

Overview

Having generated some graphics that use geometry to represent data and relationships we will now vary the way in which colour can be applied to represent numeric and categorical data.

We will use Cynthia Brewer's 'ColorBrewer' schemes that have been designed for visually representing data in maps and other graphics.

Preparation

Unlock the session 2 GUI in **HiDE** to gain access to additional interface functionality.

You will be using the **US ELECTION** data set once again in this session.

Activity 1 – ColorBrewer Schemes

Scheme Types and Preferences

Use **HiDE** to view the three types of ColorBrewer schemes.

- *Categorical Schemes* where data values have no magnitude or order, colour schemes should not imply them.

Hues are used to differentiate between classes where data are nominal or categorical and have no inherent order.
- *Sequential Schemes* for ordered data where the sequence is important and estimation along the range of values needs to be supported.

Lightness and saturation vary consistently across a single hue or a small number of hues that have a natural order.
- *Diverging Schemes* for ordered data where the emphasis is on a mid-range value and variation away from this value towards to extremes needs to be considered.

These are back-to-back sequential schemes that differ in hue and converge to a common central shade.

Can you think of research questions relating to the current data set and our initial visualization that use or could benefit from schemes of each of these types?

<i>Categorical Scheme</i>	
<i>Sequential Scheme</i>	
<i>Diverging Scheme</i>	

Which of the alternative schemes do you prefer in each situation and why?

<i>Categorical Scheme</i>	
<i>Sequential Scheme</i>	
<i>Diverging Scheme</i>	

Changing Colour Palettes

We can use colour to display different data channels or variables within the treemap through the **HIDE** interface. Doing so allows us to compare and relate the data channels encoded through the geometry of the visualization with data channels encoded using colour.

Create a treemap or mosaic plot by selecting variables that have clear hierarchical relationships.

Colour by a variable of interest.

You can use the ColorBrewer selection palette to see colour schemes of each type and select schemes to apply to the variable that you are currently colouring by.

Select the different variables that nodes can be coloured by in turn and use the ColorBrewer palette to apply a *Categorical* or *Sequential* colour scheme that you can justify in terms of:

- i. the nature of variation in the data
- ii. the research question and task that you are designing for
- iii. your own personal preference

Try to select appropriate schemes for each of the 'data channels' (variables). Record them here.

<i>Data Channel / Variable Name</i>	<i>Level of Measurement</i>	<i>ColorBrewer Scheme Name</i>

Activity 2 – Diverging Schemes and Scaling Colours

Colour schemes that diverge around critical values enable us to make comparisons and identify trends and outliers.

Experiment with the *Diverging* schemes and see whether they help you understand or ask questions of the data set. Apply these to data channels / variables that vary *numerically*.

Change the schemes so that the colour scale is non-linear:

- use logarithmic or exponential rather than linear scaling.
- change the scaling of the schemes so that the extremes of the colour scale are used on both sides of the critical value.
- use the colour legend to vary the colour scale interactively.

Think about when it might be appropriate to use each of these design options.

Experiment with the diverging schemes and see whether you can gain any insights into the data or suggest any hypotheses. Perhaps you can suggest additional colour functionality that would help you interpret the data more effectively and meet your needs.

<i>Insights / Hypotheses</i>	<i>Limitations / Suggestions</i>

Try to select appropriate schemes for each of the 'data channels' (variables). Record them here.

<i>Data Channel / Variable Name</i>	<i>Level of Measurement</i>	<i>ColorBrewer Scheme Name</i>

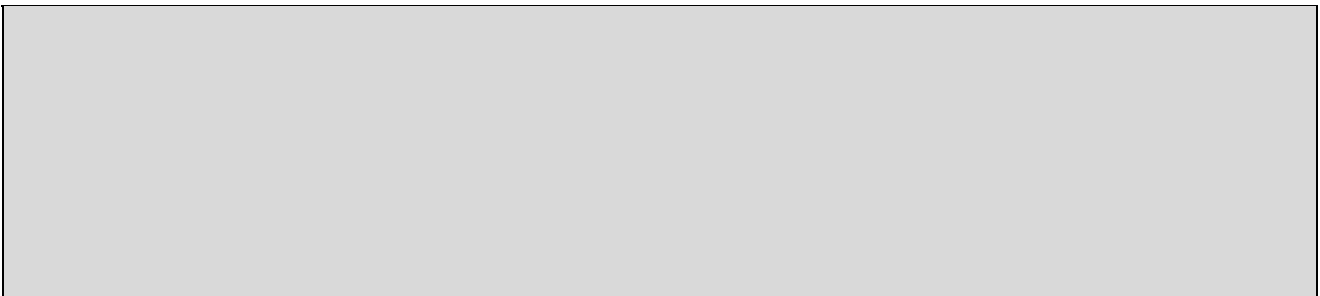
Activity 3 – Text Labelling

Use the options available to vary text in terms of applying visual channels that reflect category and sequence to symbolise the characteristics of the hierarchy effectively. Think about:

- level in the hierarchy
- relationships between categories

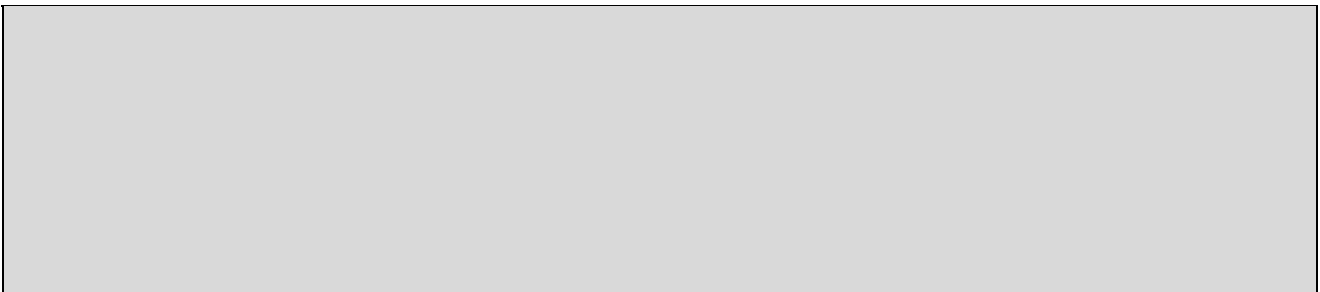
Be sure to **SAVE** images of your various designs – the instructors may ask to collect some of these.

Make notes about the effects of the different characteristics of text and how they can be used to reflect the hierarchy. Are there any dependencies?



Try using Serif typeface for physical variables or properties and Sans Serif for those that are cultural.

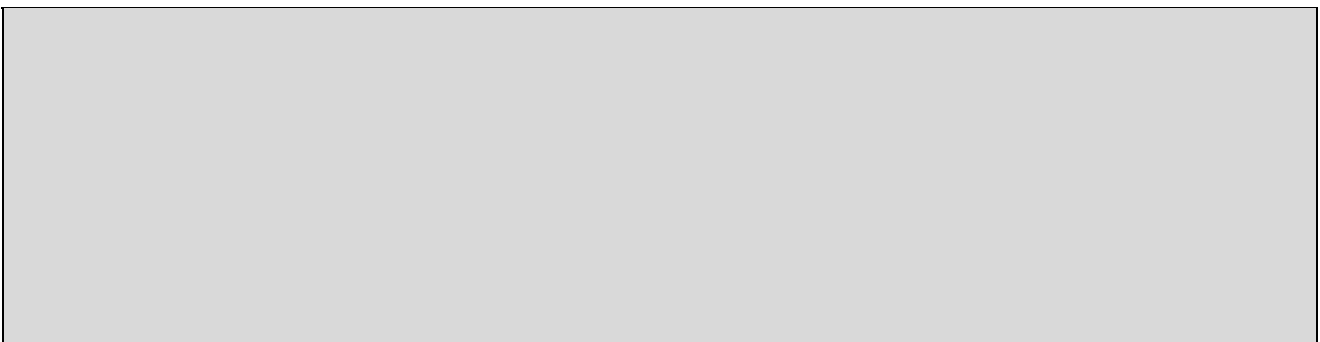
What did you think of this idea and why?



Treemaps use containment to reflect the hierarchy and the levels of the hierarchy nearer to the root are given additional visual emphasis through this design.

What impact might this have upon the way in which we emphasize or de-emphasize levels of the hierarchy using text?

Record any thoughts that you have here ... and try to act on these in your designs



The instructors will be looking to collect images of your designs, so please offer to make these available when you **SAVE** images and be sure that you can explain and justify design choices.