

#8 Data Visualization IV

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POLI 102

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Up-to-date

- ▶ You're almost there! The usual friendly reminder of **all you've accomplished so far** :) :
 - ▶ Fundamentals and R Data ✓
 - ▶ Data wrangling/cleansing ✓
 - ▶ Data visualization I, II & III ✓
 - ▶ Data summarization and MCT&D ✓
 - ▶ Hypothesis testing (Measures of Association I) ✓
 - ▶ Measures of Association II ✓
 - ▶ HW #1, #2, #3, #4 & #5 ✓
- ▶ **H #6** \rightsquigarrow Visualize association(s) of your choice
- ▶ **H #7** \rightsquigarrow Run a regression

Canvas chat for attendance

Final project

Data visualization

So far...

Data Visualization I and II → **Mainly descriptive**

- ▶ One variable (Frequencies & tables; Basic scatter plots; Barplot; Histogram (with mean + other values); Density plot (with mean + SD); Boxplot)
- ▶ Two variables –*beginning to explore potential association* (Cross-tabs; Summary based on groups: mosaic plot & barplot by groups)

Data Visualization III → **Hypothesis testing + Exploring *potential association***

- ▶ Hypothesis testing (One- and two-sample t-test density plots; Paired data before and after 'treatment')
- ▶ Multivariate graphs (2 & 3 variable scatter plots and line plots; Grouped kernel density plots; Box and violin plots by group; Mean/SEM plots)

Today

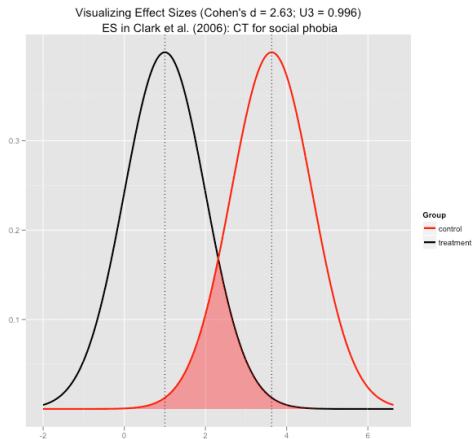
(Last class: Measures of association II)

Data Visualization IV → Visually communicating association results

- ▶ Cohen's d: Normalized distribution density plots with group means and difference
- ▶ ANOVA: Assumptions testing; Results visualization
- ▶ Odds ratio plot
- ▶ Correlograms

Cohen's d effect size

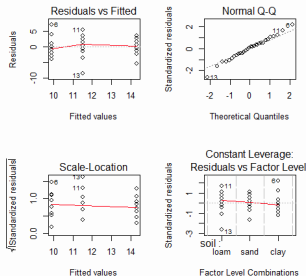
Example from: [Link](#)



ANOVA

Example from: [Link 1](#), [Link 2](#)

Assumptions testing



Results visualization

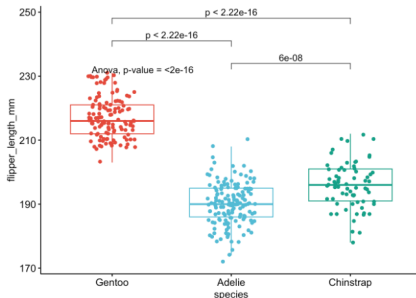


Figure 1: (1) Checking models assumptions and (2) A possible visualization

Odds ratios

Example from: [Link](#)

Mortality 5 year: OR (95% CI, p-value)

Differentiation	Well	-
	Moderate	0.62 (0.38-1.01, p=0.054)
	Poor	1.00 (0.56-1.78, p=0.988)
Age (years)	-	1.01 (1.00-1.02, p=0.098)
Sex	Female	-
	Male	0.97 (0.73-1.30, p=0.858)
Extent of spread	Submucosa	-
	Muscle	1.25 (0.36-5.87, p=0.742)
	Serosa	3.03 (0.96-13.36, p=0.087)
	Adjacent structures	6.80 (1.75-34.55, p=0.010)
Obstruction	No	-
	Yes	1.26 (0.88-1.82, p=0.206)
Lymph nodes involved	-	1.24 (1.18-1.31, p<0.001)

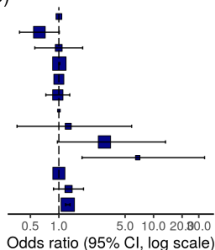


Figure 2: Odds of child mortality by factor compared to baseline (-)

Correlograms (or correlation matrix)

Example from: [Link](#)

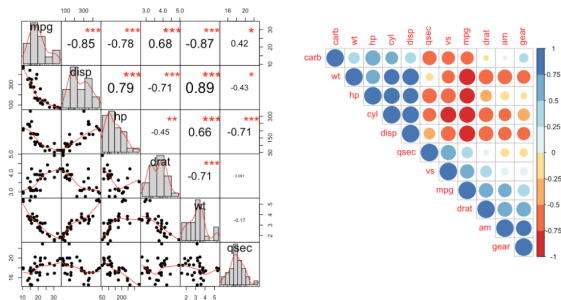


Figure 3: Relationship btn each pair of numeric variables in data is visualised through a scatterplot, histogram, etc., and/or a symbol that represents the correlation (bubble, line, number..)

Correlograms (want more? have fun...)

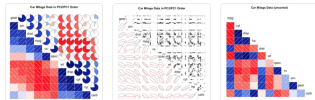
USING THE `GGALLY` PACKAGE

The `ggally` package offers great options to build correlograms. The `ggpairs()` function build a *classic correlogram* with scatterplot, correlation coefficient and variable distribution. On top of that, it is possible to inject `ggg42` code, for instance to *color categories*.



USING THE `CORRELGRAM` PACKAGE

The `correlgram` is another great alternative to build correlograms. You can choose what to display in the upper, lower and diagonal part of the figure: scatterplot, pie chart, leaf, ellipse and more.



OTHER METHODS

Lesser-known ways to build correlogram with R, like the `ellipse` package, the `plot()` function and the `car` package.

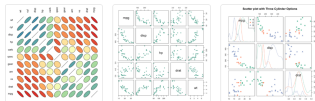


Figure 4: <https://r-graph-gallery.com/correlogram.html>

Lab: Determinants of democracy and the intertwined relationship b/n economic and democratic development (Cohen's d & ANOVA)

Heo, U., & Tan, A. C. (2001). Democracy and economic growth: A causal analysis. *Comparative politics*, 463-473.

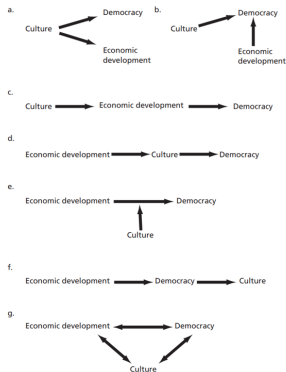
Causal Direction	Number of Countries	Percentile	Name of Countries
Growth-->Democracy	11	34 %	Costa Rica, Egypt, Guatemala, India, Israel, South Korea, Mexico, Nicaragua, Thailand, Uruguay, Venezuela
Democracy-->Growth	10	31 %	Bolivia, Burma, Colombia, Ecuador, El Salvador, Indonesia, Iran, Paraguay, The Philippines, South Africa,
Feedback Relationship	3	9 %	Chile, Dominican Republic, Turkey
No Relationship	8	25 %	Argentina, Brazil, Haiti, Honduras, Pakistan, Panama, Peru, Sri Lanka

N=32

Figure 5: Does democracy cause economic development or economic development democracy?

Lab: Determinants of democracy and the intertwined relationship btn economic and democratic development (Odds ratios & Correlograms)

FIGURE 7.1 Culture, Economic Development, and Democracy:
Some Potential Causal Relationships



Clark, W. R., Golder, M., & Golder, S. N. (2017). *Principles of comparative politics*. CQ Press.

Figure 6: Democracy and its determinants: Does anything explain anything? Aren't all these correlated then?

HW #6 posted, deadline next week

Good-old paper summarizing knowledge on determinants of
democracy

The Beer Bike Tradition!

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