



Where You Stand is What You
See:

Data Visualization Skills





Where You Stand is What You See

- Each person has an individual viewing style (rate of mental editing, personalizing, reasoning, understanding).
- Viewers will perceive visual representations of data somewhat differently than the person who has constructed them.

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Where You Stand is What You See

- Each word and image that appears in a presentation of data and information is a graphic element.
- Design these graphic elements to effectively communicate data and information to a variety of viewing styles.

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“Graphical excellence is that which gives to the viewer the greatest number of ideas in the shortest time with the least ink in the smallest space.”

Edward Tufte

The Visual Display of Quantitative Information

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Suggestion: Choose your words carefully.

- If you are explaining something in bullets, use complete sentences.
- Choose a type that is clear, precise, and simple.

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Suggestion: Choose your words carefully.

- There is evidence that the eye follows type more easily if it has serifs:

Times New Roman has serifs.

Courier New has serifs.

Comic Sans MS is sans serif.

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Suggestion: Choose your words carefully.

- **There is evidence that the eye follows type more easily if it has serifs.**
- **There is evidence that the eye follows type more easily if it has serifs.**
- **There is evidence that the eye follows type more easily if it has serifs.**

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Suggestion: Choose your words carefully.

- There is evidence that words written in upper and lower case letters are easier to read than words written in capital letters.
- **THERE IS EVIDENCE THAT WORDS WRITTEN IN UPPER AND LOWER CASE LETTERS ARE EASIER TO READ THAN WORDS WRITTEN IN CAPITAL LETTERS.**

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Suggestion: Choose your words carefully.

- Little messages on or near a graphic help explain data.
- Use labels, not legends.
- Don't use abbreviations that a viewer must decode.
- Words should run left to right.
- Never forget the source line.

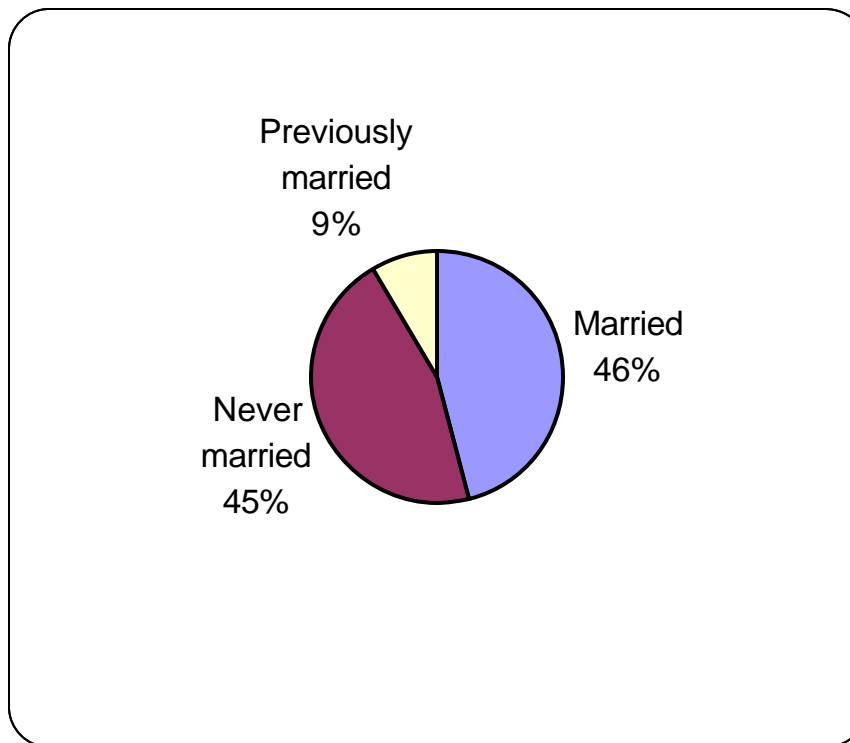
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Characteristics – Viewers of Reality Dating Television Programs

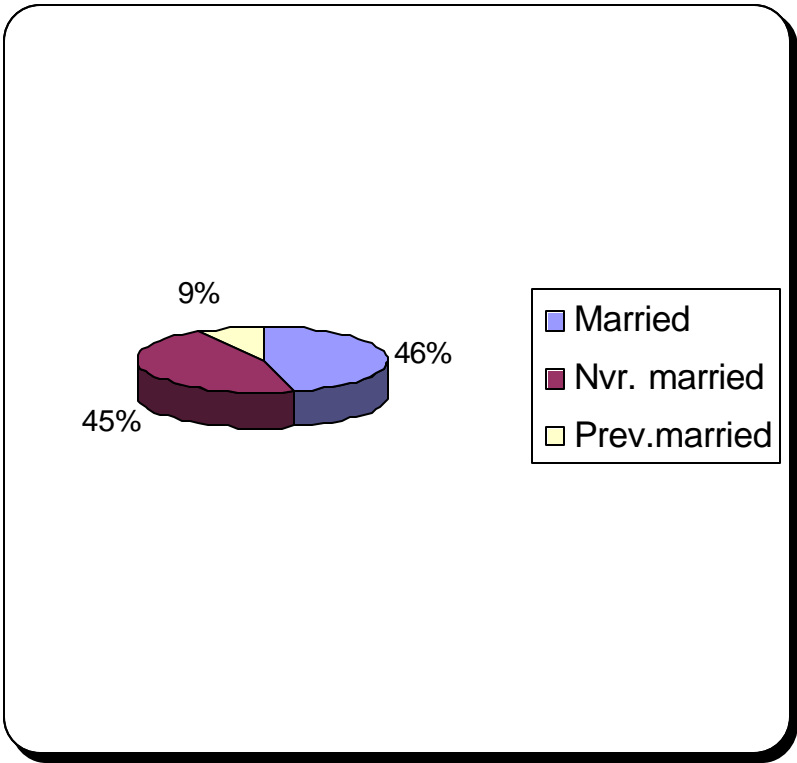
Source: R1 2005 Scarborough Report, Austin DMA

- **Nearly half of those who watch reality dating programs are married.**



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Watch
Reality
Dating



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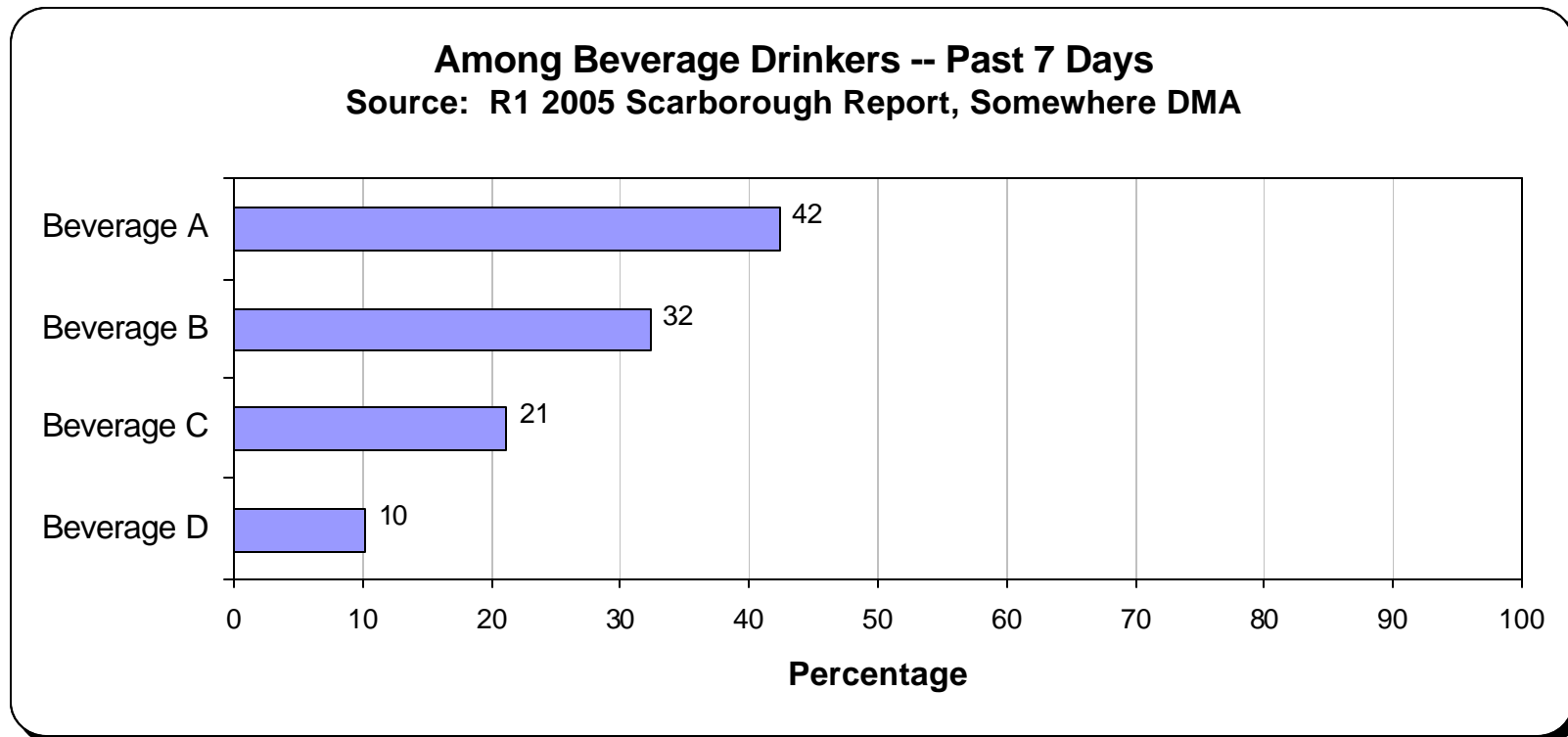
Accuracy in Imagery: Be scrupulous about proportion and scale.

- A graphic does not distort if the visual representation of the data is consistent with the numerical representation.
- Always start a numerical axis at zero.
- Keep scaling consistent for every graph you show in a presentation:

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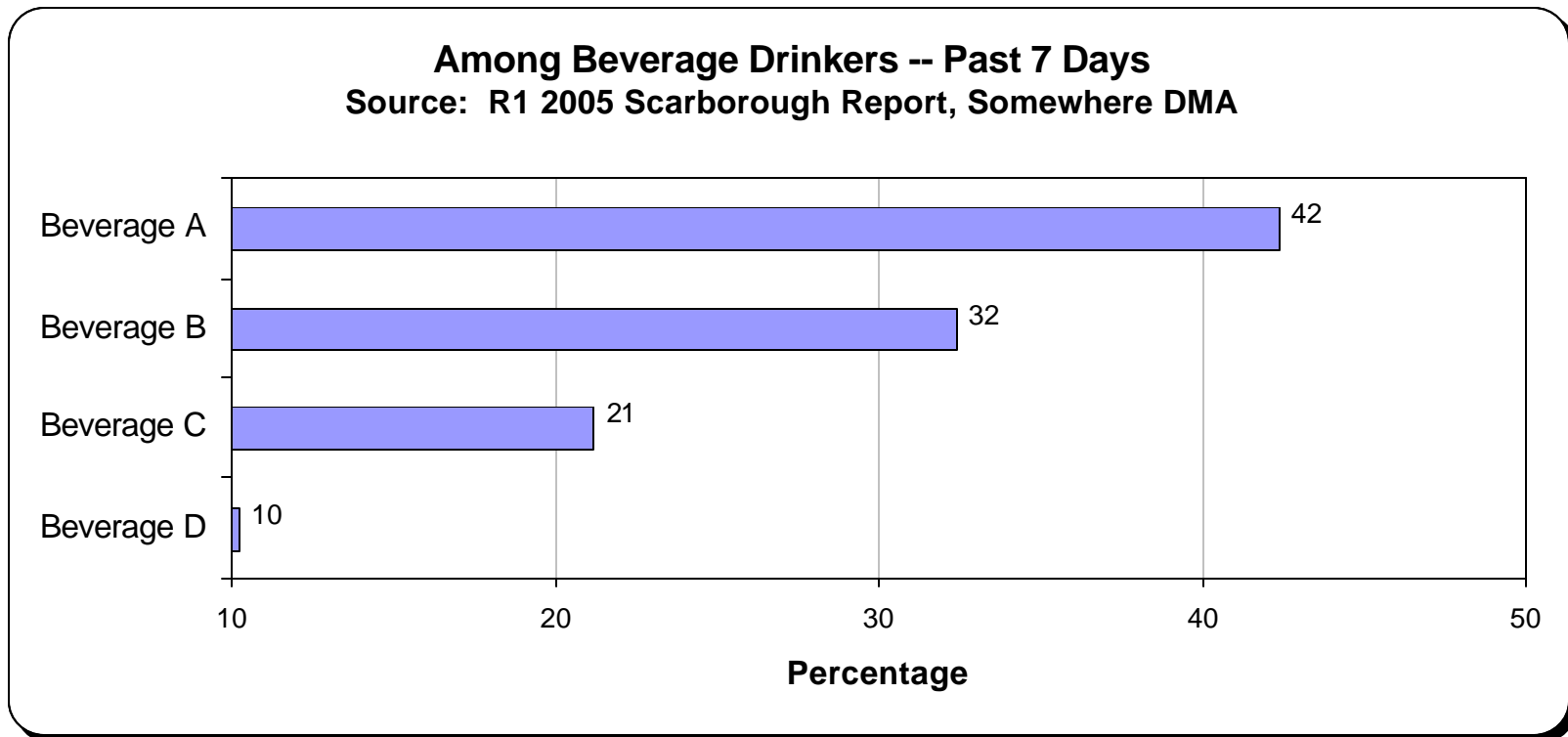
Keep the scale 0-100 when visually representing percentages.



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... because the eye can be fooled by other scales.



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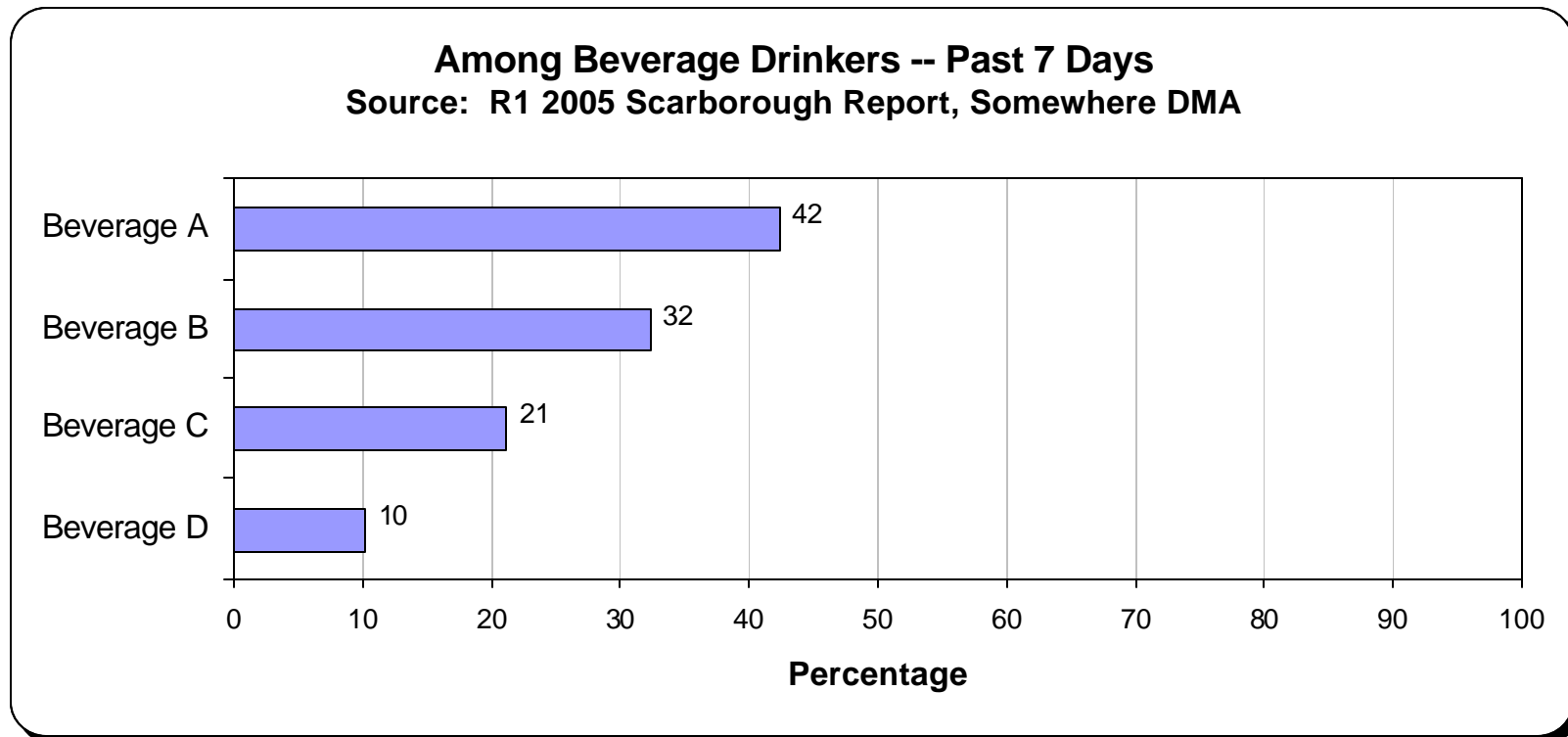
Accuracy in Imagery: Be scrupulous about proportion and scale.

- Use horizontally oriented graphics whenever possible.
- Horizontal graphics should be greater in length than in height.

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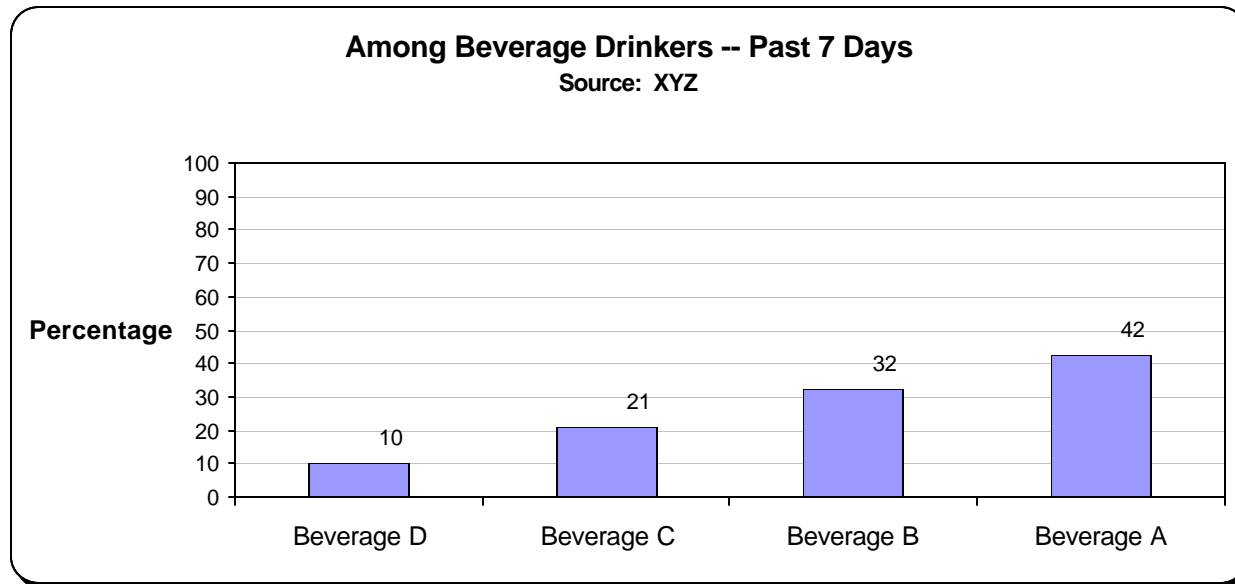
When sensible to do so, favor a horizontal display...



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... over a vertical display.

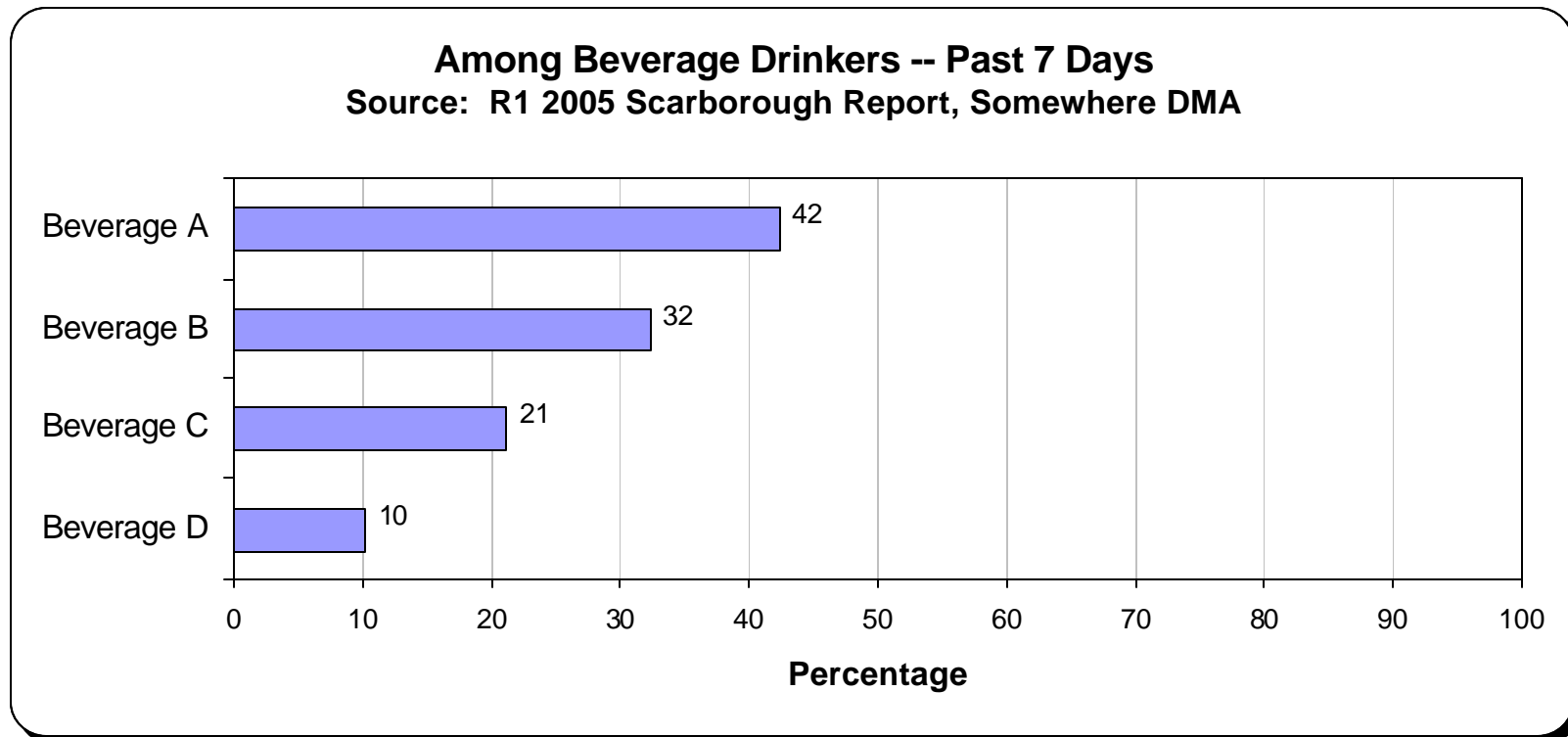


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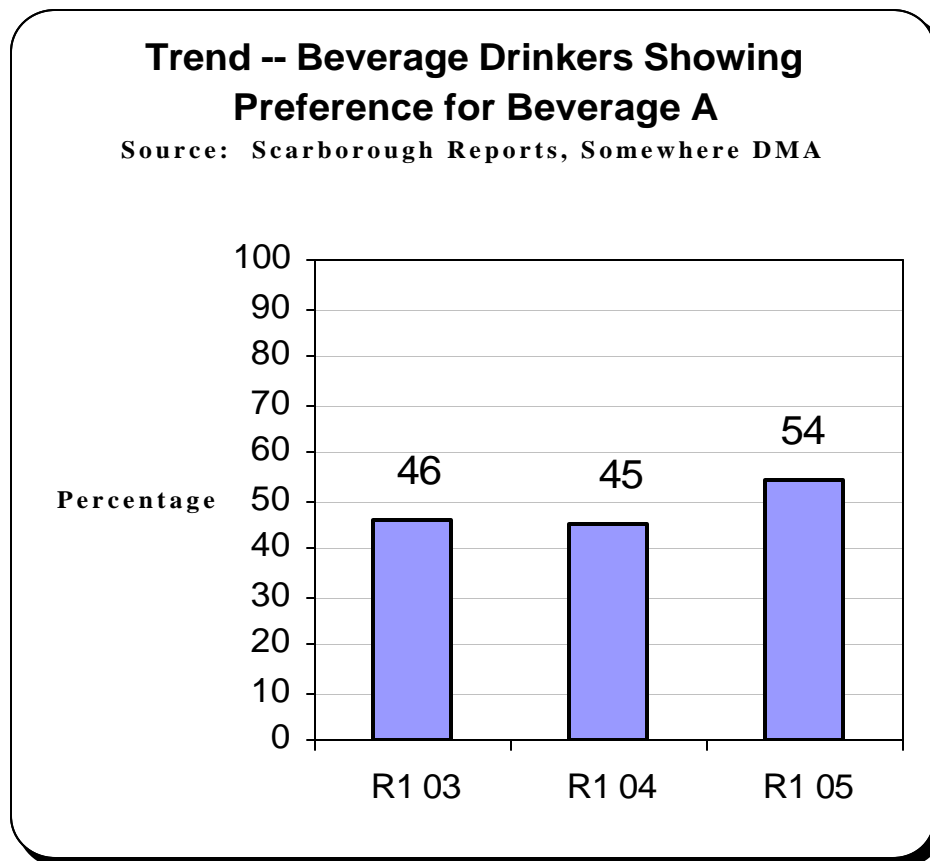
Make a horizontal graphic greater in length than in height.



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A vertical display works well for showing data on a left-right timeline



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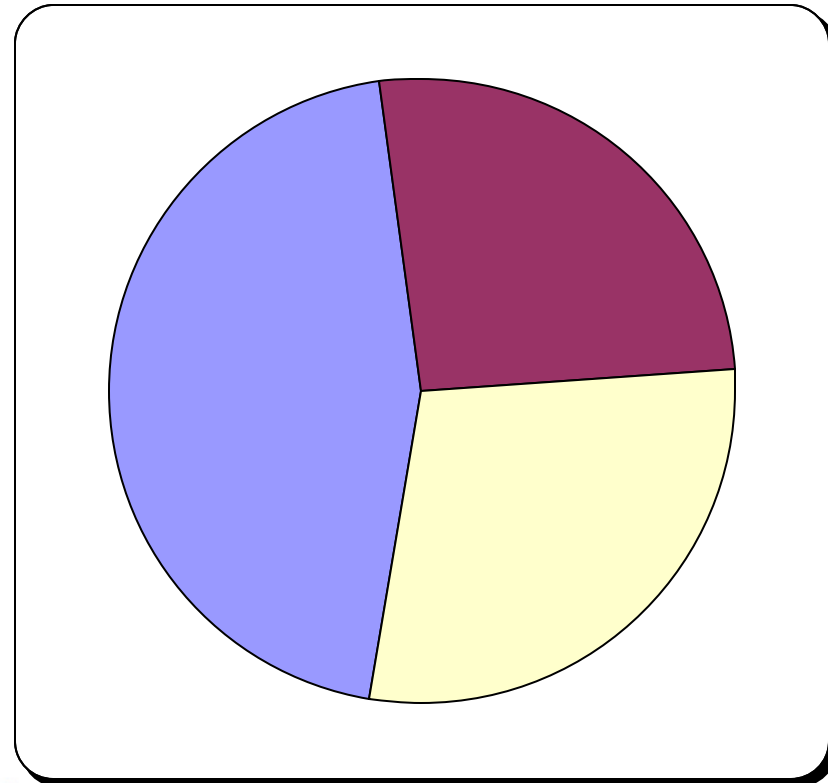
A table can be the best shape for showing some types of data.

- Tables are the best way to show exact numerical values.
- Tables usually outperform graphics in reporting small data sets.

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To many viewers, the burgundy and yellow segments will look to be the same size.

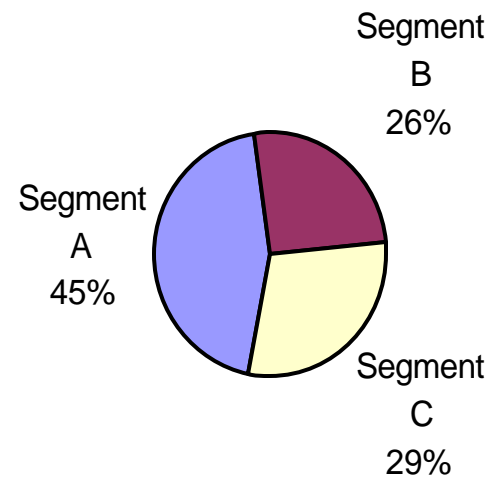
Total	Vert %	100
Segment A	Vert %	45
Segment B	Vert %	26
Segment C	Vert %	29



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Which shape best communicates the data?

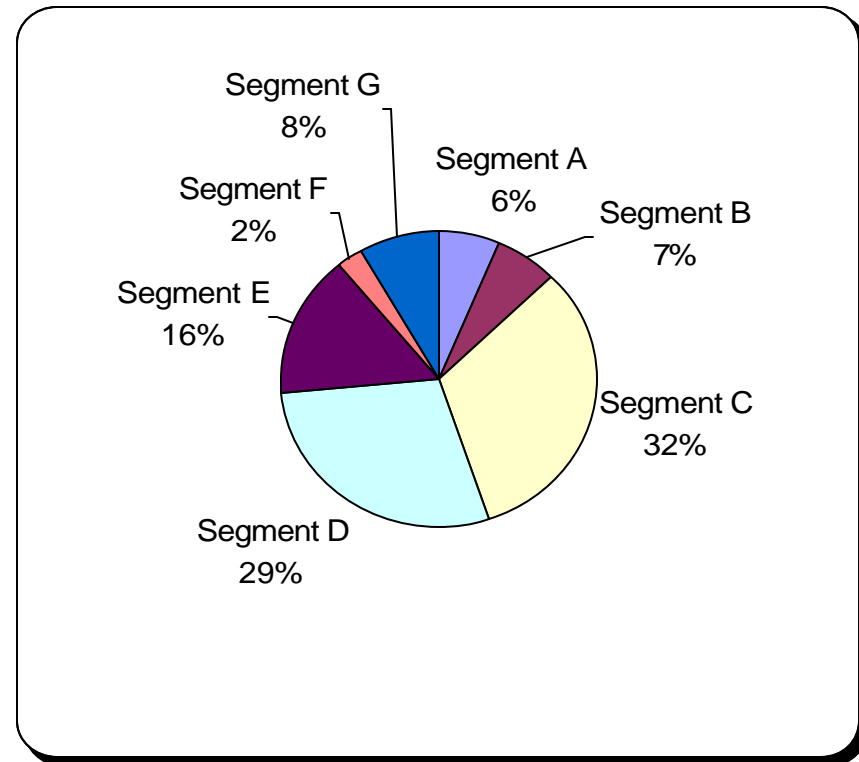
Total	Vert %	100
Segment A	Vert %	45
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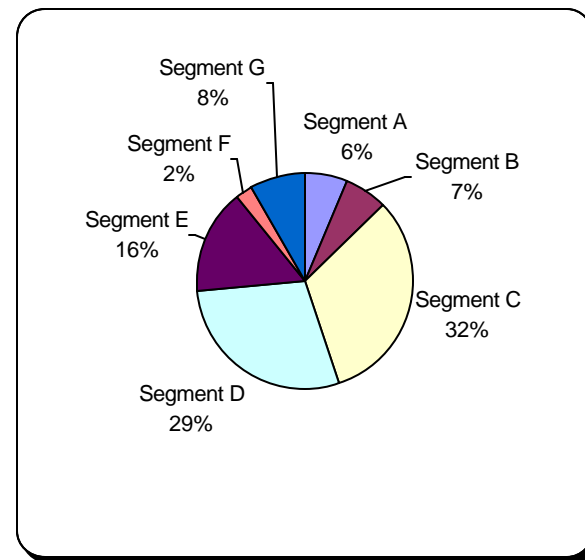
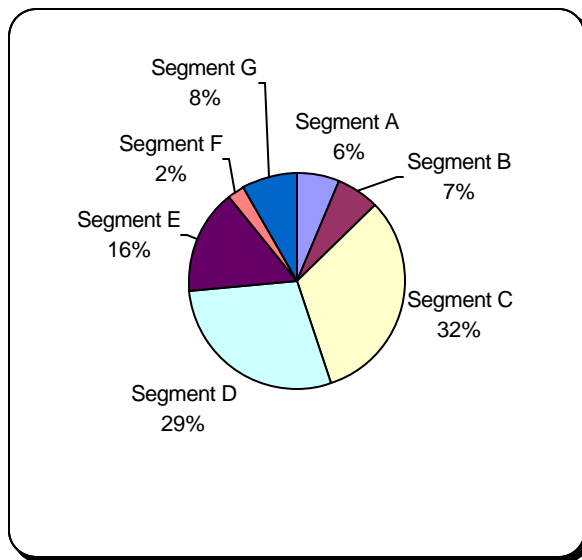
How many slices are too many for one pie?

Total	Vert %	100
Segment A	Vert %	6
Segment B	Vert %	7
Segment C	Vert %	32
Segment D	Vert %	29
Segment E	Vert %	16
Segment F	Vert %	3
Segment G	Vert %	8



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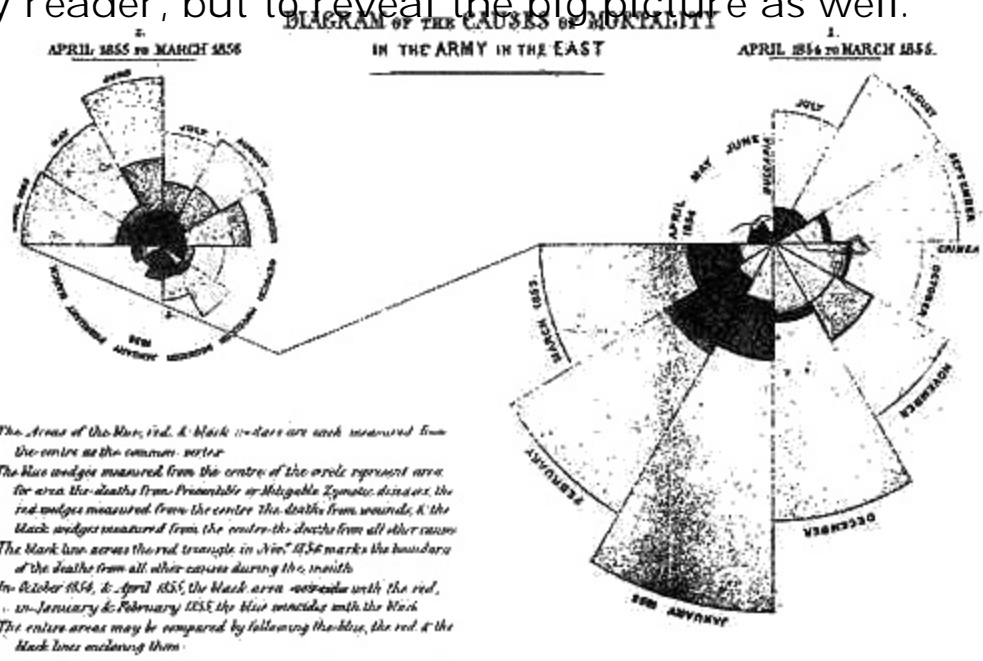
How many pies are too many for one page?



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In 1858, Florence Nightingale wrote her *Notes on Matters Affecting the Health, Efficiency and Hospital Administration of the British Army*. In it, she created a remarkable and original graphical display to show us just what'd really gone on in the War. It was a *Polar-Area Diagram* that showed how people had died during the period from July, 1854, through the end of the following year. The graph is a lesson to any engineer in how to present data -- not only so that it's clear to any reader, but to reveal the big picture as well.



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Efficiency in Imagery: Color

- Avoid using red or green. An estimated one of ten viewers will not be able to discern these colors.
- Blue can be distinguished from other colors by most people.
- Be conservative about using color because multiple colors can distract from the data message.

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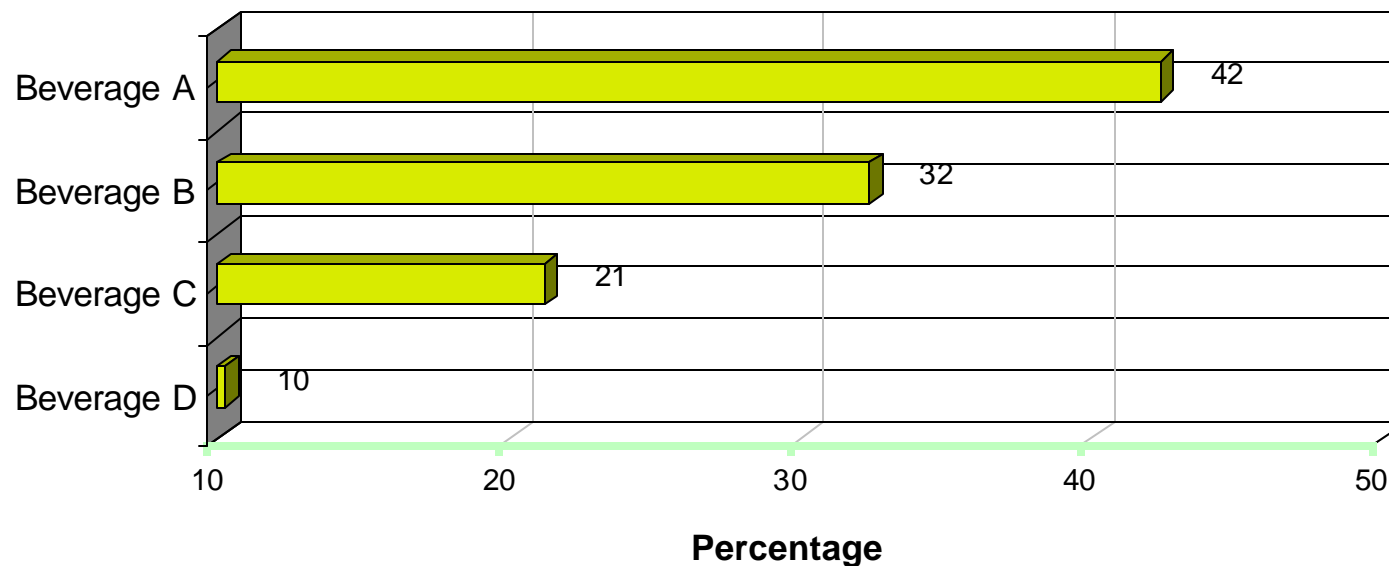
Efficiency in Imagery: Be Aware of the Data:Ink Ratio

- Ink (real ink or virtual ink) should be used only if it furthers the communication of data.
- Are you visually displaying data or are you just decorating the page?

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Efficiency in Imagery: Avoid chartjunk

Among Beverage Drinkers -- Past 7 Days
Source: XYZ

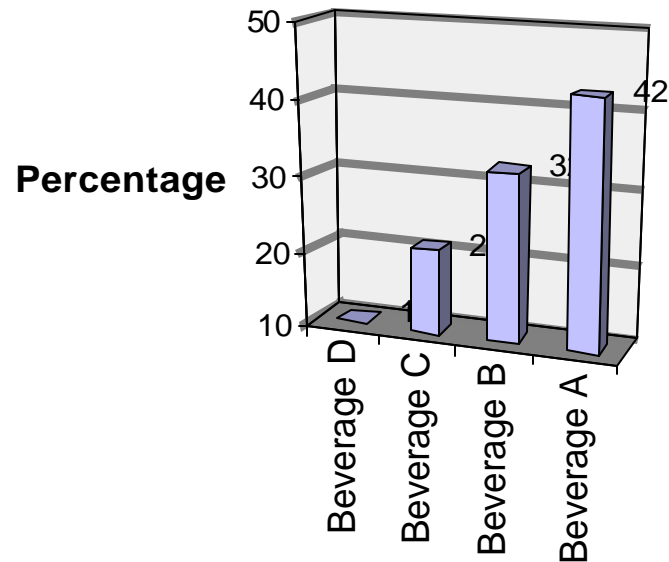


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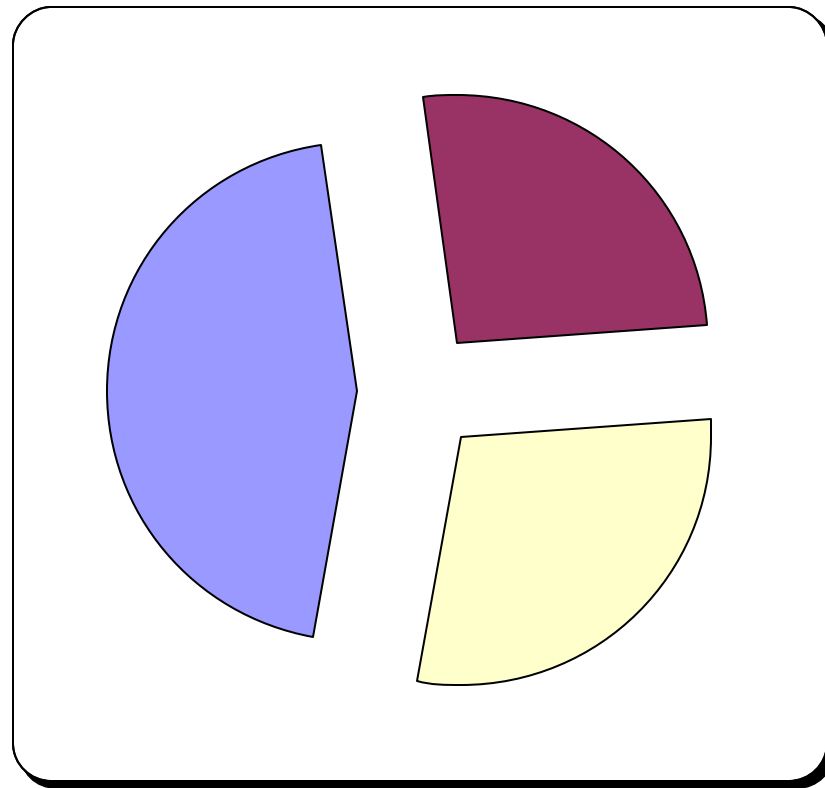
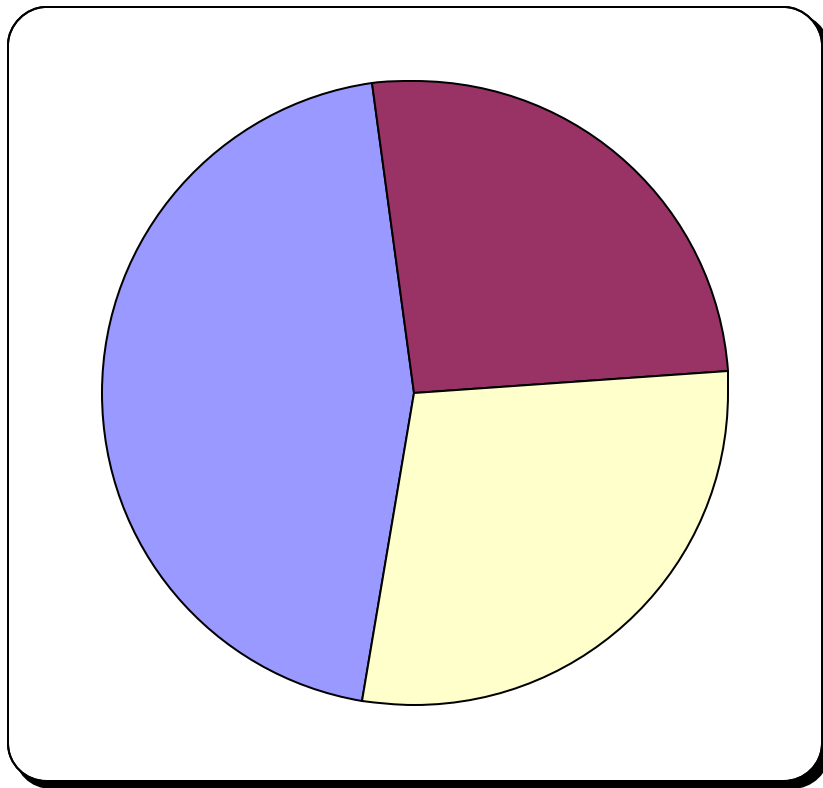
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2005 SSRM

REVOLUTIONize
SCARBOROUGH RESEARCH

Efficiency in Imagery: Shapes and Shadows

Is the shape shown on the right a distraction?



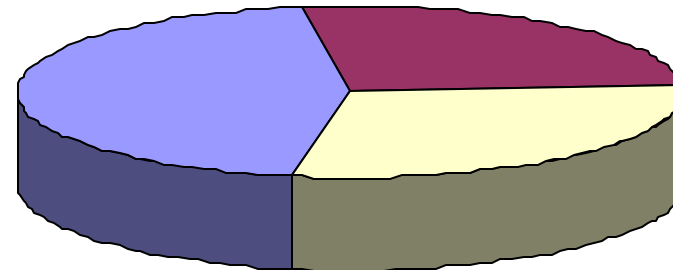
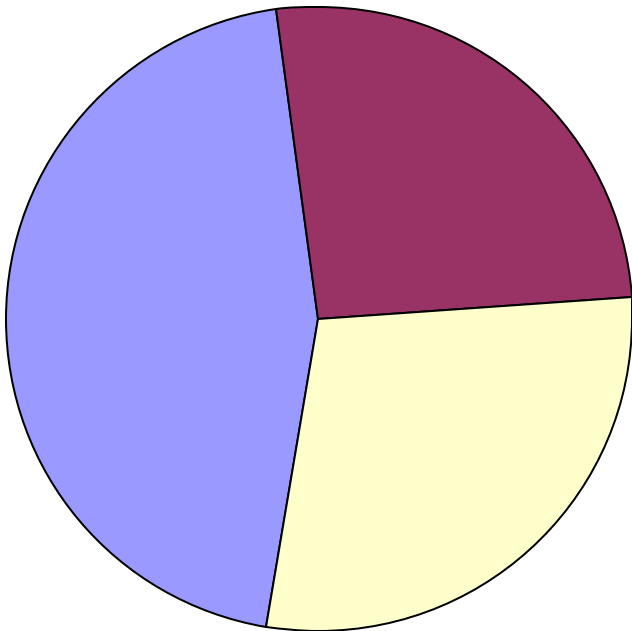
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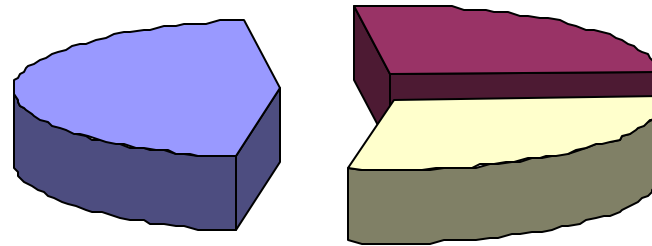
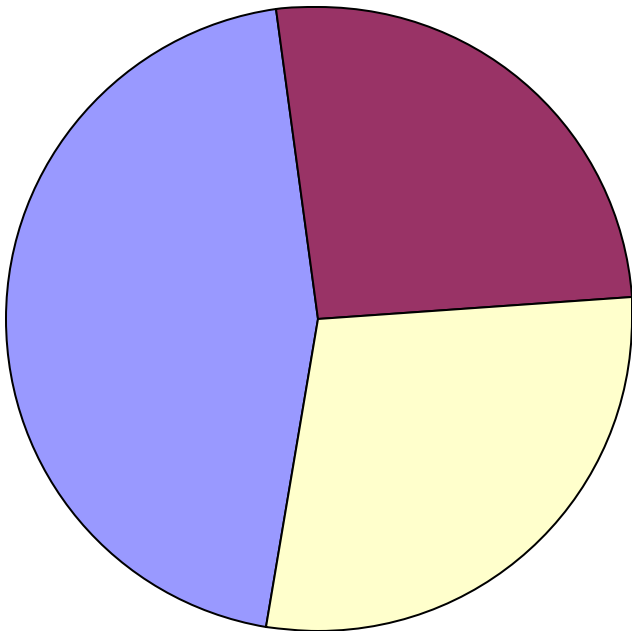
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Goal: Graphical Excellence

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Where You Stand is What You See

Well designed graphical explanations of data can accommodate different viewing styles when they --

- accurately portray the proportion of the numerical values being represented.
- are clearly labeled (word run left to right, aren't abbreviated, use upper and lower case letters, don't flash or vibrate).

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Where You Stand is What You See

Well designed graphical explanations of data can accommodate different viewing styles when they --

- **use color conservatively** (and avoid red and green).
- **do not contain chartjunk** (dark grid lines, elaborate shading, fill patterns, vibration).

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If you follow these suggestions, your viewers will show great approval for your data visualization skills.



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