

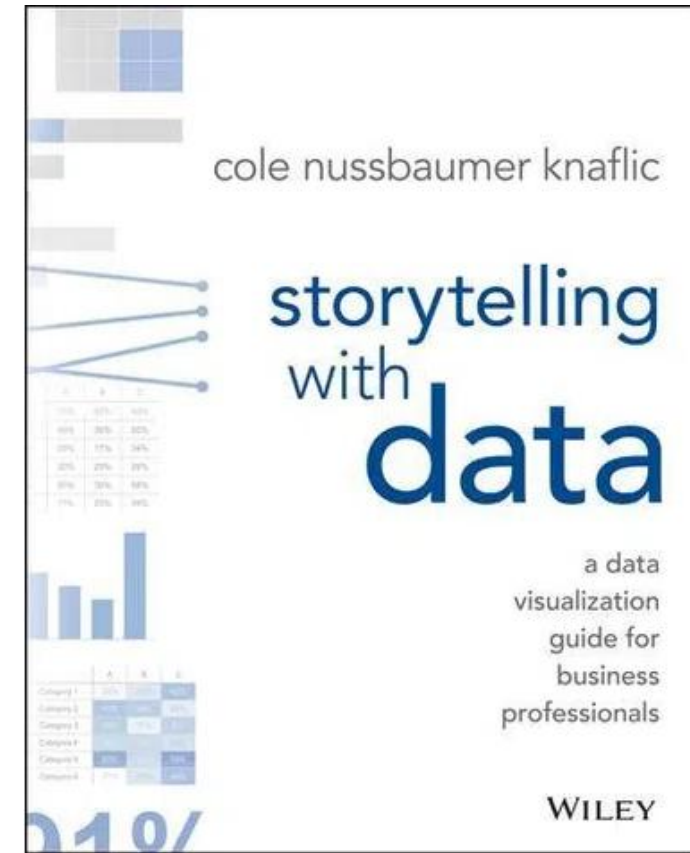
Introdução a Ciência de Dados



Professor: Alex Pereira

Storytelling with Data

- Cole Nussbaumer Knaflitz
 - Autora do livro *Storytelling with data*
 - Saiu do Google para se tornar consultora
 - ✓ de Storytelling
 - Empreendeu e criou vários produtos relacionados
 - ✓ [Podcast](#)
 - ✓ [Audiolivro](#)
 - ✓ [Blog](#)
 - ✓ [Workshops](#)
 - ✓ [Makeovers](#)



Principais Propósitos da Elaboração de Gráficos

- Análise Exploratória de Dados (Propósito Pesquisar)
 - Investigar os dados a fim de se chegar a conclusões relevantes
 - Como procurar pérolas em ostras
 - ✓ Abrir 100 ostras (testar 100 hipóteses) para encontrar 2 pérolas
- Análise Explanatória (Propósito Comunicar)
 - Facilitar a Comunicação de um achado relevante
 - ✓ É um erro apresentar a análise exploratória (apresentar as 100 ostras),
 - ✓ Enquanto se deveria apresentar a análise explanatória (as 2 pérolas)
 - use o tempo da audiência para comunicar informação

Conte os números 3

756395068473

658663037576

860372658602

846589107830

Conte os números 3

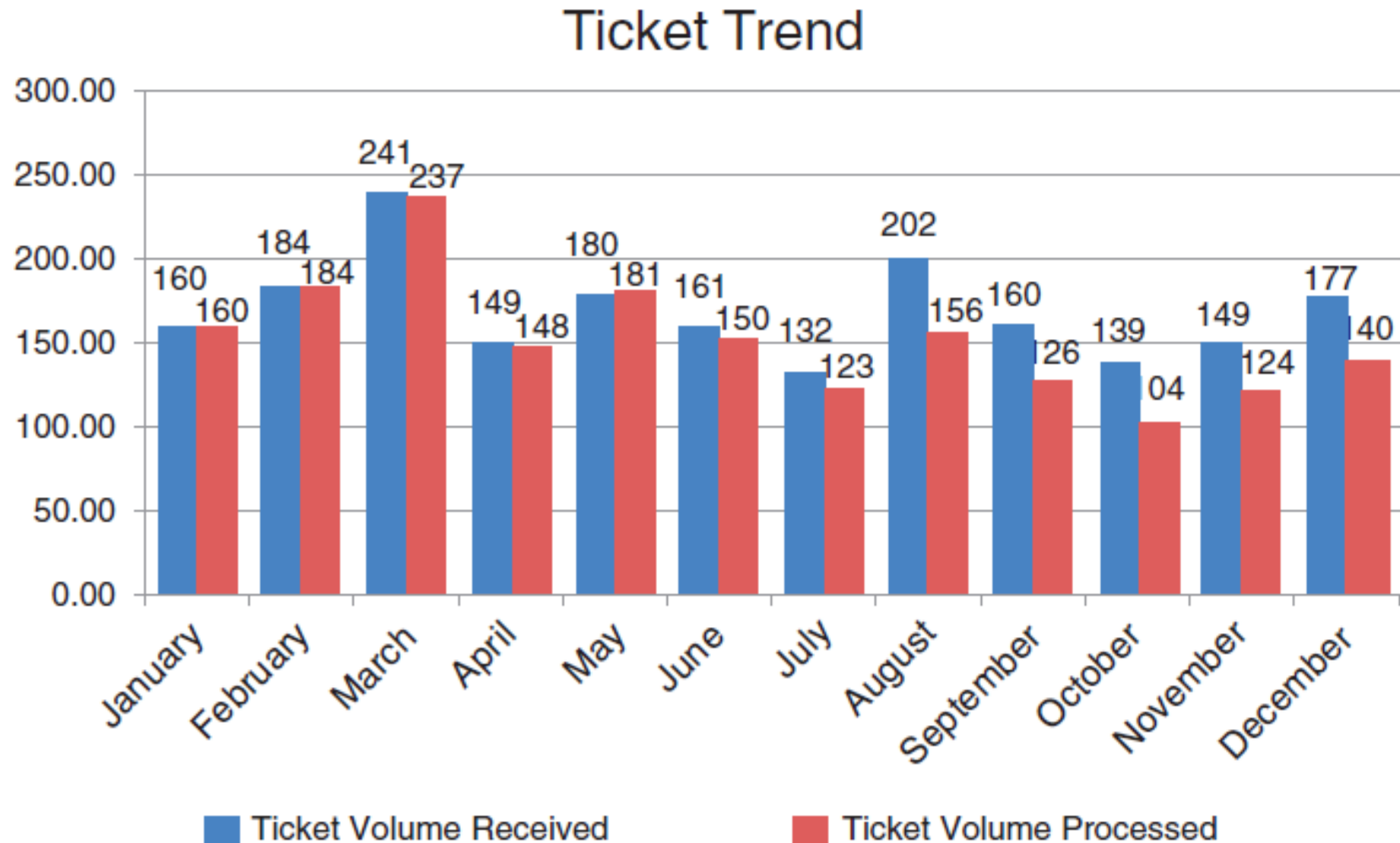
756**3**9506847**3**

65866**3**0**3**7576

860**3**72658602

8465891078**3**0

Exemplos e Contra-exemplos (1)

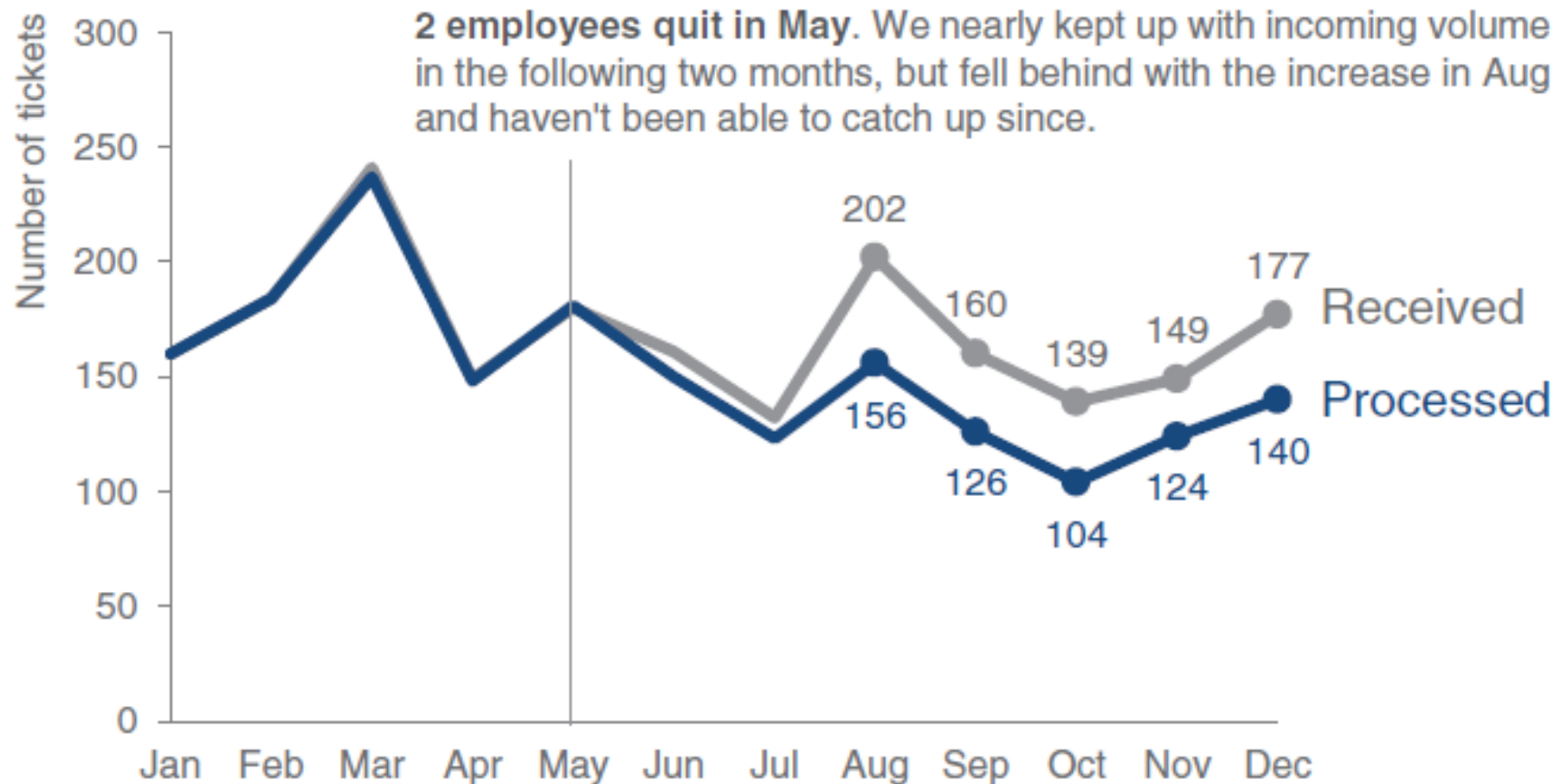


Exemplos e Contra-exemplos (2)

Please approve the hire of 2 FTEs

to backfill those who quit in the past year

Ticket volume over time



Atributos Pré-atenção



Orientation



Shape



Line length



Line width



Size



Curvature



Added marks



Enclosure



Hue



Intensity



Spatial position



Motion

FIGURE 4.4 Preattentive attributes

Dois modos de Pensar (Daniel Kahneman)



17 x 24

- Rápido
- Intuitivo
- Não trabalhoso
- Lento
- Trabalhoso
- Deliberado
- Ordenado



Dando ouvidos a sua intuição

- Um bastão e uma bola custam R\$ 1,10.
- O bastão custa um real a mais que a bola.

Quanto custa a bola?

- Mais de 50% dos estudantes de
 - Harvard, MIT e Princeton
 - ✓ deram uma resposta incorreta

Atributos Pré-atenção – Dois propósitos

- Direcionar a atenção do seu público
 - para onde você deseja que ele se concentre.
- Criar uma hierarquia visual de elementos para conduzir seu público
 - através das informações que você deseja comunicar
 - ✓ da maneira que deseja que eles as processem.

Atributos Pré-atenção – Exemplos em Texto

No preattentive attributes

What are we doing well? Great Products. These products are clearly the best in their class.

Replacement parts are shipped when needed. You sent me gaskets without me having to ask. Problems are resolved promptly. Bev in the billing office was quick to resolve a billing issue I had. General customer service exceeds expectations. The account manager even called to check in after normal business hours.

You have a great company – keep up the good work!

Color

What are we doing well? Great Products. **These products are clearly the best in their class.**

Replacement parts are shipped when needed. You sent me gaskets without me having to ask. Problems are resolved promptly. Bev in the billing office was quick to resolve a billing issue I had. General

Bold

What are we doing well? Great Products. These products are clearly the best in their class.

Replacement parts are shipped when needed. You sent me gaskets without me having to ask. Problems are resolved promptly. Bev in the billing office was quick to resolve a billing issue I had. General customer service exceeds expectations. The account manager even called to check in after normal business hours.

You have a great company – keep up the good work!

Italics

What are we doing well? Great Products. These products are clearly the best in their class.

Replacement parts are shipped when needed. You sent me gaskets without me having to ask. Problems are resolved promptly. Bev in the billing office was quick to resolve a billing issue I had. General

Atributos Pré-atenção – Hierarquia

What are we doing well?

Themes & example comments

- **Great products:** "These products are clearly the best in class."
- **Replacement parts are shipped when needed:**
"You sent me gaskets without me having to ask, and I really needed them, too!"
- **Problems are resolved promptly:** "Bev in the billing office was quick to resolve a billing issue I had."
- **General customer service exceeds expectations:**
"The account manager even called after normal business hours.
You have a great company - keep up the good work!"

Gráfico sem o uso de Atributos Pré-atenção

Top 10 design concerns

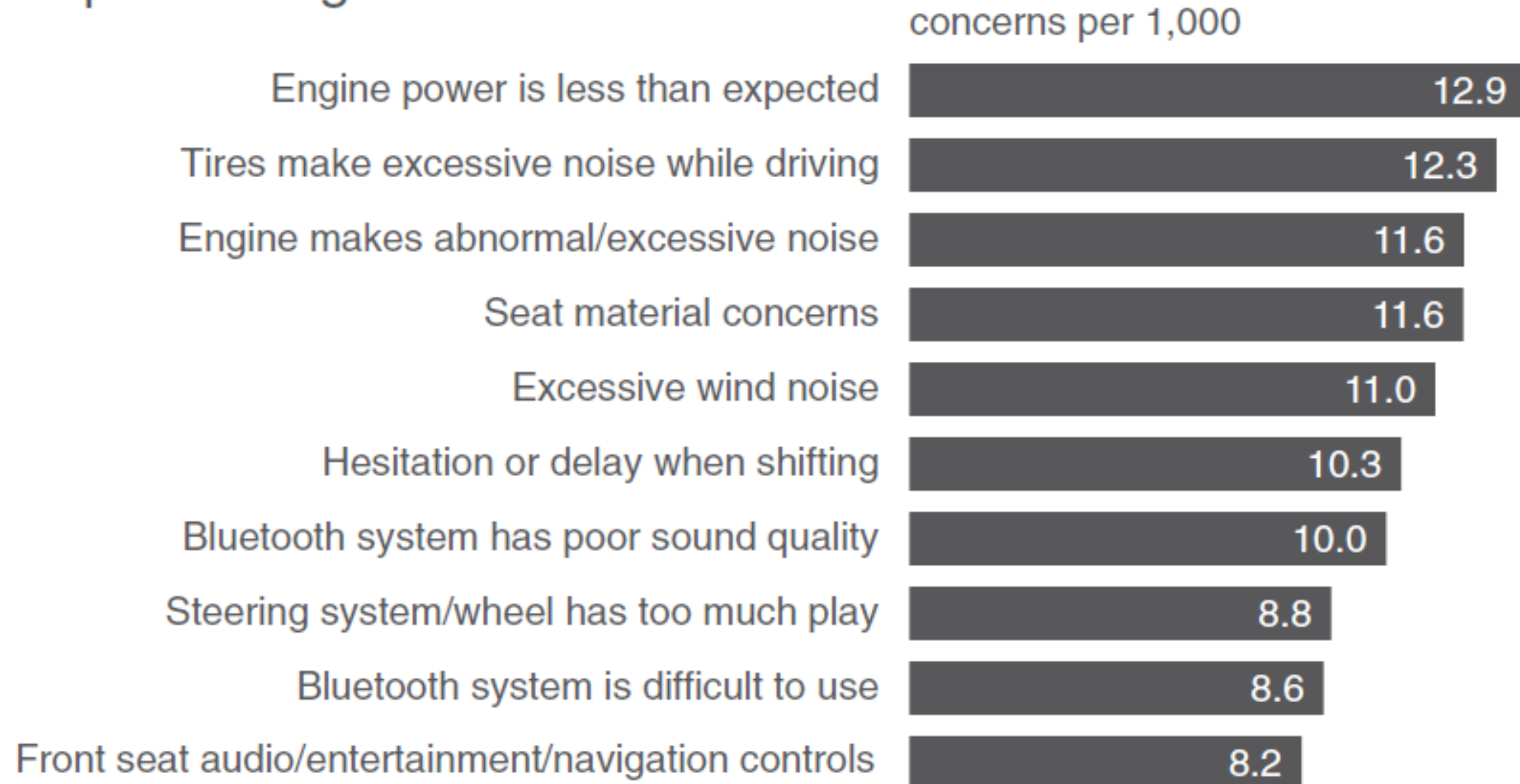
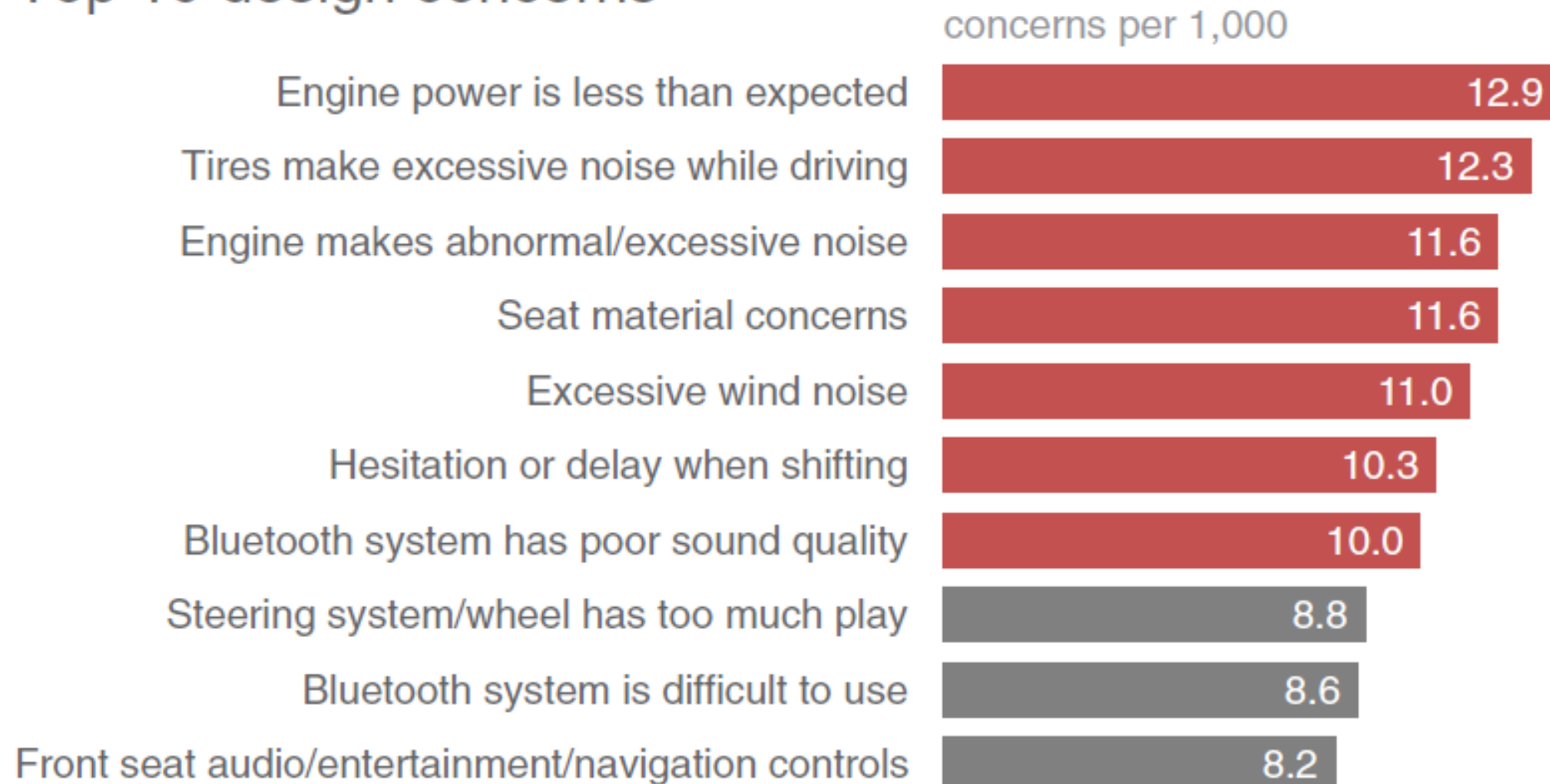


Gráfico *com* o uso de Atributos Pré-atenção

7 of the top 10 design concerns have 10 or more concerns per 1,000.

Discussion: is this an acceptable default rate?

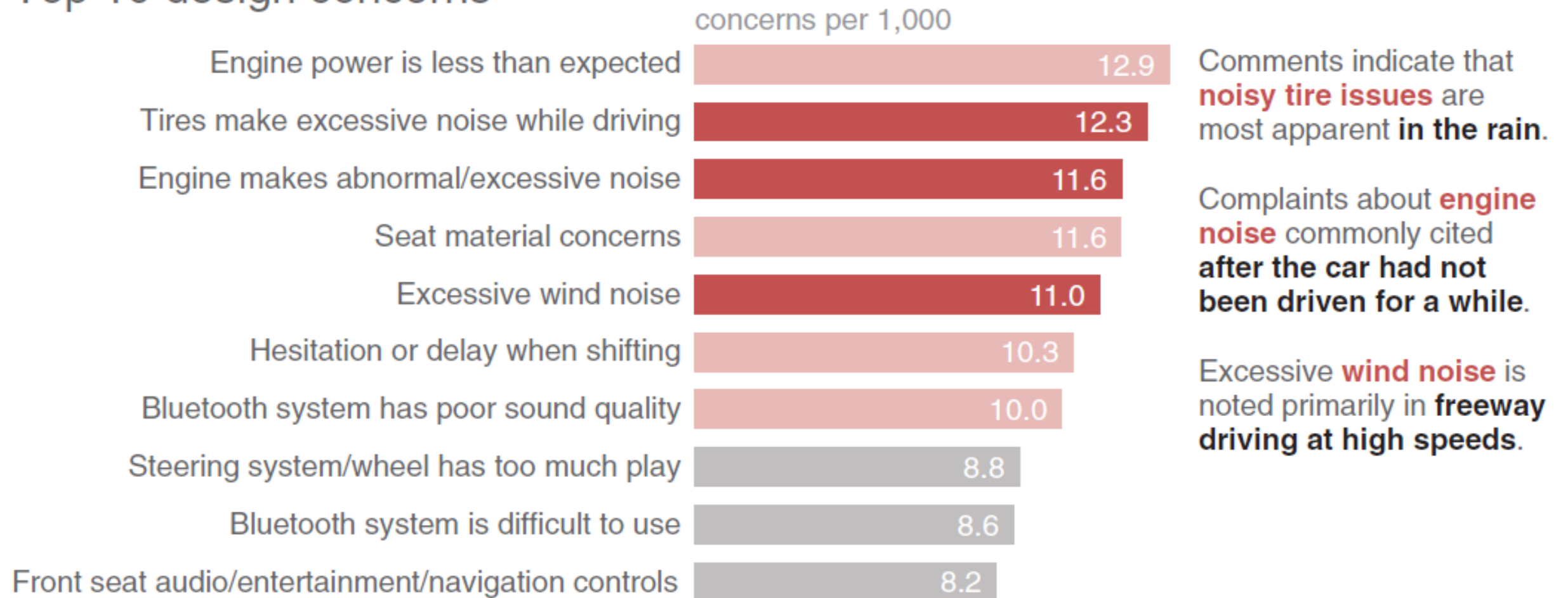
Top 10 design concerns



Mais conclusões expostas com ajuda dos atributos

Of the top design concerns, three are noise-related.

Top 10 design concerns



Clutter (Desordem/tumulto) = Inimigo

- Cada elemento adicionado a uma página (tela)
 - demanda esforço cognitivo do seu público
- Identifique qualquer coisa que não adiciona informação valiosa
 - e elimine-a.
- Esforço cognitivo é demandado para assimilar novas informações
 - Como designer de informação, como minimizar o esforço demandado da audiência ?
- Data-ink ratio (razão dados-tinta)
 - Quanto maior a proporção de tinta gastos em dados, melhor
- Signal-noise ratio (razão sinal-ruído)
 - Quanto mais sinal pra mesma quantidade de ruído, melhor

Princípios Gestalt de Percepção Visual

- Definidos pela Escola Gestalt de Psicologia nos anos 1900
 - Para entender como indivíduos percebem ordem no mundo a sua volta
 - ✓ por meio da absorção de estímulos visuais
- 6 princípios
 - proximity,
 - similarity,
 - enclosure,
 - closure,
 - continuity, e
 - connection.

Proximity (Proximidade)

- Tendemos a perceber objetos fisicamente próximos
 - como pertencentes ao mesmo grupo



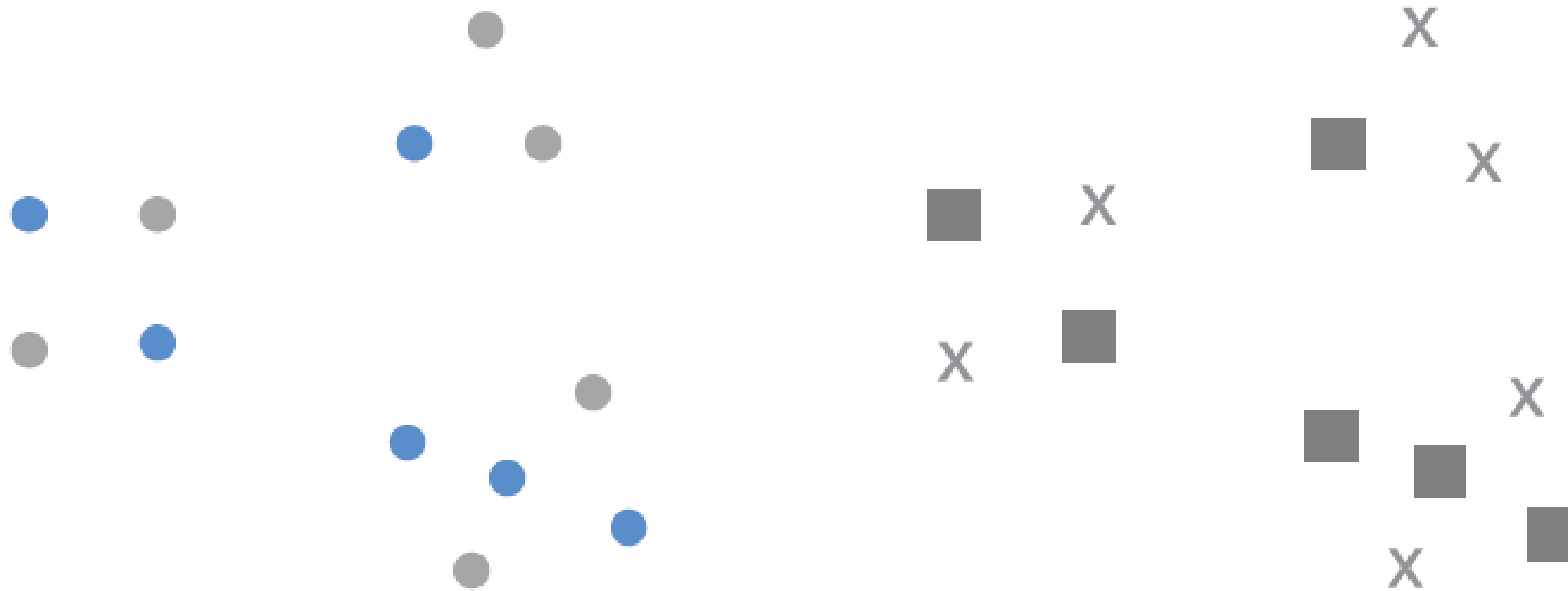
Proximity (Proximidade)

- Ao mudar o espaçamento entre os pontos
 - nossos olhos são atraídos para as colunas (à esquerda)
 - ✓ ou para as linhas (à direita)



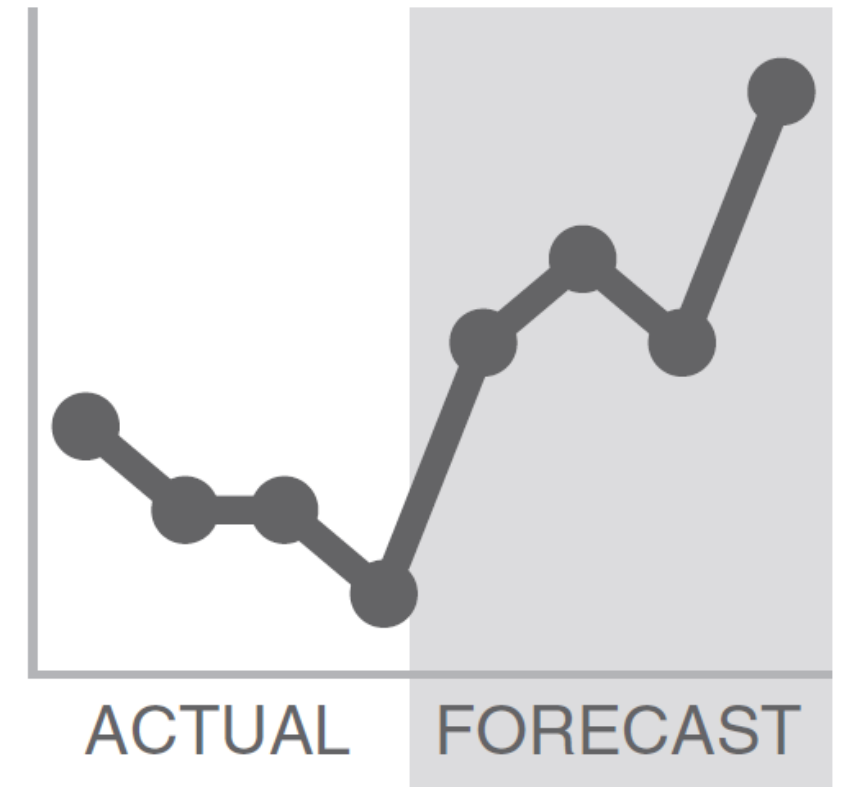
Similarity (Similaridade)

- Objetos de cor, forma, tamanho ou orientação similar
 - são percebidos como pertencentes a um mesmo grupo



Enclosure (Enclausuramento)

- Objetos fisicamente enclausurados
 - são percebidos como pertencentes a um mesmo grupo



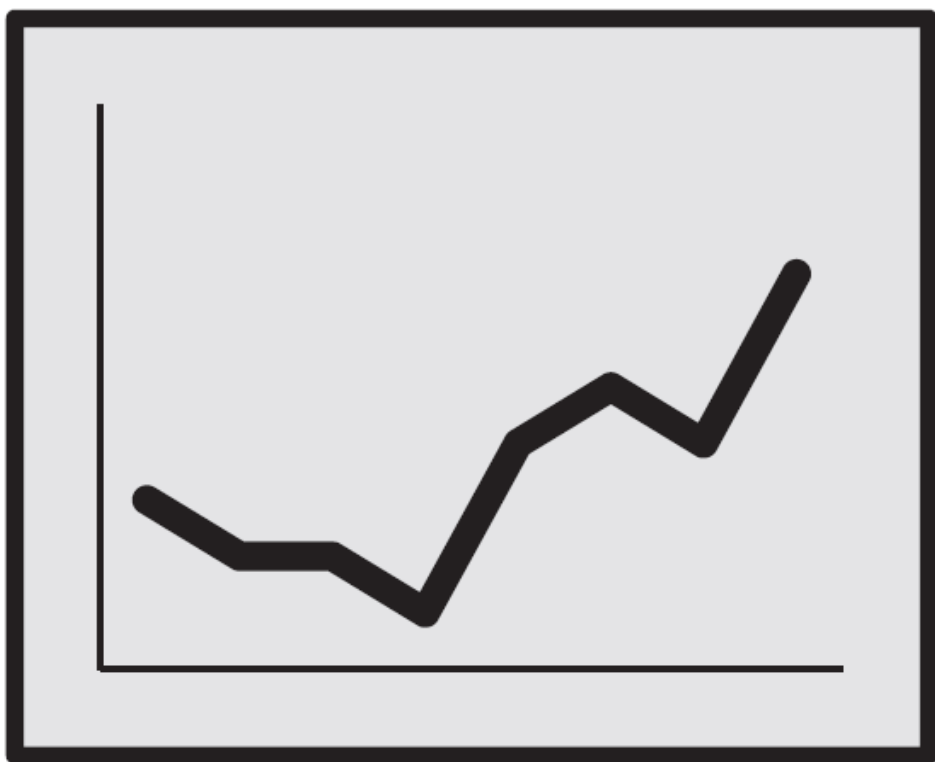
Closure (Fechamento)

- Pessoas gostam de encaixar construtos em coisas que já conhecem
 - esses tipos de objetos são percebidos como apenas 1.



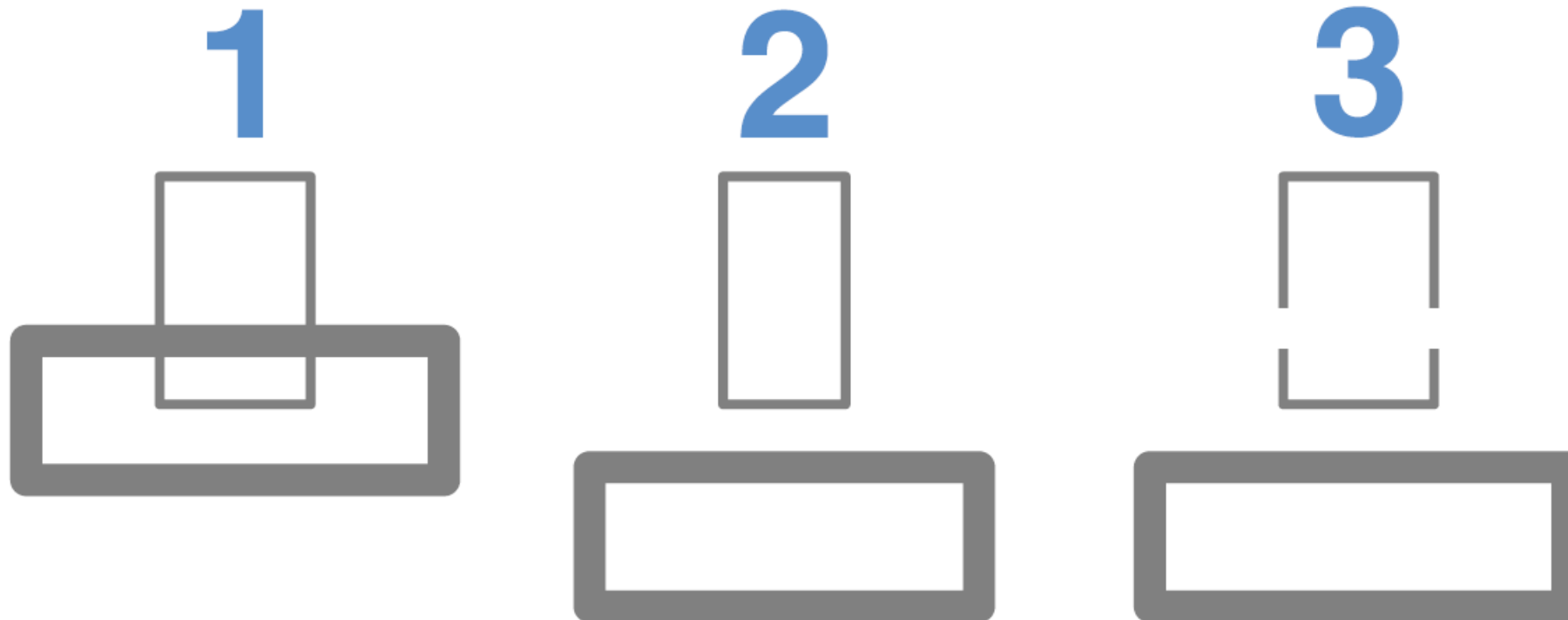
Closure (Fechamento)

- Pelo princípio do fechamento
 - as bordas externas são desnecessárias



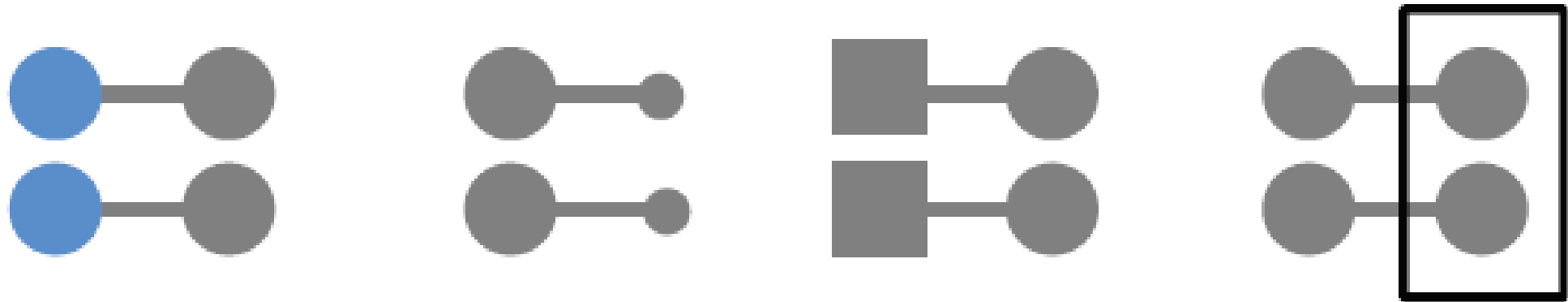
Continuity (Continuidade)

- Nossos olhos procuram continuidade, até onde não existe.
- Se separarmos os objetos em (1)
 - esperamos ver os objetos em (2)
 - ✓ Mas a configuração em (3) também é possível



Connectivity (Conexão)

- Percebemos objetos conectados como pertencentes ao mesmo grupo
 - a conexão tem um valor associado maior do que
 - ✓ cor, tamanho e forma similares



Connectivity (Conexão)

- Usamos este princípio no gráfico de linhas
 - para ajudar nossos olhos enxergar ordem nos dados

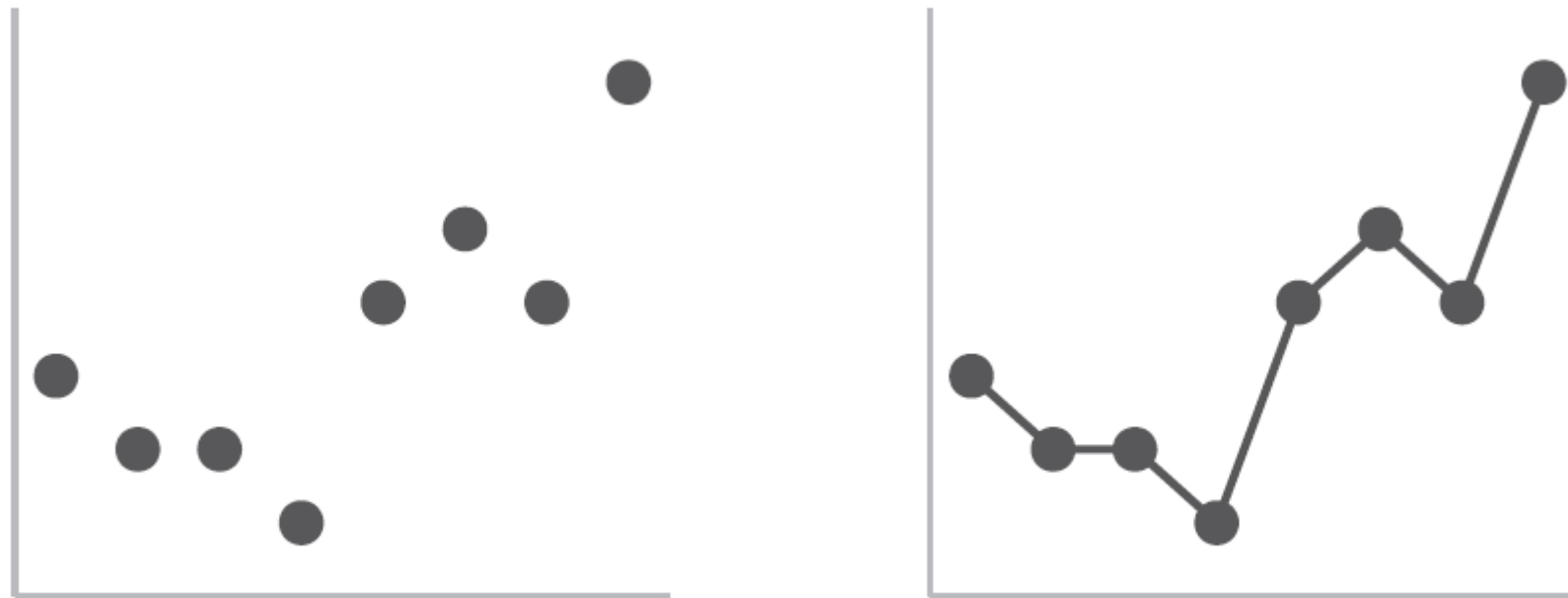
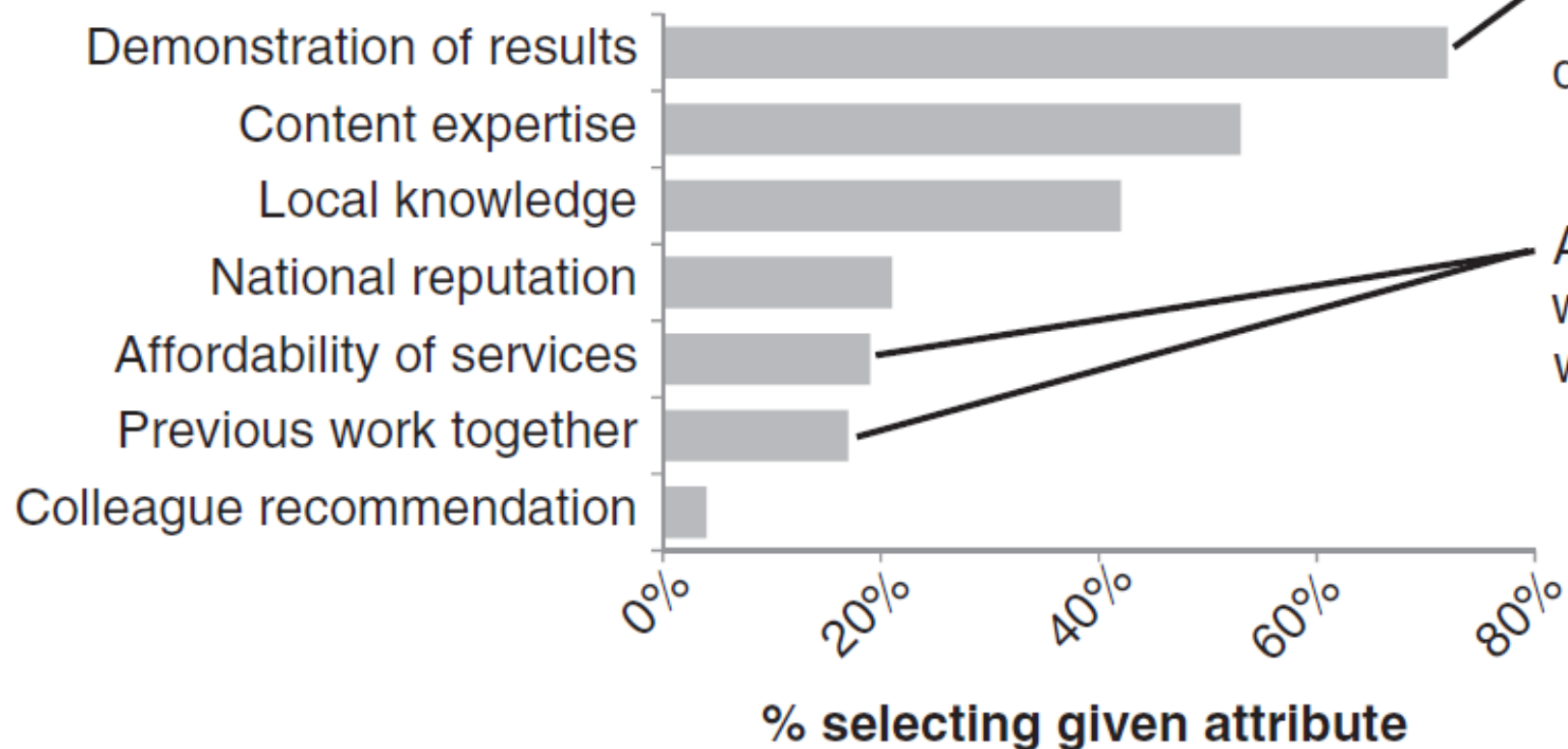


FIGURE 3.12 Lines connect the dots

Aplicando os princípios

Demonstrating effectiveness is most important consideration when selecting a provider

In general, what attributes are the most important to you in selecting a service provider?
(Choose up to 3)



Survey shows that demonstration of results is the single most important dimension when choosing a service provider.

Affordability and experience working together previously, which were hypothesized to be very important in the decision making process, were both cited less frequently as important attributes.

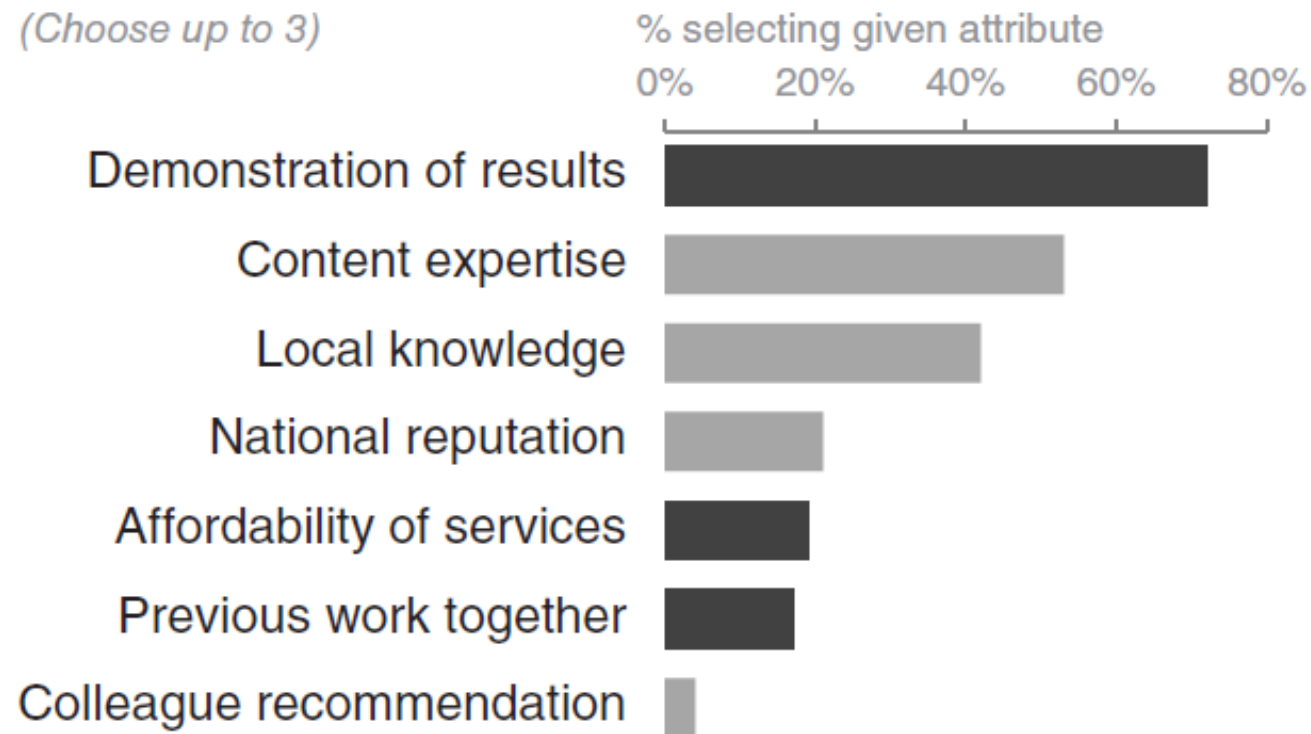
Data source: xyz; includes N number of survey respondents. Note that respondents were able to choose up to 3 options.

Aplicando os princípios

Demonstrating effectiveness is most important consideration when selecting a provider

In general, **what attributes** are the most important to you in selecting a service provider?

(Choose up to 3)



Survey shows that **demonstration of results** is the single most important dimension when choosing a service provider.

Affordability and **experience working together previously**, which were hypothesized to be very important in the decision making process, were both cited less frequently as important attributes.

Data source: xyz; includes N number of survey respondents.
Note that respondents were able to choose up to 3 options.

Aplicando os princípios

Demonstrating effectiveness is most important consideration when selecting a provider

In general, **what attributes** are the most important to you in selecting a service provider?

(Choose up to 3)



Data source: xyz; includes N number of survey respondents.
Note that respondents were able to choose up to 3 options.

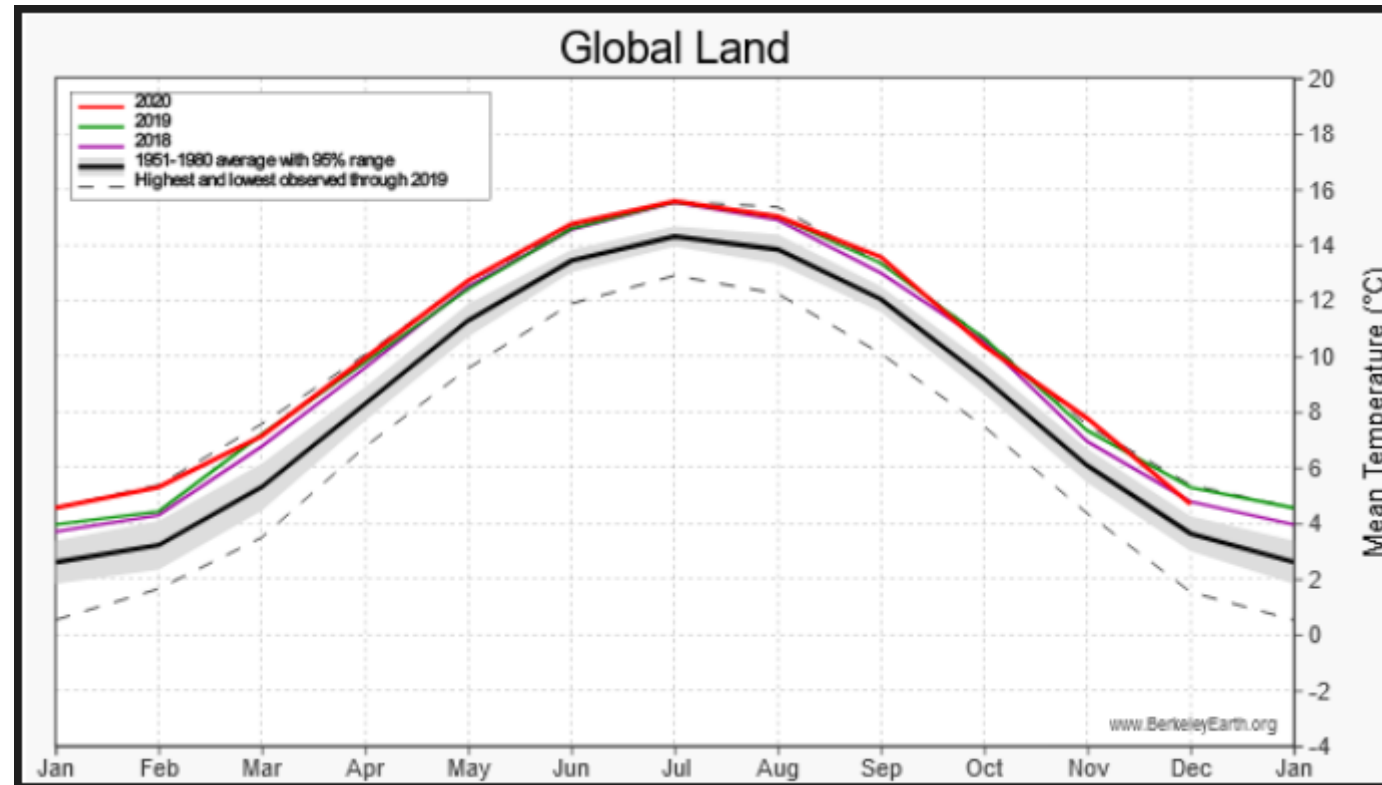
Principal alteração foi o alinhamento à esquerda, em vez de centralizado.

Survey shows that **demonstration of results** is the single most important dimension when choosing a service provider.

Affordability and **experience working together previously**, which were hypothesized to be very important in the decision making process, were both cited less frequently as important attributes.

Exercício 1.1

- Repetir o gráfico abaixo conforme instruções do [Notebook ipynb](#)



Exercício 1.1

Referências Bibliográficas

- KNAFLIC, C. N. (2018). Storytelling with data: a data visualization guide for business professionals.
- McKinney, W. (2018). Python for data analysis: Data wrangling with pandas, NumPy, and IPython.
- HURST, L. (2020). Hands on with Google Looker Studio: a data citizen's survival guide.
<https://onlinelibrary.wiley.com/doi/book/10.1002/9781119616238>.
- WEXLER, S., SHAFFER, J., & COTGREAVE, A. (2017). The big book of dashboards: visualizing your data using real-world business scenarios.
- <https://www.storytellingwithdata.com/podcast>
- <https://seaborn.pydata.org/>
- <https://pandas.pydata.org/docs/>
- <https://d3js.org>
- <https://numpy.org/doc/stable/reference/index.html>