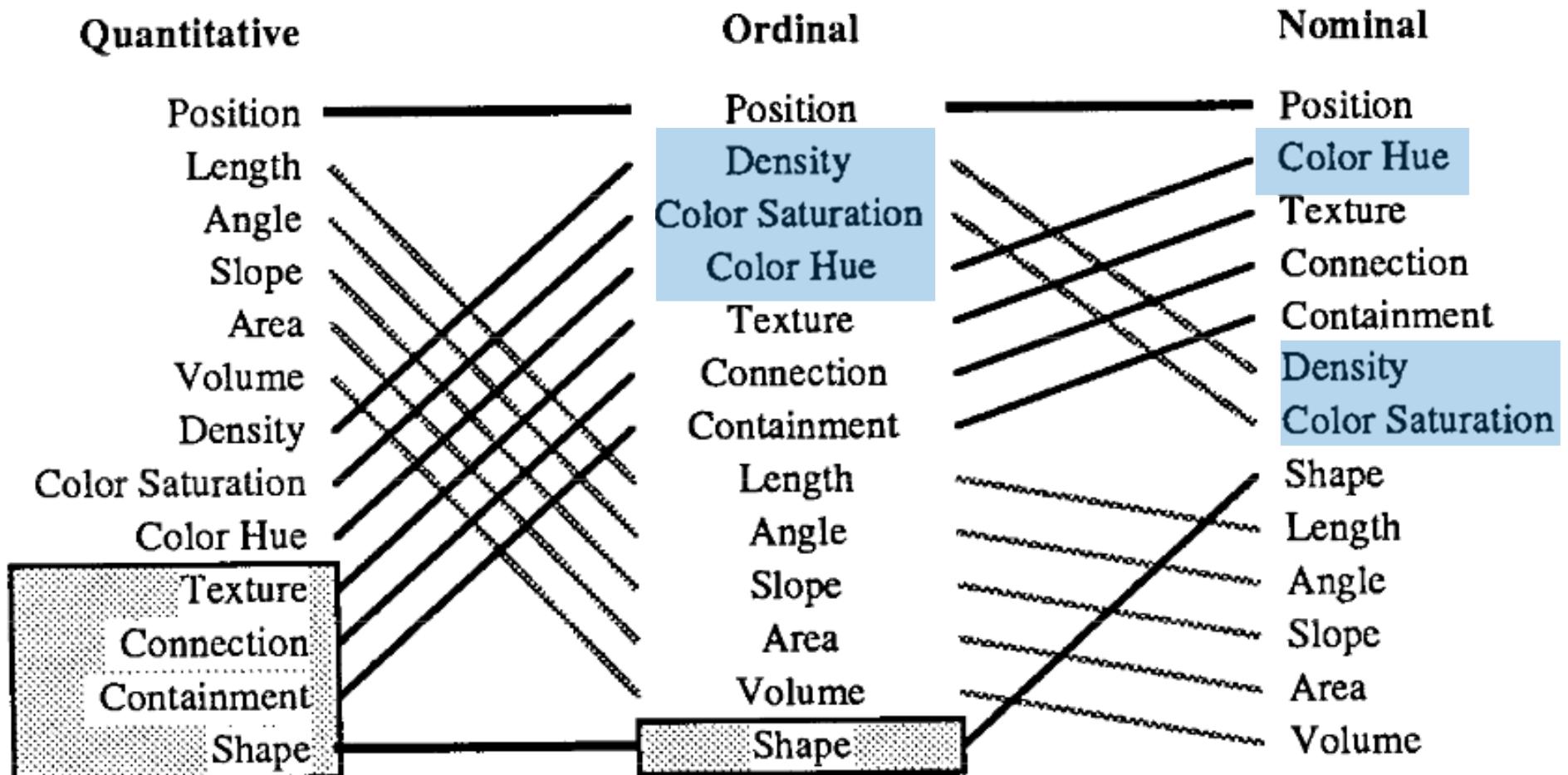


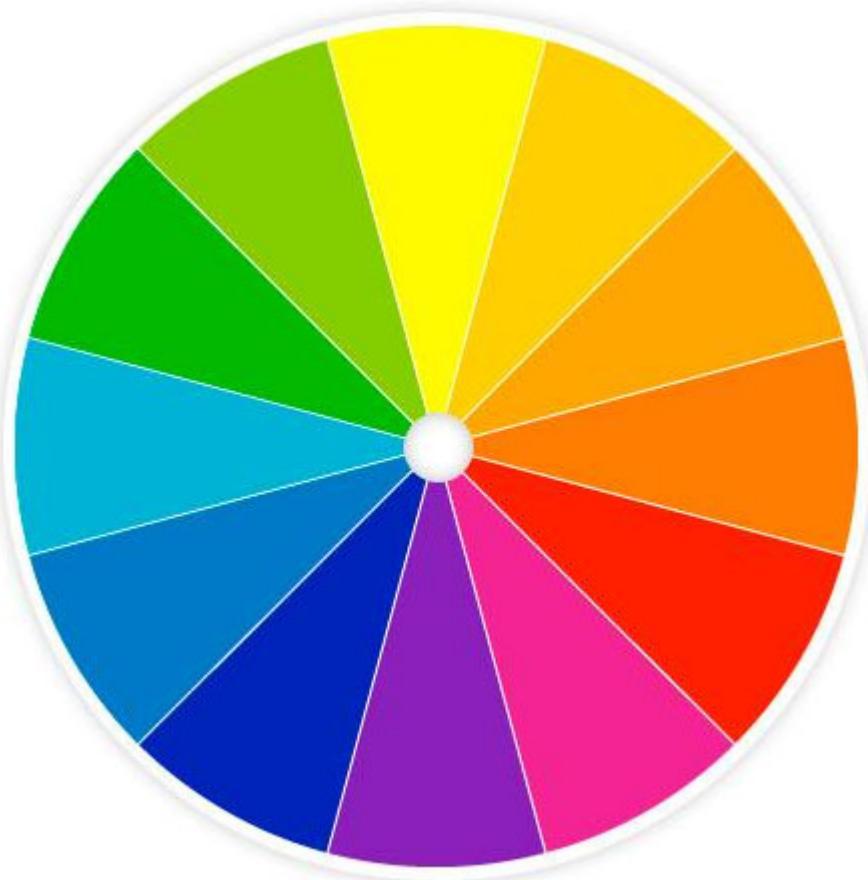
Introduction to Color and Color Maps

Mackinlay, 1986

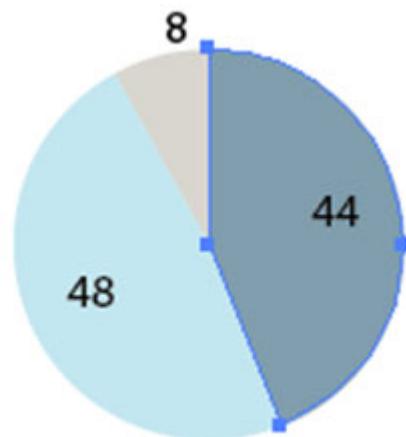
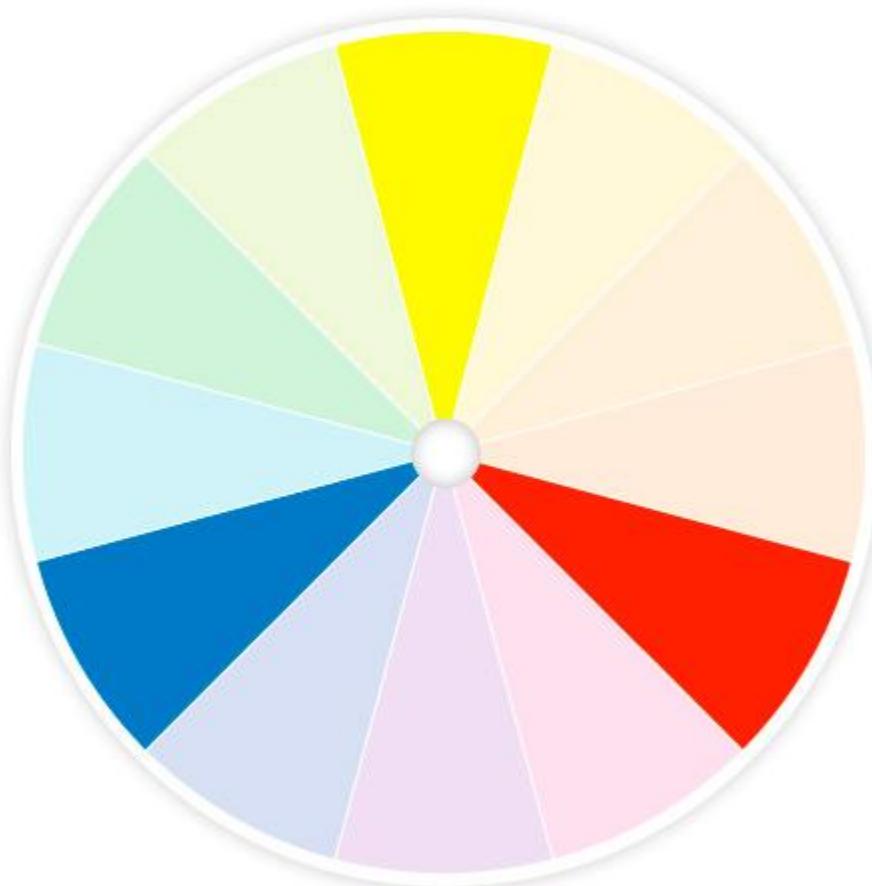


I. Color Channels



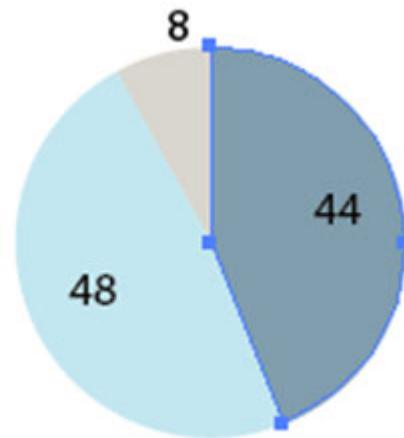
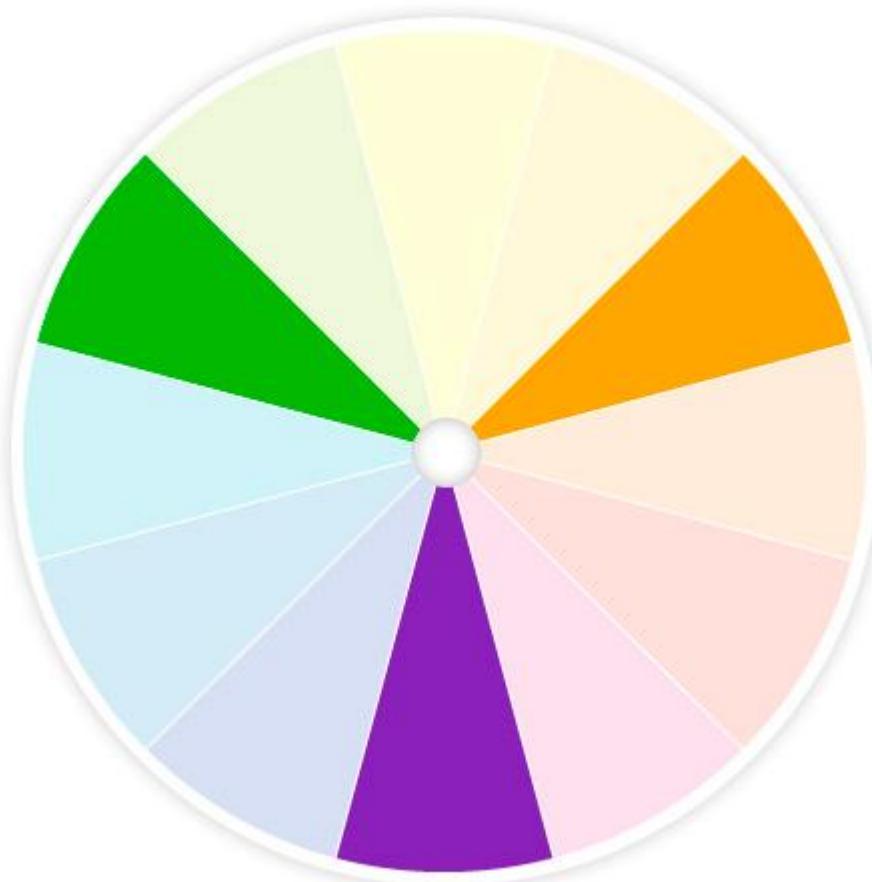


Primary Colors: Red, Yellow and Blue



Secondary Colors: Orange, Green and Violet

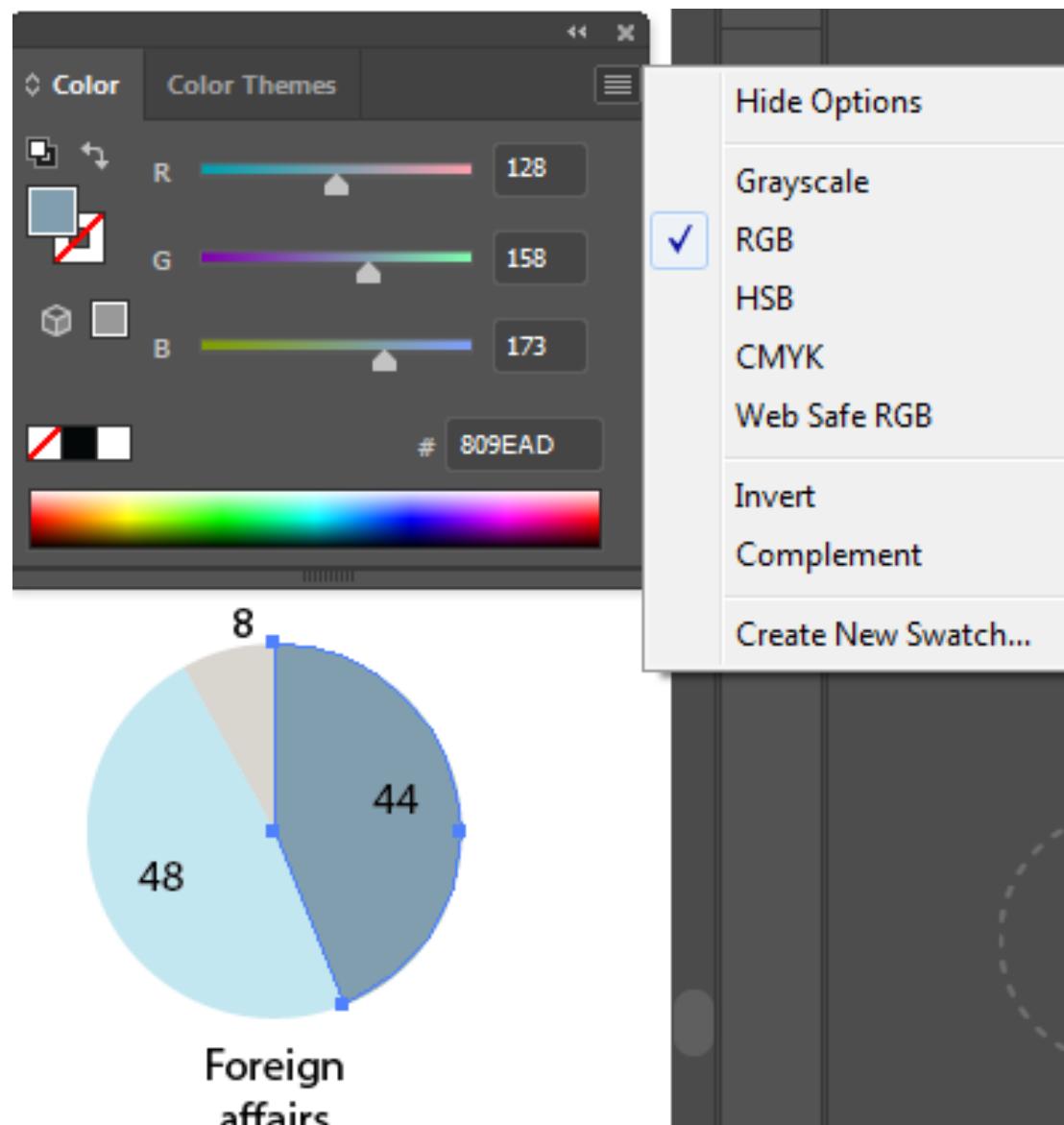
Secondary colors are created by mixing primary colors.



II. Color Models

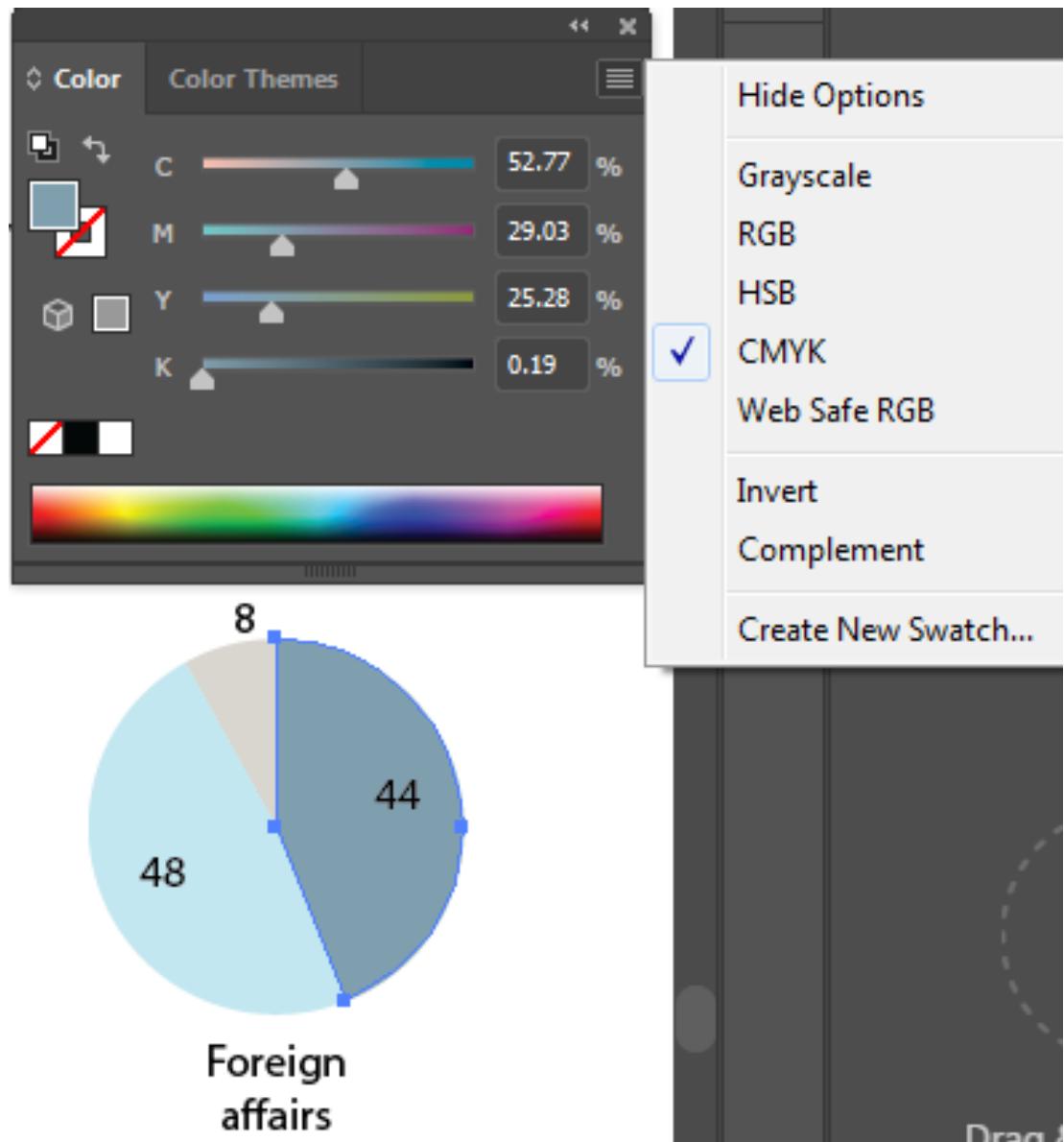
RGB (Red, Blue, Green)

Color channel	Decimal (base 10) value	Hexadecimal (base 16) value
Red	128	80
Green	158	9E
Blue	173	AD



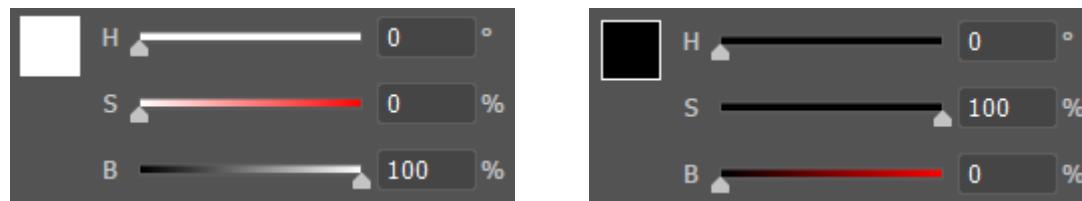
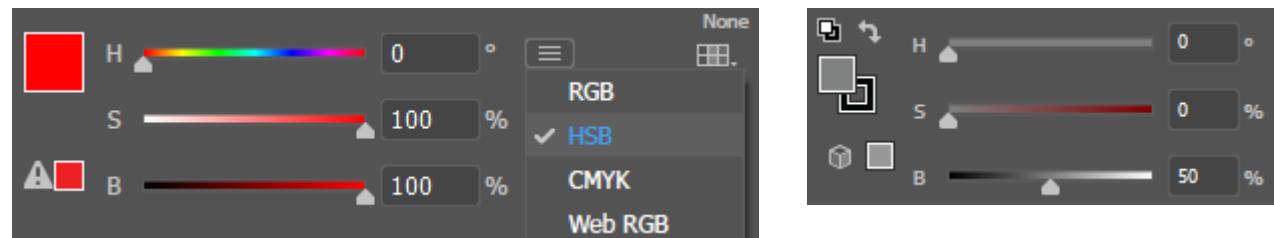
CMYK (Cyan, Magenta, Yellow, Black)

Color channel	CMYK value
Cyan	52.77
Magenta	29.03
Yellow	25.28
Black	0.19

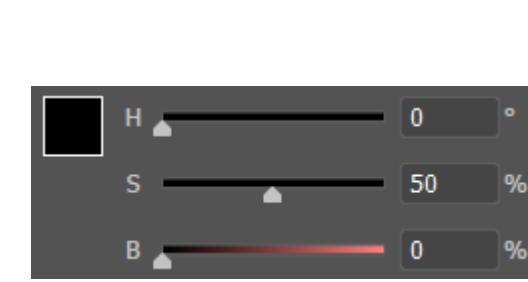
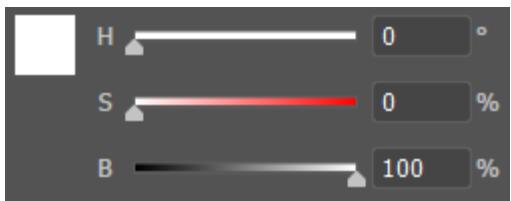
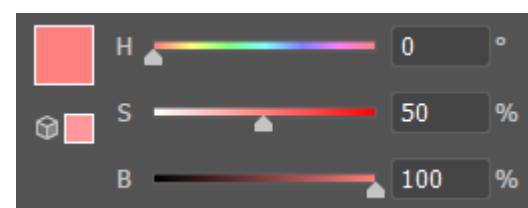
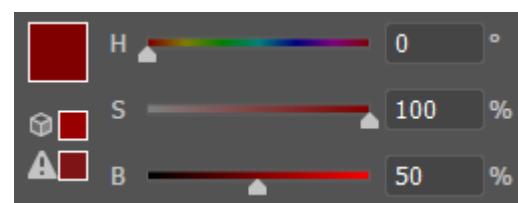
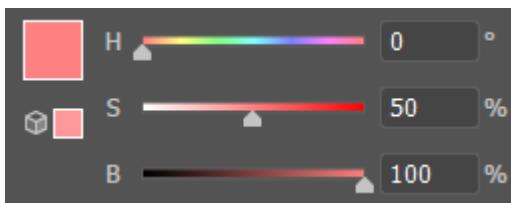
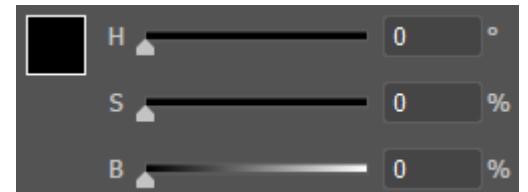
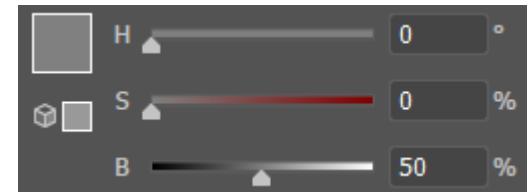


Hue, saturation, and luminance (or “brightness”)

- S indicates “strength” of a color, that is the amount of gray added relative to the hue (0% = gray; 100% = complete saturation; no gray)
- B indicates “brightness” (0% = black; 100% = white)

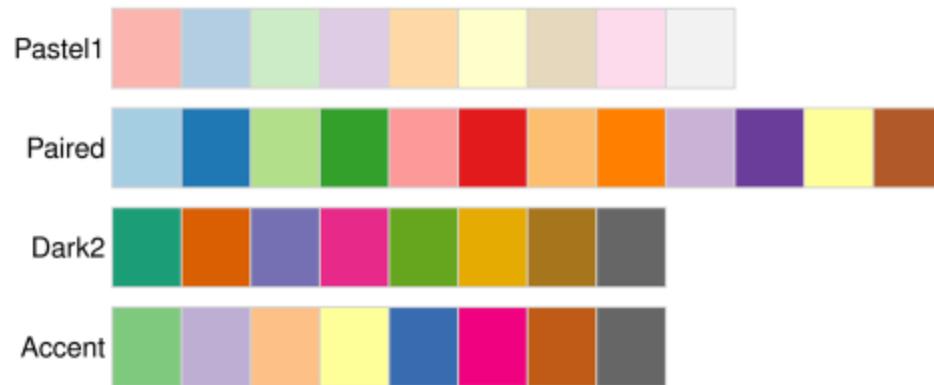


S and B values interact with each other and with hue values



III. Varieties of Color Maps

Categorical palettes



- High differentiation among categories can rely on opponent process channel hues, e.g., red, green, yellow, and blue
- Additional hues, e.g., secondary hues: purple, orange, brown, pink
- Saturation level desired can depend on size of mark

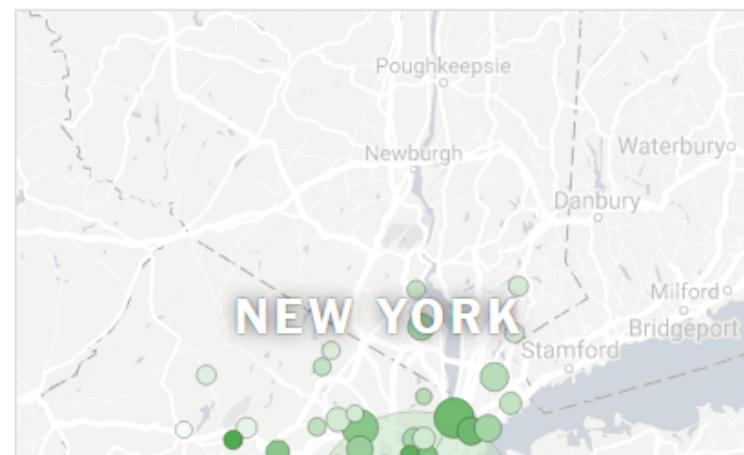
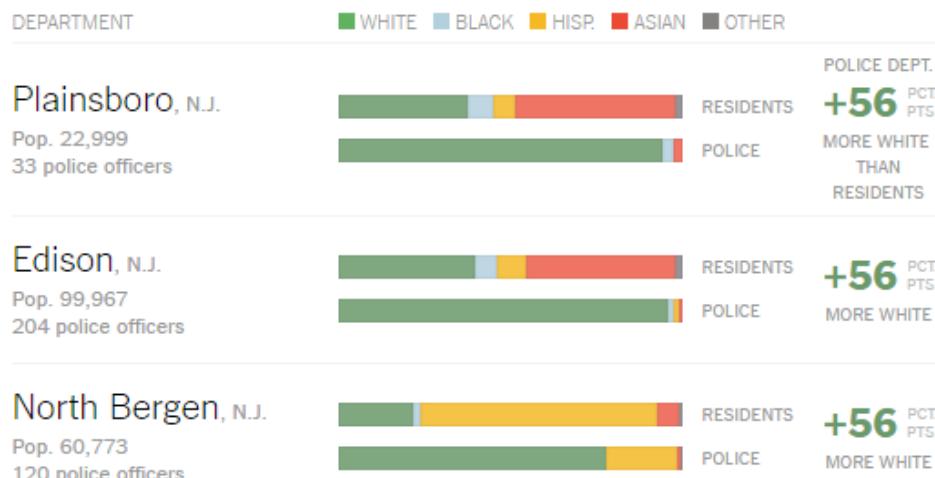
The Race Gap in America's Police Departments

By JEREMY ASHKENAS and HAEYOUN PARK UPDATED April 8, 2015

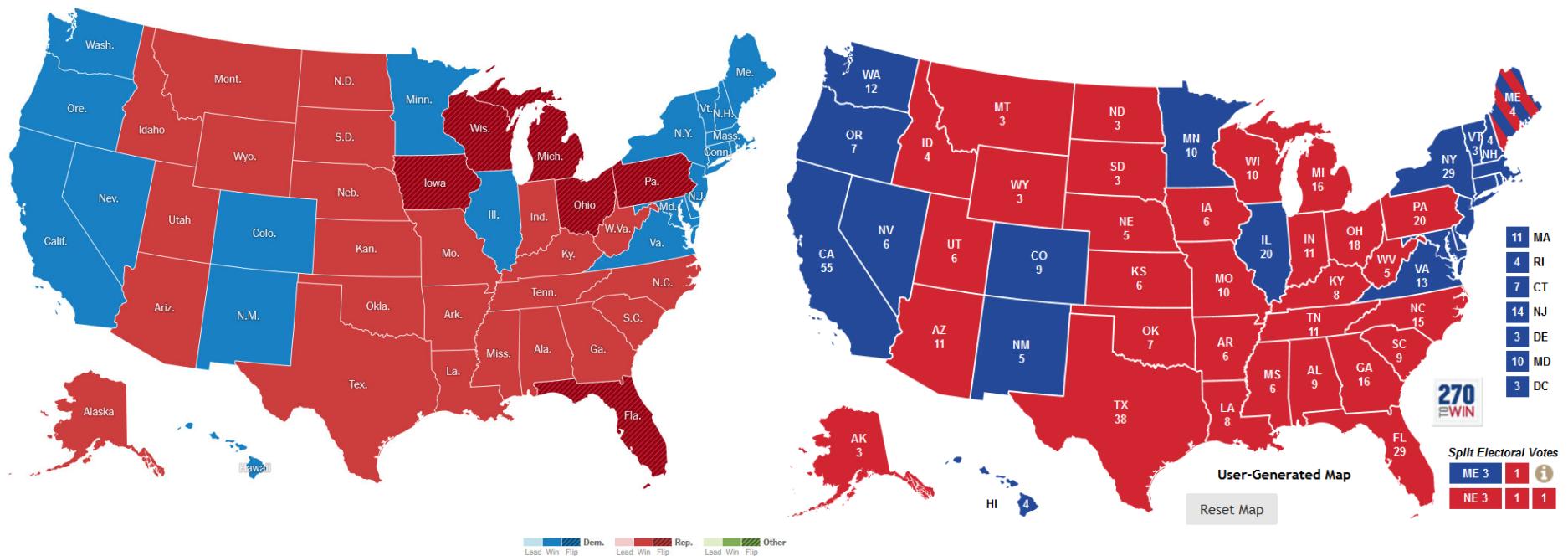
In hundreds of police departments across the country, the percentage of whites on the force is more than 30 percentage points higher than in the communities they serve, according to an analysis of a government survey of police departments. Minorities make up a quarter of police forces, according to the 2007 survey, the most recent comprehensive data available. Experts say that diversity in the police force increases a department's credibility with its community. "Even if police officers of whatever race enforce the law in relatively the same way, there is a huge image problem with a department that is so out of sync with the racial composition of the local population," said Ronald Weitzer, a sociologist at George Washington University. Listed below are local police departments from 17 metropolitan areas, sorted so that departments with the largest percentage-point differences of white officers to white residents are at the top.

New York

New York City's police department is among a number of large departments where court-ordered mandates have led to more racial diversity. A federal judge ruled in 1978 that the city could not use its Civil Service exam to select new police recruits, leading to measures that increased the hiring of black and Hispanic officers. In some New Jersey towns, like Plainsboro, Dover and Edison, Hispanics and Asians are significantly underrepresented.



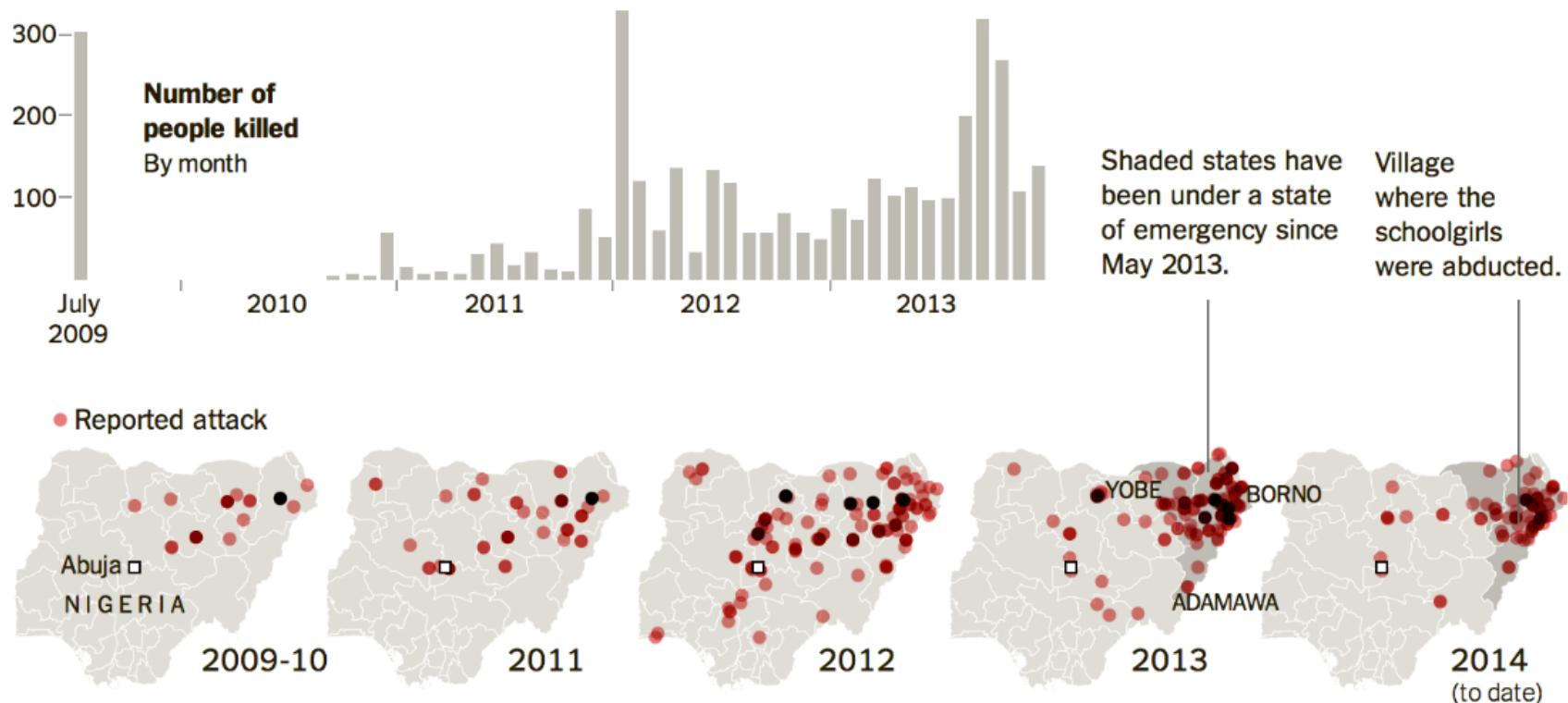
Less vs. more saturated colors for large areas



Sources: www.nytimes.com/elections/results/president and www.270towin.com/maps/270towin-election-night-map 13

Five Years of Attacks by Boko Haram in Nigeria

Boko Haram, the radical group that abducted more than 200 girls from a Nigerian village in April, has steadily increased the frequency and brutality of its attacks since its formation in 2002.

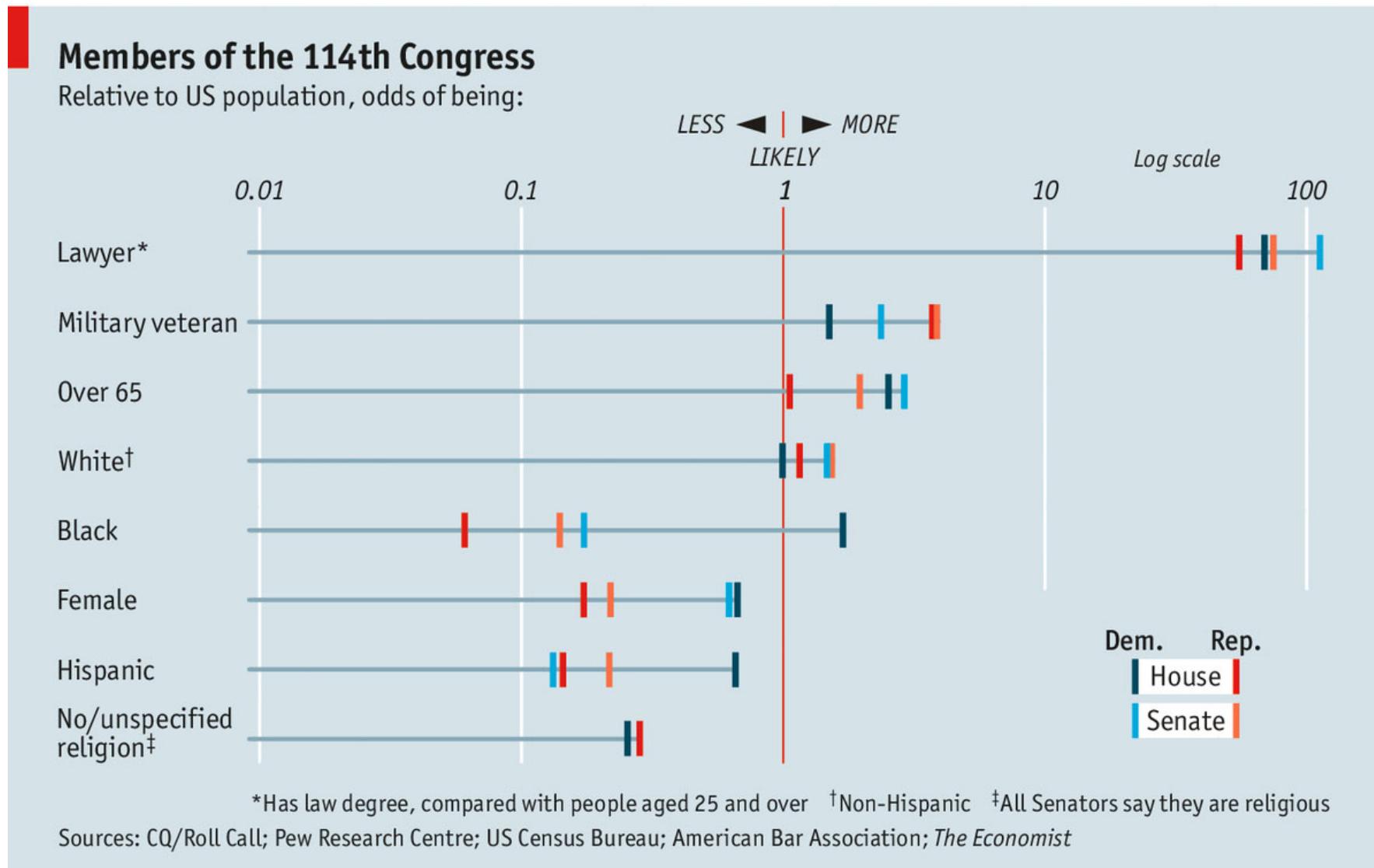


In 2009, the group attacked a mosque and a police station, killing about 55 people. The next day, Nigerian security forces retaliated with a brutal crackdown. The group went underground, re-emerging with sporadic attacks in the second half of 2010.

Boko Haram greatly expanded its operations between 2011 and 2012, but scaled back in 2013 after Goodluck Jonathan, Nigeria's president, targeted the group in the three states where it is primarily based.

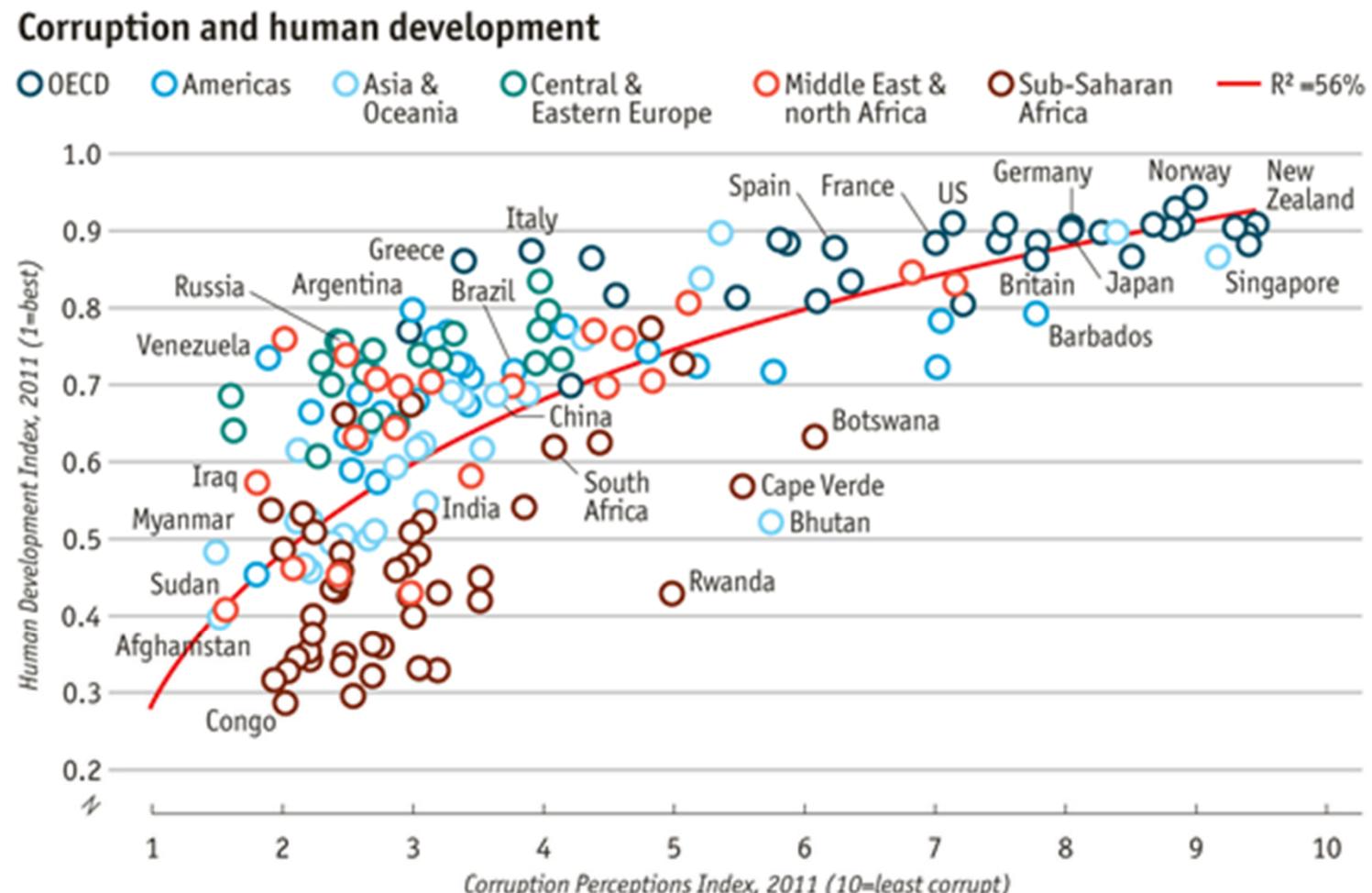
Though the government operation may have limited the group's reach, Boko Haram has increased the frequency and intensity of its attacks in the states of Borno and Yobe, and caused large casualties in the capital, Abuja.

High saturation for small marks



Source: <http://www.economist.com/news/united-states/21637419-how-politicians-are-unlike-america>

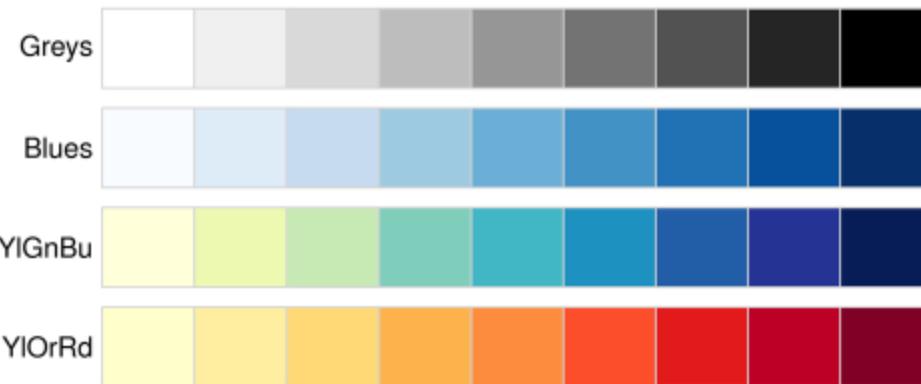
High saturation for small marks



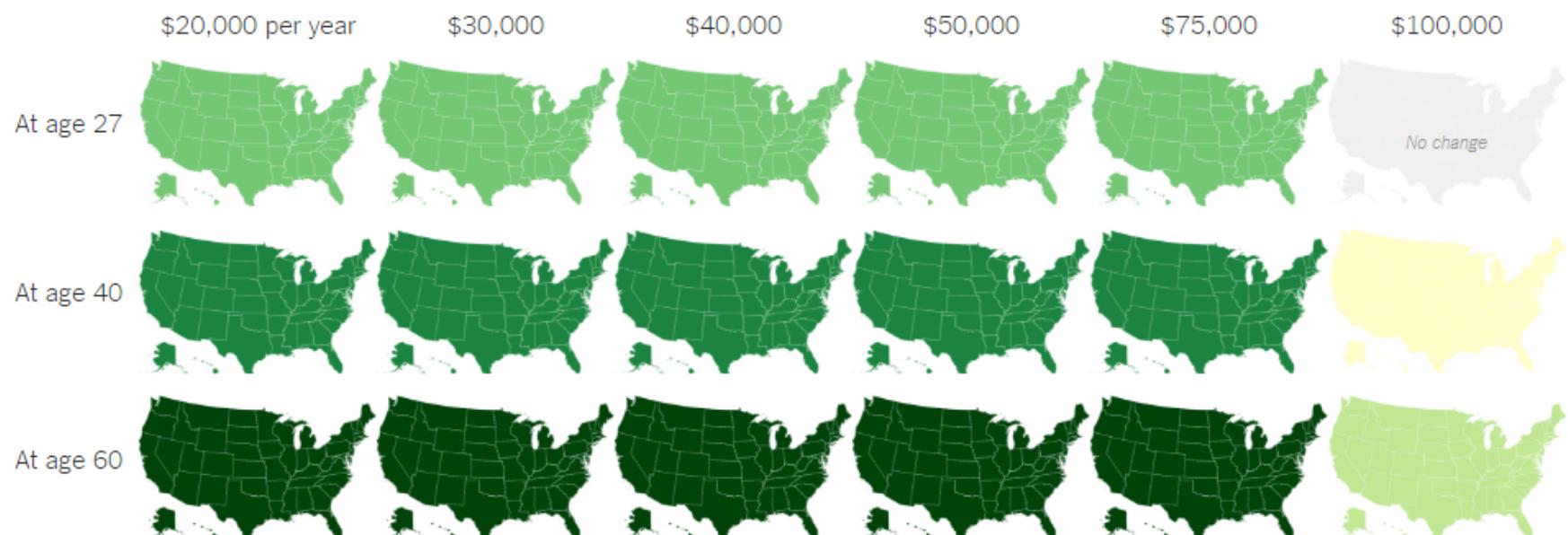
Sources: Transparency International; UN Human Development Report

Source: <http://www.economist.com/node/21541178>

Sequential palettes



Five categories

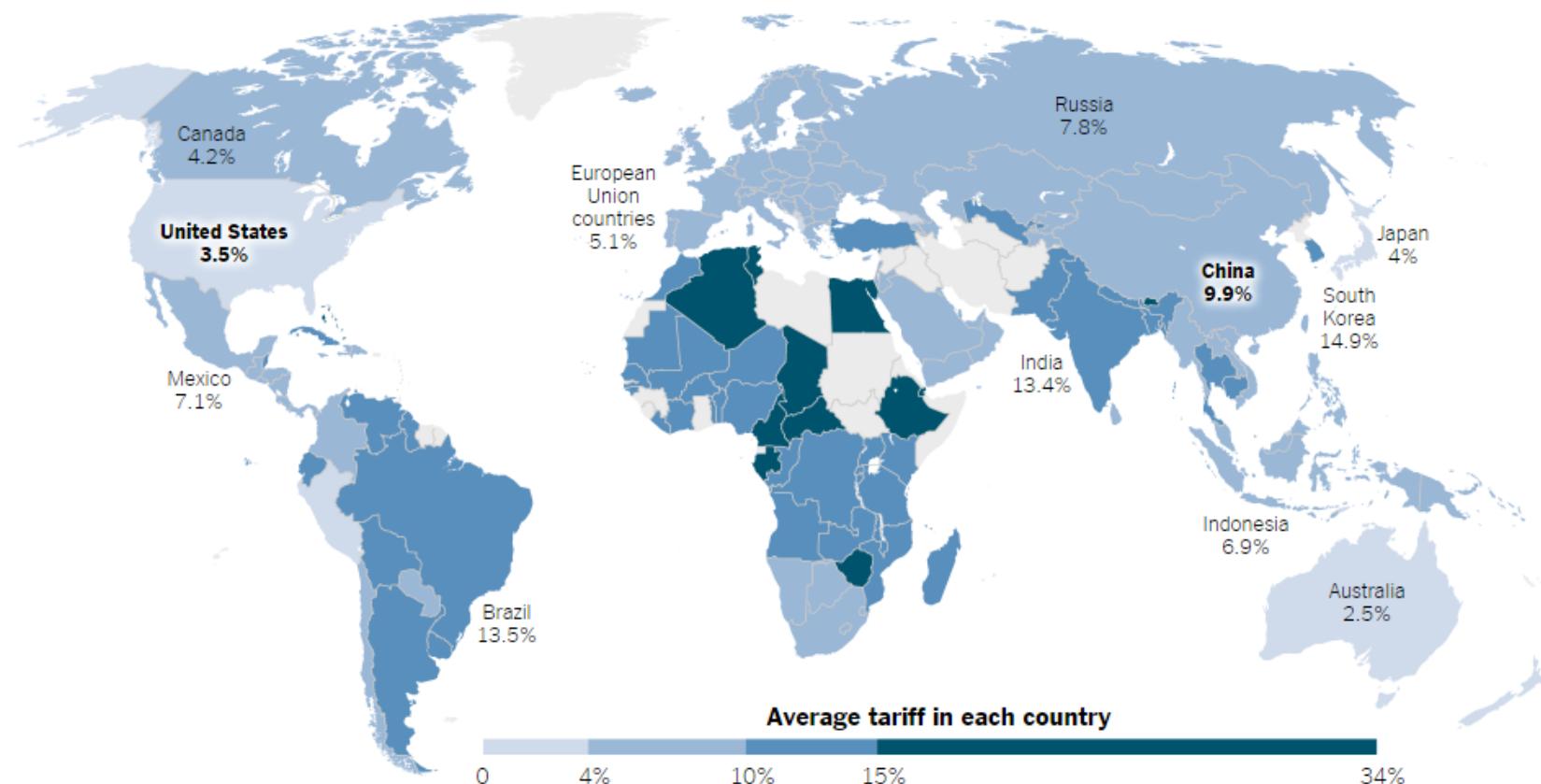


Source: <https://www.nytimes.com/interactive/2017/03/08/upshot/who-wins-and-who-loses-under-republicans-health-care-plan.html>

Building Trade Walls

Four categories

By KEITH BRADSHER and KARL RUSSELL MARCH 7, 2017



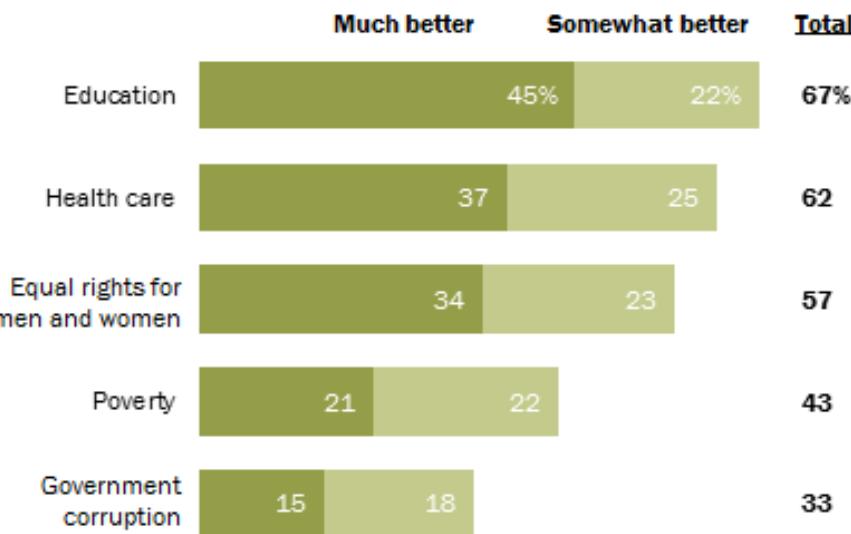
Source: World Trade Organization

Source: <https://www.nytimes.com/interactive/2017/business/trade-china-protectionism.html>

Two-thirds say education will be better for future generations

Two-thirds say education will be better for future generations

When children today in South Africa grow up __ will be ...

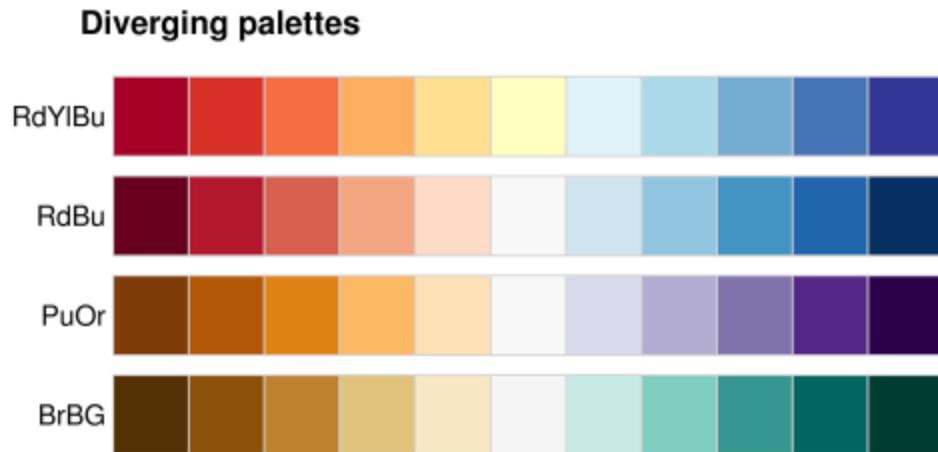


Source: Spring 2016 Global Attitudes Survey. Q66a-d, f.

PEW RESEARCH CENTER

Diverging palettes

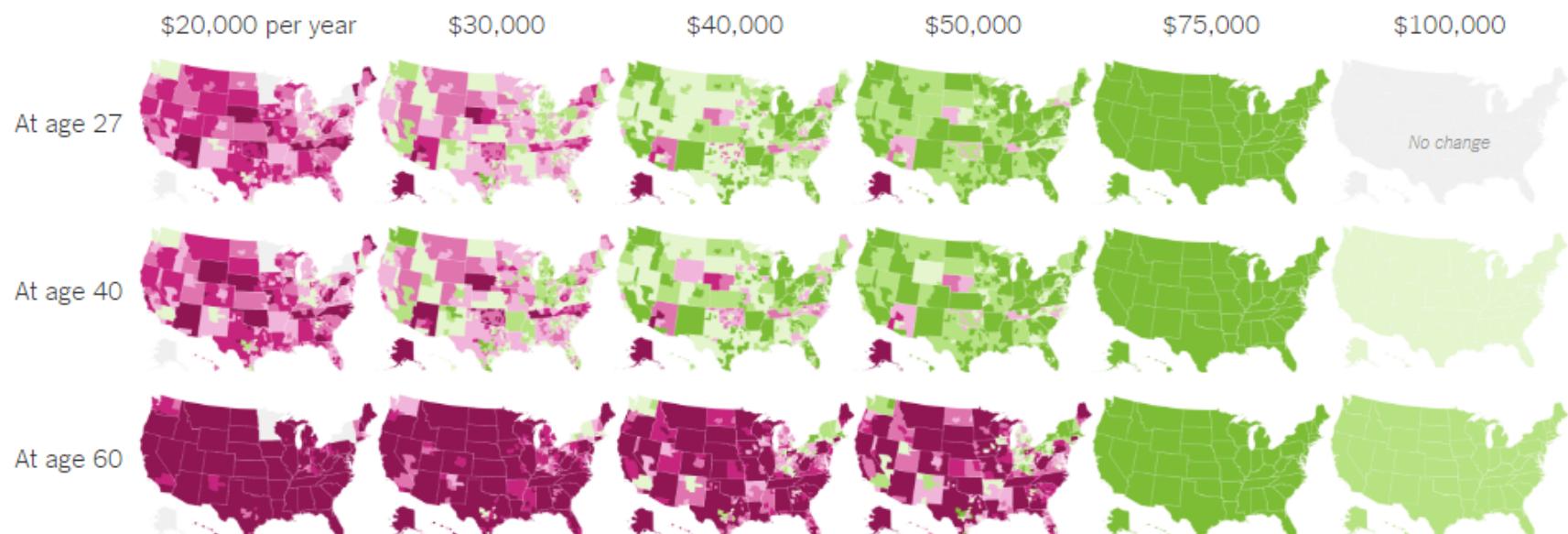
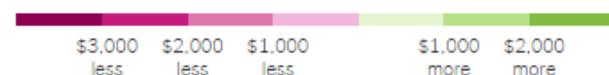
- Encodes, e.g., departures in two directions from a baseline or a central value, such as a mean or a neutral point
- One hue at each endpoint
- Neutral light or high-luminance color at the midpoint
- Decreasing luminance toward the endpoints



Who Wins and Who Loses Under Republicans' Health Care Plan

By KEVIN QUEALY and MARGOT SANGER-KATZ MARCH 8, 2017

Tax credits in the Republican plan compared with Obamacare



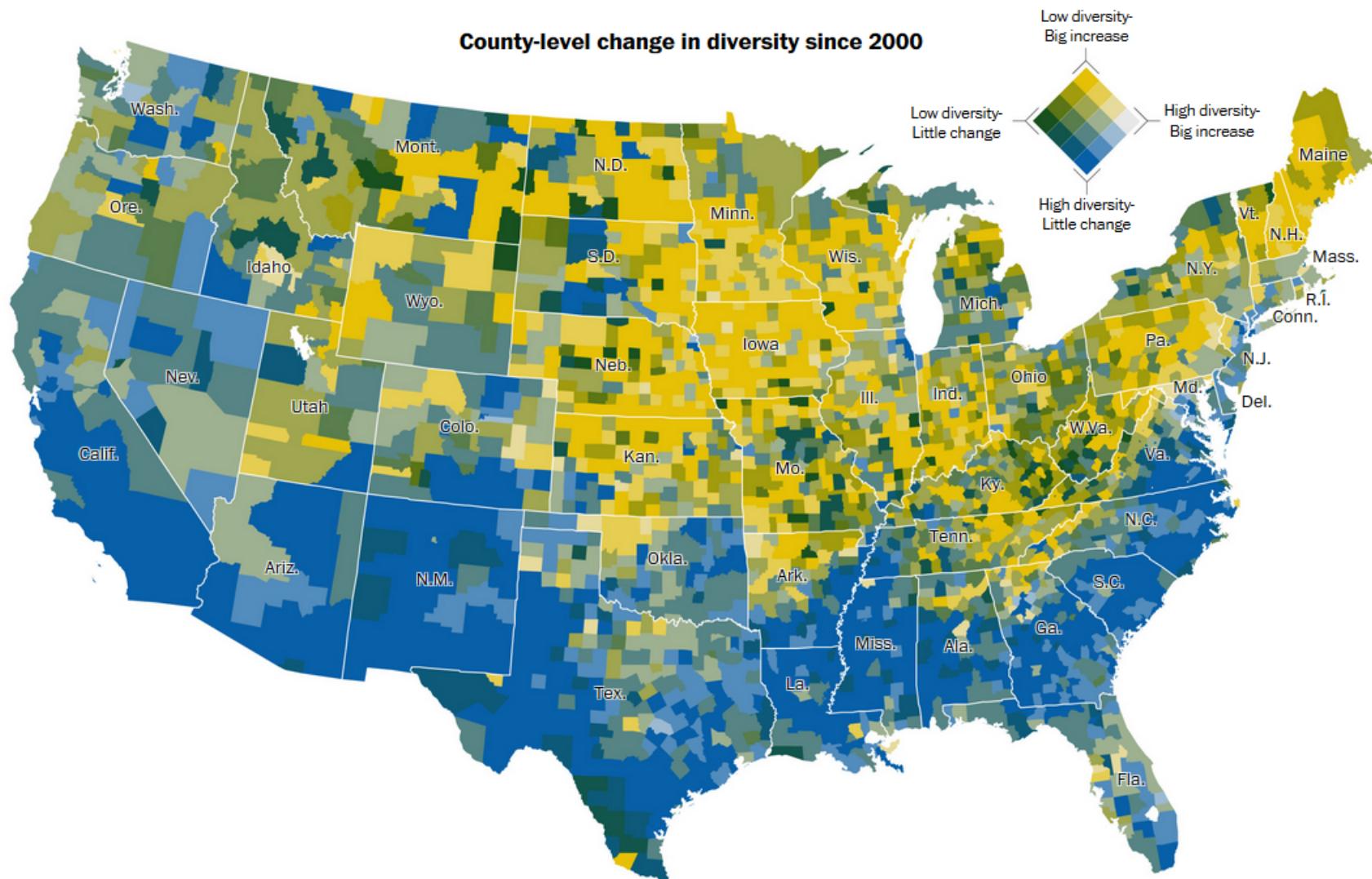
Note: At \$20,000 income in 2020, residents of Alaska would be eligible for Medicaid, and residents of Minnesota and New York would be eligible for the Basic Health Program.

Source: www.nytimes.com/interactive/2017/03/08/upshot/who-wins-and-who-loses-under-republicans-health-care-plan.html

Bivariate color encoding

The increasingly diverse United States of America

The racial and ethnic diversity of communities varies greatly across the country, but rapid change is coming to many of the least-diverse areas.



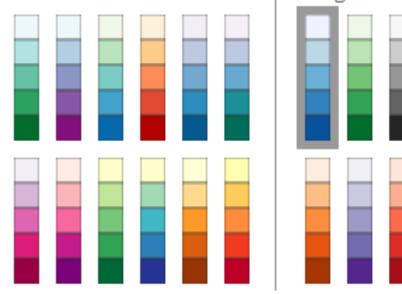
Designed for cartography, but useful for other applications, from Cynthia Brewer of Penn State:

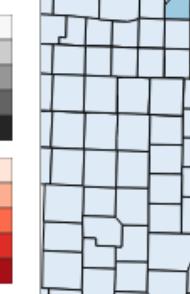
Number of data classes: 3 i

Nature of your data: i

sequential diverging qualitative

Pick a color scheme:

Multi-hue: 

Single hue: 

Only show: i

colorblind safe print friendly photocopy safe

Context: i

roads cities borders 

Background: i

solid color terrain 

color transparency 

how to use | updates | downloads | credits

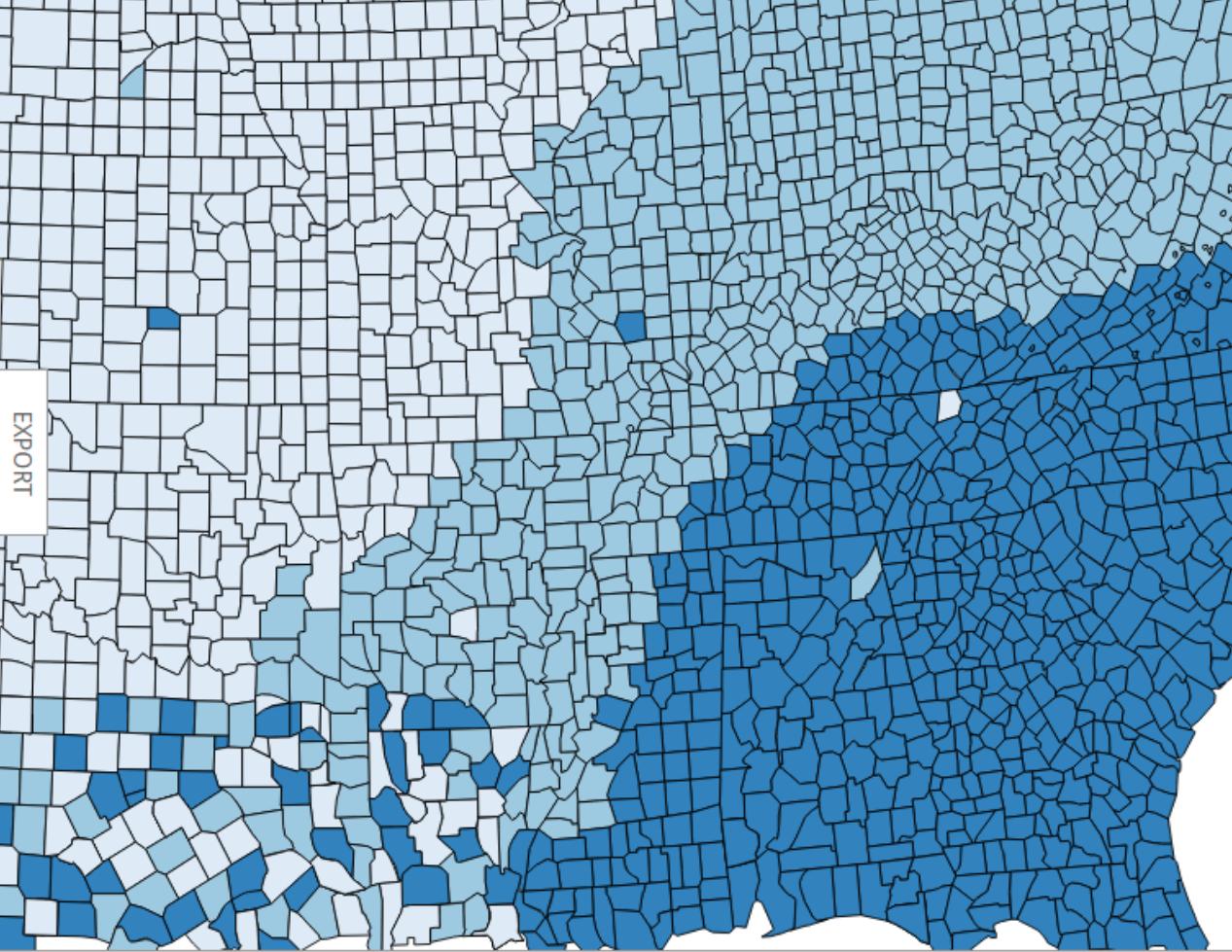
COLORBREWER 2.0
color advice for cartography

3-class Blues

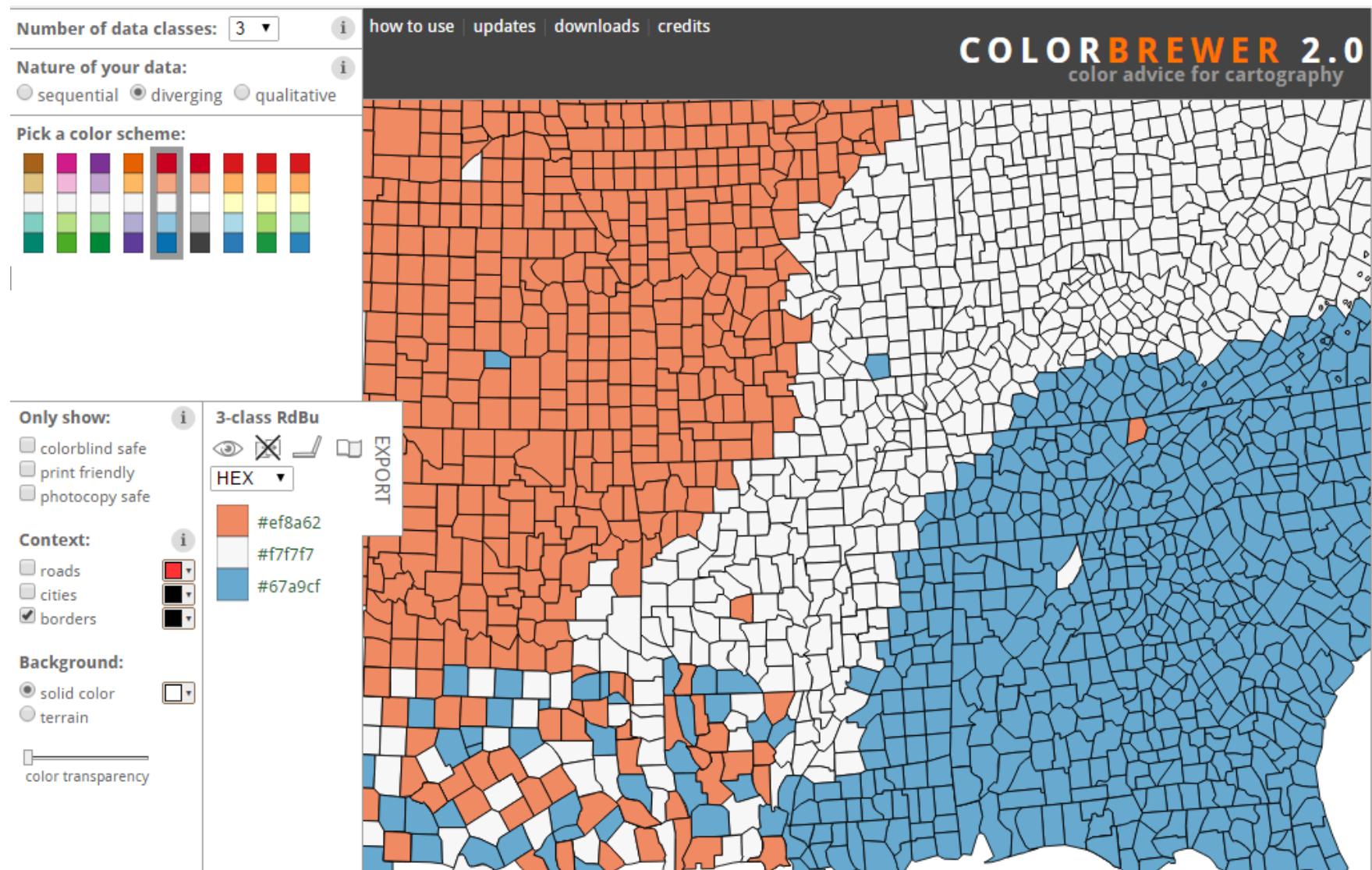
EXPORT

HEX i

#deebf7
#9ecae1
#3182bd



Diverging colors:



Categorical (qualitative) colors:

Number of data classes: 3 ▾ i how to use | updates | downloads | credits

Nature of your data: i

sequential diverging qualitative

Pick a color scheme:



Only show: i

colorblind safe
 print friendly
 photocopy safe

Context: i

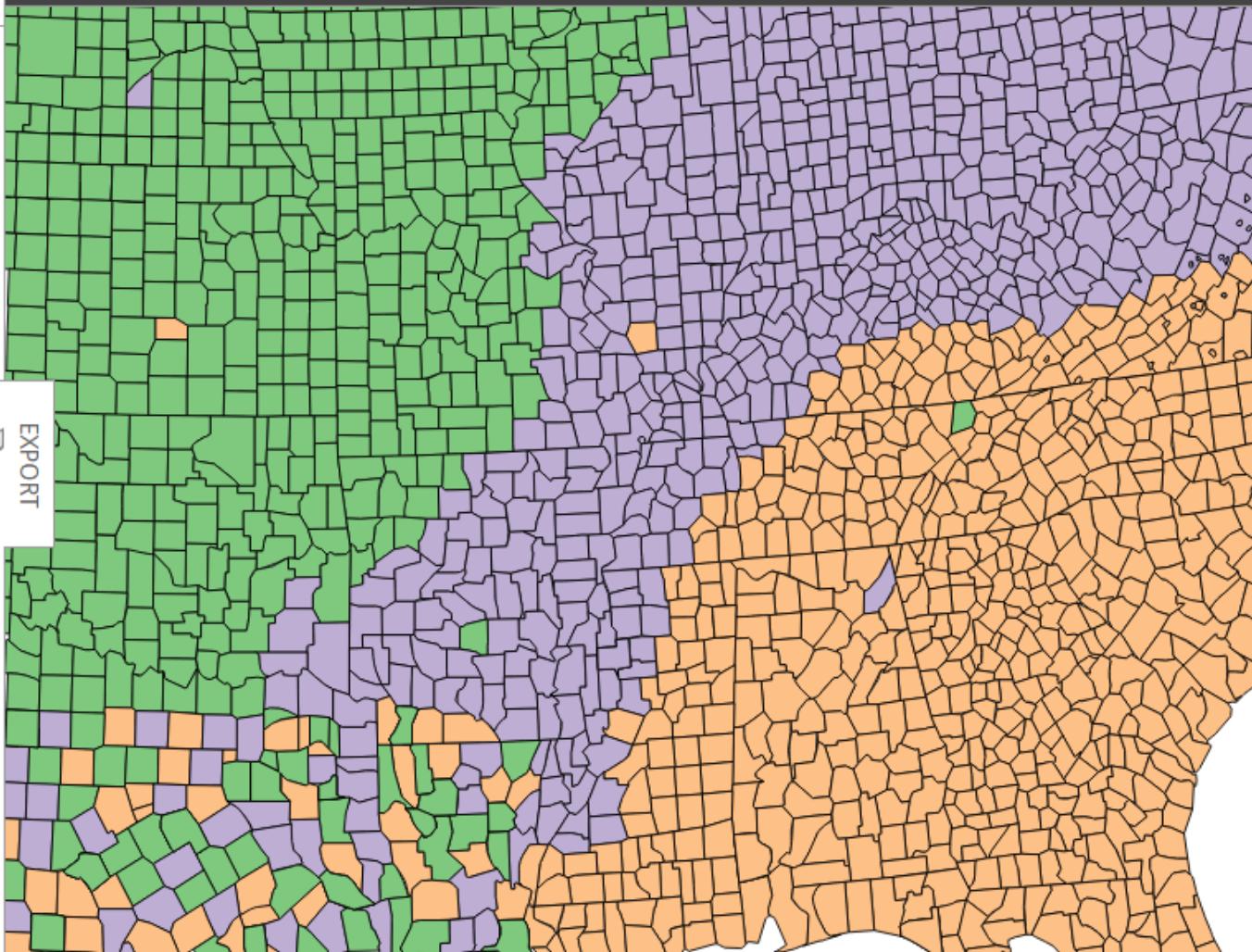
roads
 cities
 borders

Background: i

solid color terrain

color transparency

3-class Accent i



EXPORT

HEX ▾

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