What’s so hard about categorical color?

Maureen Stone
StoneSoup Consulting

Color as label: Identify

Map courtesy of the National Park Service

Gray’s Anatomy

Seattle Real Estate: Around the Sound

Created by Tableau - Visual Analysis for Databases

Accountants use pop-out

Maureen Stone, StoneSoup Consulting
More than pop-out

Analysis of College GPA by Hometown

Control size and transparency

Map for symbols vs. map for navigation

Contrast draws attention
Get it right in black & white

Maps courtesy of the National Park Service (www.nps.gov)

Hue & chroma
Luminance

Design questions

What is the color used for?

What type of imagery needs to be colored?

What can we assume about the display?

What can we assume about the user?

What can we assume about the task?

Perceptual and cognitive factors
Questions
- What are parameters for legibility?
- Can we adapt color to size?
- Richness vs. clarity

Spreading: Adjacent colors blend

Bezold Effect
Luminance contrast + size + font

Legibility and readability are very important
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Design Rules

ISO legibility metrics
- 5:1 (C5 = 67%) comfortable legibility
- 3:1 (50%) minimum legibility
- 10:1 (82%) for small text

Contrast using ΔL* (my rules of thumb)
- 1 is ideally visible
- 10 is easily visible
- 20 is legible for text
- 30 is easily readable
- 60 is robustly readable

<table>
<thead>
<tr>
<th>ratio</th>
<th>ΔL*</th>
<th>On white</th>
</tr>
</thead>
<tbody>
<tr>
<td>3:1</td>
<td>36</td>
<td>64</td>
</tr>
<tr>
<td>5:1</td>
<td>48</td>
<td>52</td>
</tr>
<tr>
<td>10:1</td>
<td>62</td>
<td>38</td>
</tr>
</tbody>
</table>

Categorical Colors

10 basic colors + lightness
Legible dots, lines and text
But not too gaudy for bars

Palette-based UI

1. Select whole palettes
2. Individual colors from different palettes
3. Standard color picker
Not everyone has the same color vision

Selecting Colors for CVD

Emphasize lightness differences
- Those with CVD depend on them

Safe colors
- Blue (but not RGB = 0,0,255)
- One of orange, yellow or brown
- Black, white and gray

Disjoint Categorical Palettes
Color and identity

Map courtesy of the National Park Service

Gray's Anatomy

World Color Survey (WCS)

Eleven basic names in English
- Red, green, blue, yellow, black, white, gray, orange, purple, brown, pink

Color names

Basic names (11)
- Black, white, gray
- Red, green, blue, yellow
- Orange, purple, brown, pink

Tableau names (10)
- Minus black & white
- Plus teal
- Yellow => gold
“Good painting, good coloring, is comparable to good cooking. Even a good cooking recipe demands tasting and repeated tasting while it is being followed. And the best tasting still depends on a cook with taste.”

—Josef Albers