**Key Takeaways from Readings on Best Practices**

* Take into account:
  + Your goals/objectives – explore/reveal
    - compare? show change/flow? relationship? temporal or spatial?
    - Does the visualization bring added value/insight? Does it complement or reveal something a statistic/model wouldn’t adequately convey in an accessible manner?
  + Your viewers. Careful encoding/visualizations fail if the ***decoding*** fails (e.g., pie charts; inappropriate color scales)
  + Commitment to great visualizations (see below).
  + Aesthetic qualities that achieve the aboe.
* Visualizations should be:
  + Truthful/honest (see scale cut-off)
  + Functional/accurate
  + Beautiful (see color; simplicity practices)
  + Insightful (don’t just do because you can but because there is value added; the viz is revealing in some way)
  + Englightening (the viz inspires understanding; changes minds)
* Aesthetic principles/practices that affect the above:
  + Tufte principle – simplicity is often better; declutter (w/in reason (Wilke))
    - Clarity, precision, efficiency.
    - High data to ink ratio.
    - BUT – balance data and context. Minimize context but not if it reduces readability.
    - See element-specific practices below
  + Don’t cut scales off; include meaningful 0 (generally); misleading otherwise.
  + Organize data effectively (e.g., bar charts that descend)
  + Overlapping points
    - Use transparency (alpha)
    - Perhaps jitter (danger here? Only if specific value representation is needed)
  + Color:
    - Don’t give color too big of a job – qualitative color scales work best when there are just 3-5 categories.
    - Aesthetically pleasing
    - Use gradients if quantitative (to better distinguish low to high)
    - Be attentive to color-vision deficiencies (viridis)
  + Redundancy – color, shape, etc. Can be a good thing.
  + If overly complicated, try multiple (facet) plots.
  + Title, captions, labels, tables
    - Always need a title – above or below (ahead of caption).
    - Labels should be horizontal (including y-axis title if possible)
    - Make sure axis-labels, etc are big enough (Wilke); goes against default themes
    - Title/captions should be above tables but (perhaps) below plots (depends)
    - Tables:
      * Do not use vertical lines
      * Do not use horizontal lines between data rows
      * Avoid shading unless trying to highlight
      * Text columns should be left aligned
      * Numeric columns should be right aligned
      * Columns with single characters should be centered
      * Round numbers (to whole if possible; one decimal; etc.)
      * Header fields aligned with column values (e.g., left if text; right if number).
      * Title/captions better placed above tables (people read tables more like text than plots).
  + Legends
    - Possible to get rid of? Needed? Possible to embed info in the plot?
    - If relevant, make the order of elements in legend correspond to plot order.
  + Background grids
    - soften and/or eliminate if possible (perhaps embed numbers)
    - usually only keep grid lines that run perpendicular to key variable (if even)
  + Axes, axis titles, labels are ok but may possibly be jettisoned if things are clear.
  + Avoid 3D