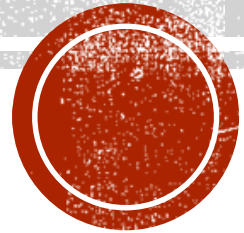
COMO MENTIR COM GRÁFICOS

Camila de Barros



PORCENTAGEM DE TRABALHADORES QUE TIRARAM FÉRIAS DE UMA SEMANA

http://hbrbr.uol.com.br/como-mentir-com-graficos/

EIXO Y TRUNCADO

PORCENTAGEM DE TRABALHADORES QUE TIRARAM FÉRIAS DE UMA SEMANA

ABORDAGEM ORIGINAL

O truncamento pode criar uma falsa sensação de terminalidade. Estudos mostram que nosso cérebro atribui valores metafóricos a sinais visuais (por exemplo, a linha que sobe é positiva, a que baixa é negativa). Isso significa que podemos processar a linha deste gráfico como se estivesse se aproximando do zero e interpretar que "ninguém mais tira férias de uma semana".

ABORDAGEM REVISTA

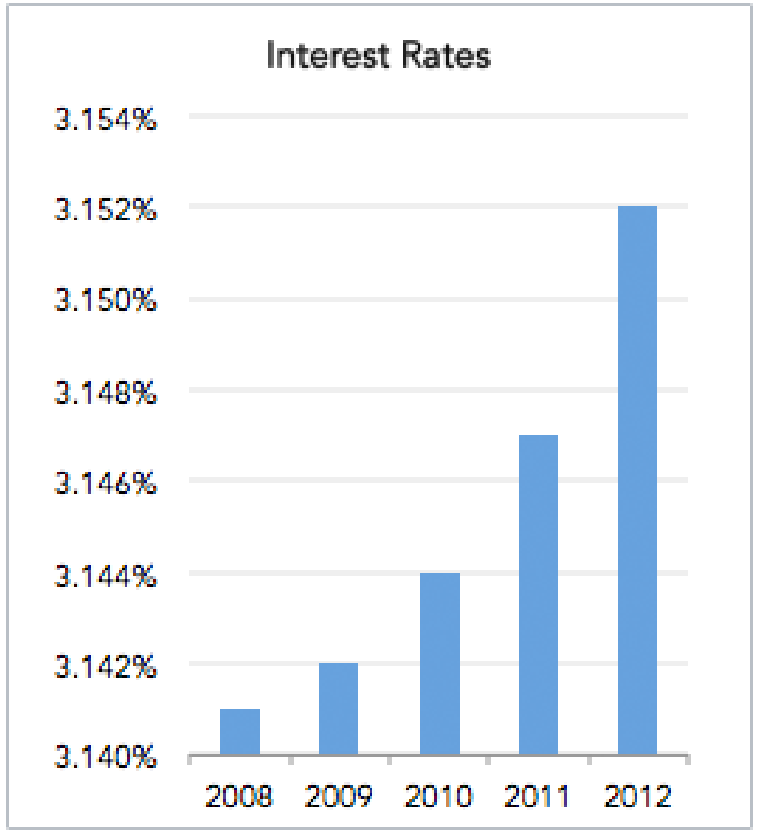
A linha da tendência divide o espaço entre aqueles que tiraram férias (embaixo) e aqueles que não tiraram (em cima). Ao incluir o eixo Y inteiro, temos a informação completa sobre quem tirou e quem não tirou férias. Antes, grande parte estava escondida na versão truncada.

http://hbrbr.uol.com.br/como-mentir-com-graficos/

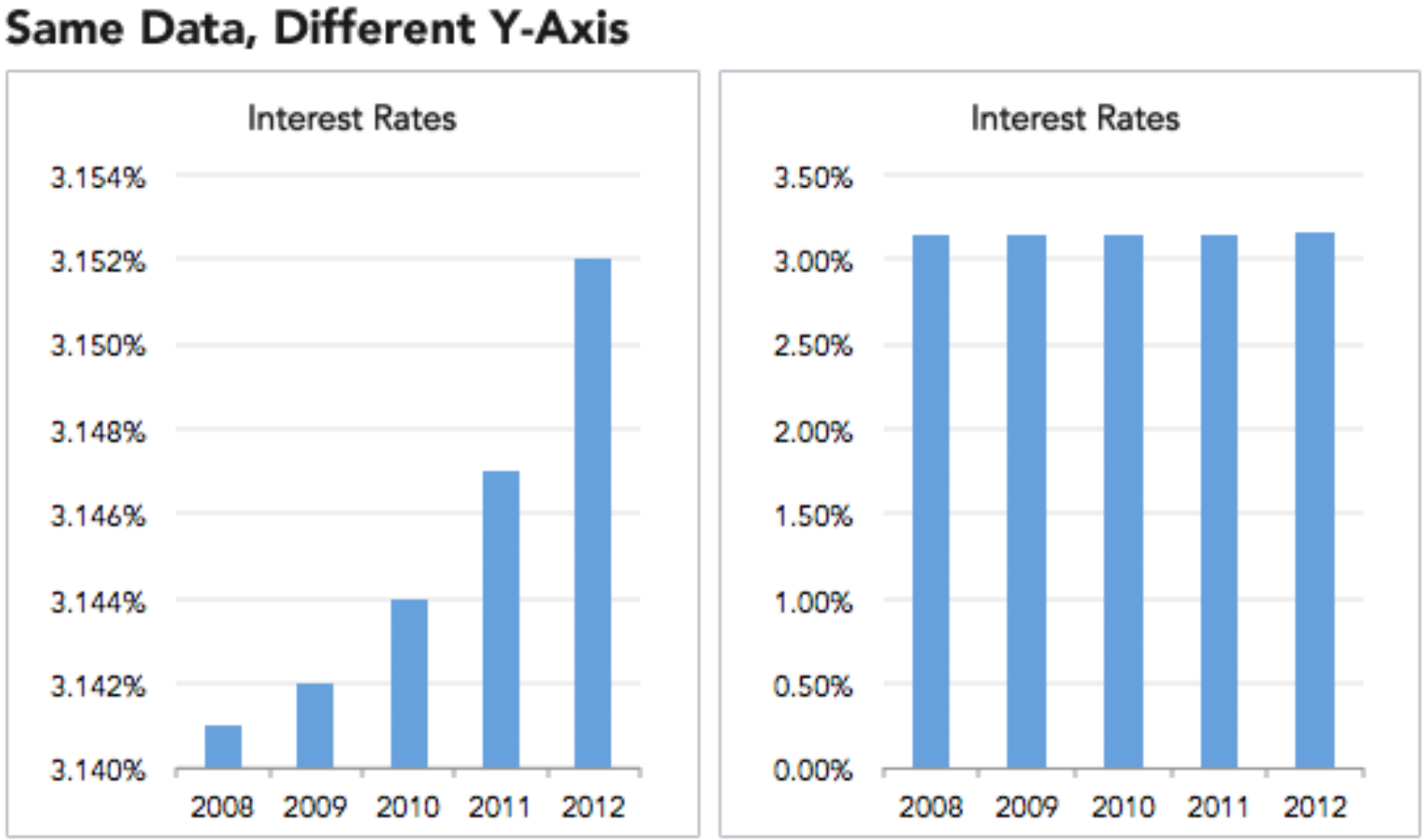
EIXO Y TRUNCADO

http://hypsypops.com/axes-evil-lie-graphs/

EIXO Y TRUNCADO



EIXO Y TRUNCADO



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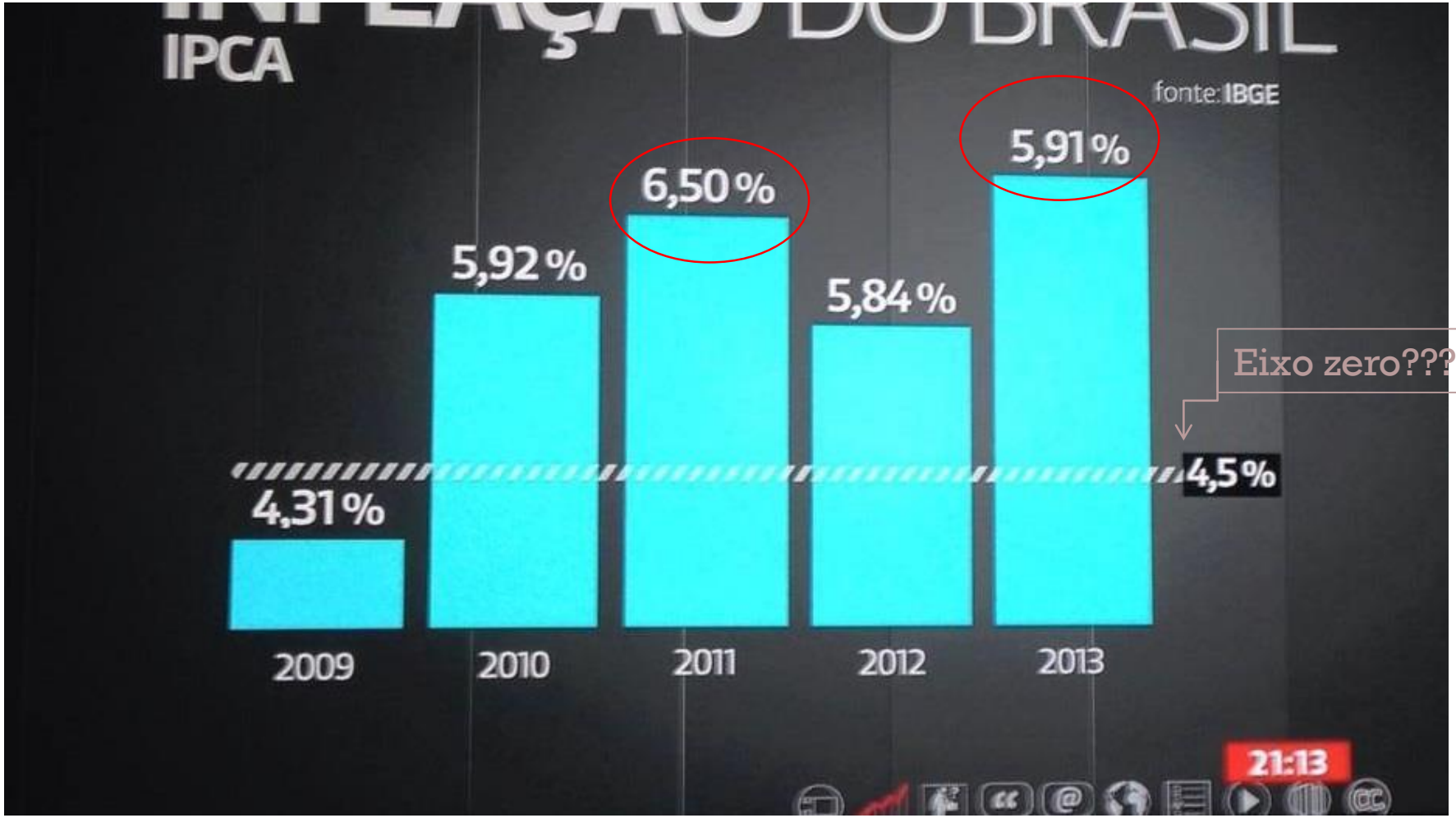
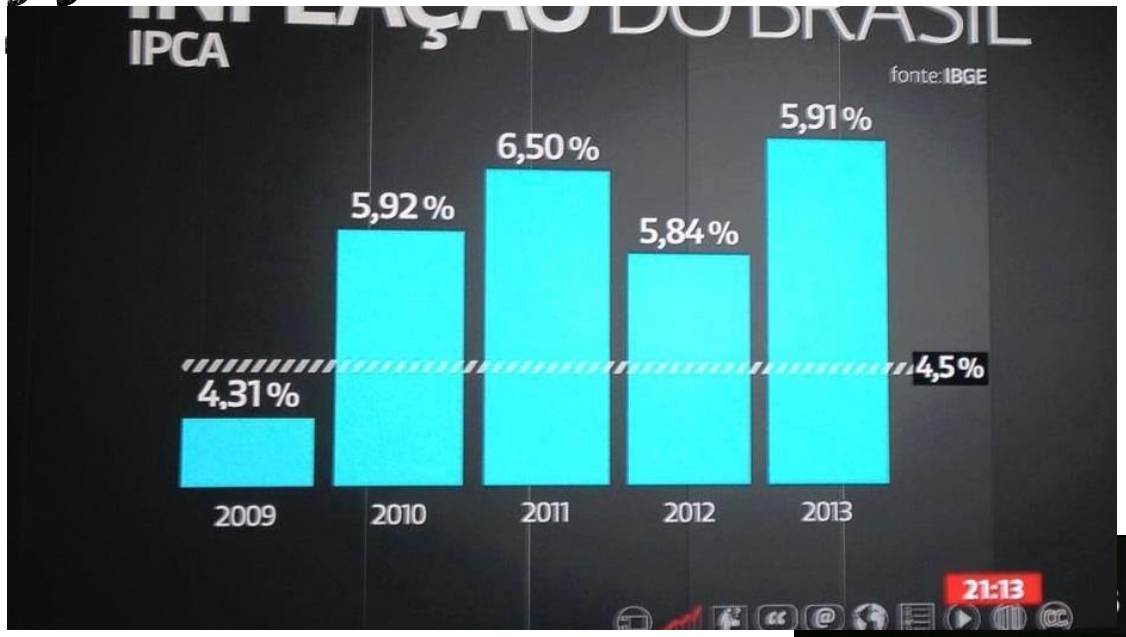

IPCA
fonte: IBGE
4,31%
5,92%
6,50%
5,84%
5,91%
4,5%
2009
2010
2011
2012
2013
21:13

Eixo zero???

???


IPCA
fonte: IBGE
4,31%
5,92%
6,50%
5,84%
5,91%
4,5%
2009
2010
2011
2012
2013
21:13


INFLAÇÃO DO BRASIL
IPCA
fonte: IBGE
4,31%
5,92%
6,50%
5,84%
5,91%
CENTRO DA META
4,50%
2009
2010
2011
2012
2013
G1.com.br
21:05

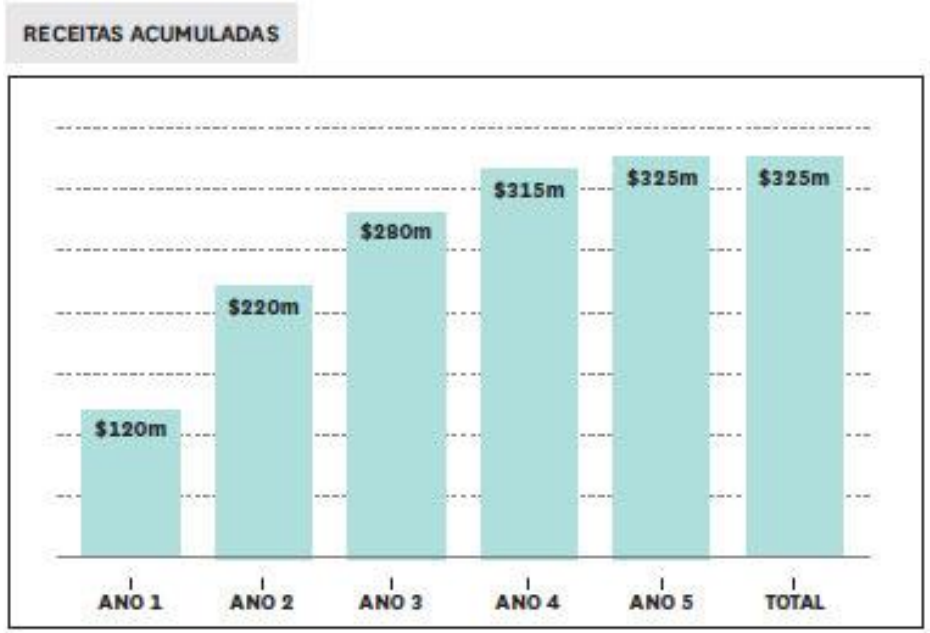
RECEITAS ACUMULADAS

ABORDAGEM ORIGINAL

Cada barra inclui os valores de crescimento de todos os anos anteriores. Assim, em cinco anos, o crescimento do primeiro ano é contado cinco vezes.

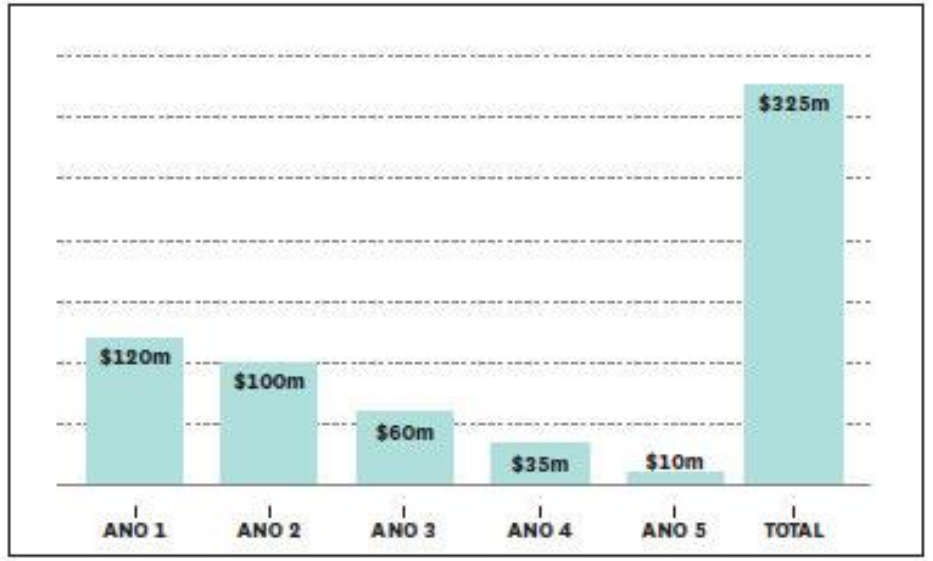
http://hbrbr.uol.com.br/como-mentir-com-graficos/

FALSO ACÚMULO



ABORDAGEM ORIGINAL

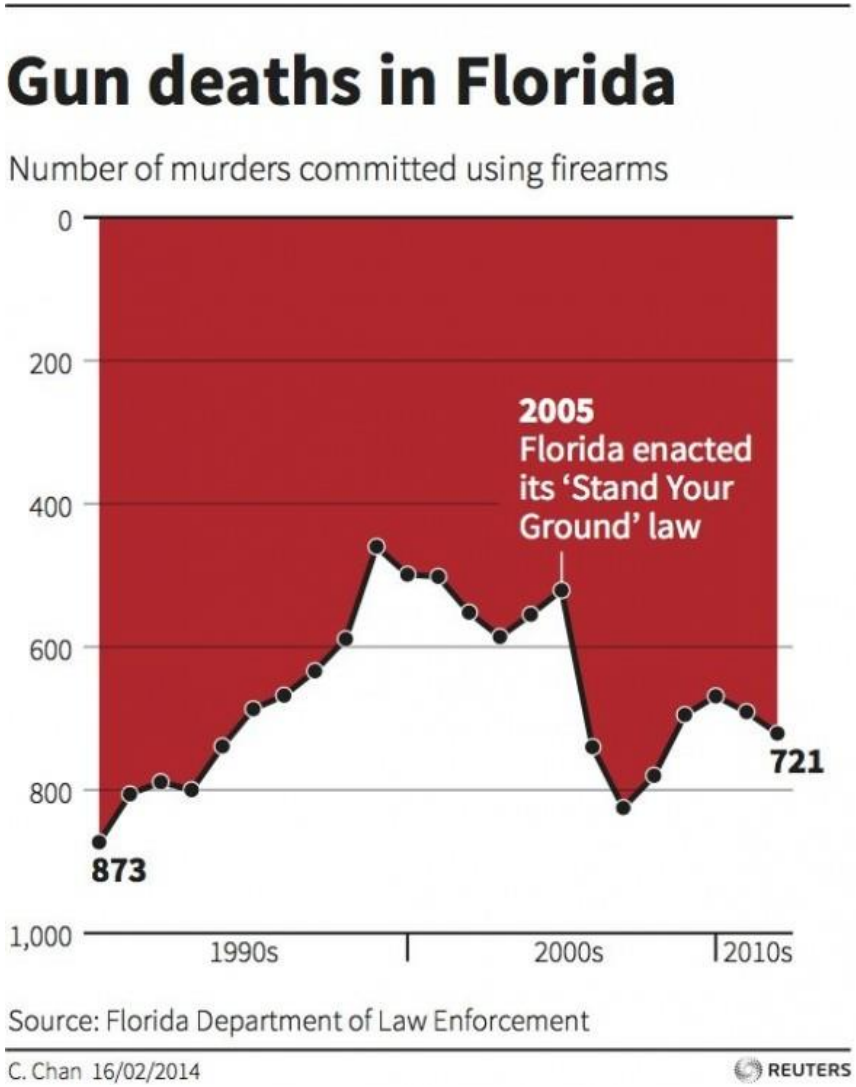
Cada barra inclui os valores de crescimento de todos os anos anteriores. Assim, em cinco anos, o crescimento do primeiro ano é contado cinco vezes.



ABORDAGEM REVISTA

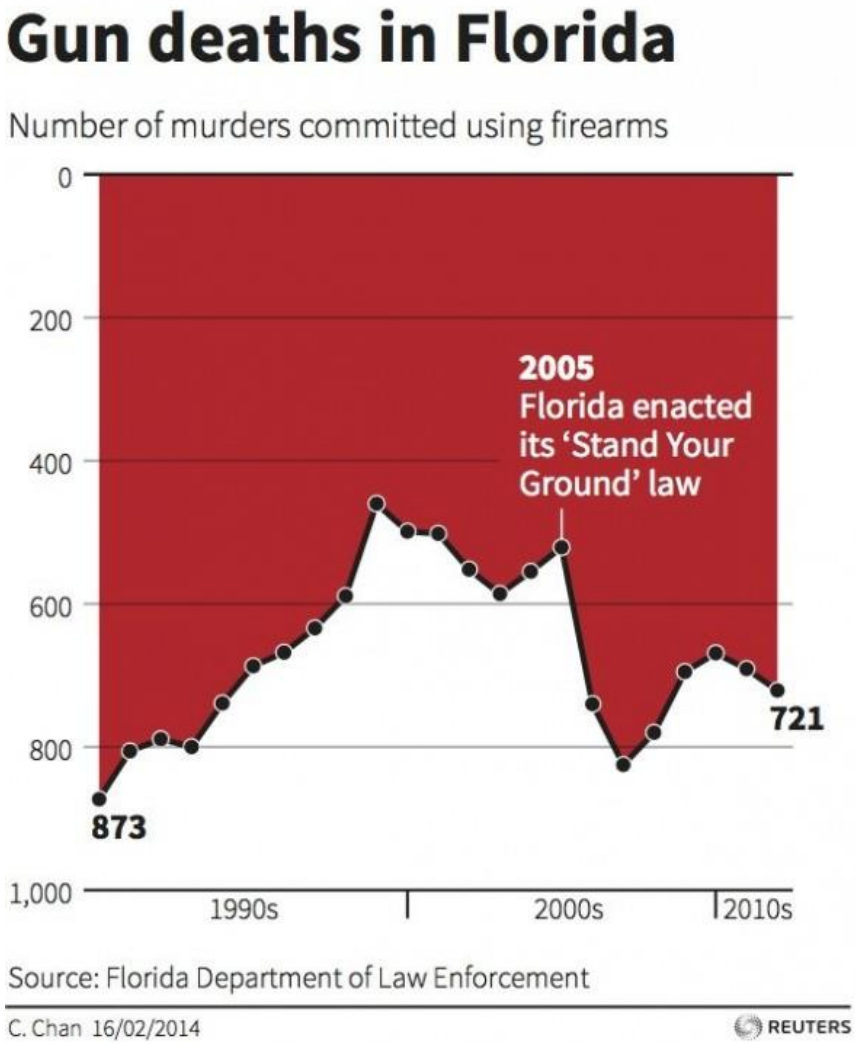
Quando o crescimento de cada ano é mostrado separadamente, surge uma imagem clara da queda de desempenho.

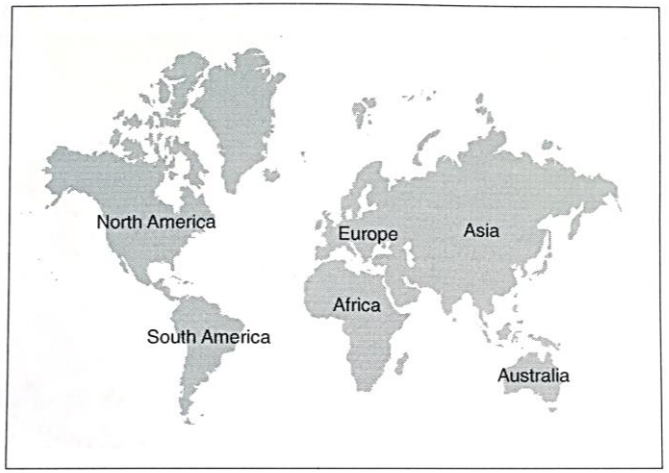
http://hbrbr.uol.com.br/como-mentir-com-graficos/



Número de mortes por arma de fogo está diminuindo?

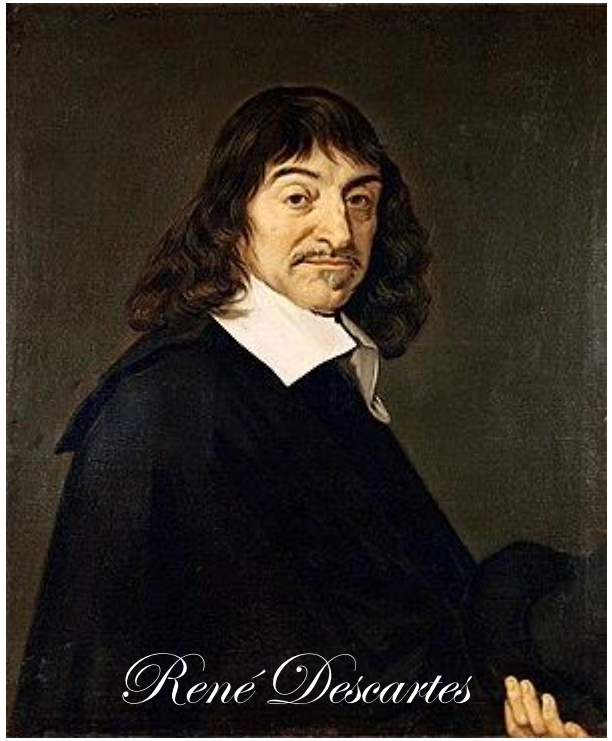
EIXO Y INVERTIDO

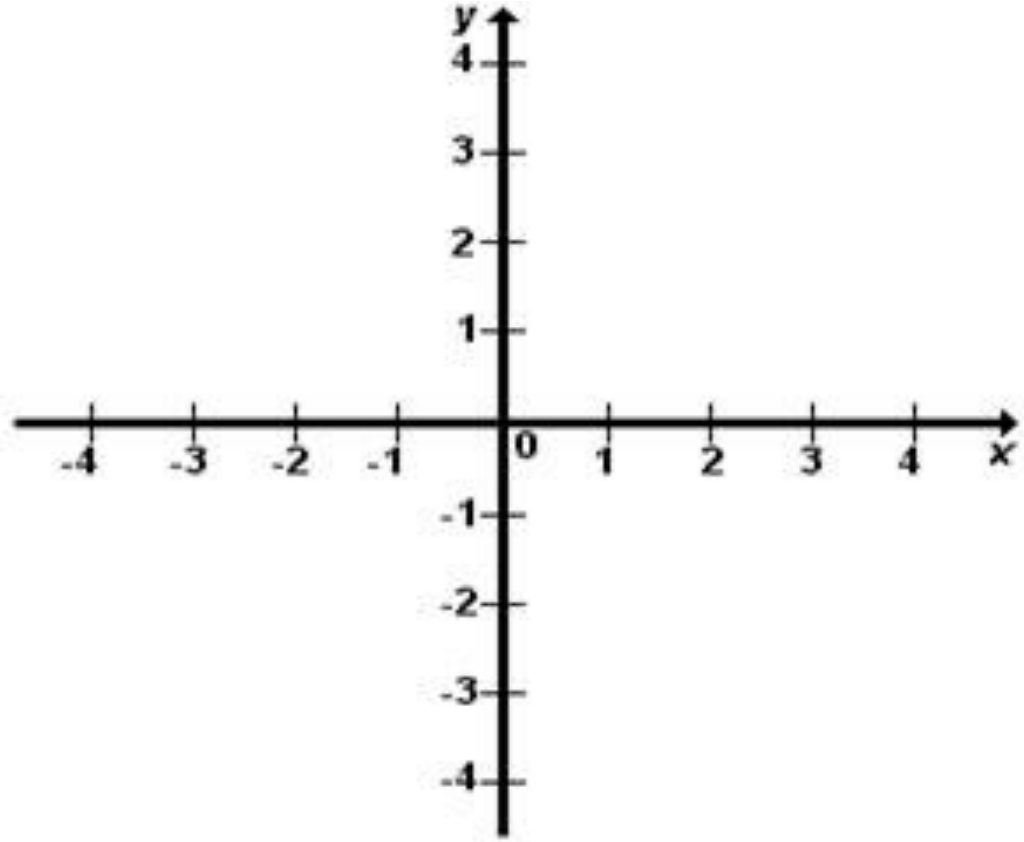




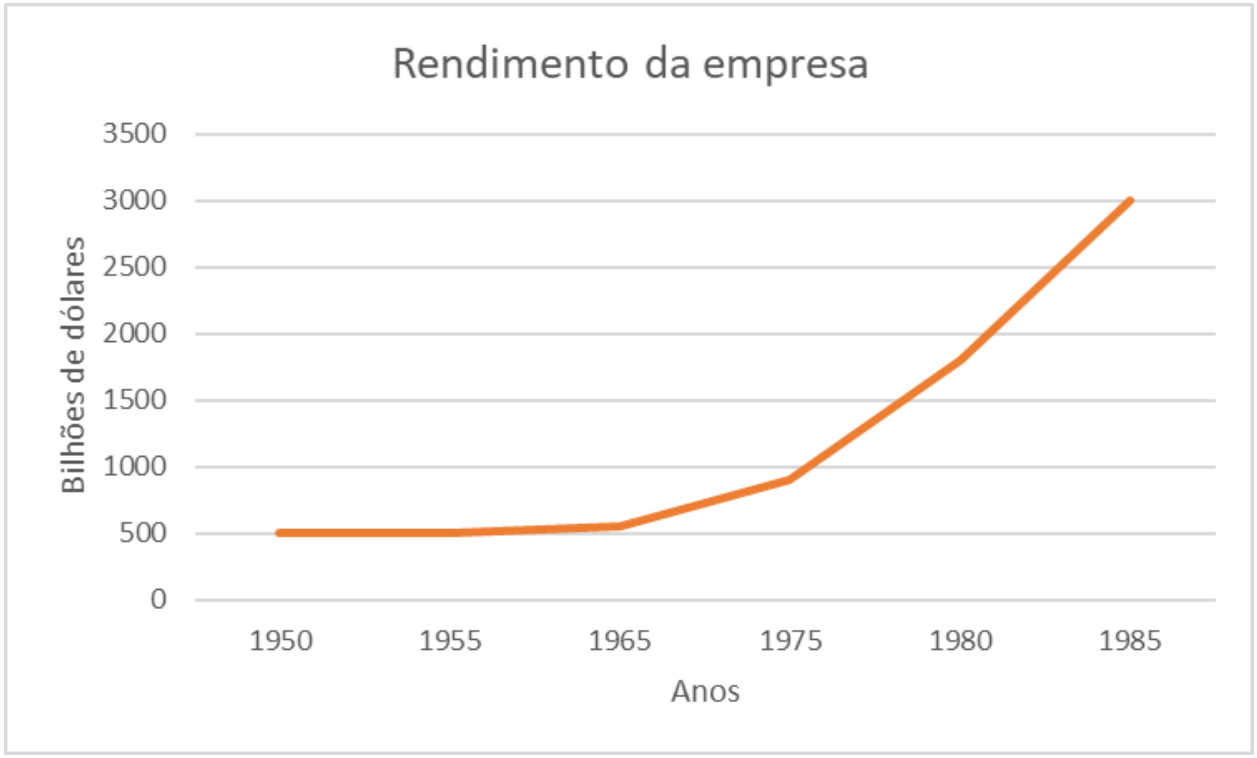
Jones, G.E. 2007. How to lie with Charts.

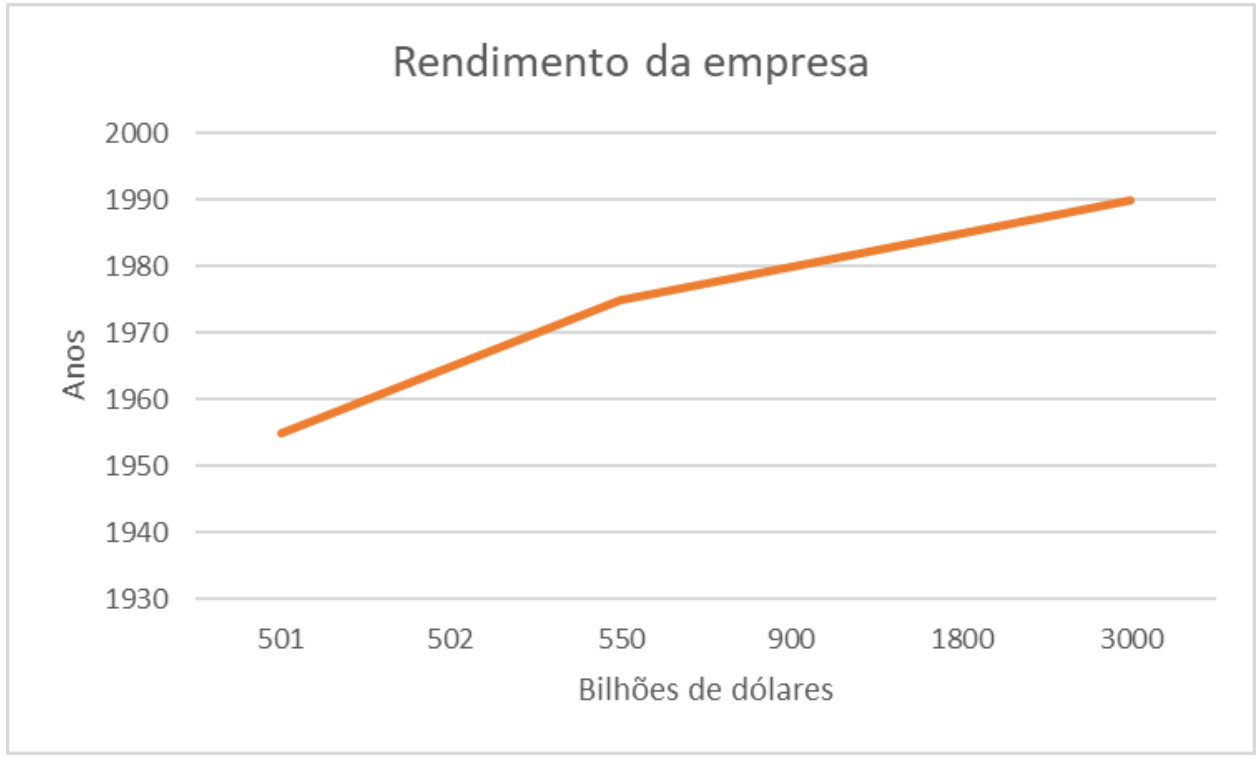
PLANO CARTESIANO

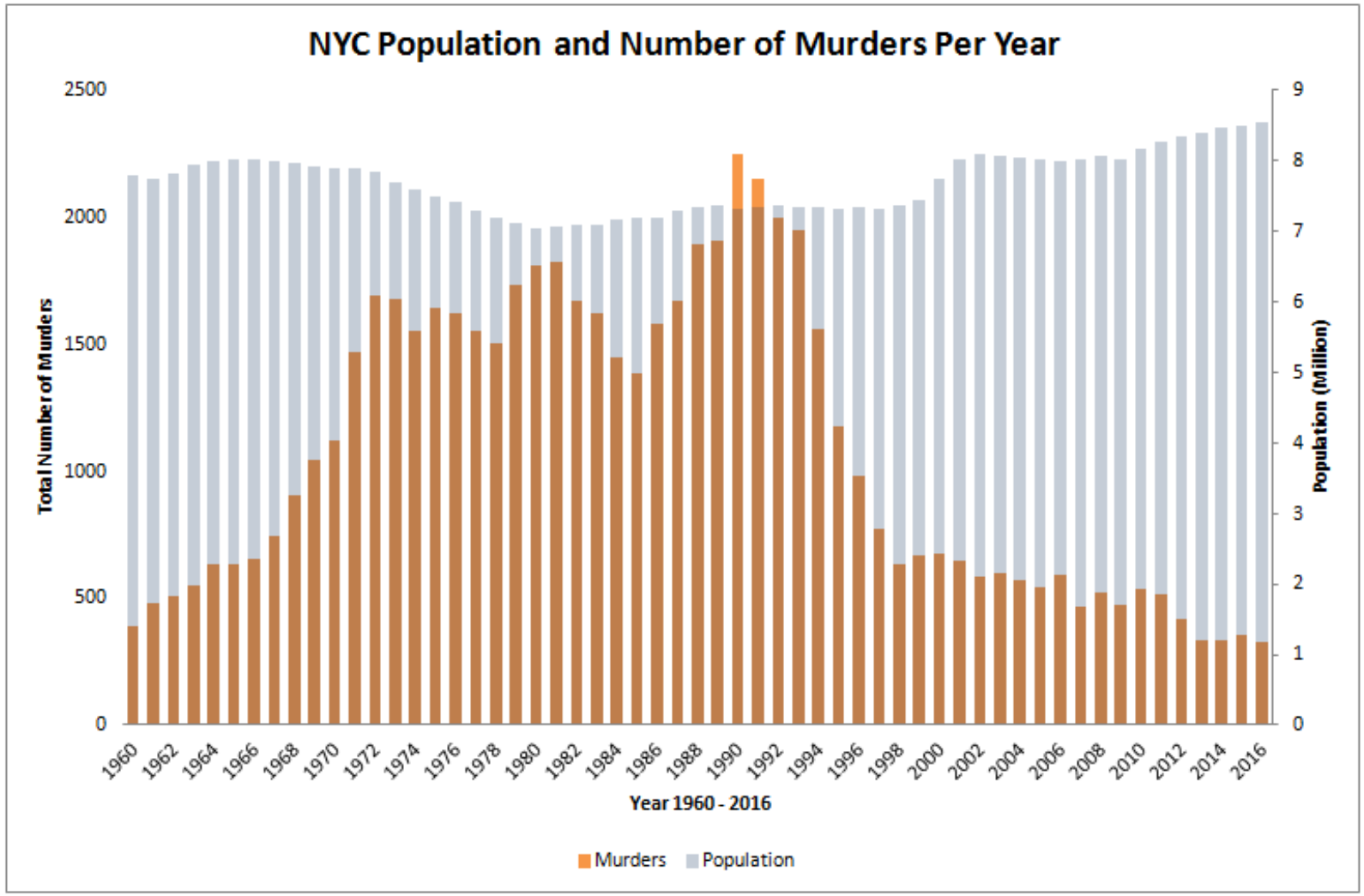




Qual empresa está aumentando e qual esta diminuindo os lucros?

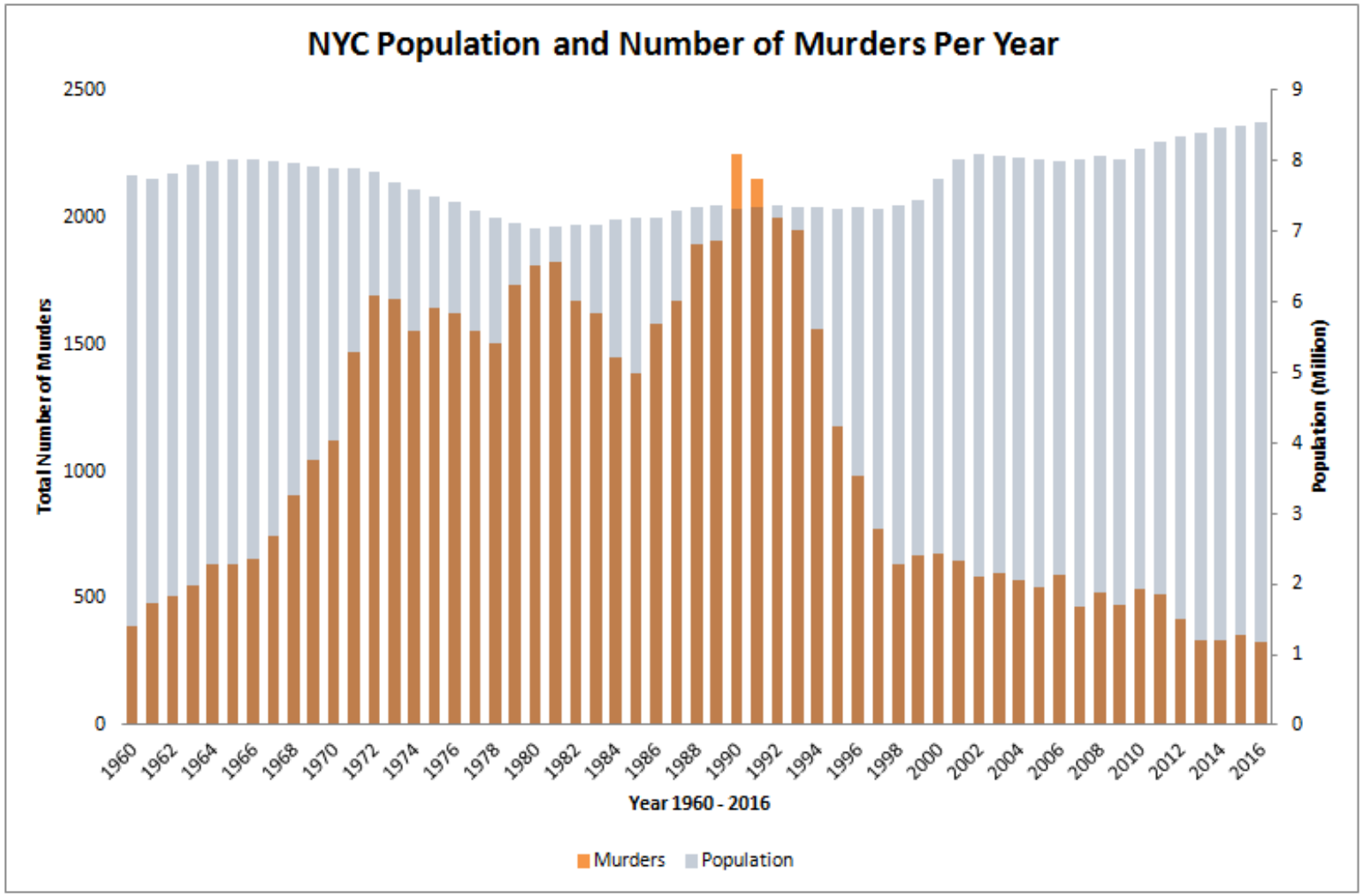






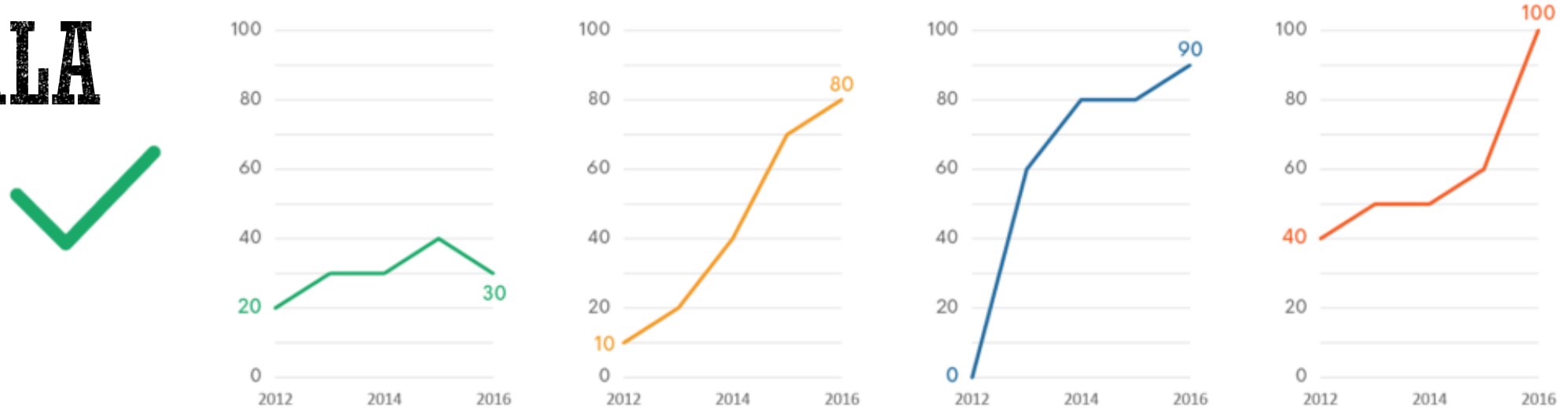
http://hypsypops.com/axes-evil-lie-graphs/

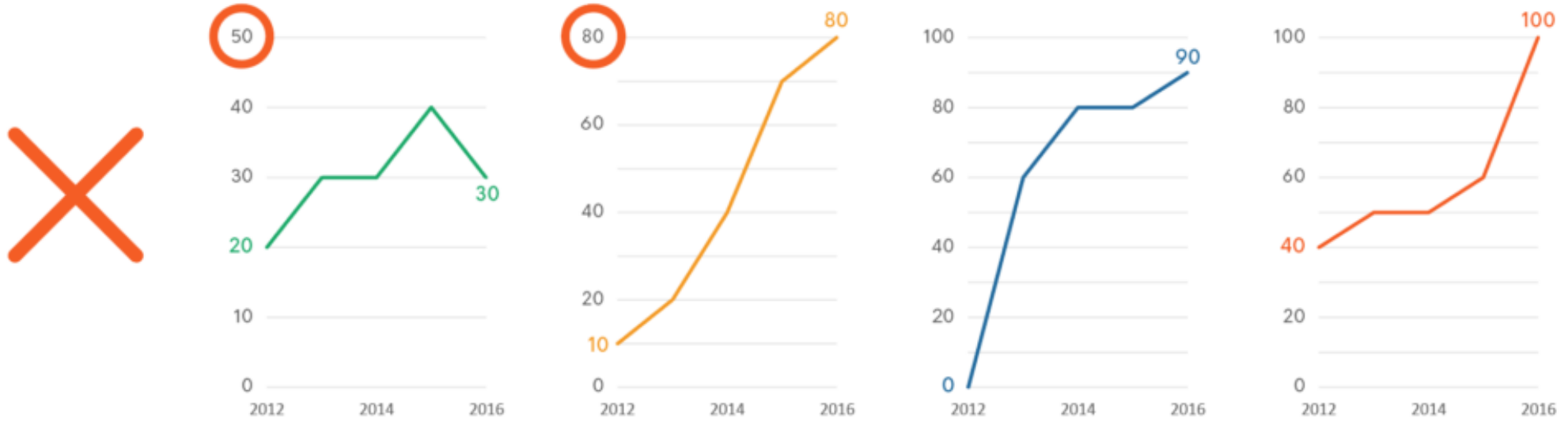
EIXOS EM ESCALAS DIFERENTES



http://hypsypops.com/axes-evil-lie-graphs/

ESCALA


100
80
60
40
20
0
2012
2014
2016
30
80
10
90
0
100
40


50
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30
20
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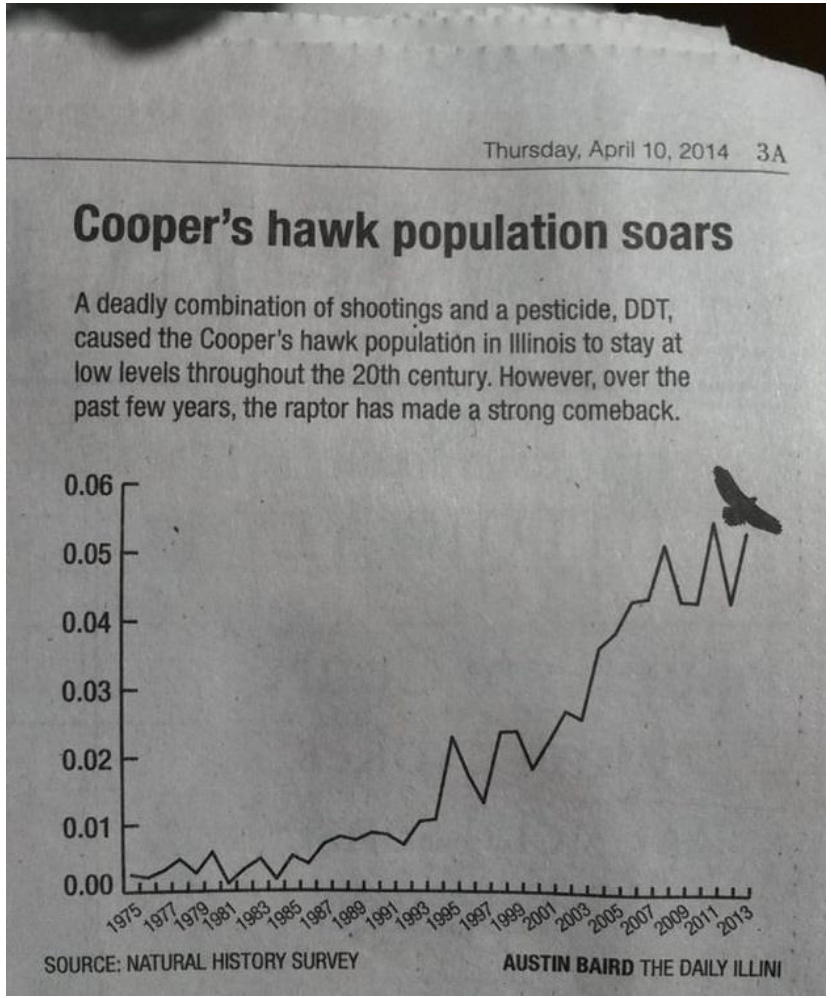
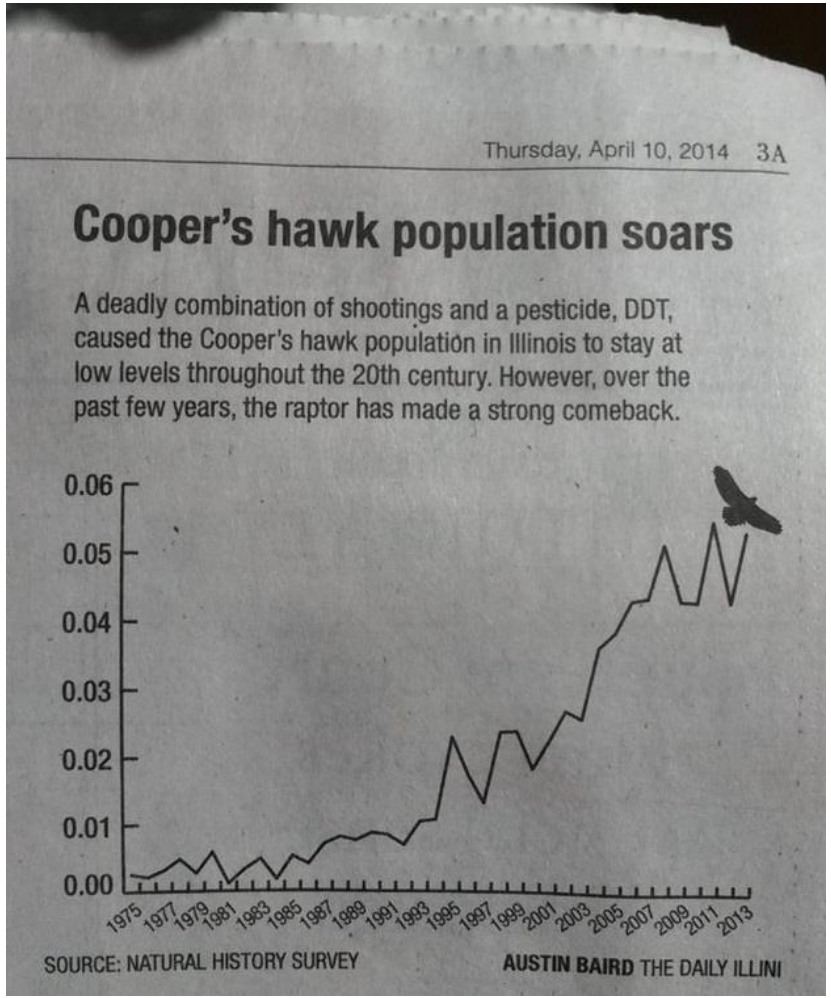
0
2012
2014
2016
30
80
60
10
80
100
90
100
40



http://hypsypops.com/axes-evil-lie-graphs/

TÍTULO DOS EIXOS



http://hypsypops.com/axes-evil-lie-graphs/

TÍTULOS DOS EIXOS

- Além de identificar, deve fornecer uma medida precisa.
  - Ex: Caixas de maçã

TÍTULOS DOS EIXOS

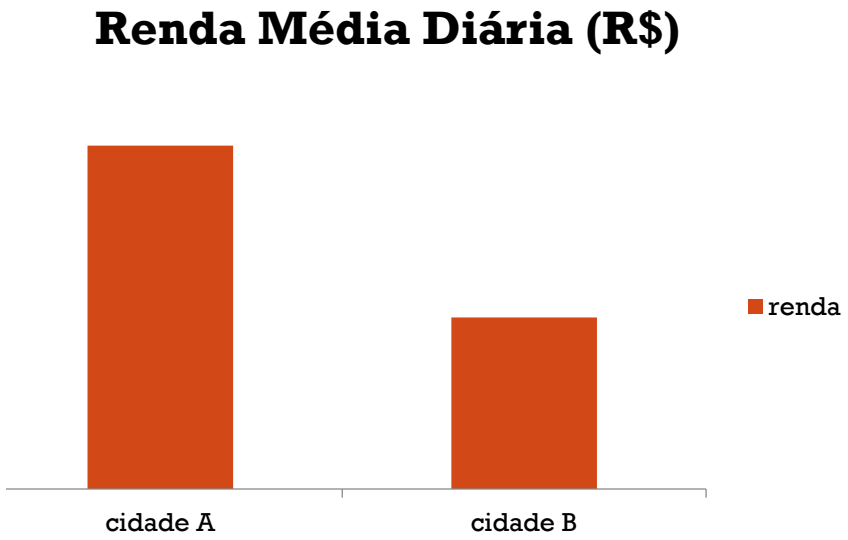
- Além de identificar, deve fornecer uma medida precisa.
  - Ex: Caixas de maçã
  - Dados x informação

Dado

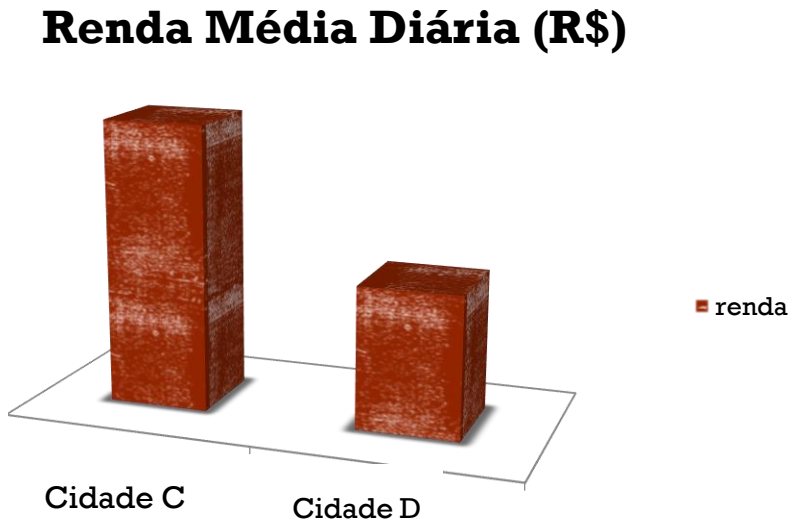
552139386611

Informação

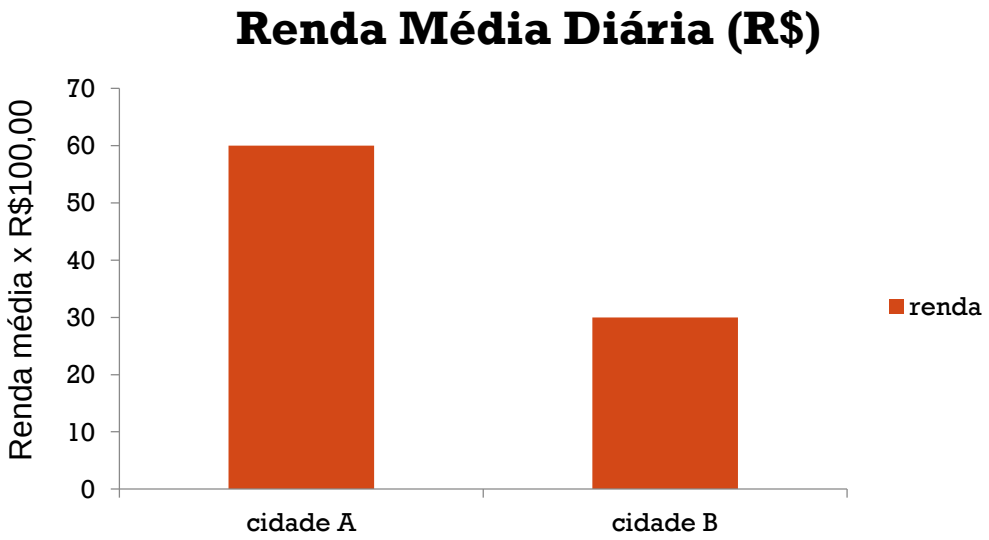
+55(21)3938-6611



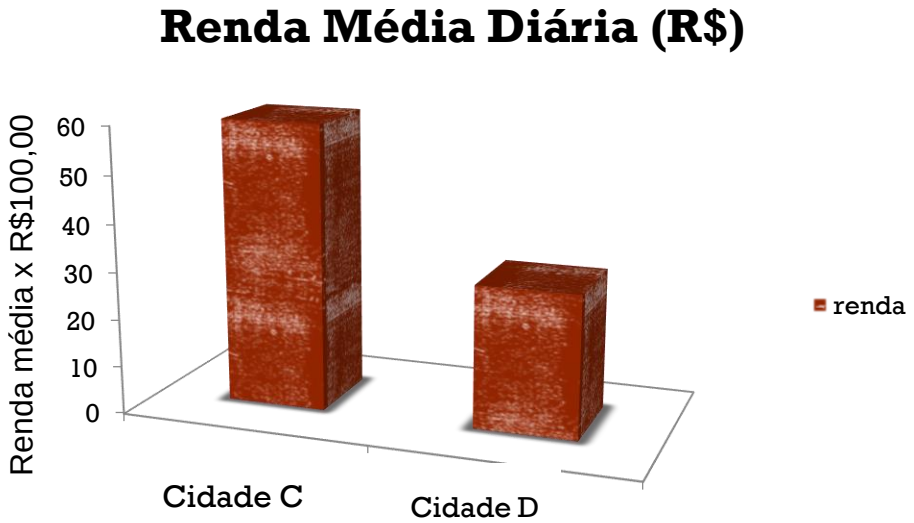
Cidade A tem renda
( ) 2x maior que B
( ) 2.5x maior que B
( ) 3x maior que B



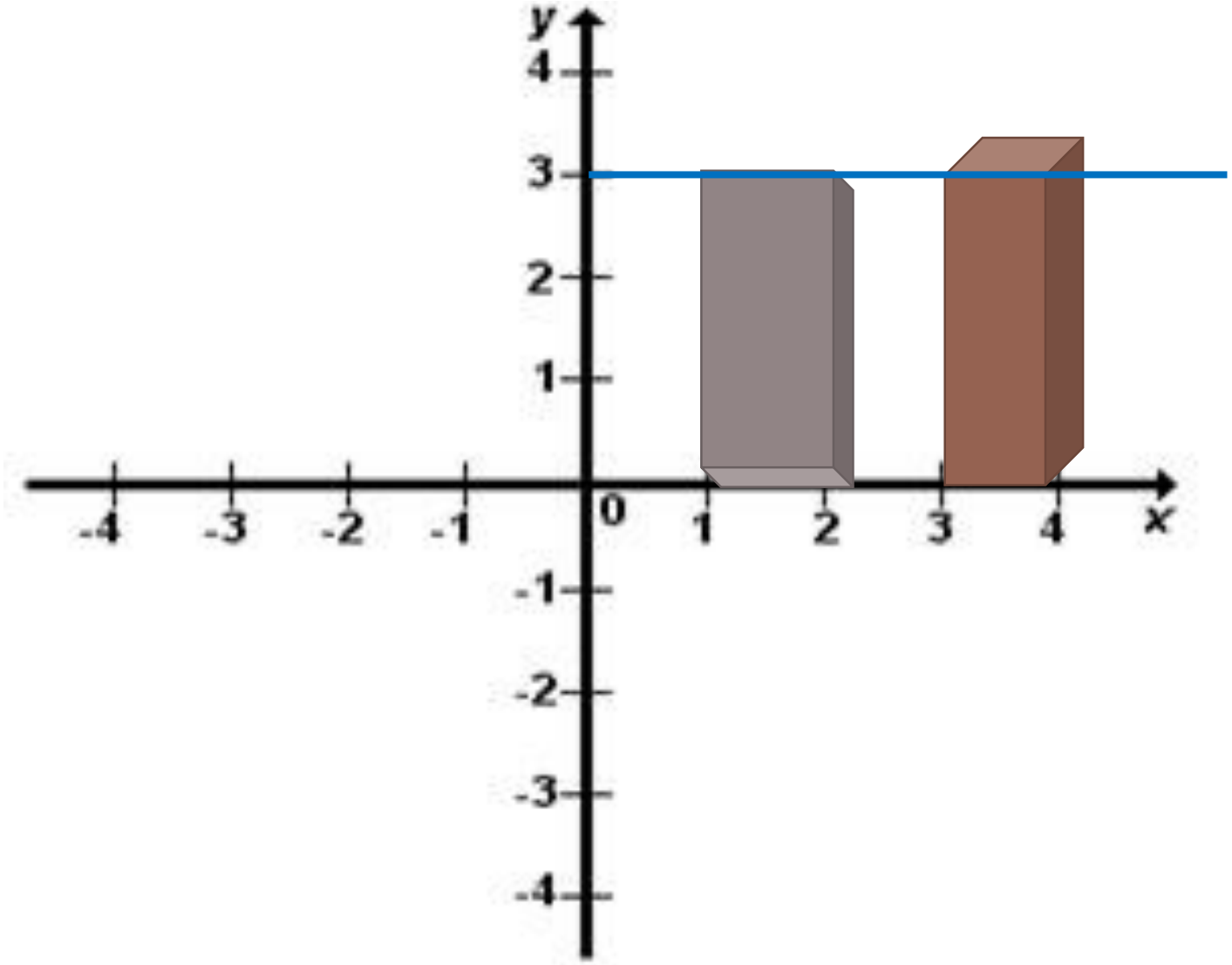
Cidade C tem renda
( ) 2x maior que D
( ) 2.5x maior que D
( ) 3x maior que D



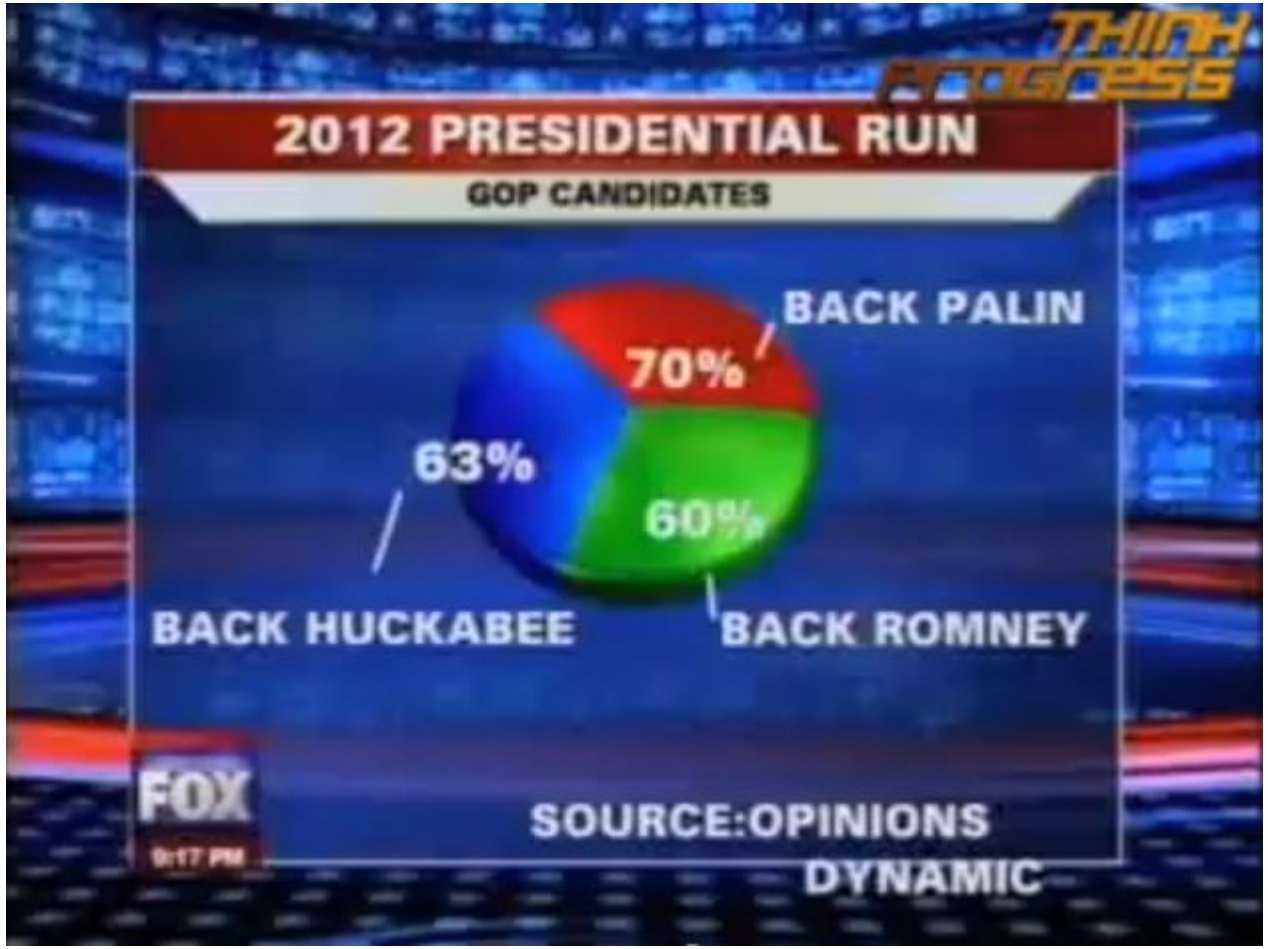
Cidade A tem renda
(X) 2x maior que B
( ) 2.5x maior que B
( ) 3x maior que B



Cidade C tem renda
(X) 2x maior que D
( ) 2.5x maior que D
( ) 3x maior que D


y
4
3
2
1
-4
-3
-2
-1
0
1
2
3
4
x
-1
-2
-3
-4

GRÁFICOS DE PIZZA



http://gizmodo.uol.com.br/mentir-visualizacao-dados/

GRÁFICO DE PIZZA

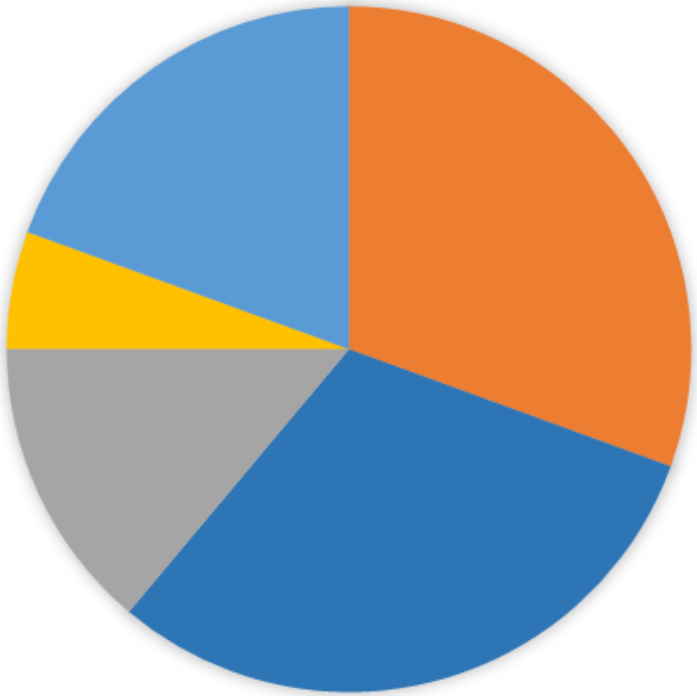


GRÁFICO DE PIZZA

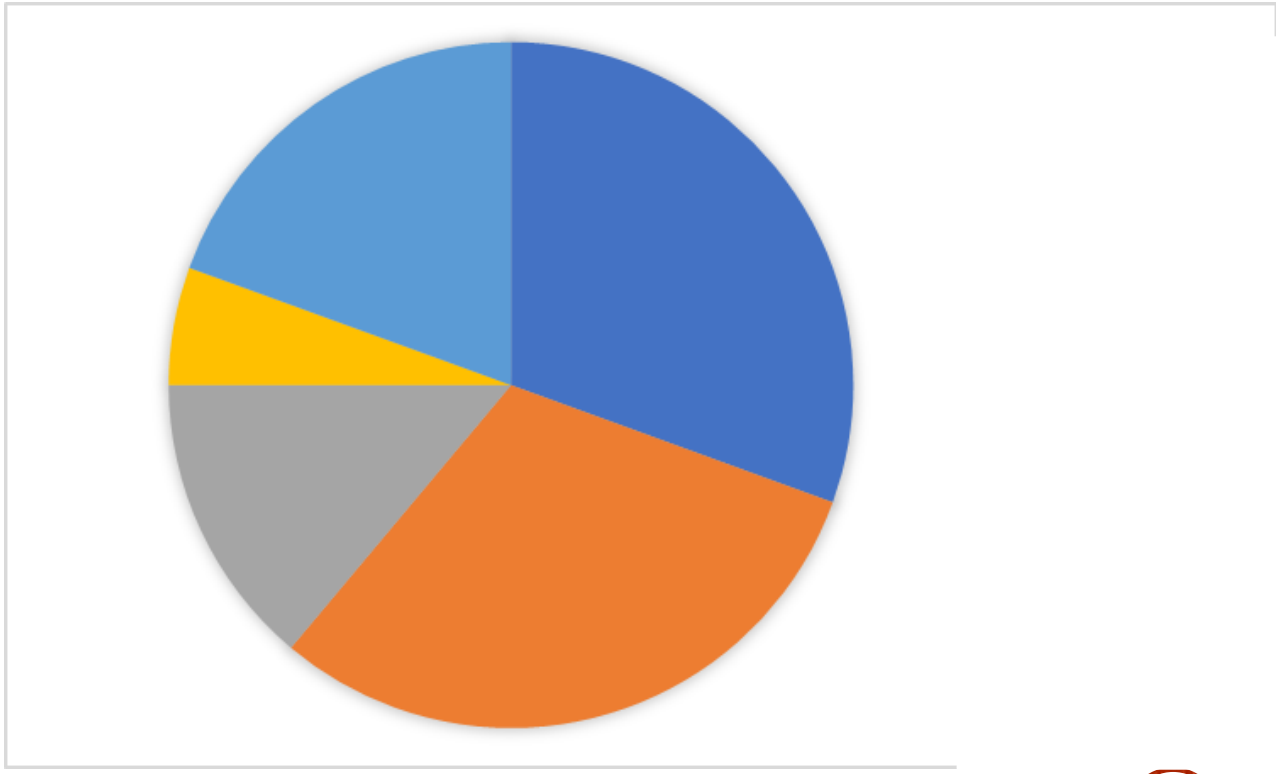
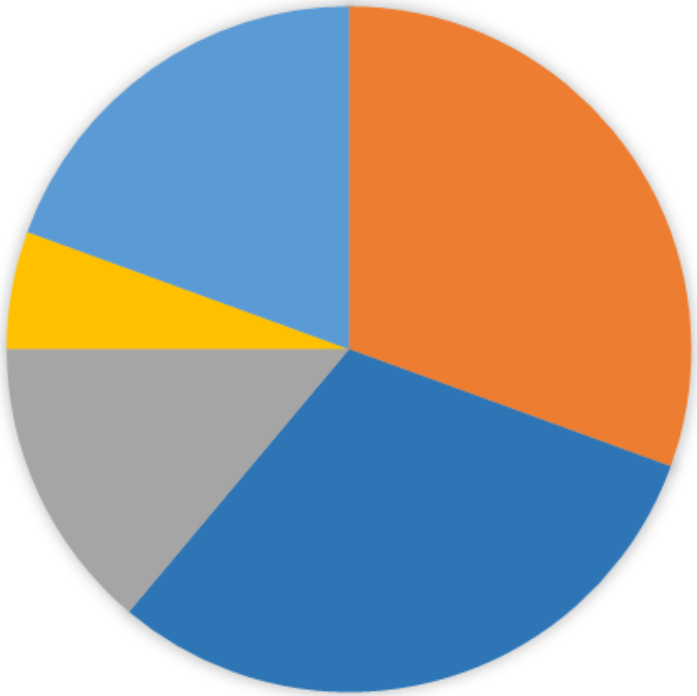


GRÁFICO DE PIZZA



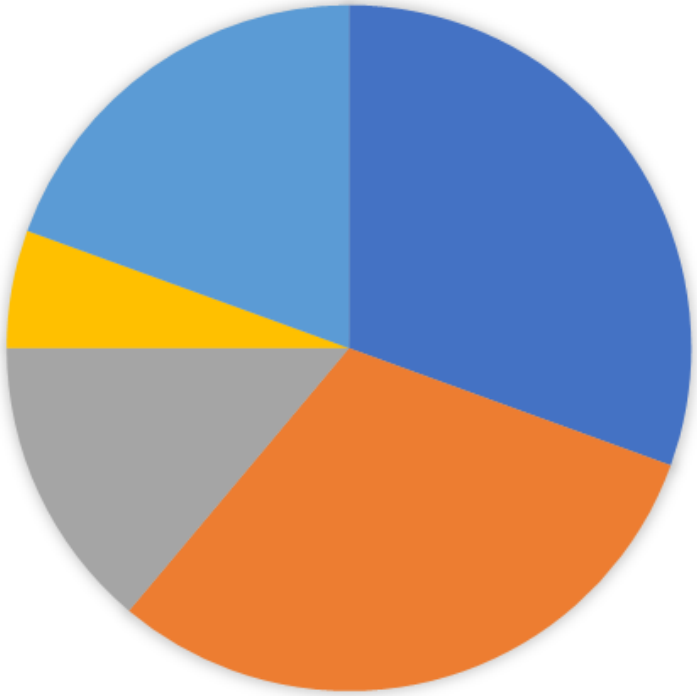
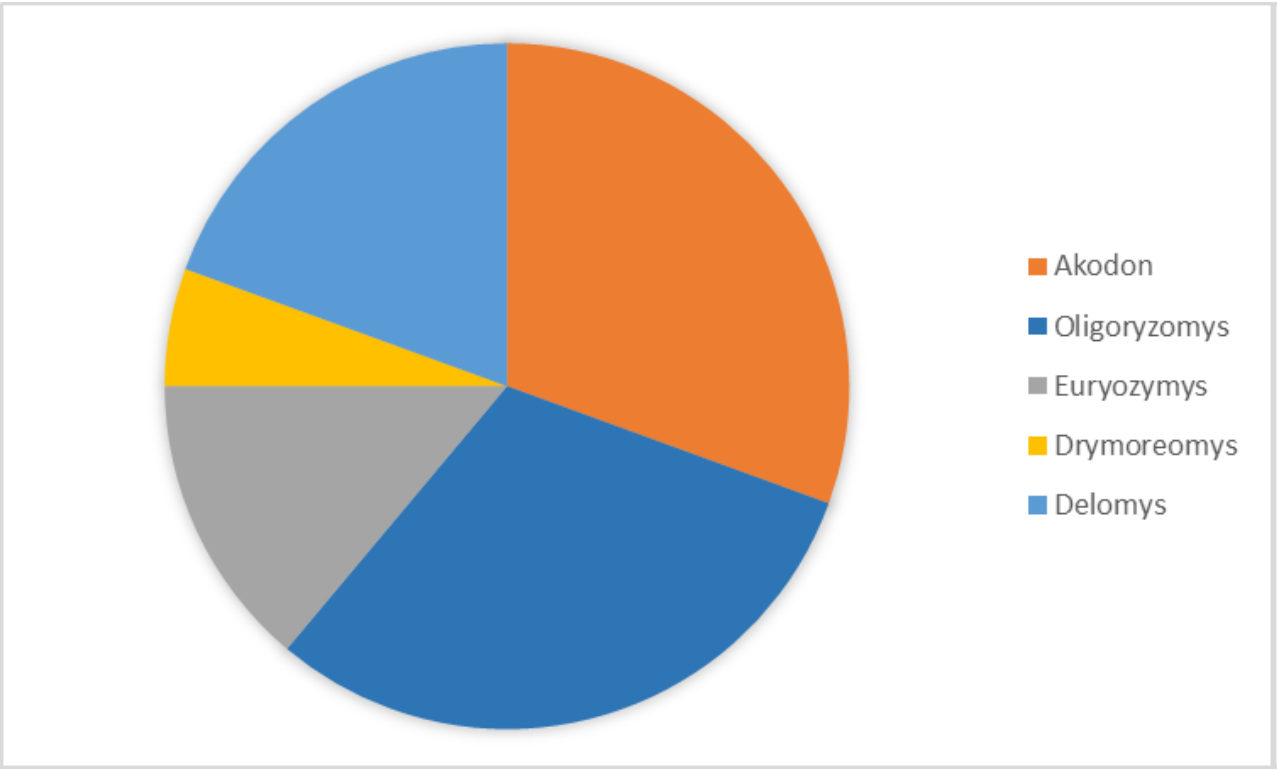


GRÁFICO DE PIZZA

Comunidade de roedores



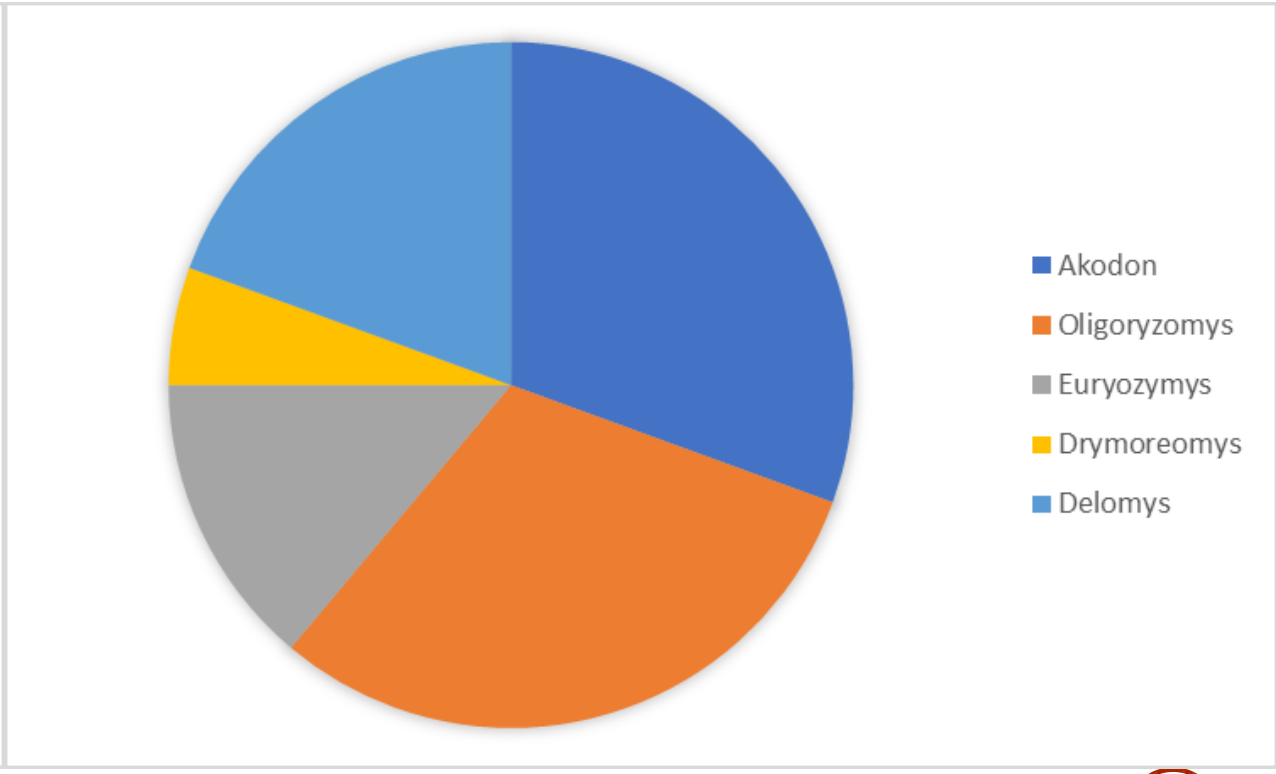
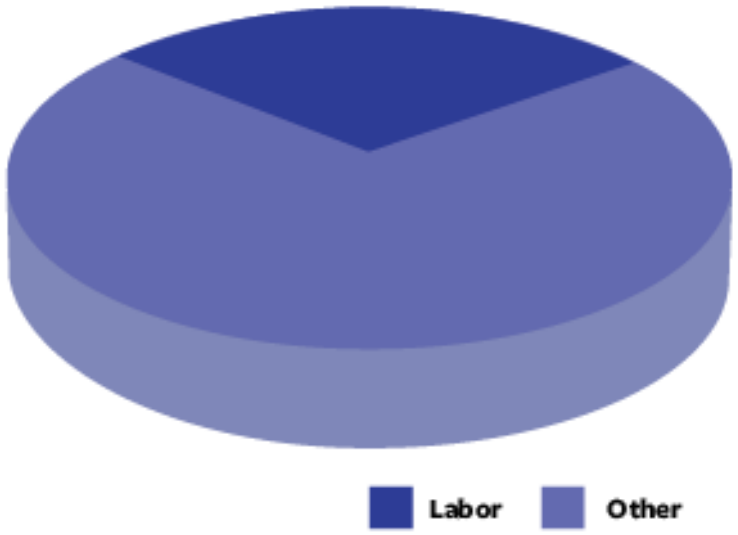
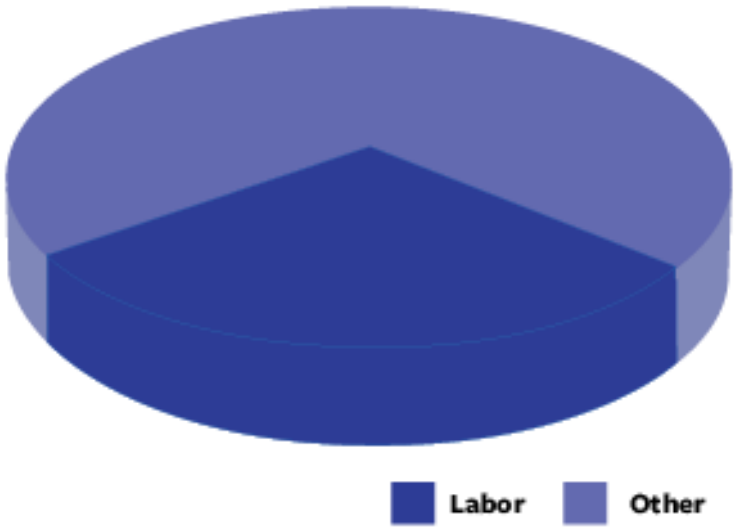


GRÁFICO DE PIZZA

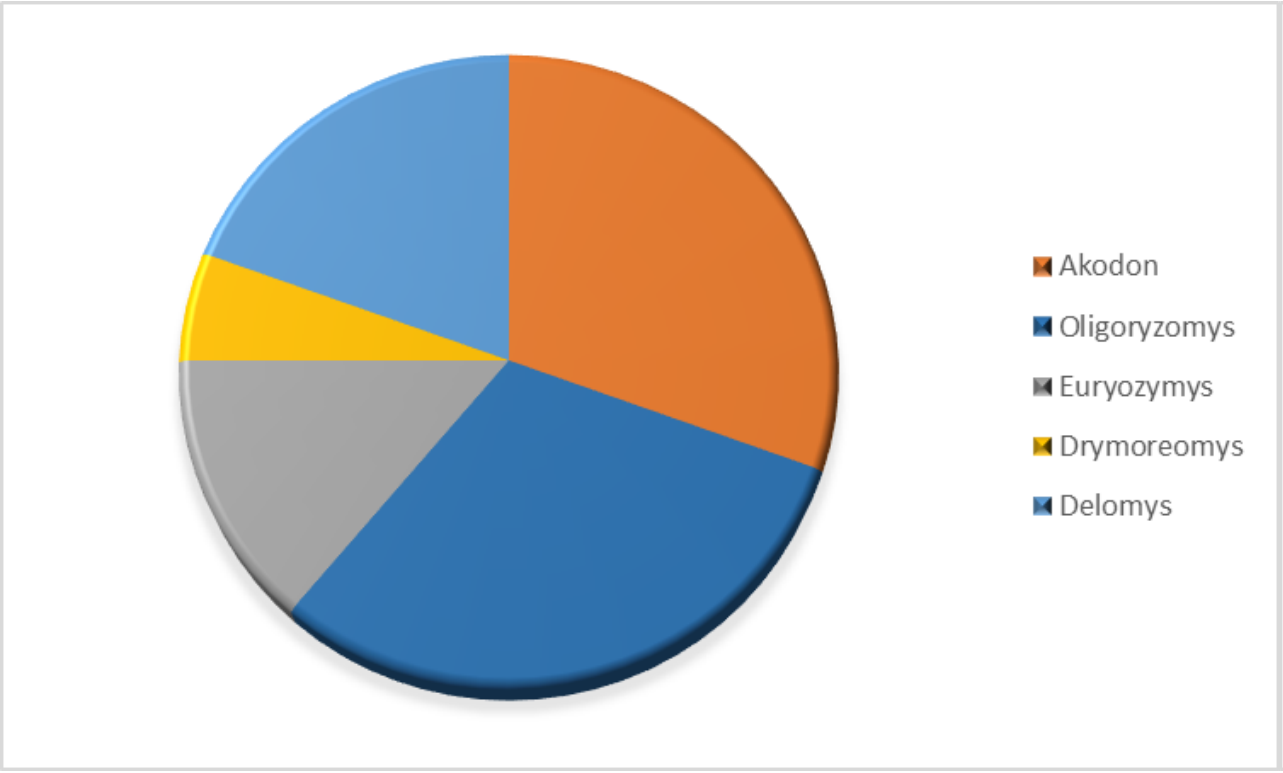




http://nautil.us/issue/19/illusions/%E2%80%9Dhttp://www.mrexcel.com/tip142.shtml%E2%80%9D

GRÁFICO DE PIZZA

Comunidade de roedores



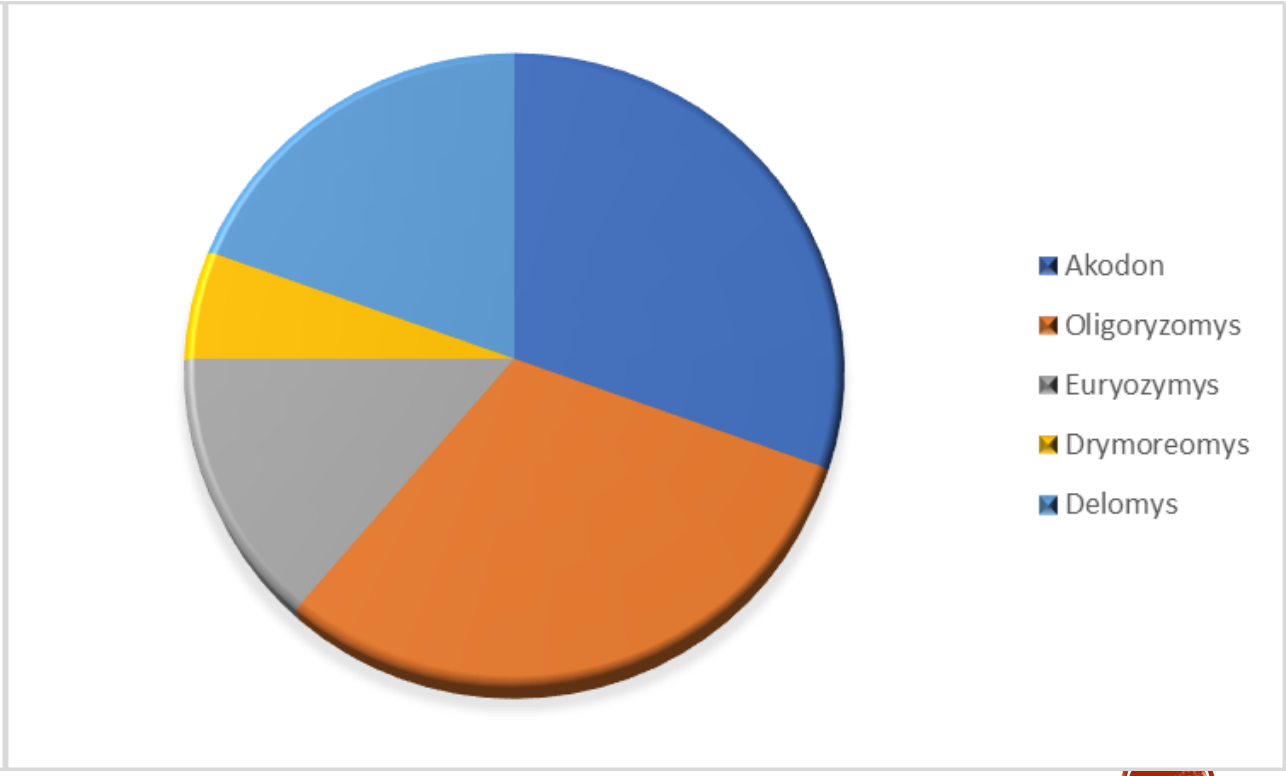


GRÁFICO DE PIZZA

Comunidade de roedores

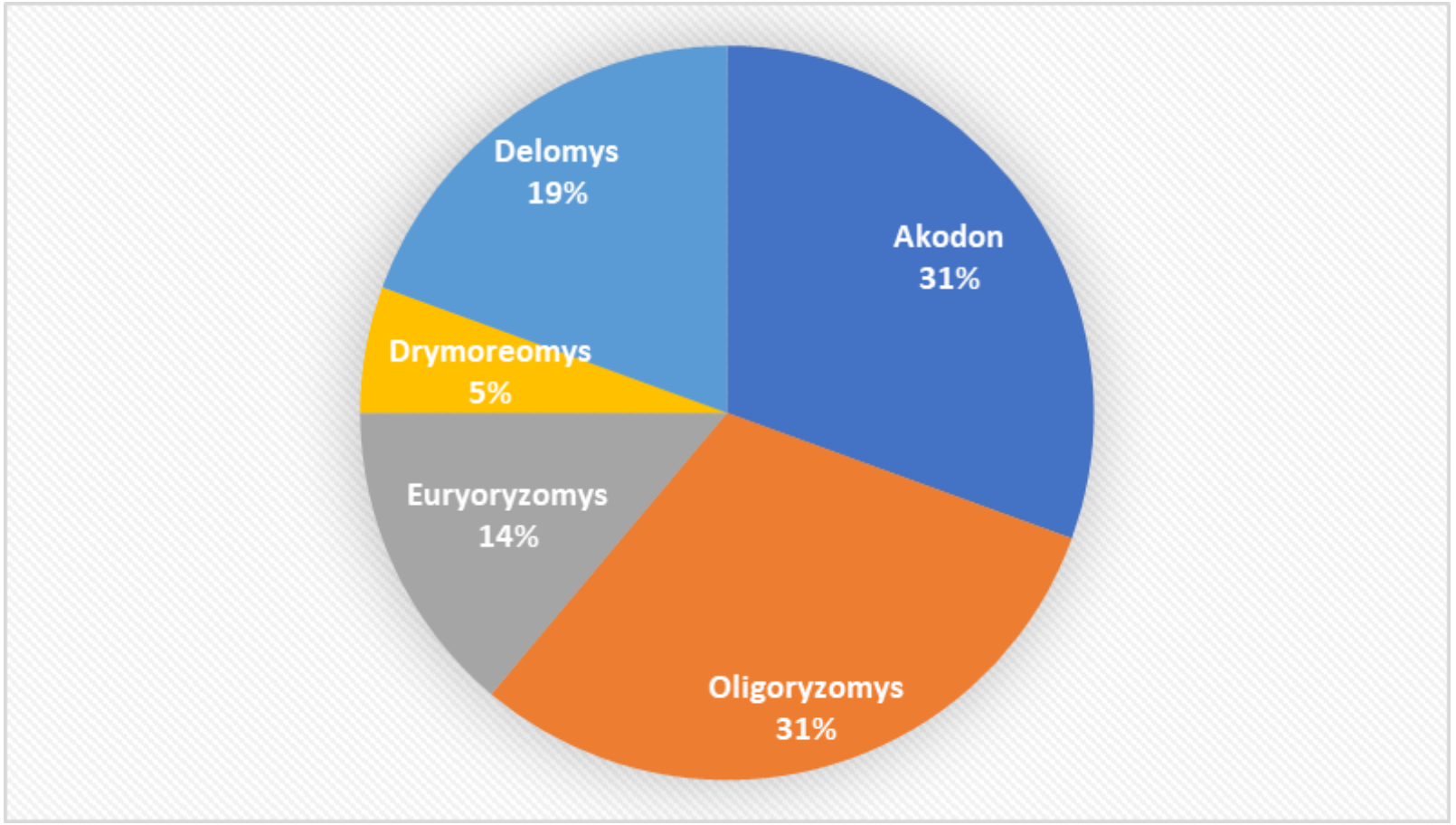
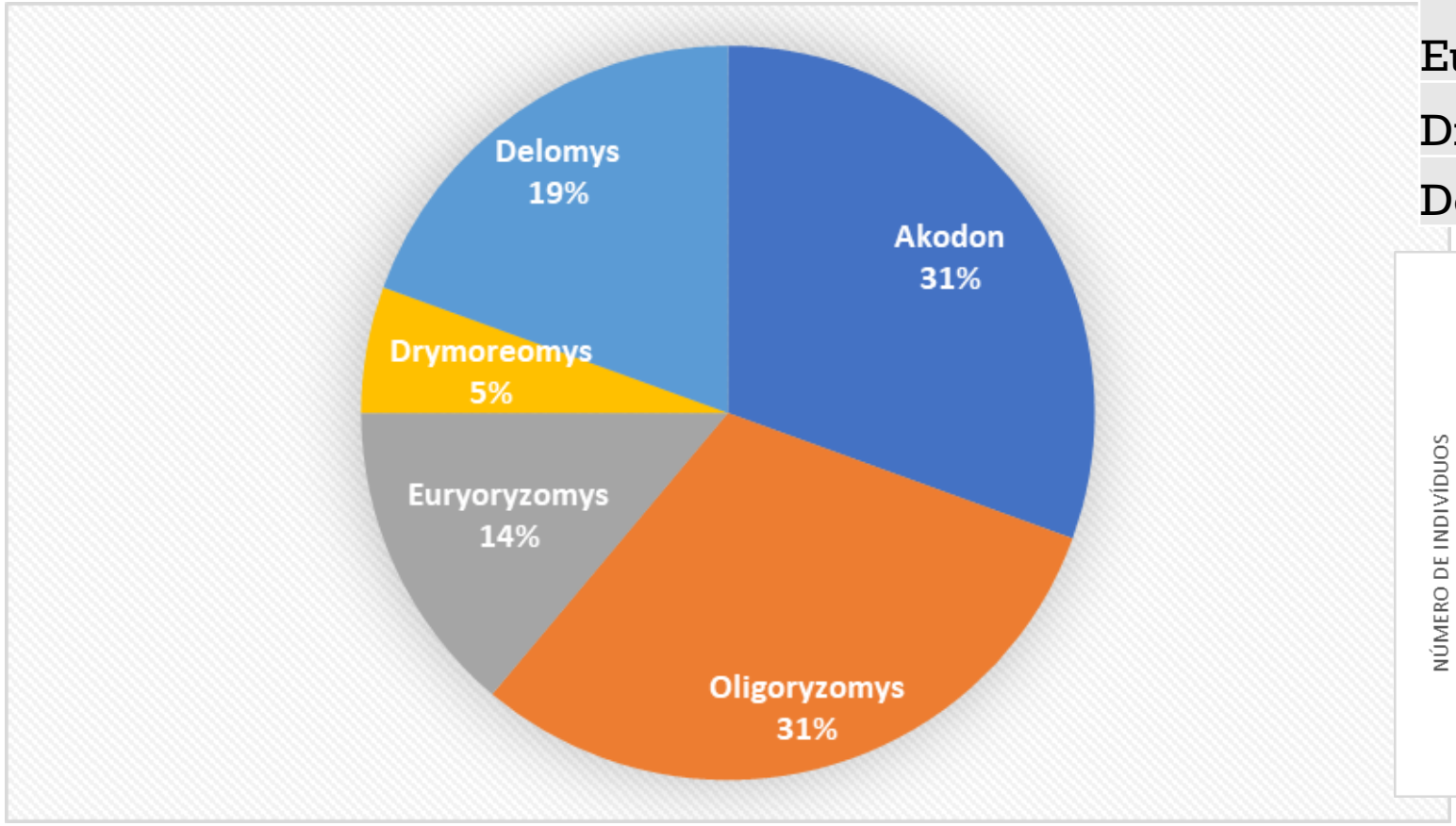
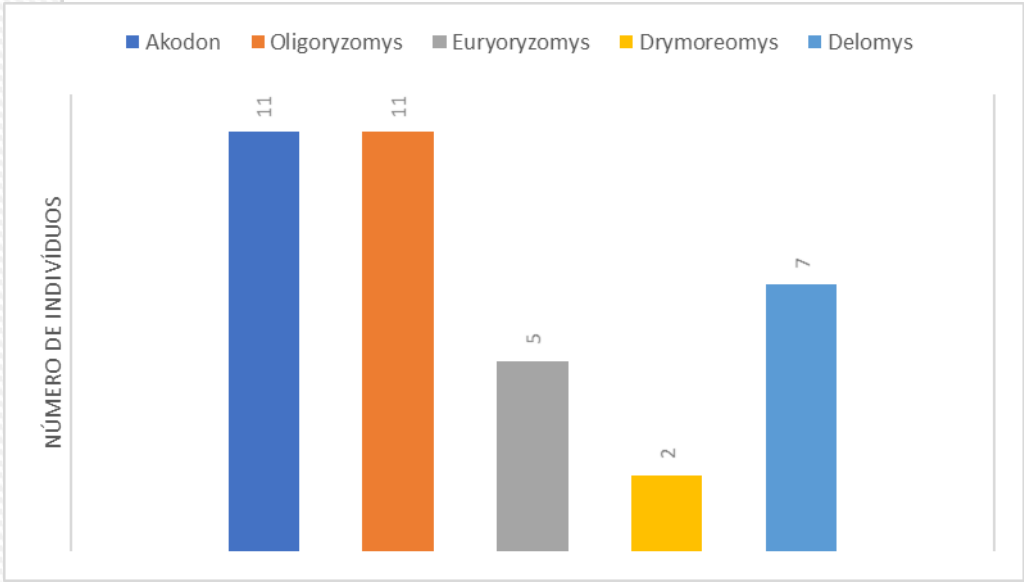


GRÁFICO DE PIZZA

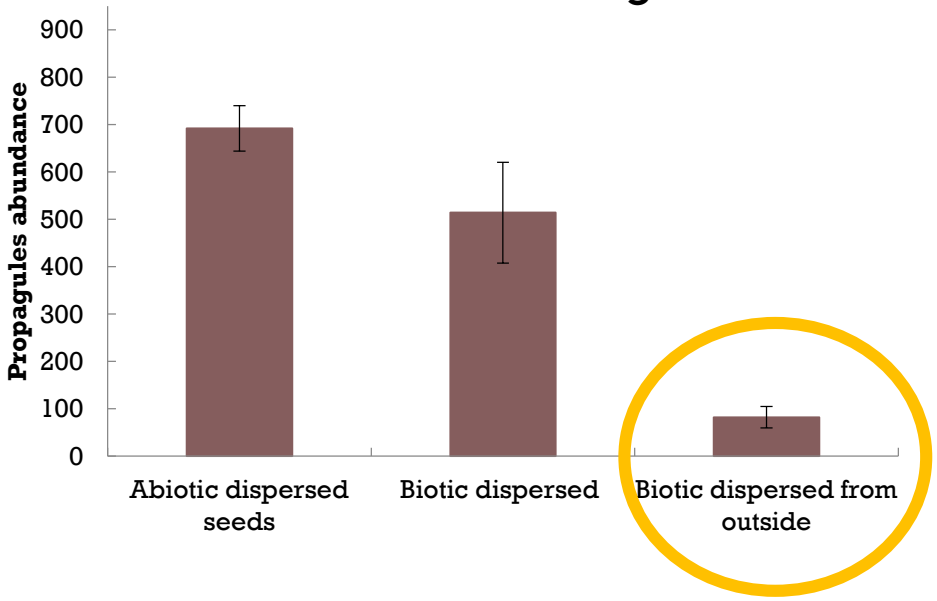
Comunidade de roedores



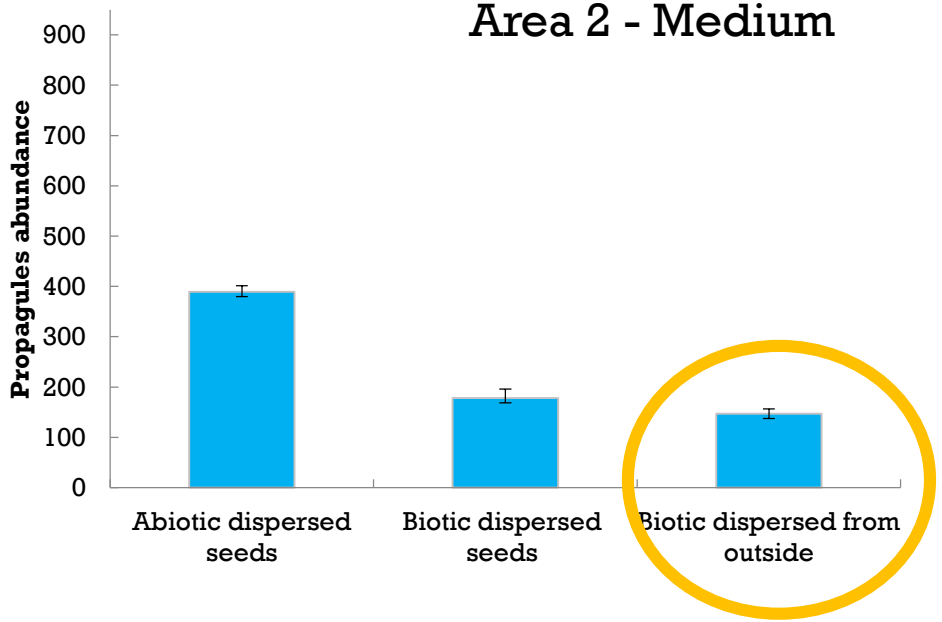
Akodon	11	33
Oligoryzomys	11	33
Euryoryzomys	5	15
Drymoreomys	2	6
Delomys	7	21



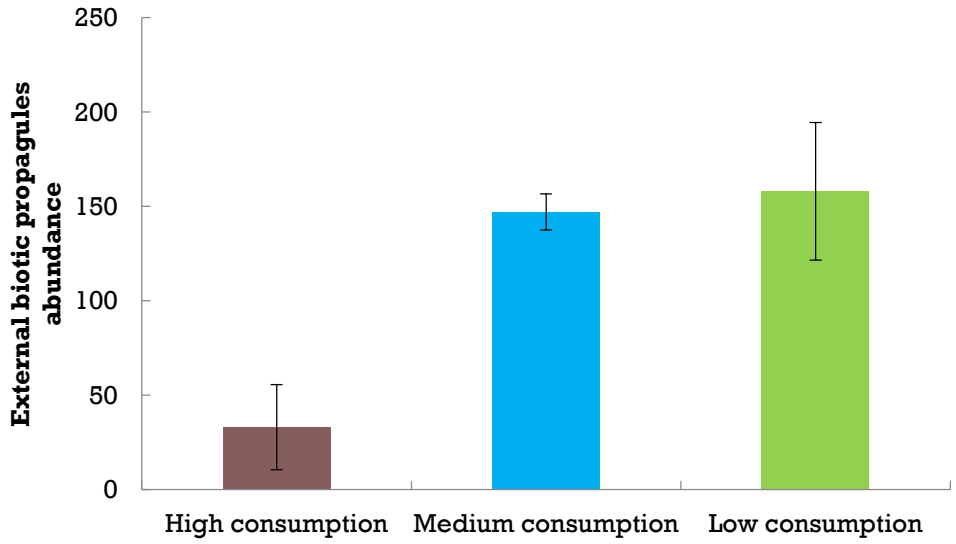
Area 1 -High



Area 2 - Medium



Area 3 - Low



IMPORTÂNCIA DOS DADOS

- NA e zeros

9,10,23,18,23,23,23,0,43,78,65,87,0,0,87,274,521

9,10,23,18,23,23,23,NA,43,78,65,87,NA,NA,87,274,521

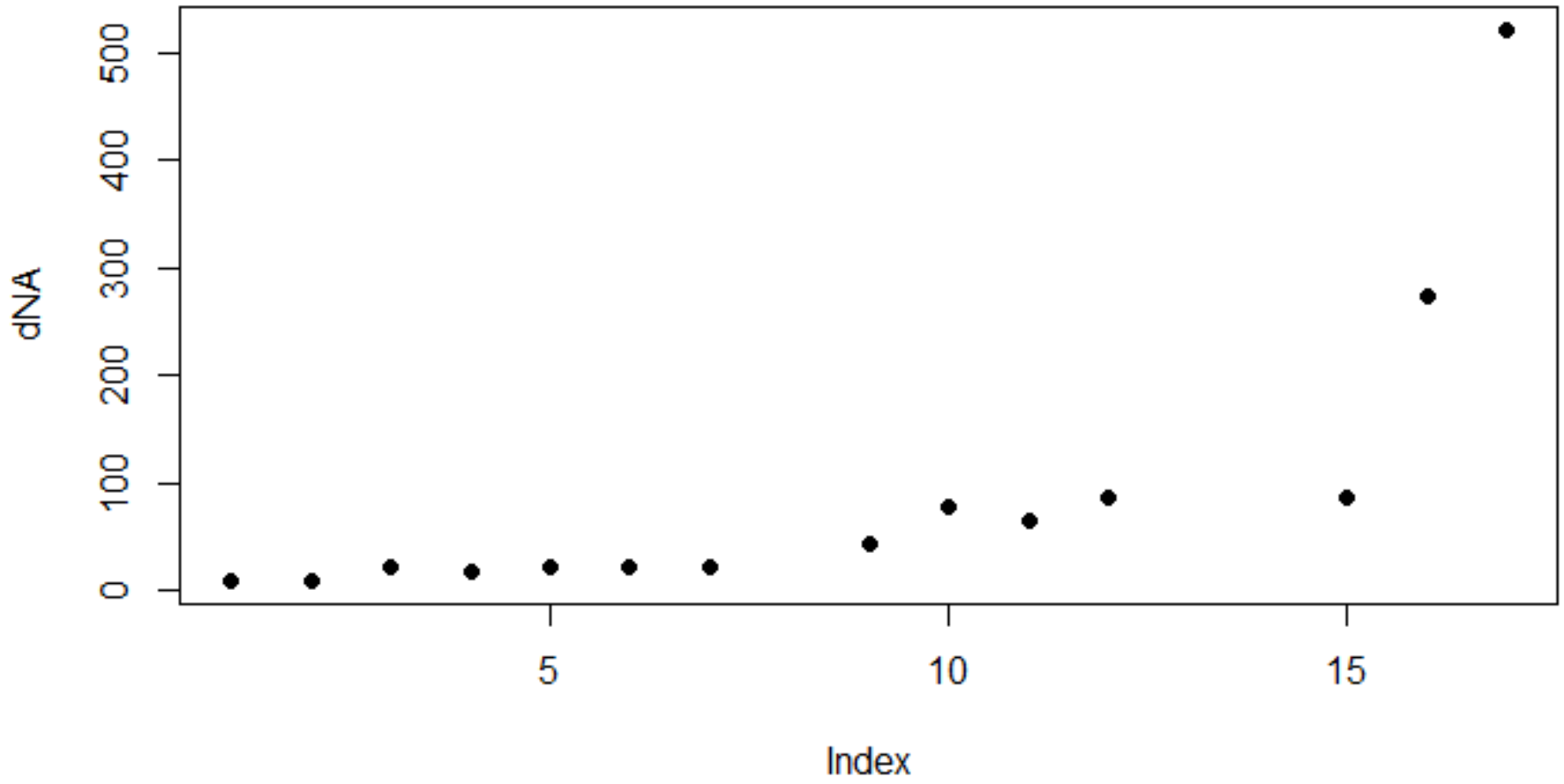
MÉDIA:

75,53

91,71

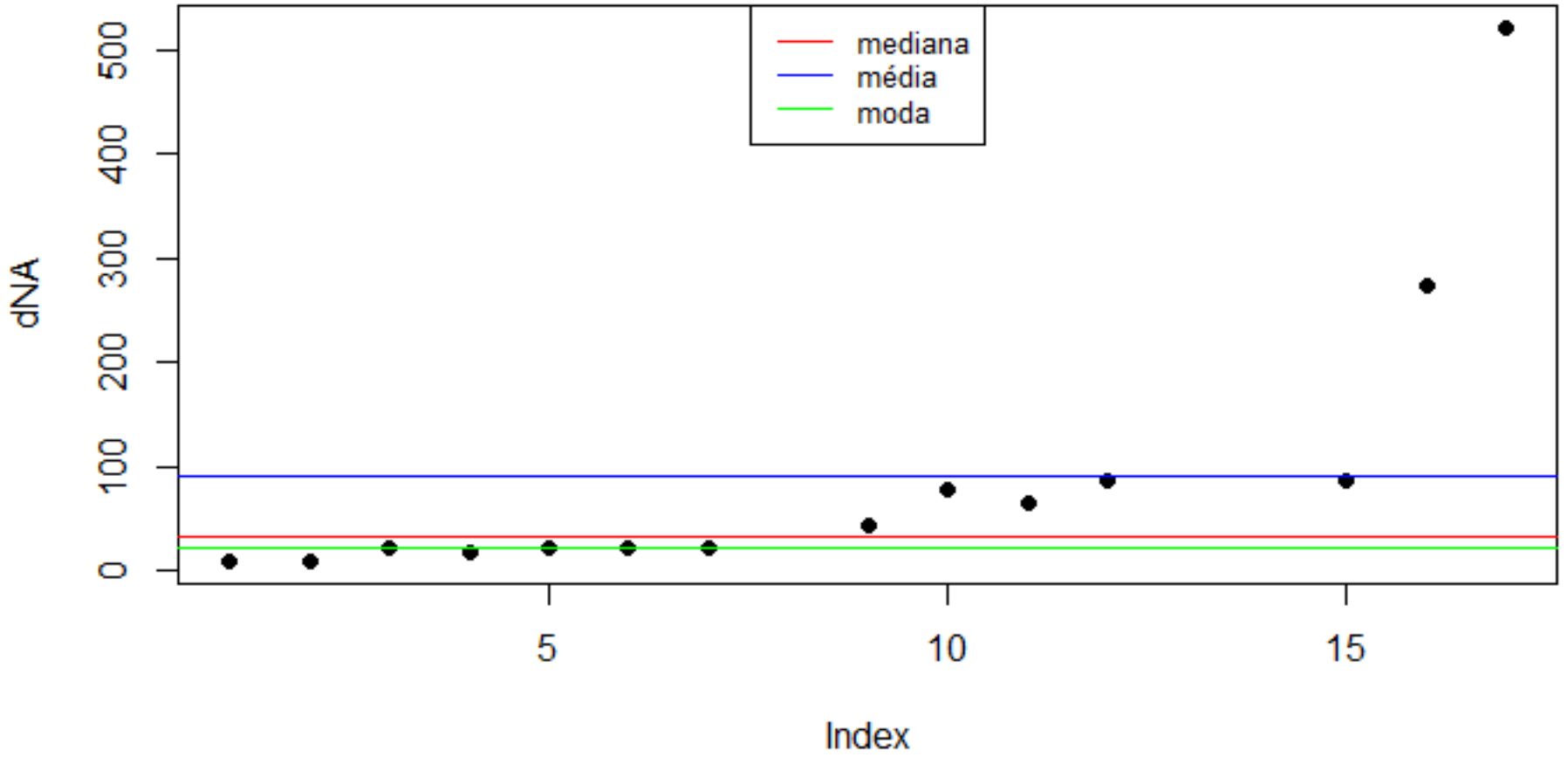
IMPORTÂNCIA DOS DADOS

- NA e zeros
- Média



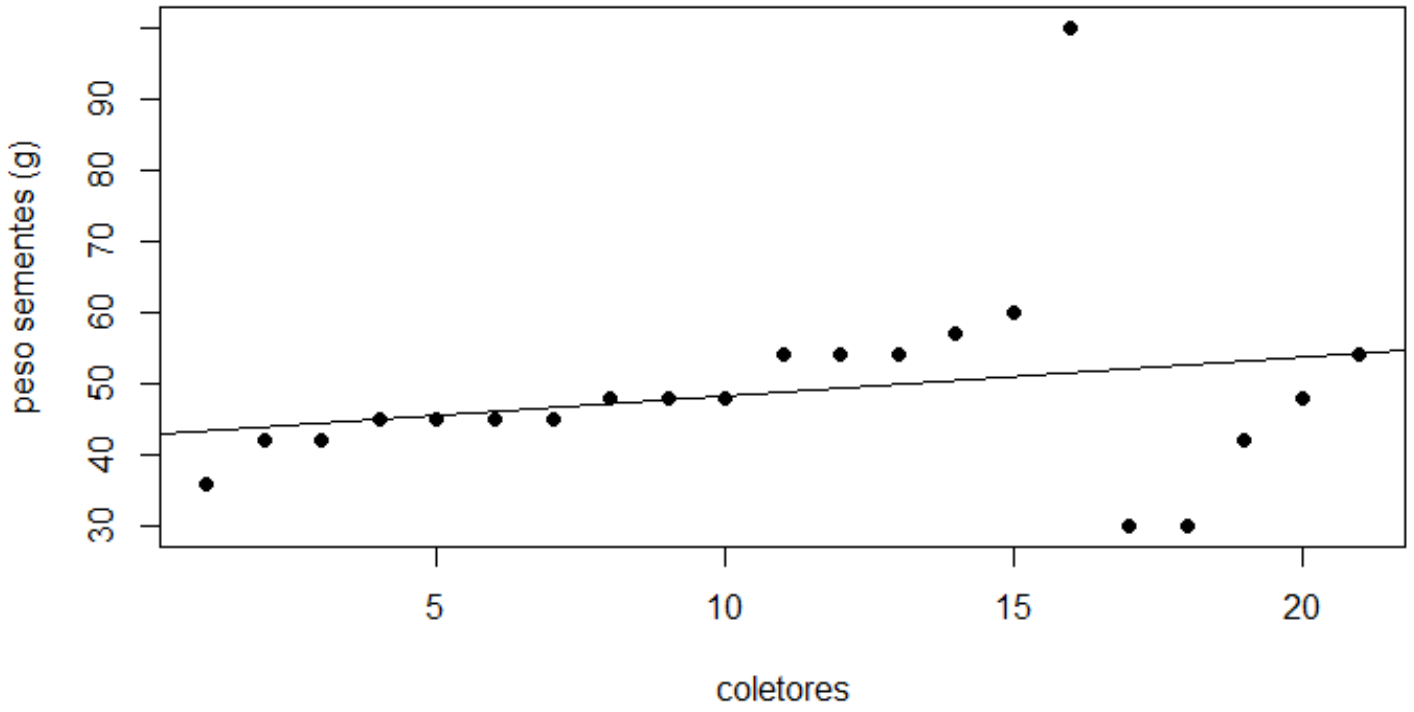
IMPORTÂNCIA DOS DADOS

- NA e zeros
- Média



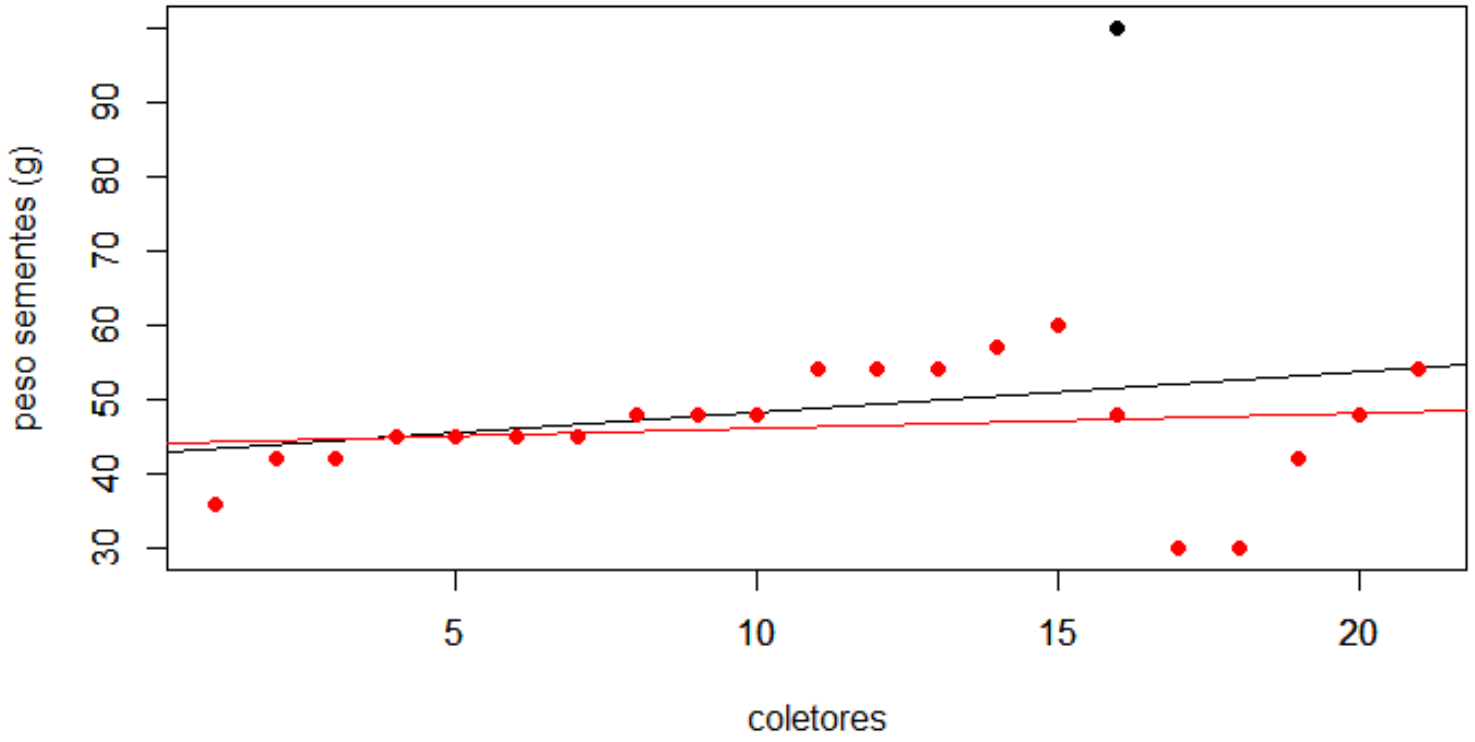
IMPORTÂNCIA DOS DADOS

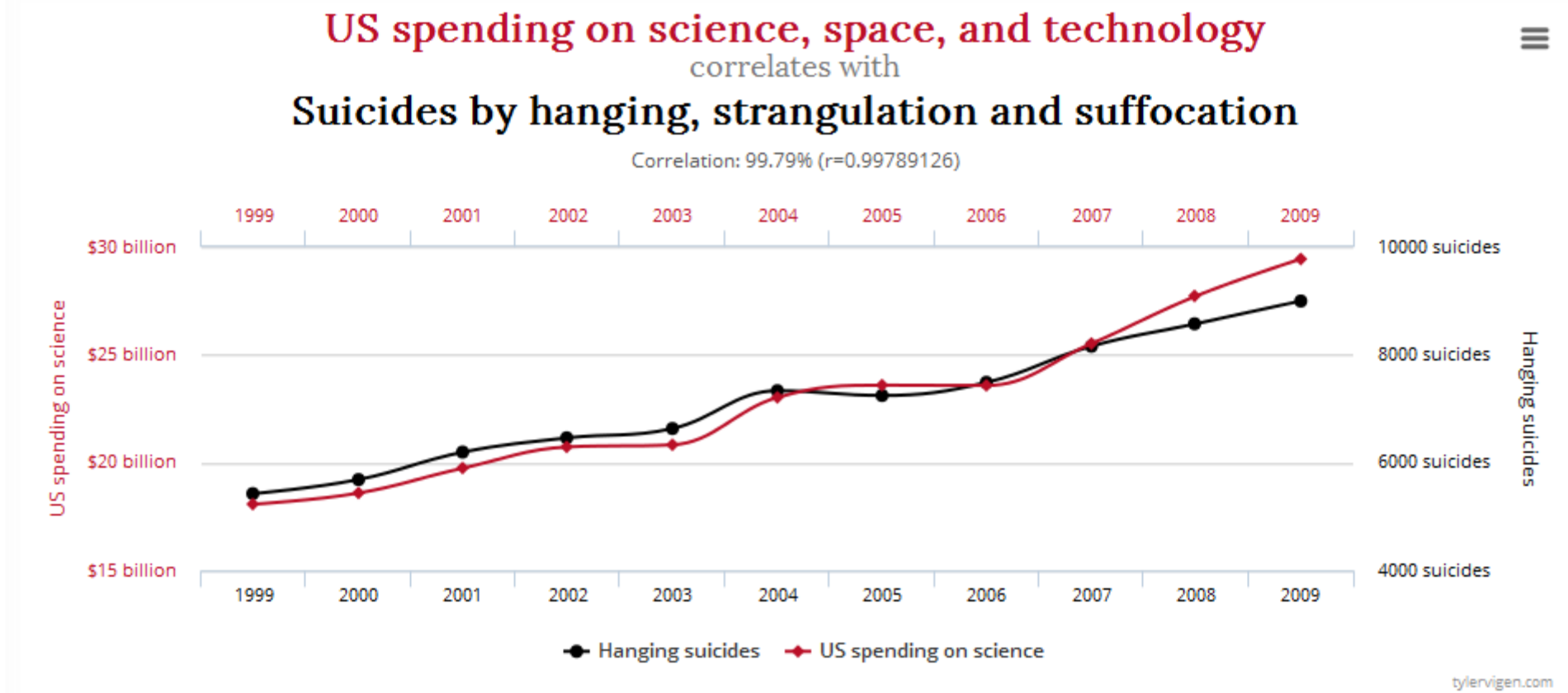
- NA e zeros
- Média
- Tendência



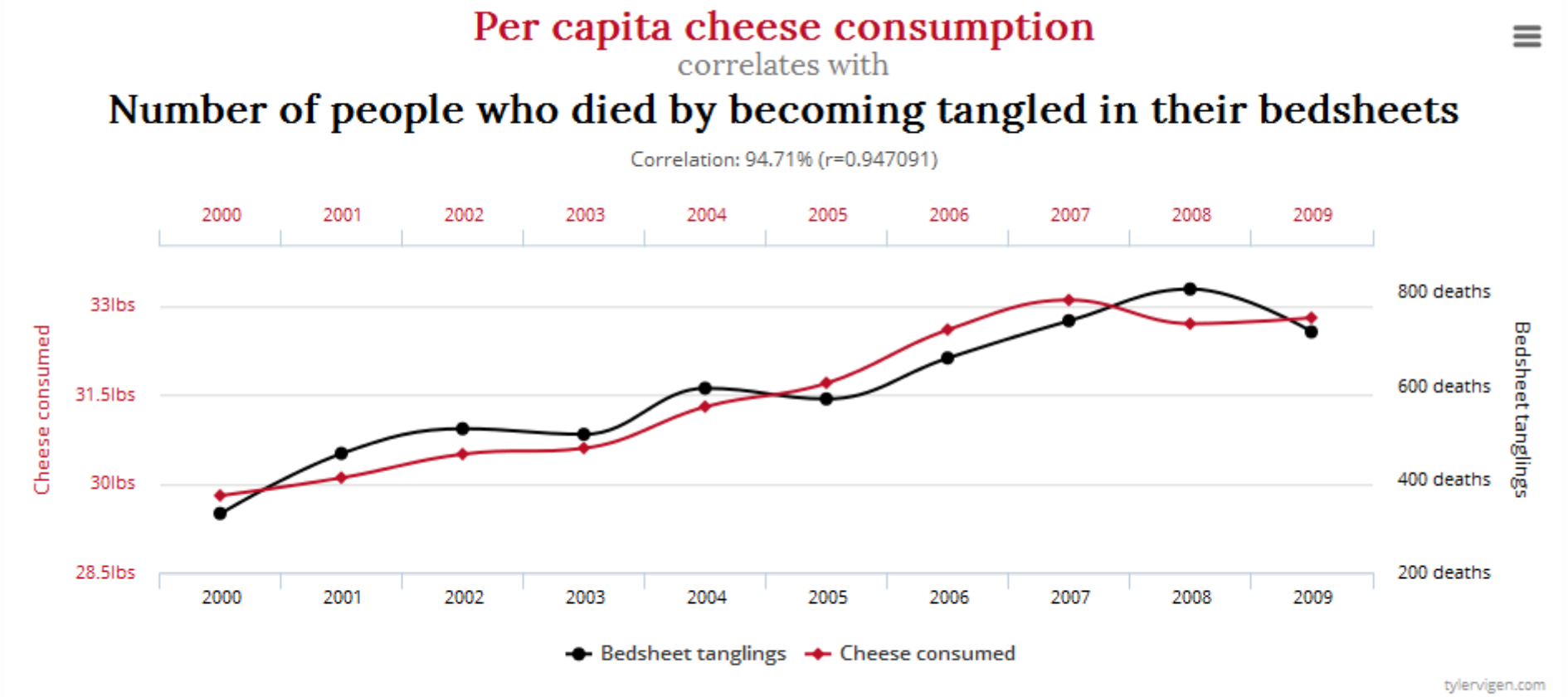
IMPORTÂNCIA DOS DADOS

- NA e zeros
- Média
- Tendência





http://tylervigen.com/spurious-correlations



http://tylervigen.com/spurious-correlations

PARÂMETROS X DADOS

Nenhuma magia estatística irá melhorar dados mal coletados

Mackenzie et al 2006

How to spot a misleading graph
https://www.youtube.com/watch?v=E91bGT9BjYk