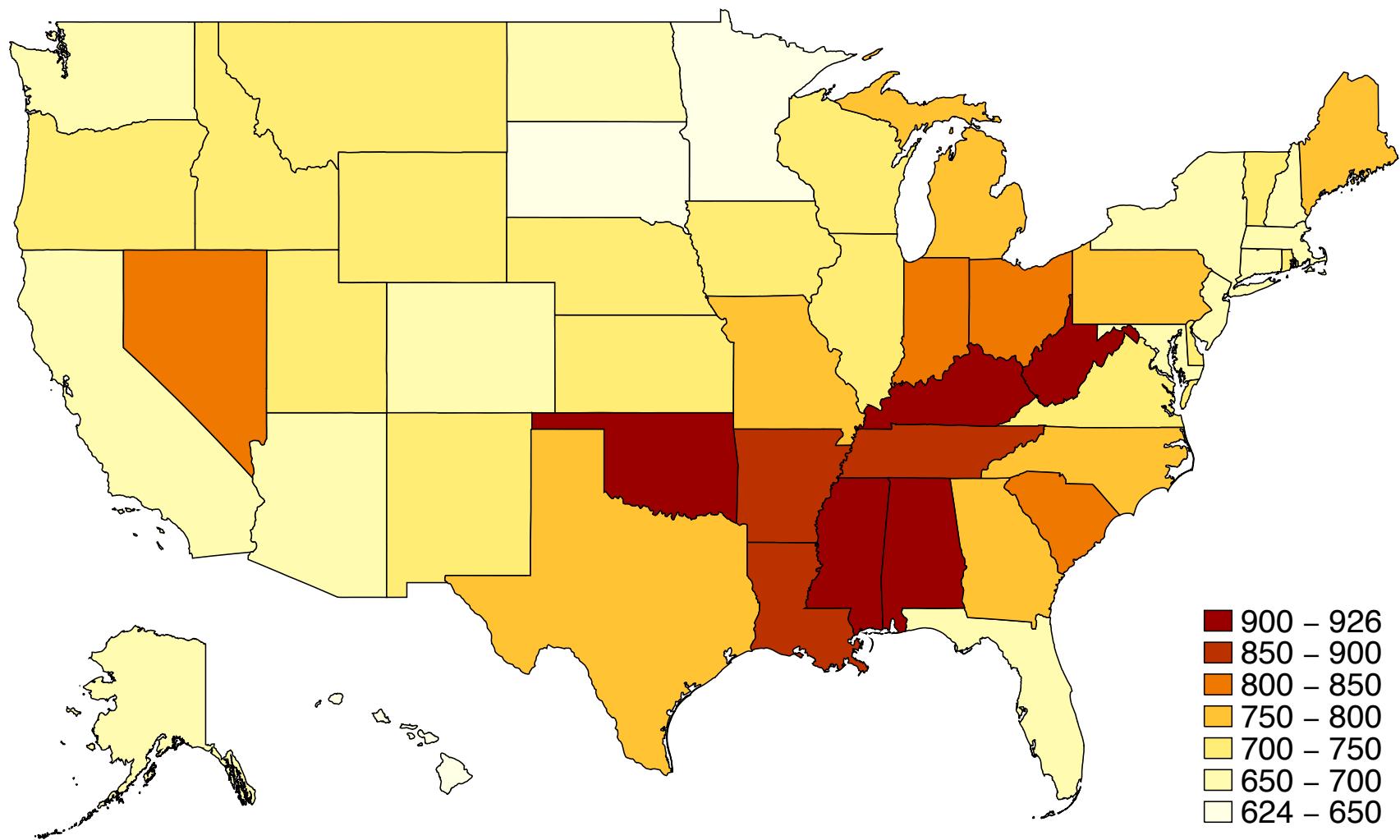
750

800

850

900

926



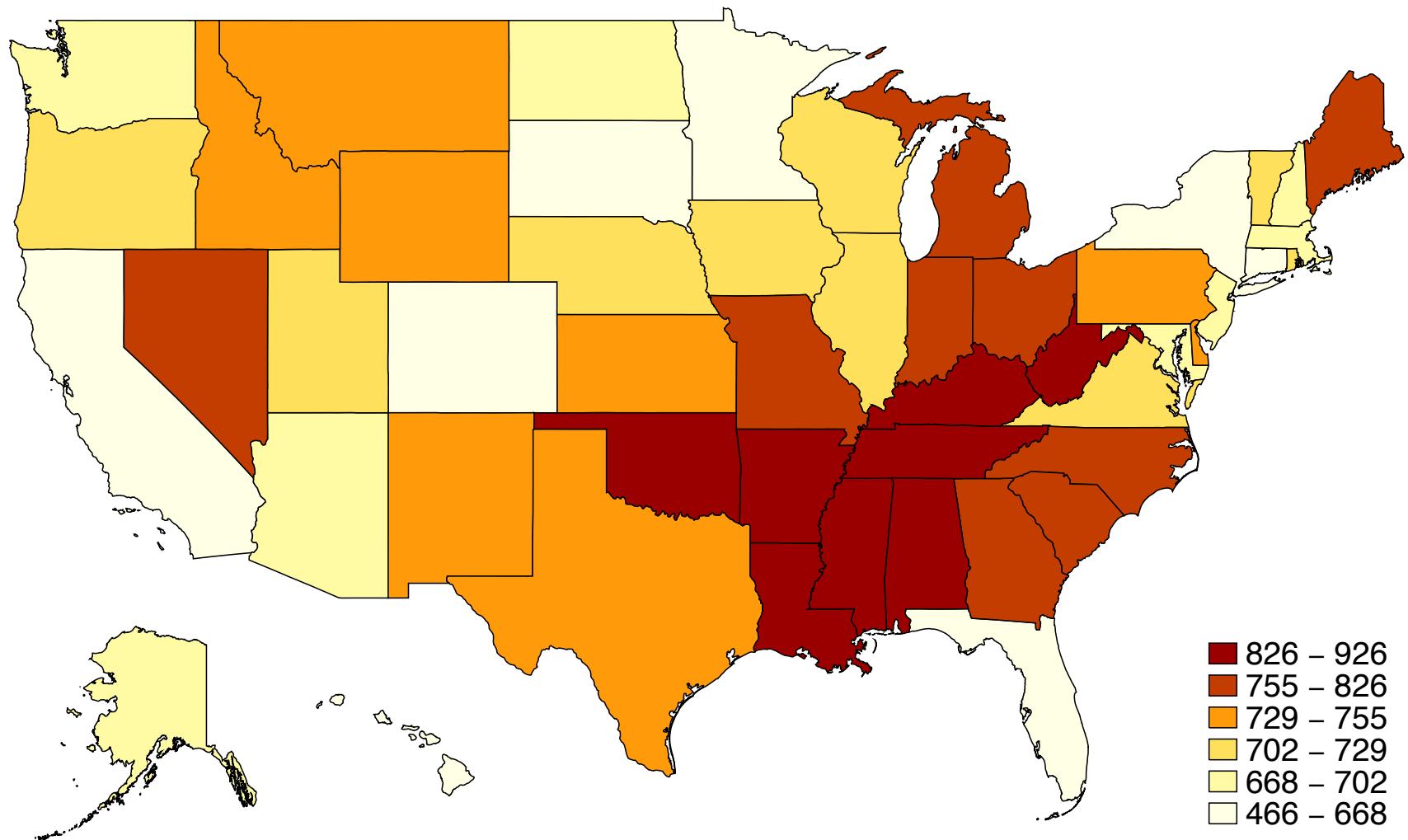
• `maptile mort_white, geo(state) cutvalues(650(50)900)`

# Loops

- Same way you would do any loop in Stata

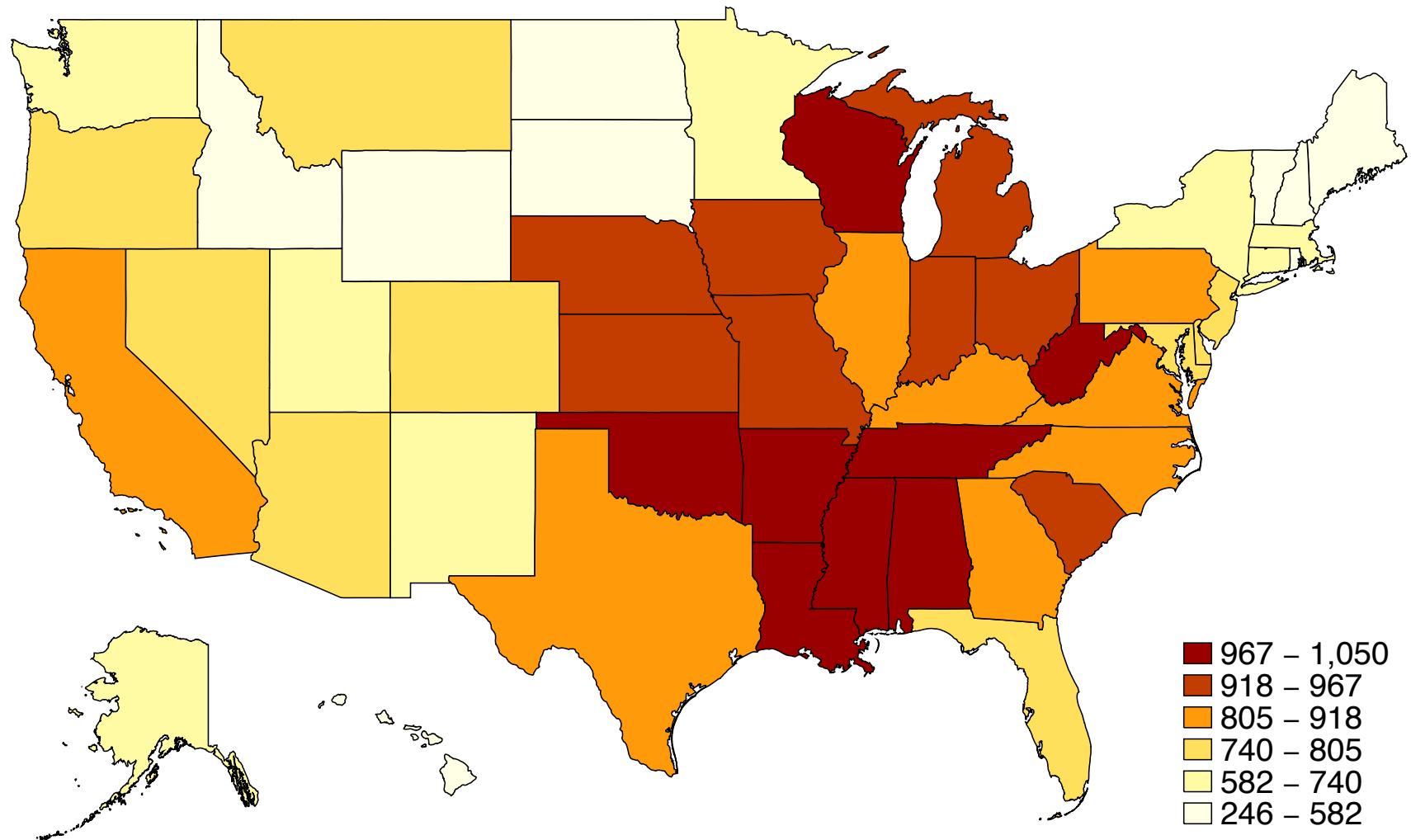
```
foreach race in white black {  
  
    maptile mort_`race', geo(state) ///  
        savegraph(fig/map_mort_`race'.eps)  
  
}
```

# White Mortality Rates



- `maptile mort_white, geo(state)`

# Black Mortality Rates



• `maptile mort_black geo(state)`

# Absolute comparisons between groups

- When each group uses its own bins, the map shows a **relative** comparison between the groups
  - “Where are black Americans worst off, relative to other black Americans?”
  - “Where are white Americans worst off, relative to other white Americans?”
- An **absolute** comparison is also interesting:
  - “How do black Americans fare, relative to white Americans?”
  - To see this comparison, hold the bins fixed.

# Absolute comparisons between groups

- Generate a variable containing the break points using the distribution of white mortality:

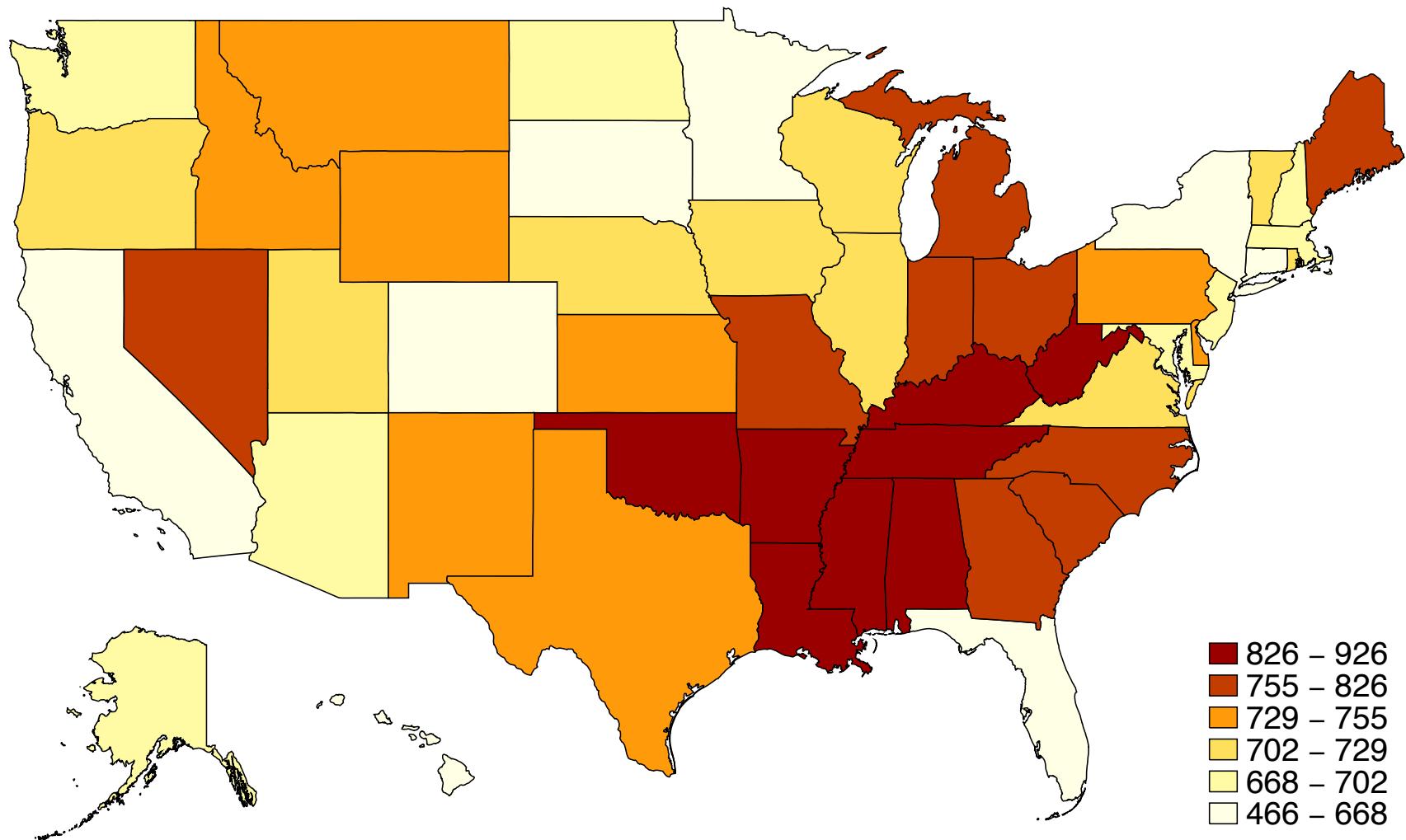
```
pctile mort_white_breaks=mort_white, nq(6)
```

- Map both white and black mortality using the same break points:

```
maptile mort_white, geo(state) cutp(mort_white_breaks)
```

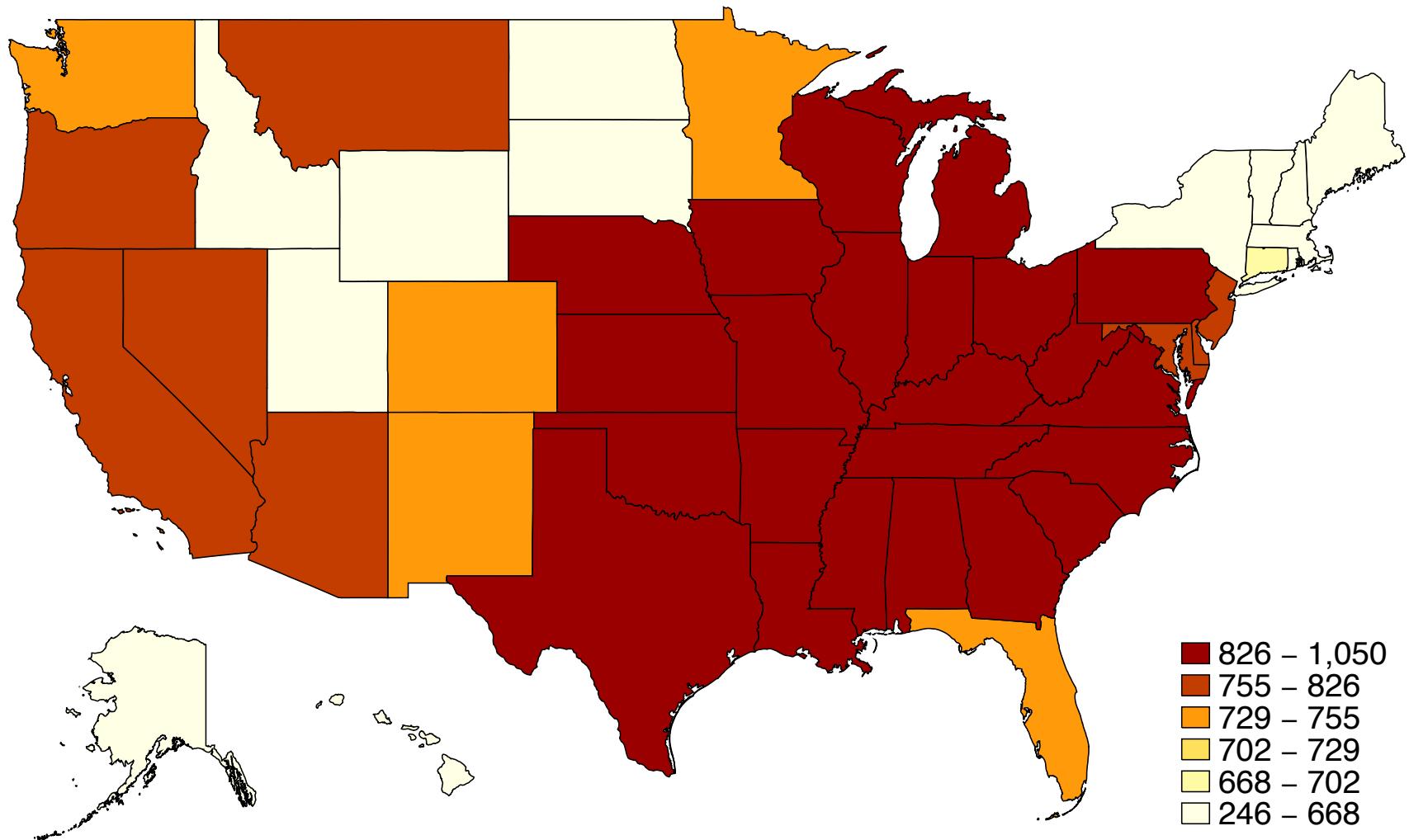
```
maptile mort_black, geo(state) cutp(mort_white_breaks)
```

# White Mortality Rates



• `maptile mort_white, geo(state) cutp(mort_white_breaks)`

# Black Mortality Rates



• `maptile mort_black, geo(state) cutp(mort_white_breaks)`

# Making maps

“More an art than a science.”

- Data values are cardinal
  - Color spectrum is ordinal
- Choice of binning procedure and color spacing  
should depend on the features of the data  
that you want to highlight.

# How maptile works

maptile

Easy to use



Template

spmap

Highly customizable



Information

Data + Shapefile

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Easy to use



Template

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Information

Data + Shapefile

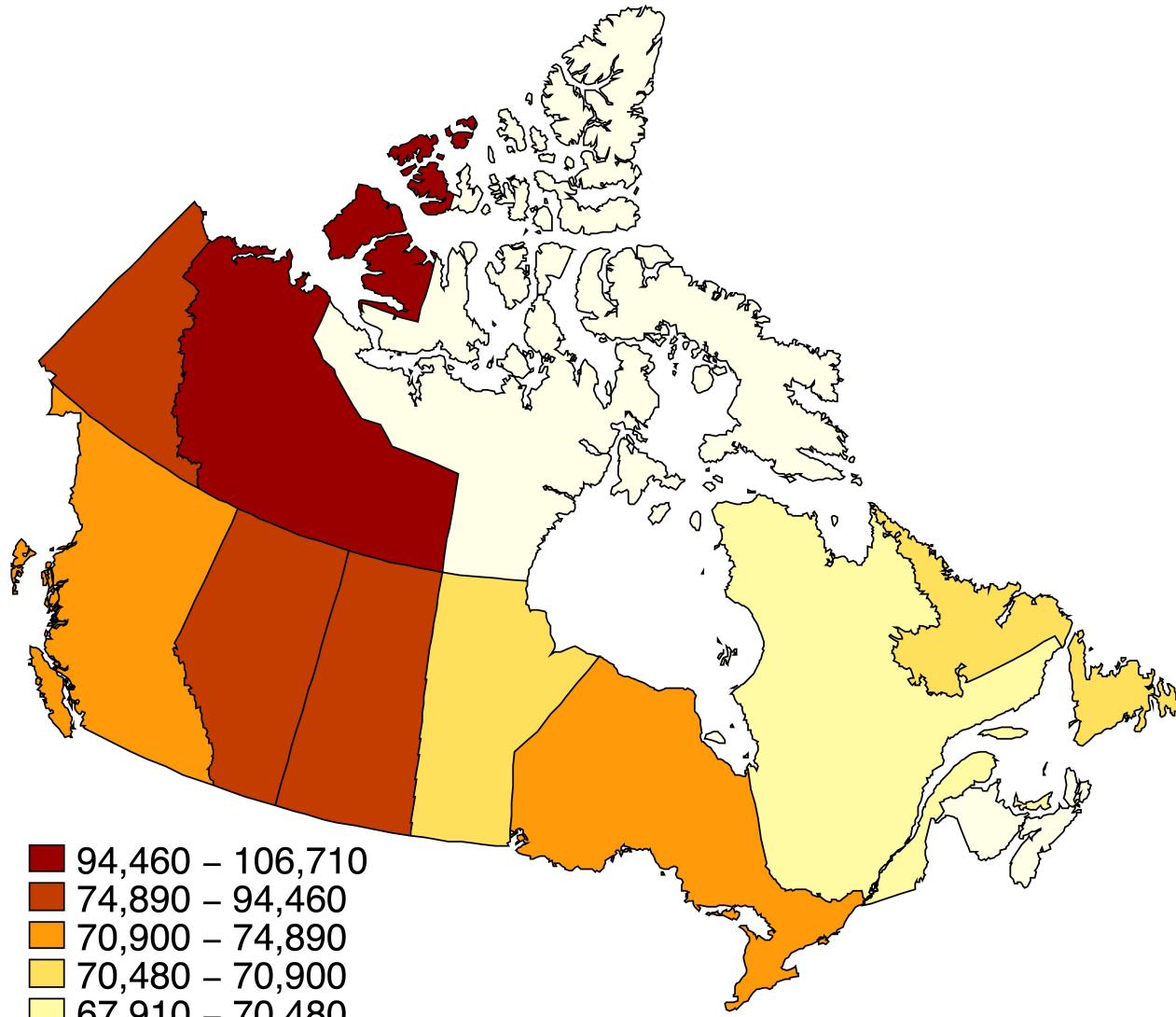
# Making a new template

- There are detailed instructions in the maptile help file
- Requires you to:
  - Find a shapefile for the region you want to map
  - Edit an ado-file that connects maptile to your shapefile
- If you make a new template, consider sharing it!
  - Send it to me and I will post it on the maptile website with your name.
  - With your help, people will be able to quickly make maps of many different places.

# Making a new template

- Useful resources:

- **demo\_maptile.ado** (linked from the help file) provides a base and a step-by-step guide to each line of code you need to edit.
- Download the “Creation Files” for any template posted on the maptile website to see how the shapefile was processed.
- To copy a feature from an existing template, download the template’s zip file and look at the code in the ado-file.
  - (Instead of copying and pasting the `maptile_install` command into Stata, copy and paste the URL in your browser.)



- . maptile median\_income, geo(can\_prov)

**Making maps?**

**No problem.**