

Ciencia y analítica de datos

“VISUALIZACIÓN”

25/10/22

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Tecnológico
de Monterrey



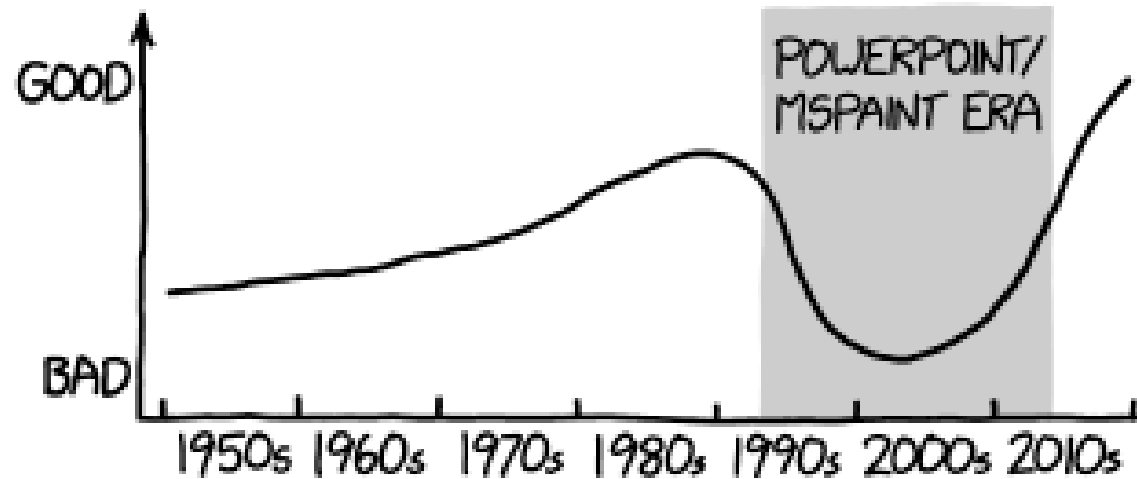
Visualización



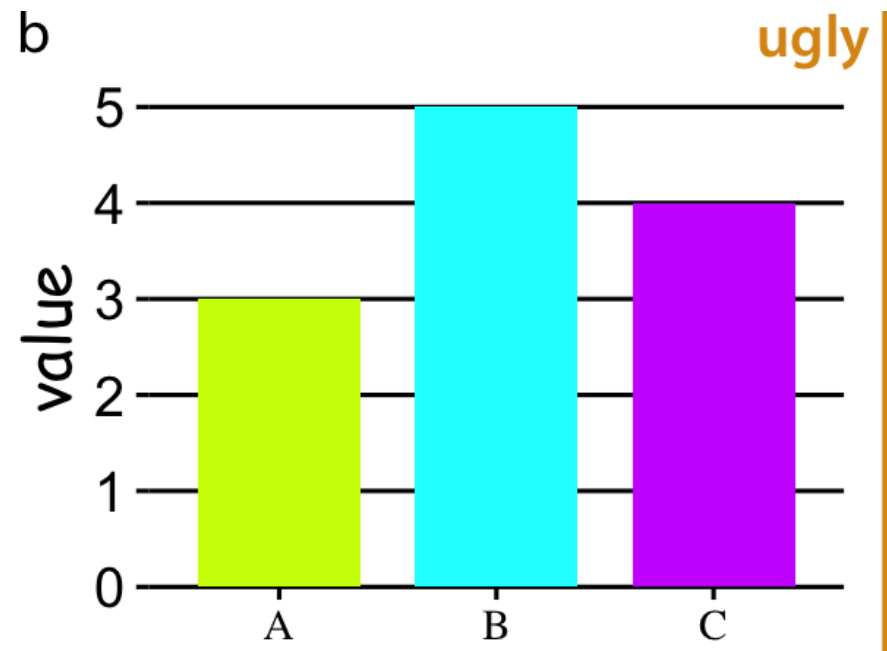
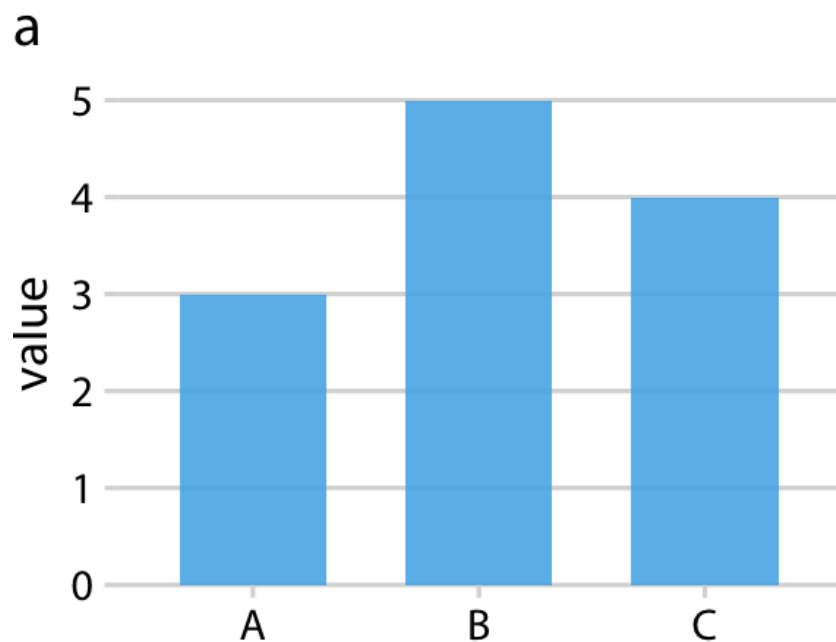
La visualización de los datos está compuesta por una parte de arte y la otra de ciencia.

Si una figura contiene colores discordantes, elementos visuales desequilibrados u otras características que distraen, al espectador le resultará más difícil inspeccionar la figura e interpretarla correctamente.

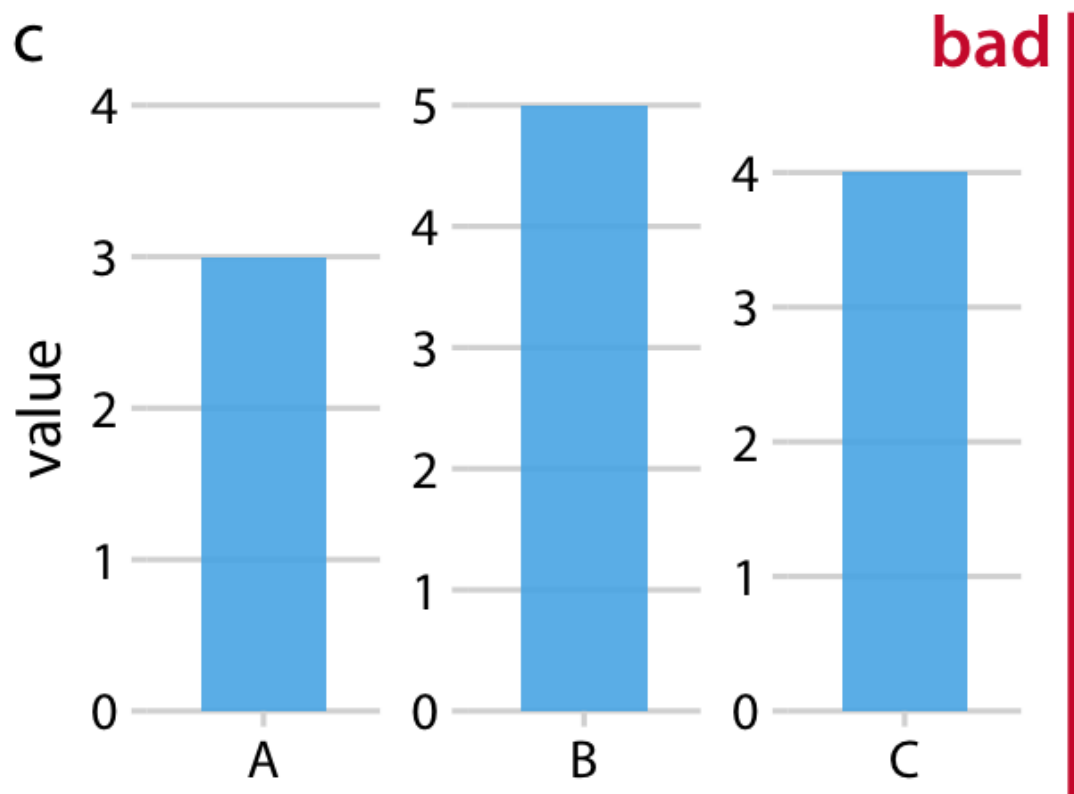
GENERAL QUALITY OF CHARTS AND GRAPHS IN SCIENTIFIC PAPERS



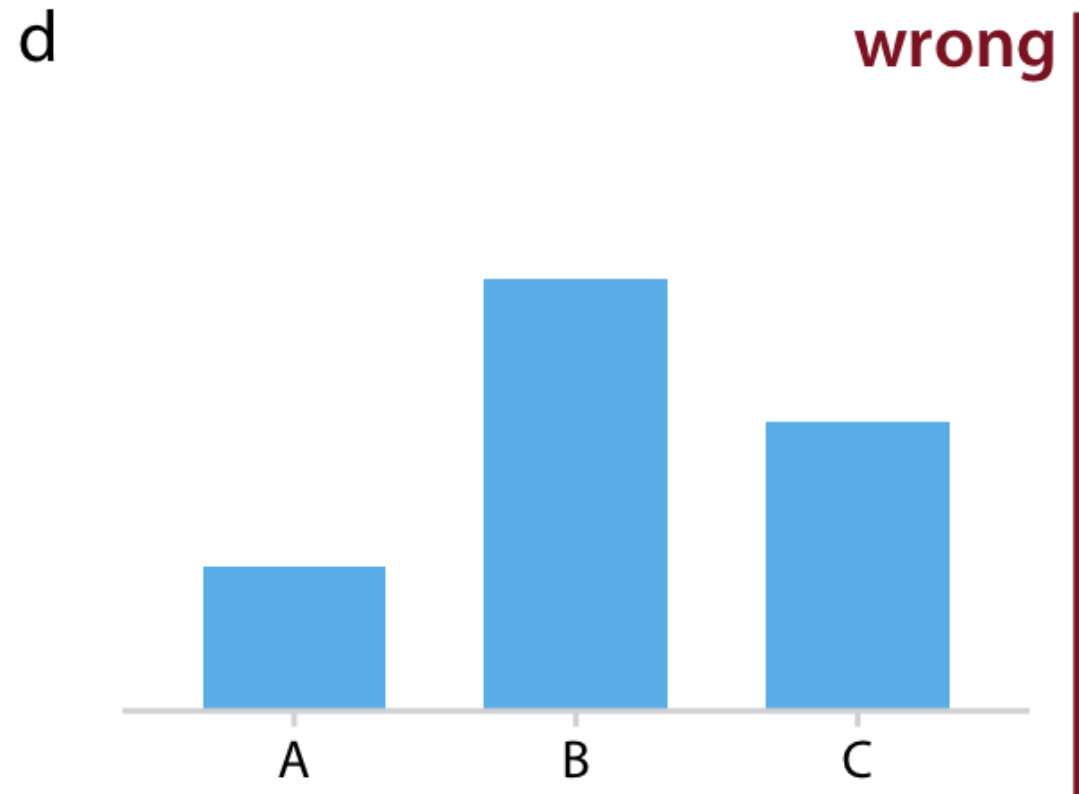
Visualizaciones



Fea, una figura que tiene problemas estéticos pero por lo demás es clara e informativa.



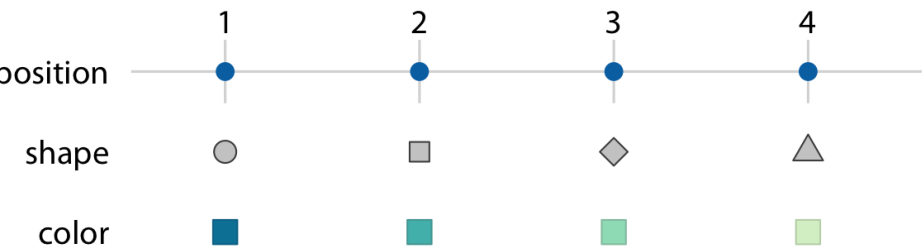
Mala, una figura que tiene problemas relacionados con la percepción; puede ser poco claro, confuso, demasiado complicado o engaños



Errónea, una figura que tiene problemas relacionados con las matemáticas; es objetivamente incorrecto

Estética y que nos ayuda a describir:

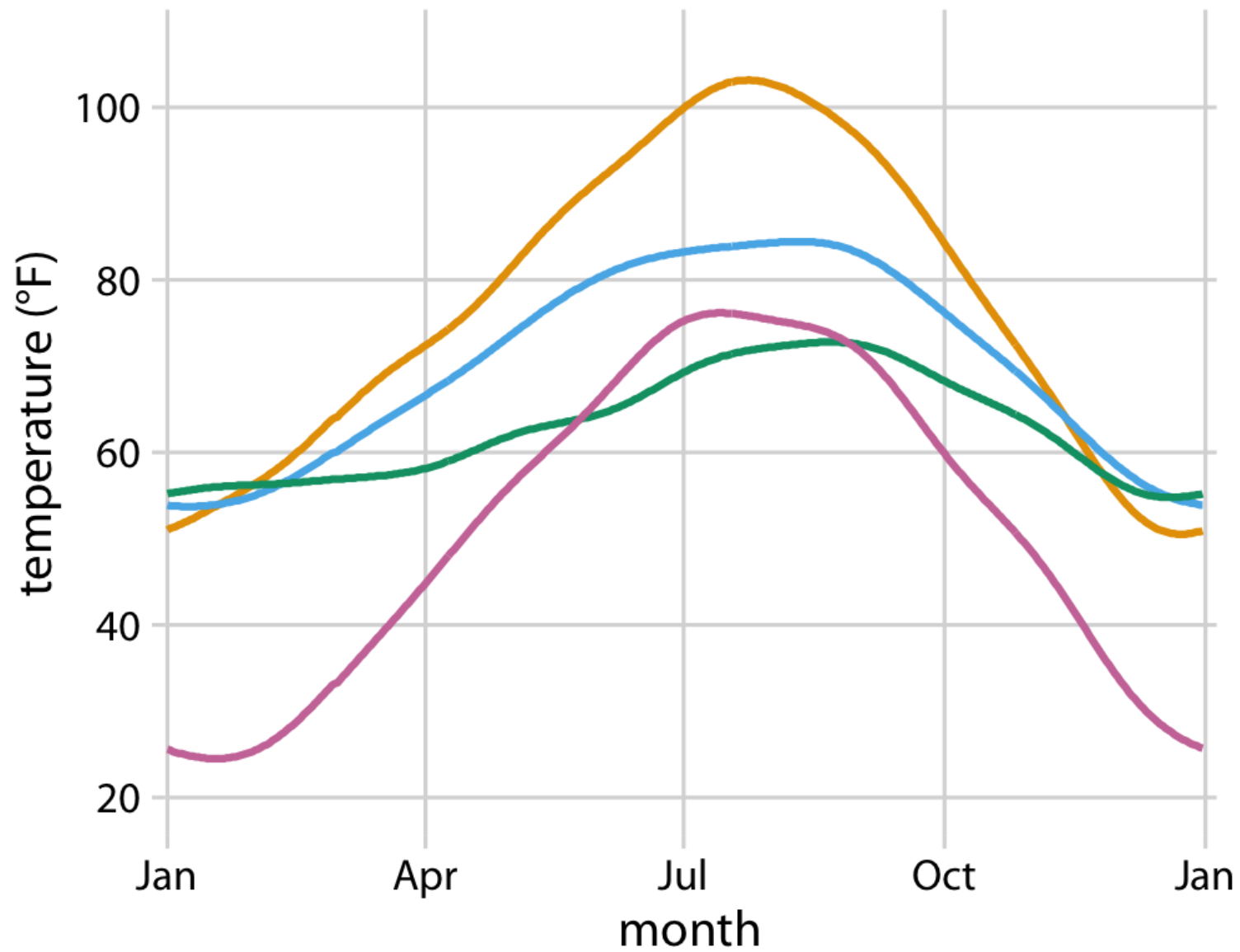
Todas las visualizaciones de datos asignan valores de datos a características cuantificables del gráfico resultante. Nos referimos a estas características como **estética**.



Type of variable	Examples	Appropriate scale	Description
Quantitative/numerical continuous	1.3, 5.7, 83, 1.5×10^{-2}	Continuous	Arbitrary numerical values. These can be integers, rational numbers, or real numbers.
Quantitative/numerical discrete	1, 2, 3, 4	Discrete	Numbers in discrete units. These are most commonly but not necessarily integers. For example, the numbers 0.5, 1.0, 1.5 could also be treated as discrete if intermediate values cannot exist in the given dataset.
Qualitative/categorical unordered	dog, cat, fish	Discrete	Categories without order. These are discrete and unique categories that have no inherent order. These variables are also called <i>factors</i> .
Qualitative/categorical ordered	good, fair, poor	Discrete	Categories with order. These are discrete and unique categories with an order. For example, “fair” always lies between “good” and “poor.” These variables are also called <i>ordered factors</i> .
Date or time	Jan. 5 2018, 8:03am	Continuous or discrete	Specific days and/or times. Also generic dates, such as July 4 or Dec. 25 (without year).
Text	The quick brown fox jumps over the lazy dog.	None, or discrete	Free-form text. Can be treated as categorical if needed.

Table 2-2. First 8 rows of a dataset listing daily temperature normals for four weather stations. Data source: National Oceanic and Atmospheric Administration (NOAA).

Month	Day	Location	Station ID	Temperature (°F)
Jan	1	Chicago	USW00014819	25.6
Jan	1	San Diego	USW00093107	55.2
Jan	1	Houston	USW00012918	53.9
Jan	1	Death Valley	USC00042319	51.0
Jan	2	Chicago	USW00014819	25.5
Jan	2	San Diego	USW00093107	55.3
Jan	2	Houston	USW00012918	53.8
Jan	2	Death Valley	USC00042319	51.2



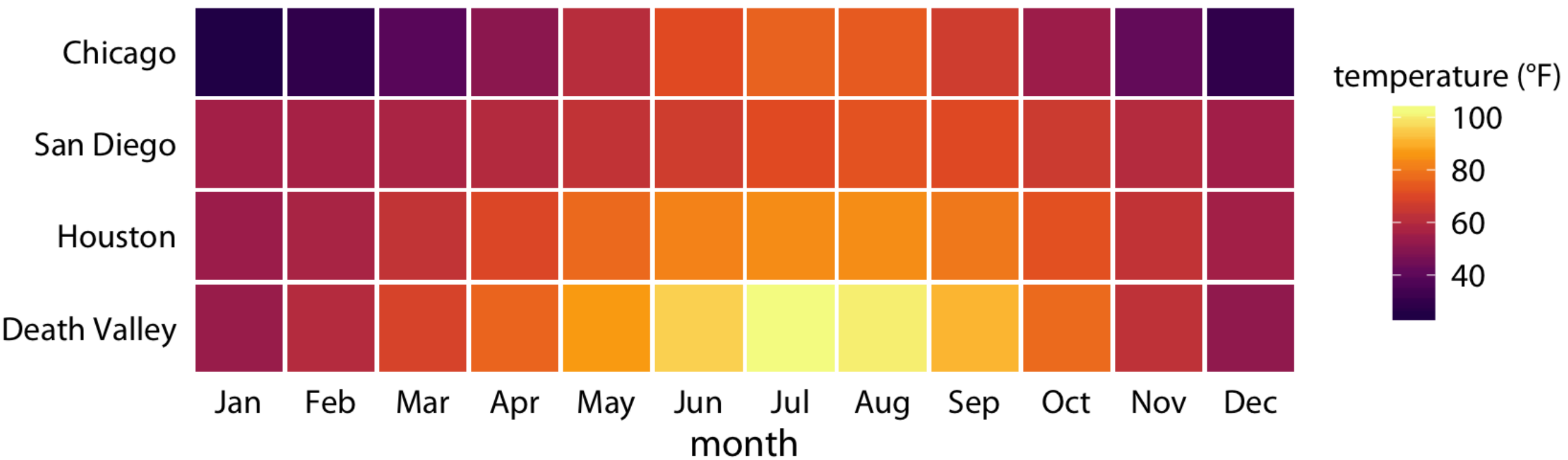
Death Valley
Houston
San Diego
Chicago



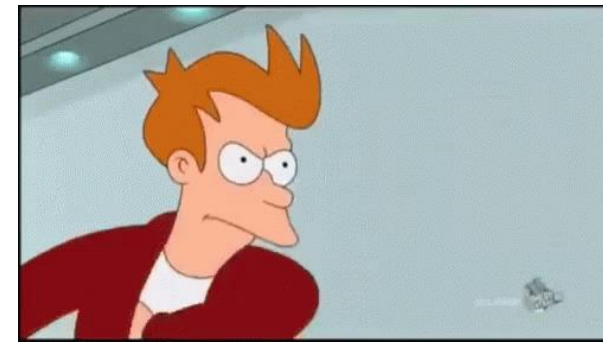
¿Qué otra forma se te ocurre?



Heat maps



Pregunta del millón



¿Cuántas variables con sus respectivas escalas podríamos incluir en una grafica 2D?

1

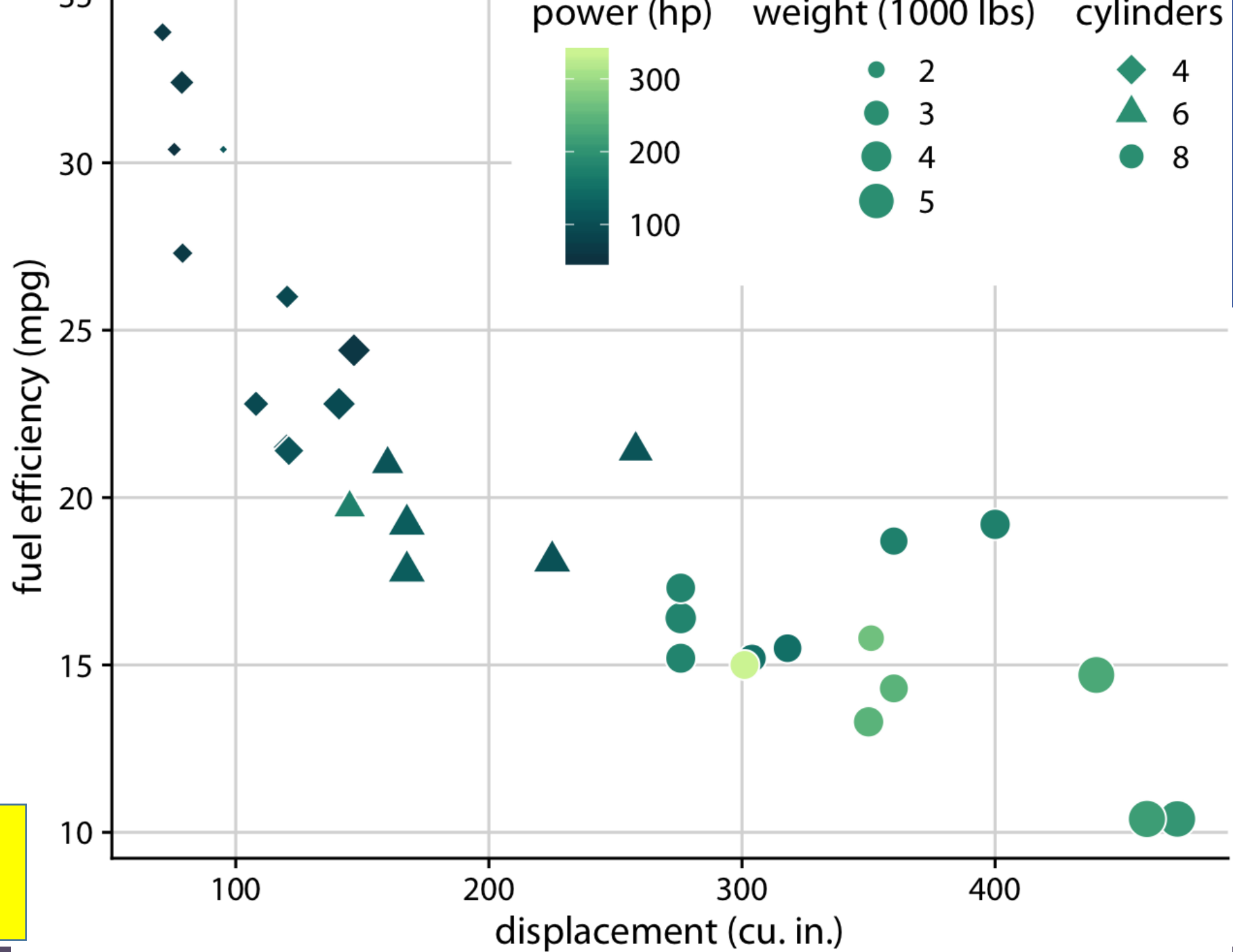
2

3

4

5

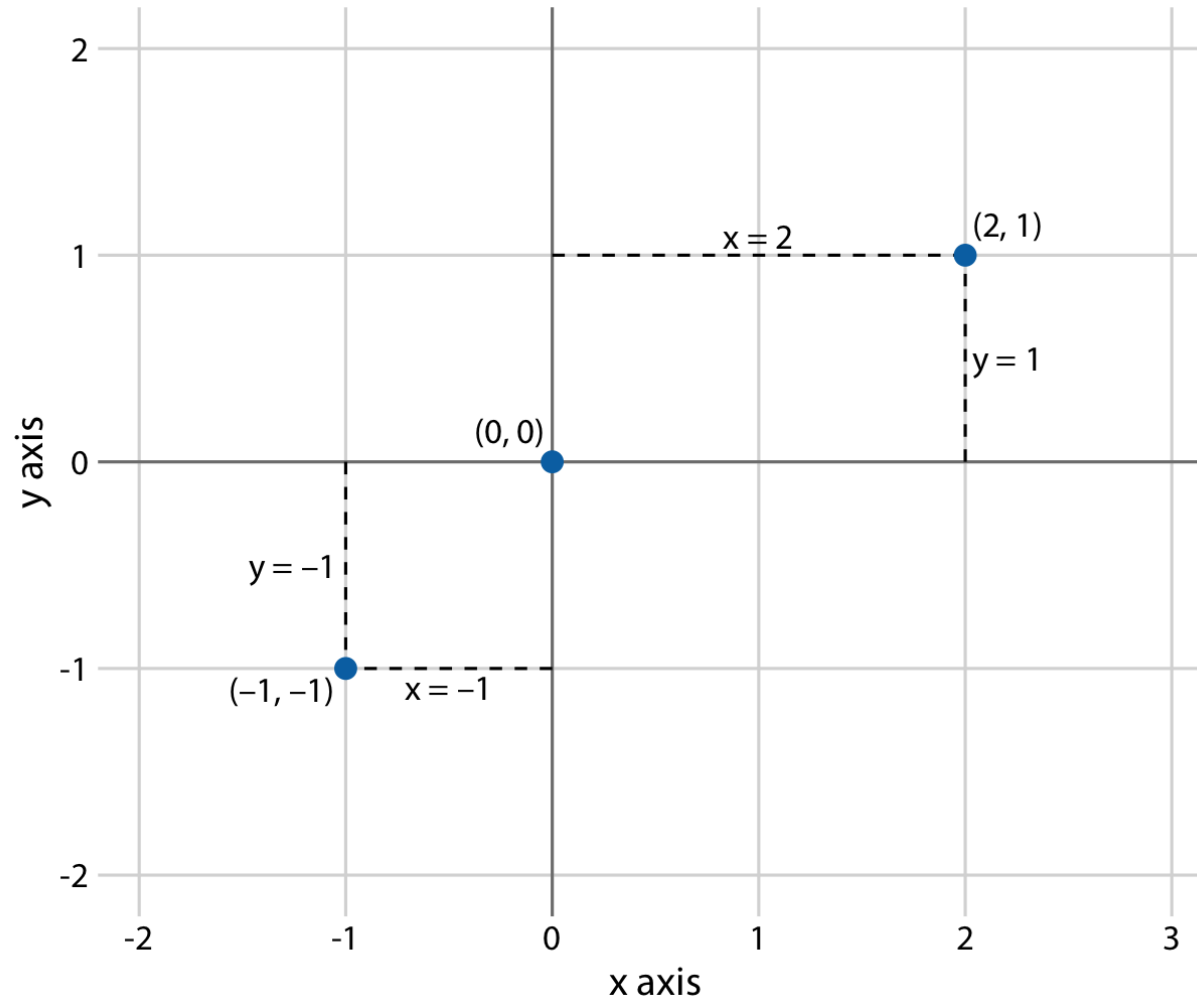
Fuel efficiency versus displacement, for 32 cars (1973–74 models). This figure uses five separate scales to represent data: (i) the x axis (displacement); (ii) the y axis (fuel efficiency); (iii) the color of the data points (power); (iv) the size of the data points (weight); and (v) the shape of the data points (number of cylinders). Four of the five variables displayed (displacement, fuel efficiency, power, and weight) are numerical continuous. The remaining one (number of cylinders) can be considered to be either numerical discrete or qualitative ordered. Data source: Motor Trend, 1974.

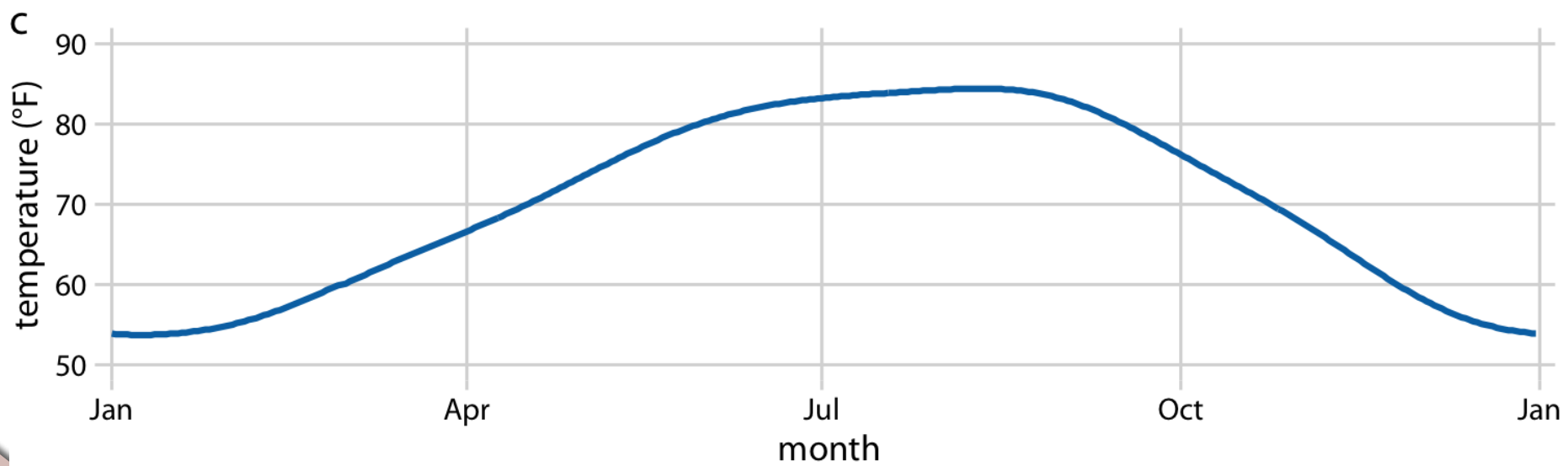
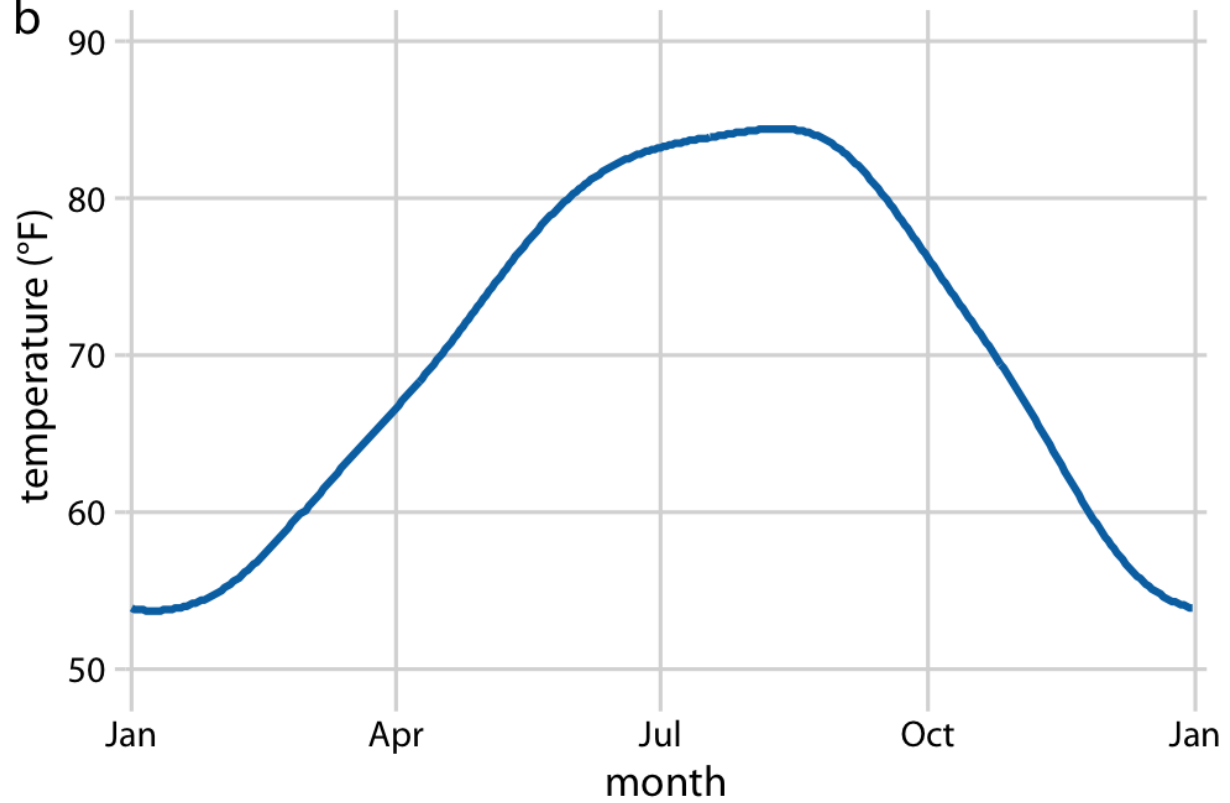
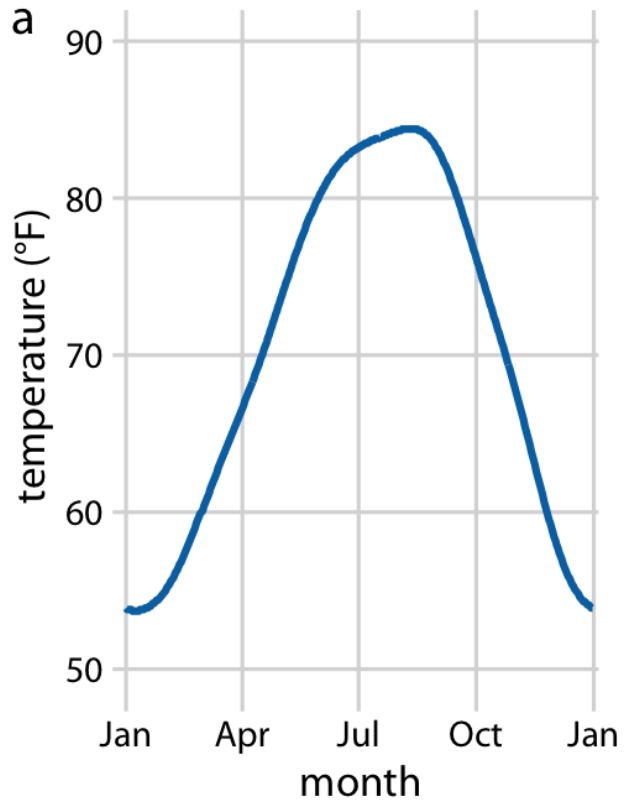


En este ejemplo vemos hasta 5 variables

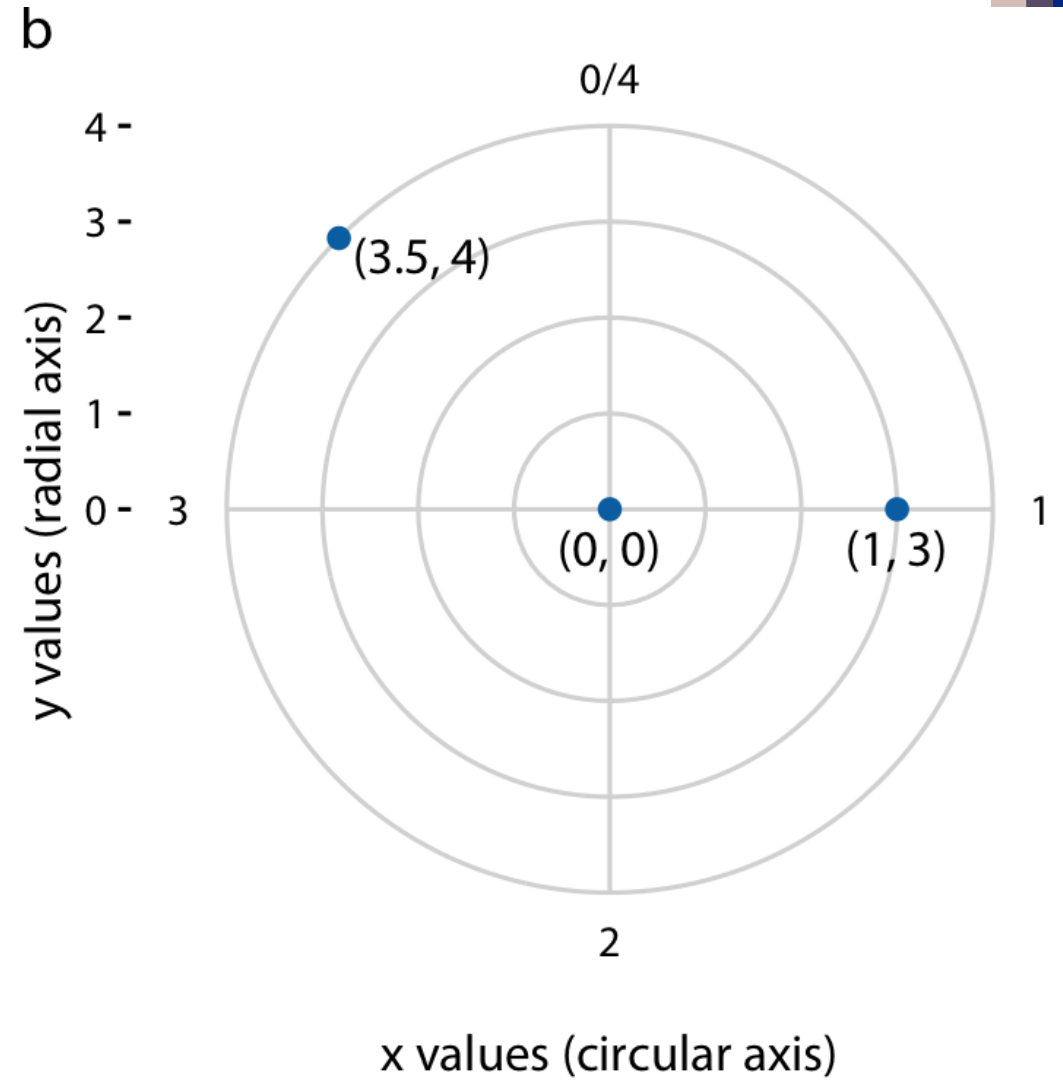
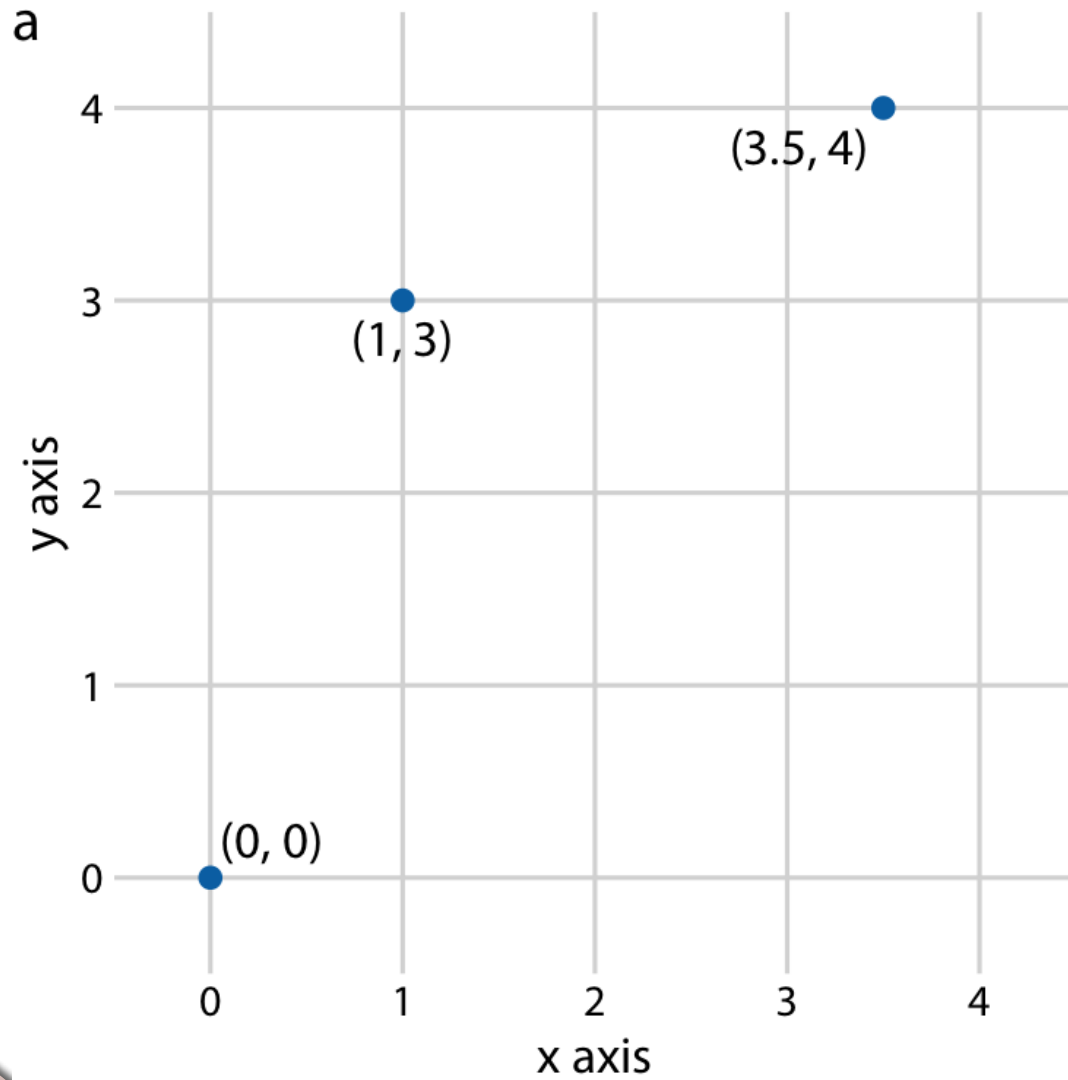
SISTEMAS DE COORDENADAS Y EJES

Cartesiano





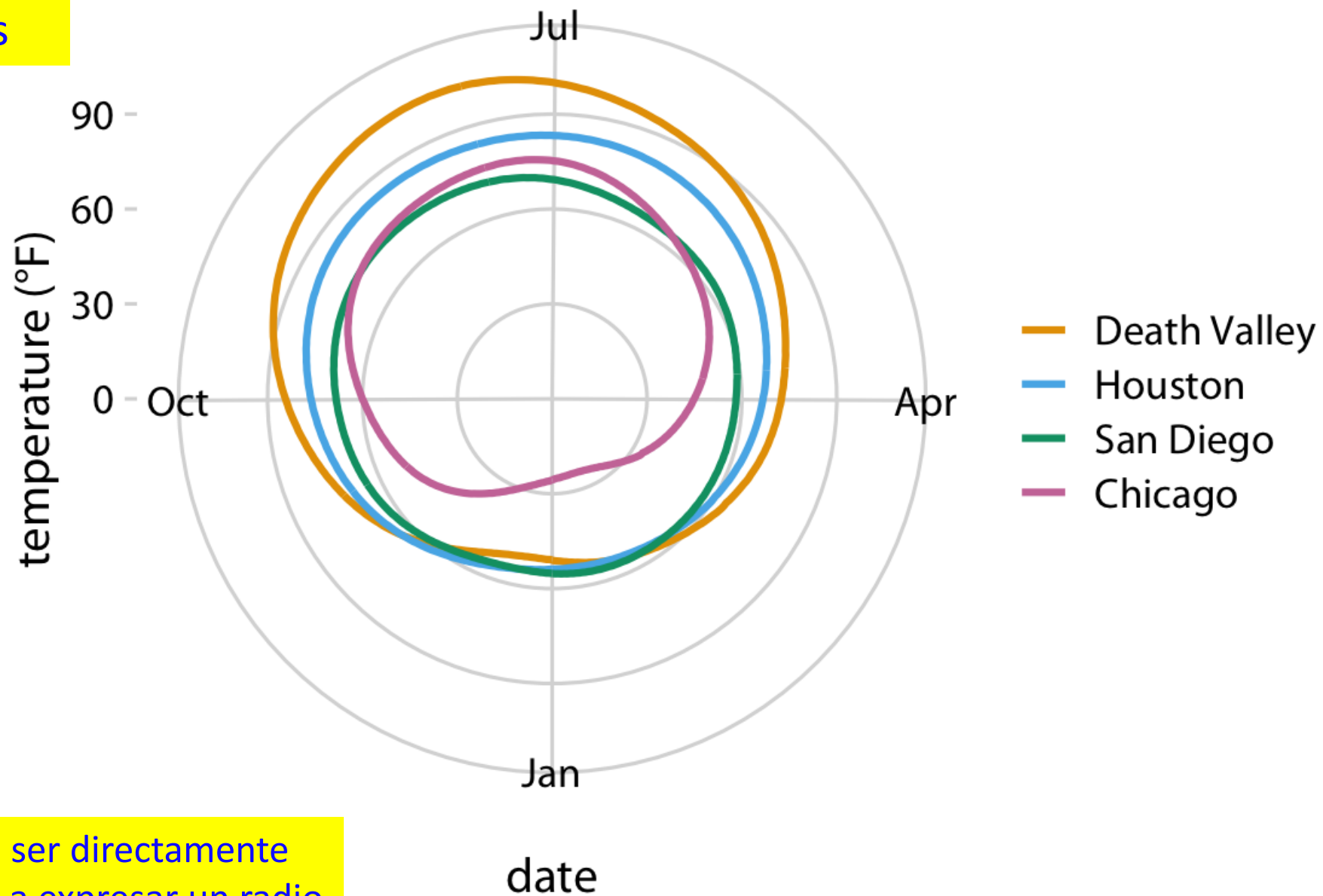
Sistemas de coordenadas y ejes curvos



¿Qué características deben tener los datos?

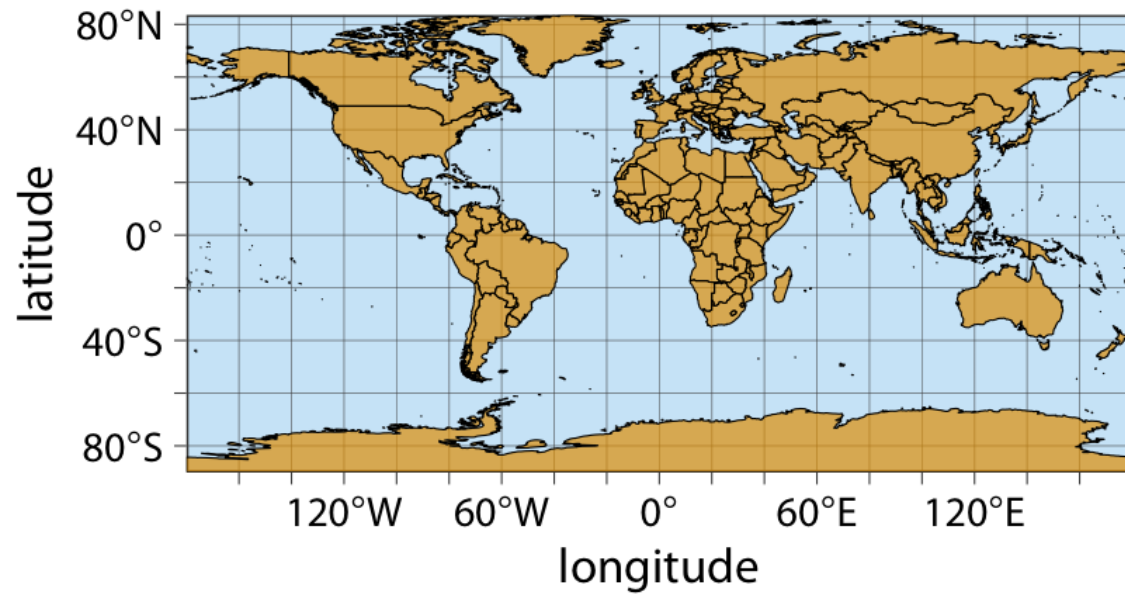


Datos periódicos

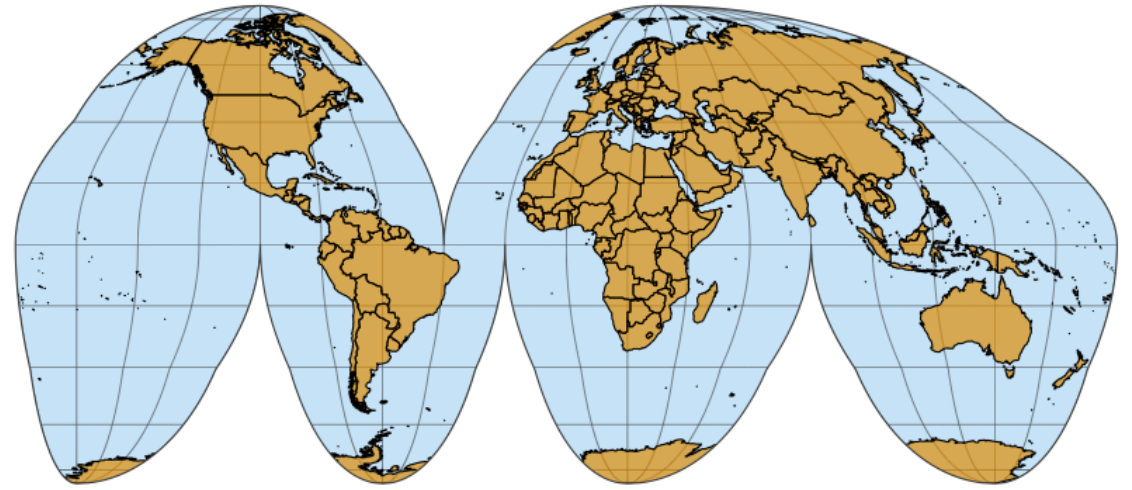


Otros datos pudieran ser directamente algunos relacionados a expresar un radio y un ángulo

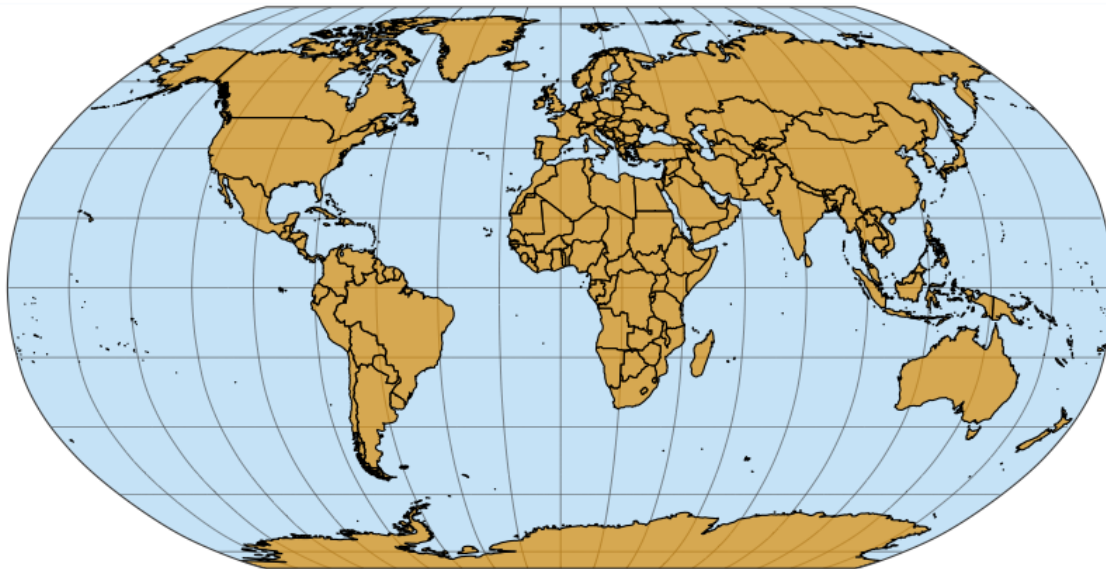
Cartesian longitude and latitude



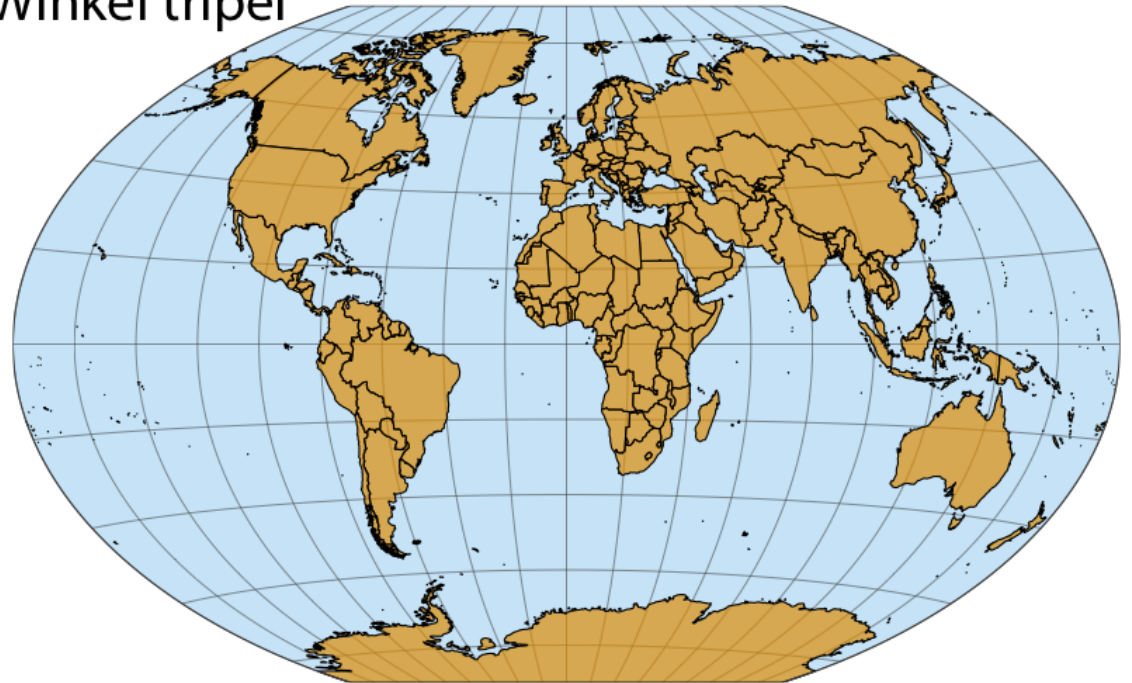
Interrupted Goode homolosine



Robinson



Winkel tripel



Color y escalas

- Los colores nos pueden servir para:

Distinguir

Okabe Ito



ColorBrewer Dark2



ggplot2 hue



Representar valores

ColorBrewer Blues



Heat



Viridis



Resaltar

Okabe Ito Accent



Grays with accents












ColorBrewer Accent


















Quizz – Puntajes perfectos- ¡Felicidades muchachos!

Todos los informes de Quizizz ahora usarán puntos. Promover el dominio con un enfoque en el aprendizaje [Saber más](#)

Nombre		Precisión	Puntos	Puntuación
 JM 1 intento	<div><div>✓ 5</div></div>	100%	5/5	8280
 Melendres 1 intento	<div><div>✓ 5</div></div>	100%	5/5	6727
 Abi 1 intento	<div><div>✓ 5</div></div>	100%	5/5	6700
 Karina 1 intento	<div><div>✓ 5</div></div>	100%	5/5	6660
 Carlos L 1 intento	<div><div>✓ 5</div></div>	100%	5/5	6490
 Jorge Hidalgo 1 intento	<div><div>✓ 5</div></div>	100%	5/5	6375
 IC 1 intento	<div><div>✓ 5</div></div>	100%	5/5	6220
 Pablo Acosta 1 intento	<div><div>✓ 5</div></div>	100%	5/5	6140

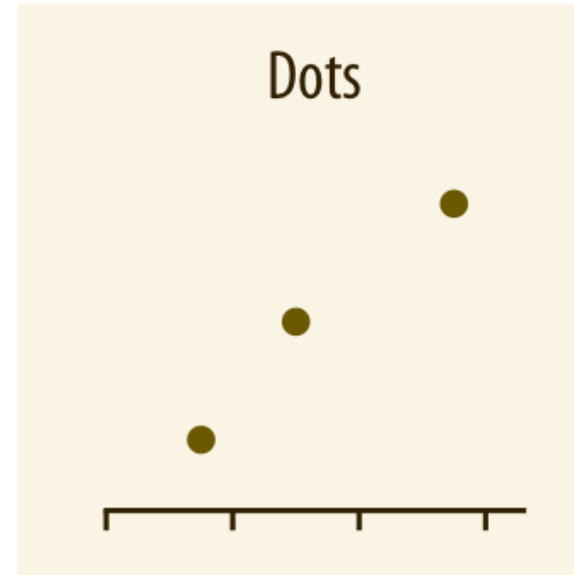
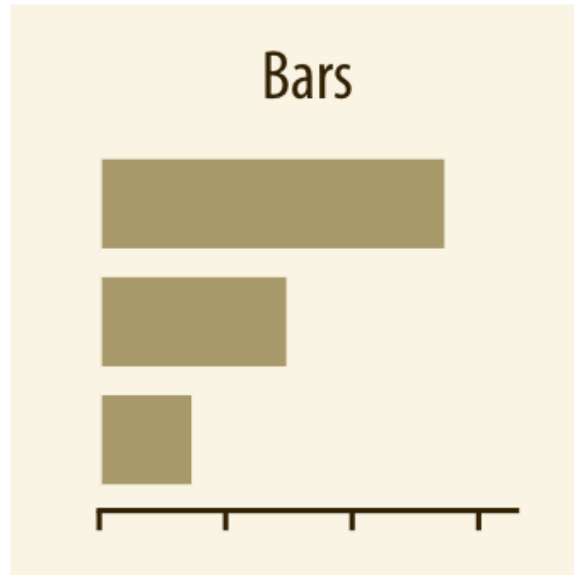
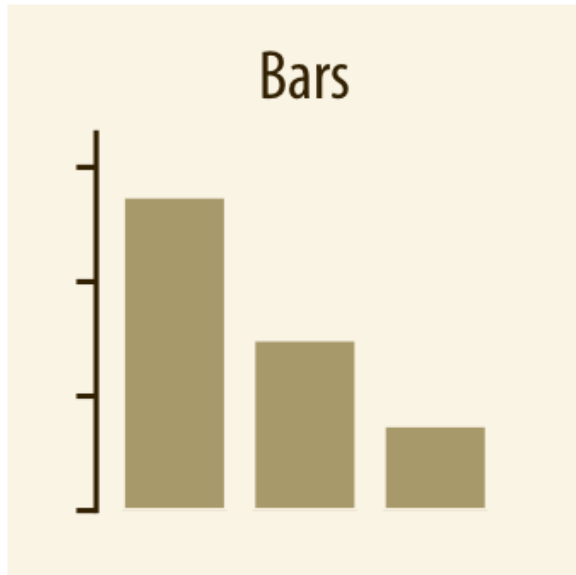
 Elmer Payro 1 intento	<div><div>✓ 5</div></div>	100%	5/5	6050
 Euni 1 intento	<div><div>✓ 5</div></div>	100%	5/5	5900
 denisse 1 intento	<div><div>✓ 5</div></div>	100%	5/5	5782
 Octavio 1 intento	<div><div>✓ 5</div></div>	100%	5/5	5610
 Valeria 1 intento	<div><div>✓ 5</div></div>	100%	5/5	5540
 Roberto Romero 1 intento	<div><div>✓ 5</div></div>	100%	5/5	5465
 Emmanuel Domínguez 1 intento	<div><div>✓ 5</div></div>	100%	5/5	5392
 Patraca 1 intento	<div><div>✓ 5</div></div>	100%	5/5	5375
 YV 1 intento	<div><div>✓ 5</div></div>	100%	5/5	5370
 AbrahamR 1 intento	<div><div>✓ 5</div></div>	100%	5/5	5340

	MSib 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	5240
	Eduardo Arteaga 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	5185
	AndresPalacios 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	5185
	Alberto Garcia 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	5070
	fco 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	5025
	Alfonso VC 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	4835
	Omar Esparza 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	4820
	Christian Suarez 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	4780
	amf 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	4770
	Johan Castro 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	4760

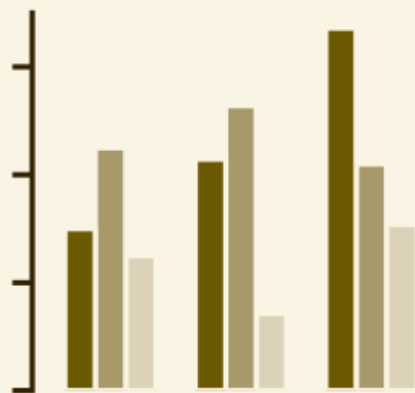
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	AngelHdz 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	4695
	Ale 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	4690
	Adriana 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	4680
	Francisco Bastidas 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	4650
	Samantha Mancias 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	4620
	Johanna 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	4620
	Emmanuel 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	4580
	Luis Rojas 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	4475
	Julian.Lopez 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	4475
	Luis Rojas 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	4475
	Julian.Lopez 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	4475
	Andrea T 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	4435
	maricelp 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	4385
	Andres Figueroa 1 intento	<div><div></div></div> ✓ 5	<div><div></div></div> 100%	5/5	4280

Directorio de visualizaciones

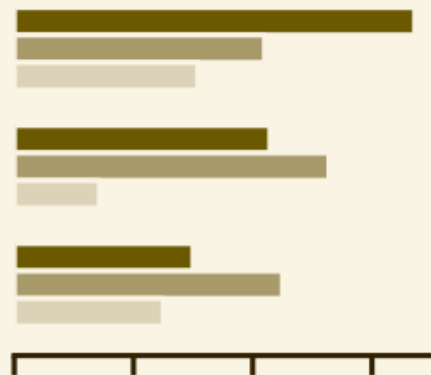
Cantidades



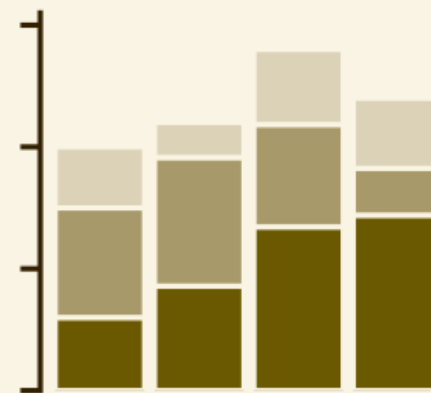
Grouped Bars



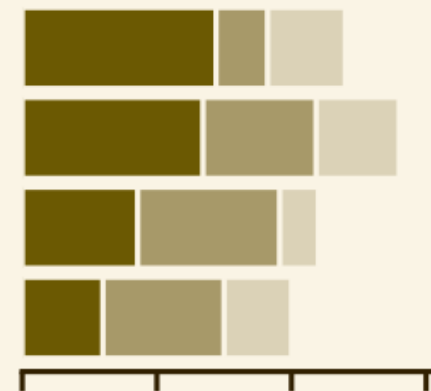
Grouped Bars



Stacked Bars



Stacked Bars

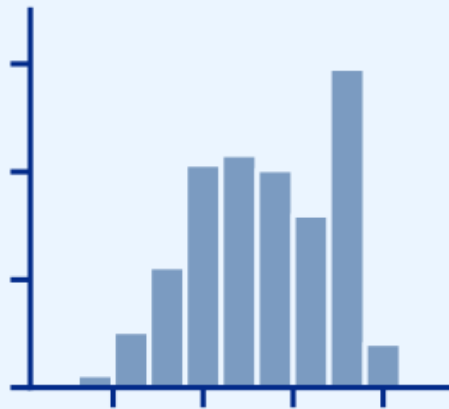


Heatmap

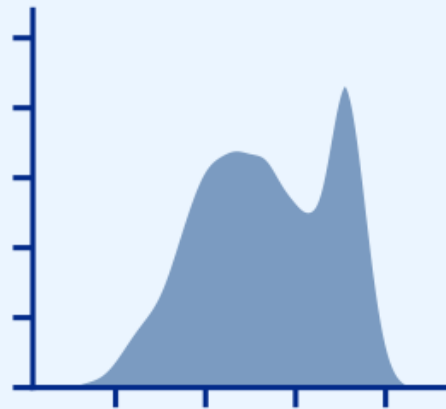


Distribuciones

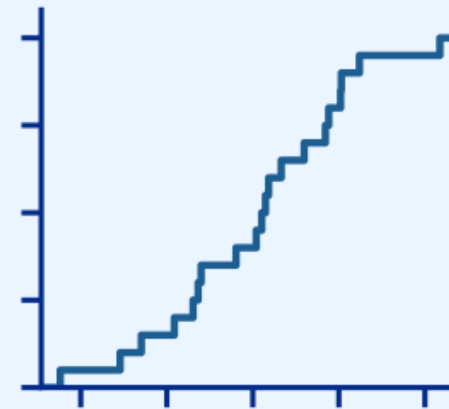
Histogram



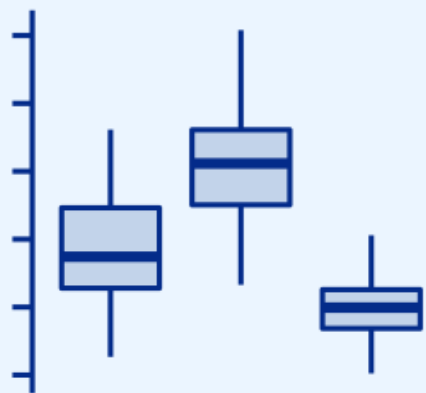
Density Plot



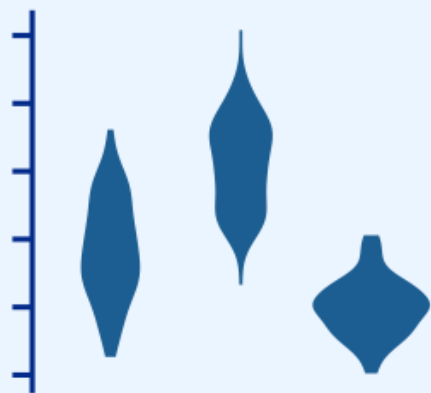
Cumulative Density



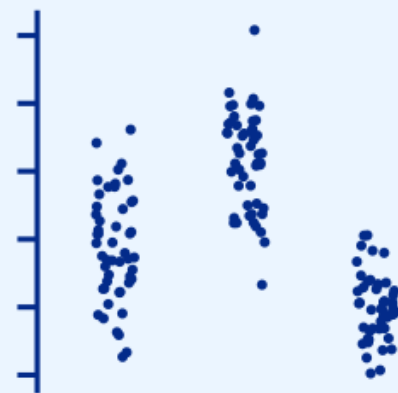
Boxplots



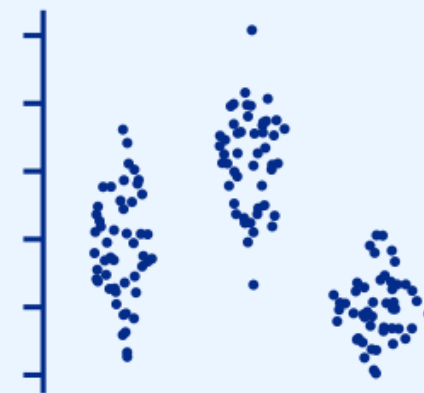
Violins



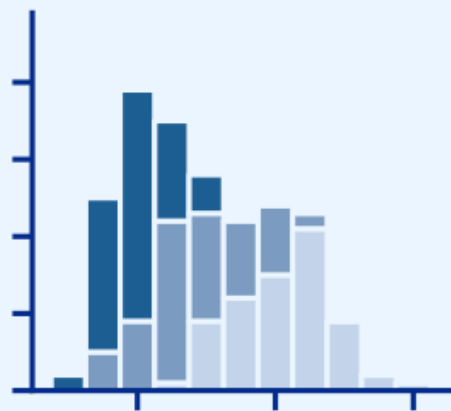
Strip Charts



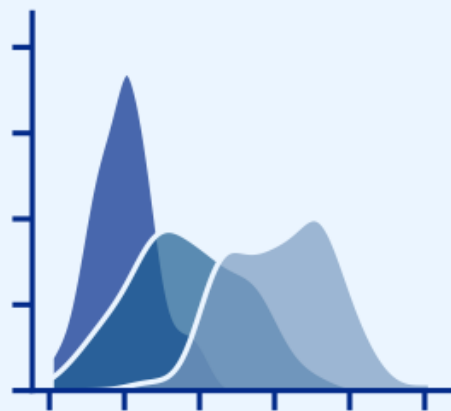
Sina Plots



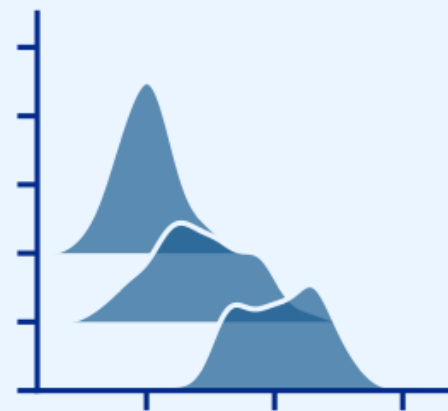
Stacked Histograms



Overlapping Densities

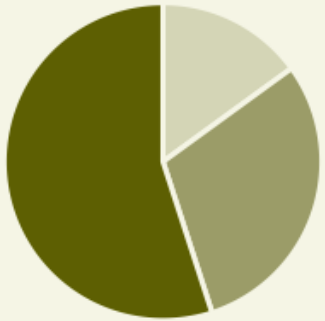


Ridgeline Plot

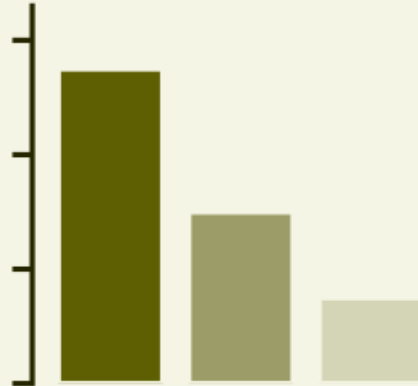


Proporciones

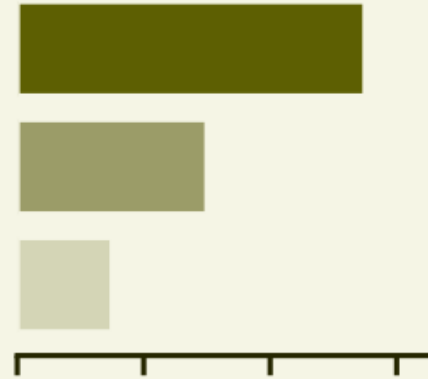
Pie Chart



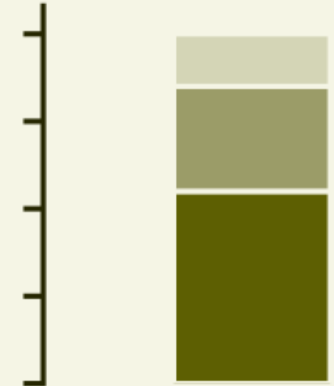
Bars



Bars



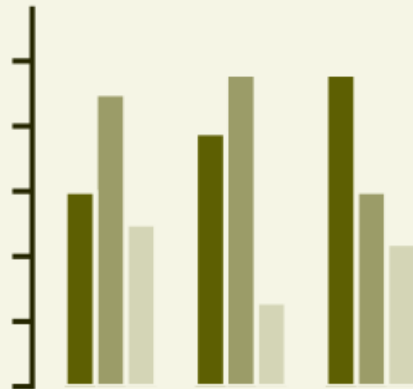
Stacked Bars



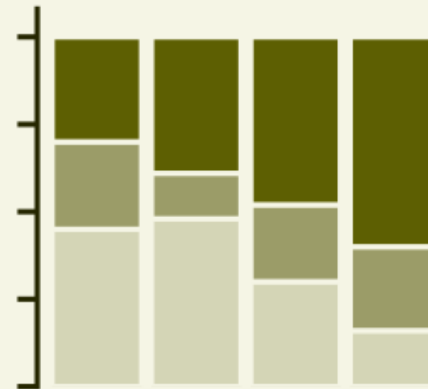
Multiple Pie Charts



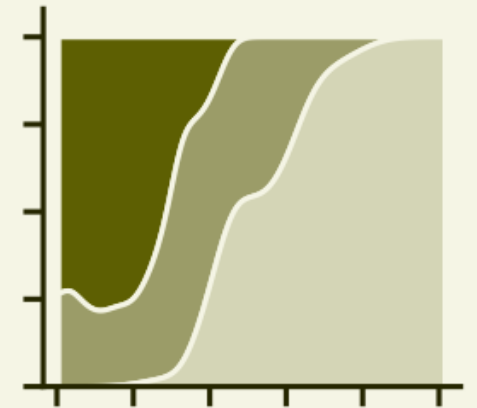
Grouped Bars



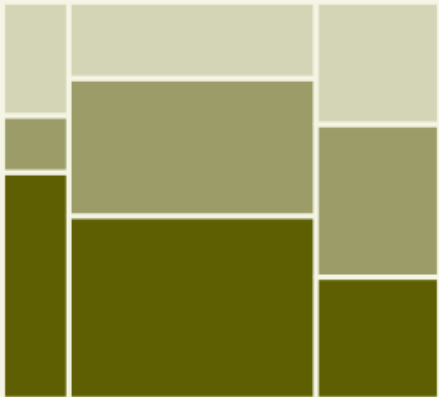
Stacked Bars



Stacked Densities



Mosaic Plot



Treemap

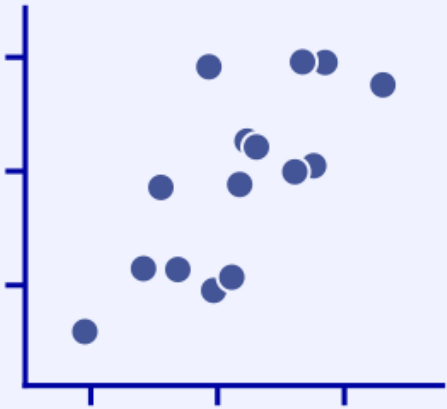


Parallel Sets

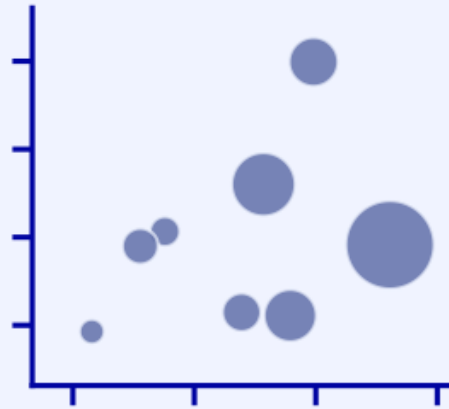


Relaciones X-Y

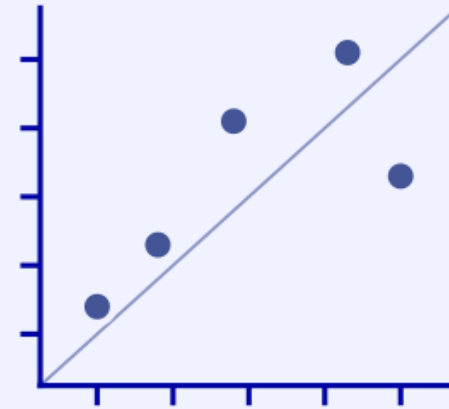
Scatterplot



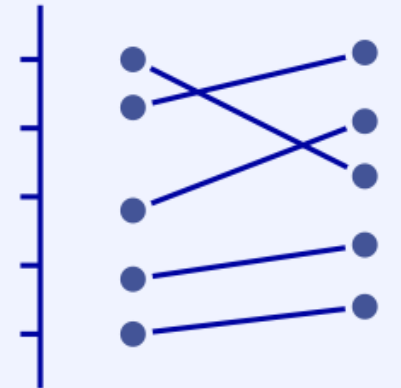
Bubble Chart



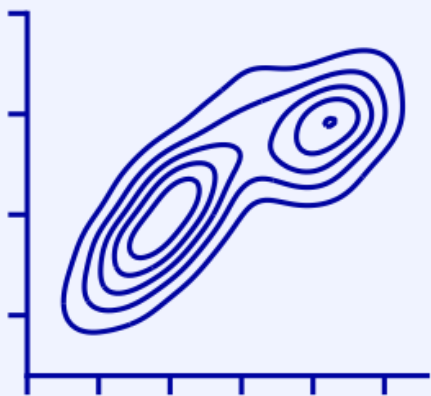
Paired Scatterplot



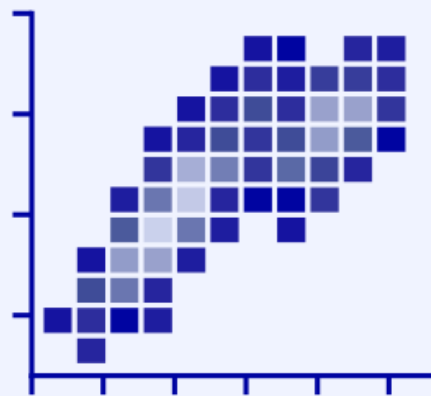
Slopegraph



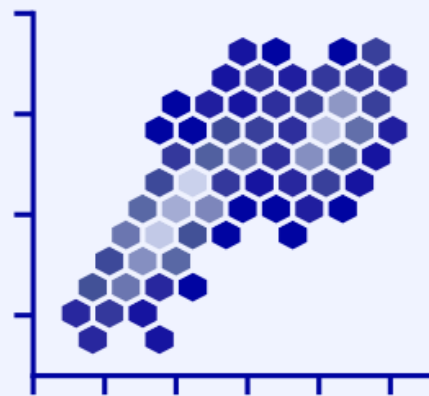
Density Contours



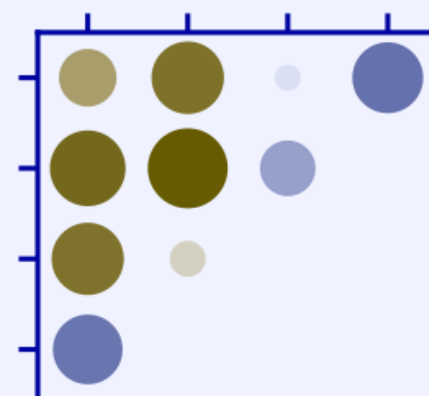
2D Bins



Hex Bins



Correlogram



Geospatial

Map



Choropleth



Cartogram

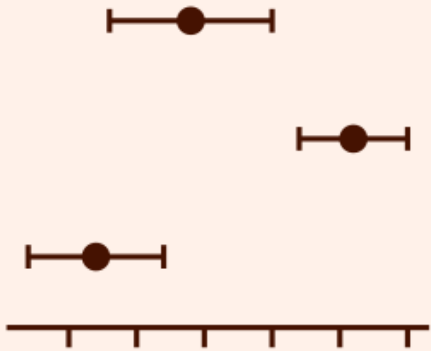


Cartogram Heatmap

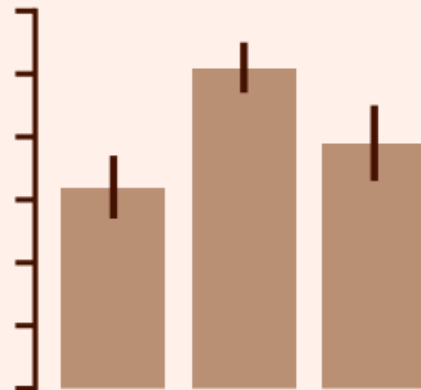


Incertidumbre/ Errores

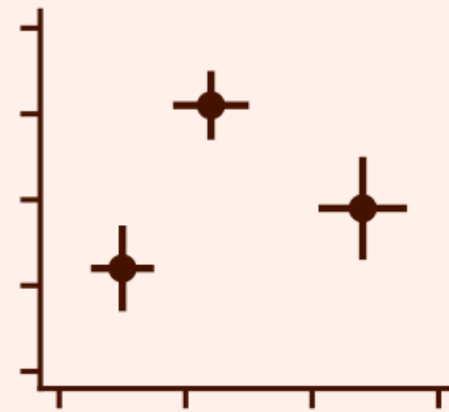
Error Bars



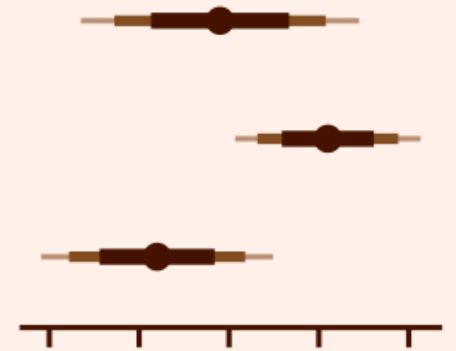
Error Bars



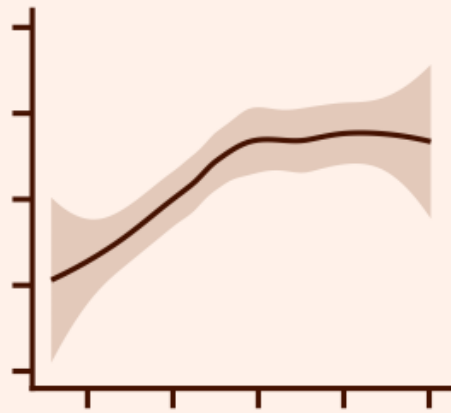
2D Error Bars



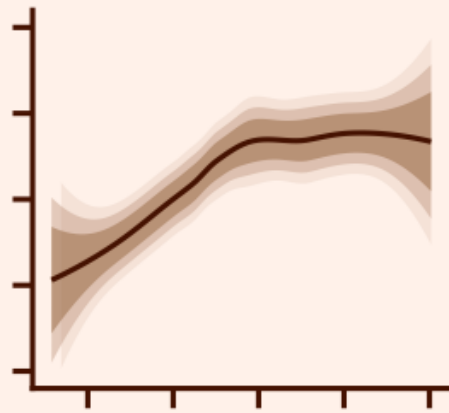
Graded Error Bars



Confidence Band



Graded Confidence Band



Fitted Draws

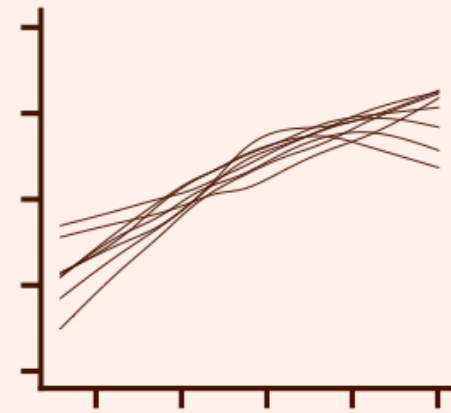


Chart Suggestions—A Thought-Starter

