Northwestern University

The Psychology of Data Visualization

Week 5

KNOW YOUR AUDIENCE

UNDERSTAND NEUROSCIENCE

HELP YOUR AUDIENCE

SEE & REMEMBER

70%

30%

Iconic memory

Working memory

Long-term memory

PREATTENTIVE PROCESSING

- Very Fast
- Attributes can be used to capture attention

Iconic memory

Working memory

ATTENTIVE PROCESSING

- Temporary
- Limited capacity (3-4 chunks of info)

Long-term memory

Iconic memory

Working memory

Long-term memory

DECISION TO STORE INFO

REPETITION

Iconic memory

Working memory

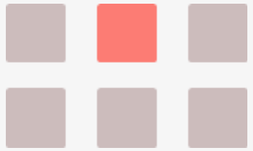
Long-term memory

PREATTENTIVE PROCESSING

- Very Fast
- Attributes can be used to capture attention

PREATTENTIVE ATTRIBUTES

Color



Shape/Size

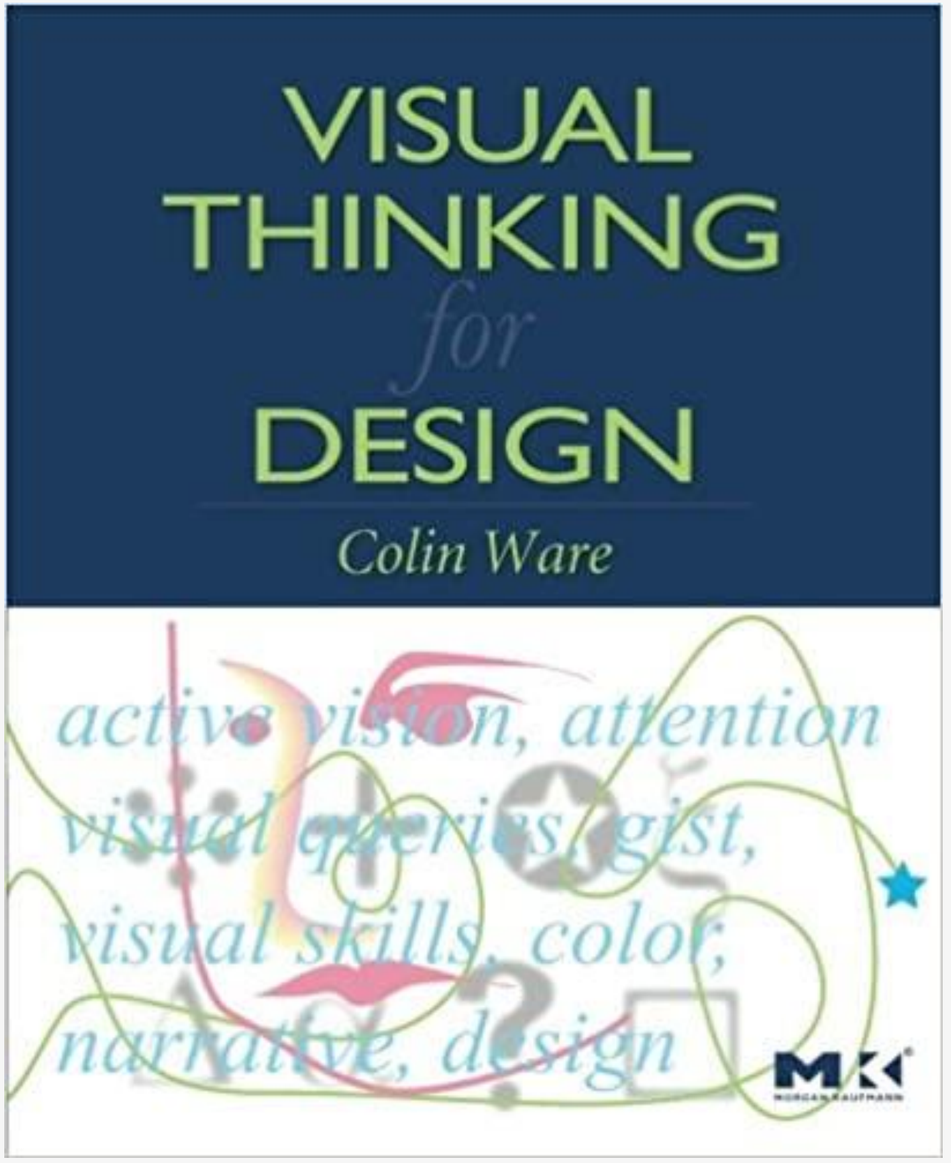
Motion

Spatial Grouping

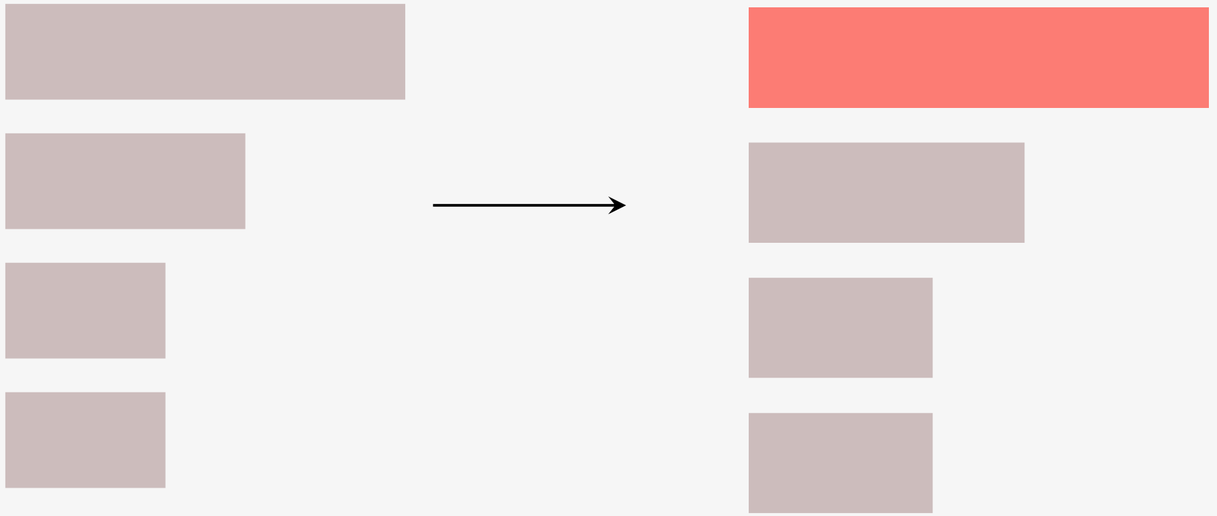
“Things that do not pop-up require several eye movements to find, with eye movement taking place at a rate of roughly 3 per second. [...]

These may seem like small differences but they represent the difference between visually efficient at-a-glance processing and cognitively effortful search.

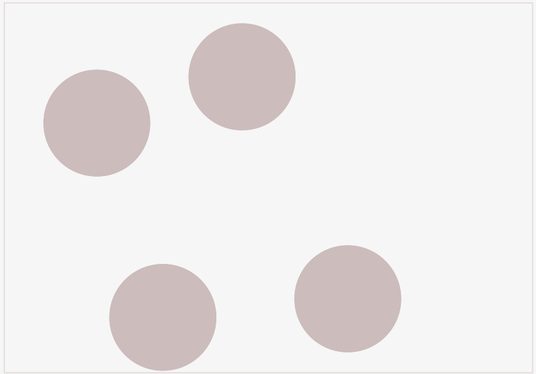
– Colin Ware –


VISUAL
THINKING
for
DESIGN
Colin Ware
active vision, attention
visual queries, gist,
visual skills, color,
narrative, design

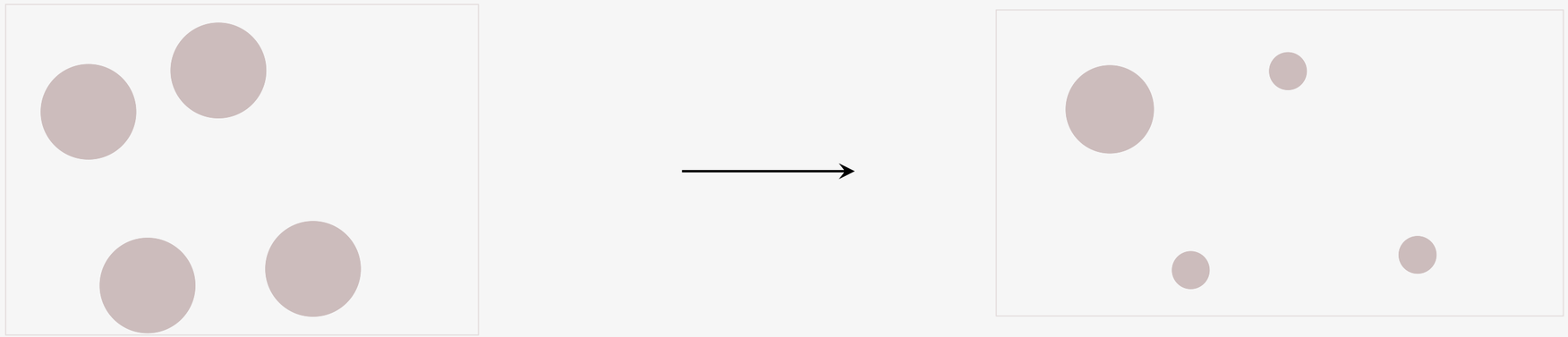
Color



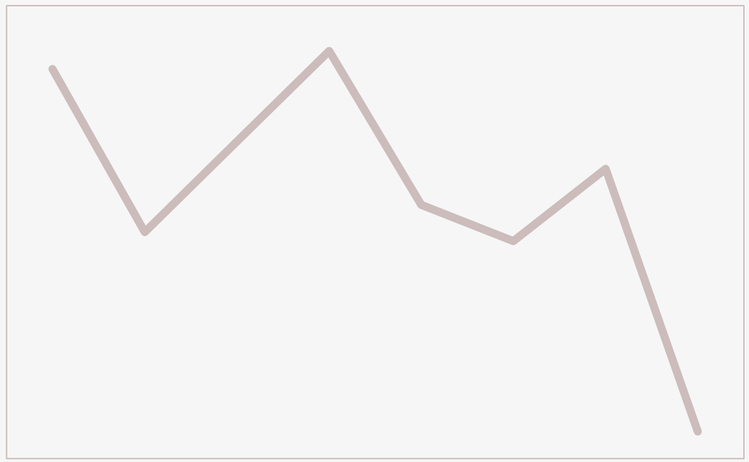
Shape/Size



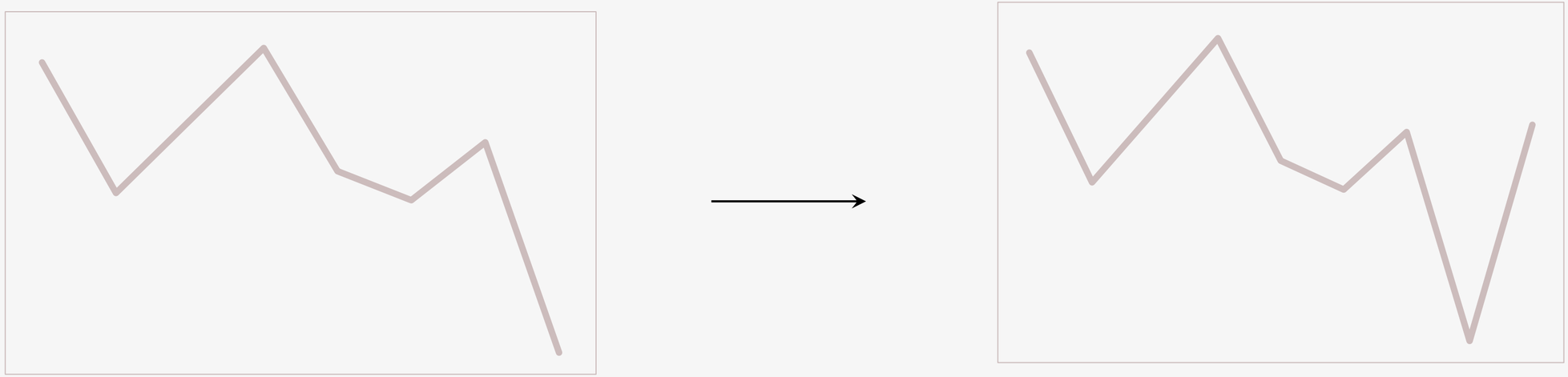
Shape/Size

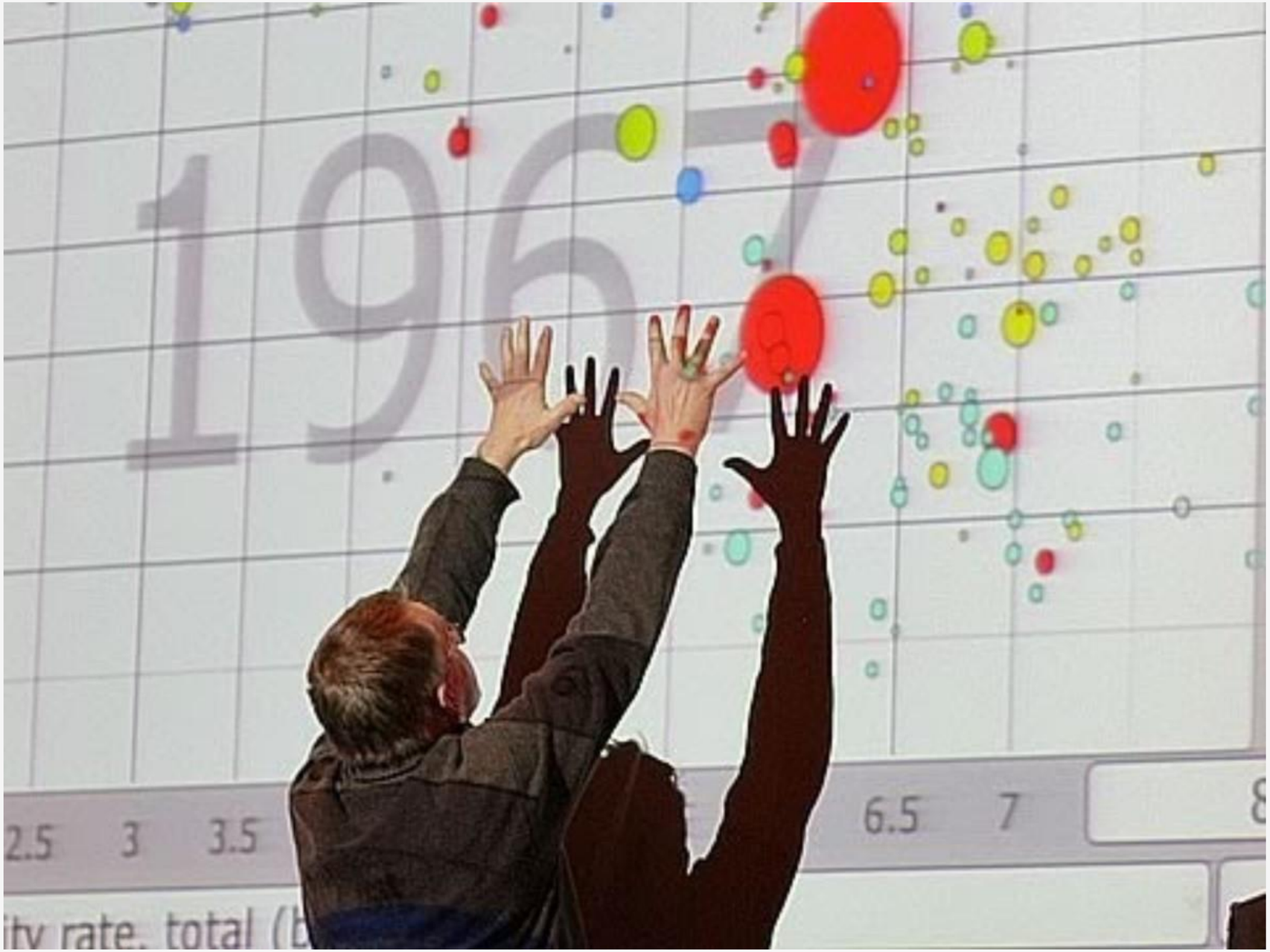


Motion

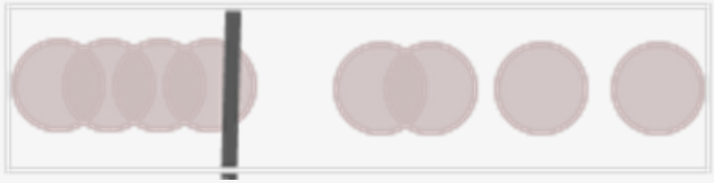


Motion




1967
2.5
3
3.5
6.5
7

Spatial Grouping



CUMULATIVE CASES PER 100,000: NY, NJ, CT, WA, CA
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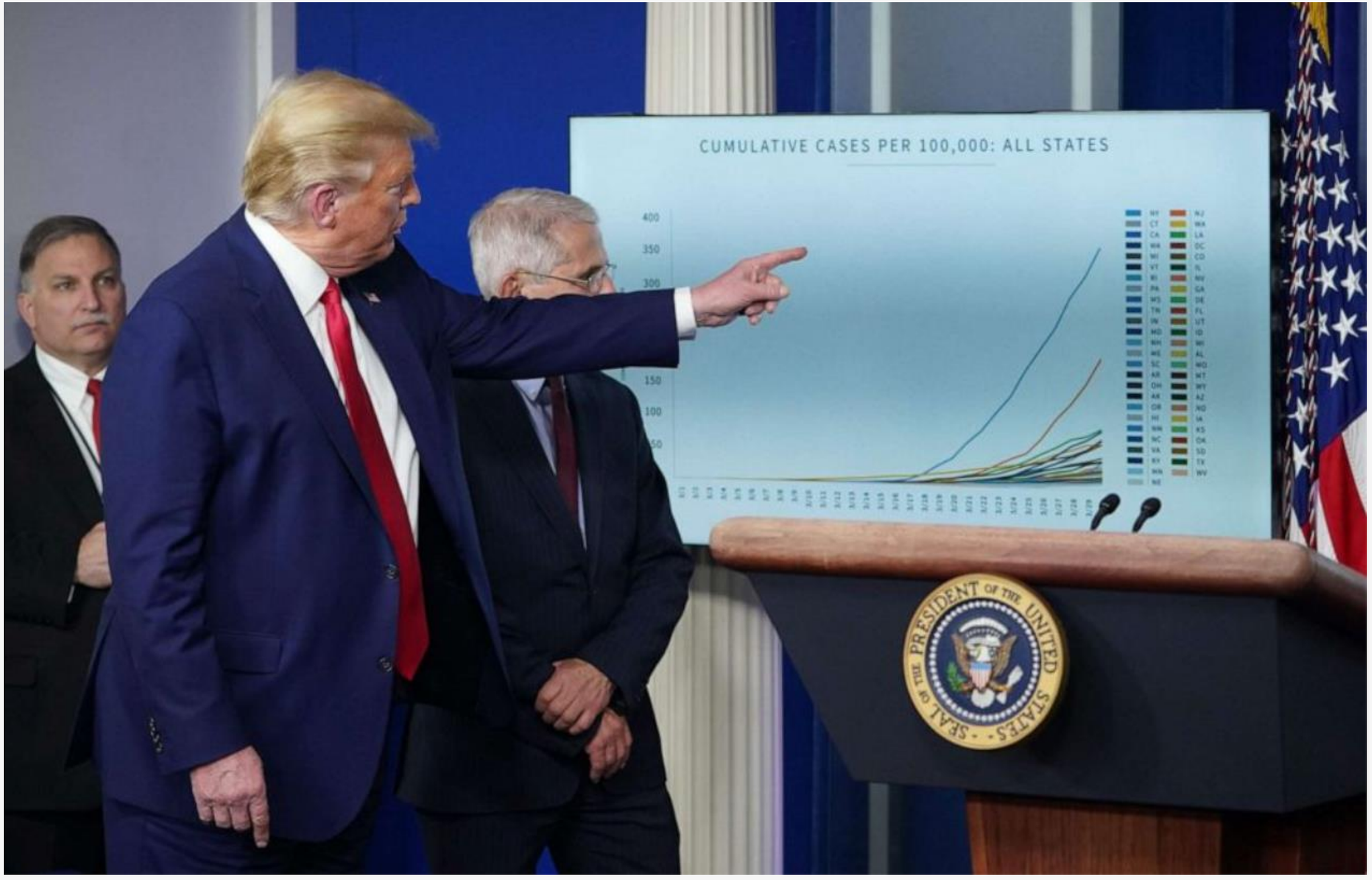

CUMULATIVE CASES PER 100,000: ALL STATES
400
350
300
150
100
PRESIDENT OF THE UNITED STATES
SEAL OF THE

GB
Gringhahns Bank | Real Time Insurance Call Centre
TOTAL PREMIUM SOLD
Today
1
MTD
96
TOP 5 AGENTS
IN-BOUND CLOSE RATE (%)
Daily
34
Monthly
25
OUT-BOUND CLOSE RATE (%)
Daily
2
Monthly
4
CALLS HANDLED
Leading Agent
45 (+6)
Leading Prospect Rep
20 (+1)
CALLS TRANSFERRED
MTD: 481
ABANDON RATE
Good
Bad
IN-BOUND CALLS IN QUEUE
35
AVERAGE SPEED OF ANSWER
CALL ME IN
CALL ME LATER
'Call Center Insight' has improved its customer experience with help from Dundas Data Visualization.
Researc

Iconic memory

Working memory

ATTENTIVE PROCESSING

- Temporary
- Limited capacity (3-4 chunks of info)

Long-term memory

Chunking

438 vs 4, 3, 8

Chunking

Personal Care Aide Jobs Almost Triple in a Decade

The graph below shows the seven jobs that experienced growth of over 100% in the last 10 years.

Personal Care Aide jobs rose 251% in the last 10 years, reaching over 2.2 million jobs. As the US population ages and the Baby Boomer generation retires, more jobs in healthcare will continue to be needed.

Source: https://www.commercialcafe.com/blog/fastest-growing-jobs/

Chunking

Personal Care Aide Jobs Almost Triple in a Decade

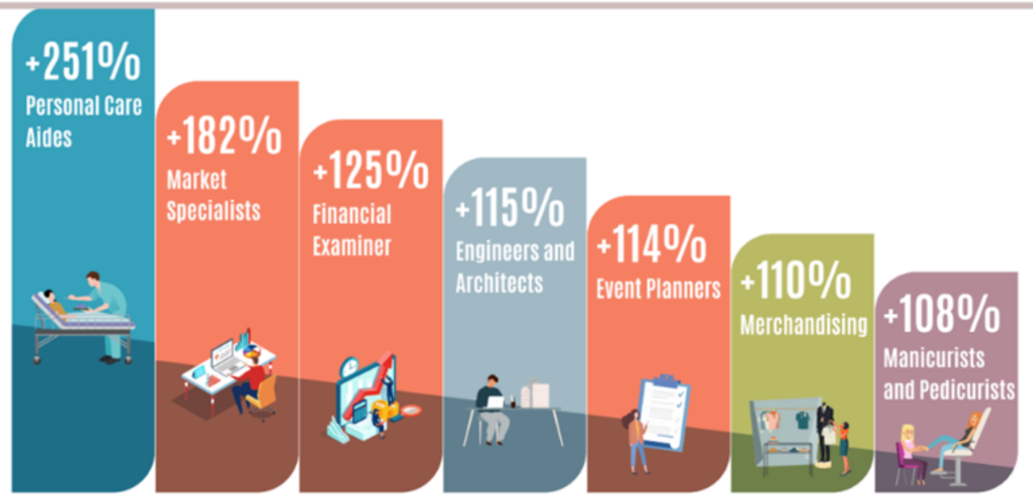
1

The graph below shows the seven jobs that experienced growth of over 100% in the last 10 years.

2

Fastest Growing Jobs in the US

3



4-10

Brought to you by COMMERCIALCafé

11

Personal Care Aide jobs rose 251% in the last 10 years, reaching over 2.2 million jobs. As the US population ages and the Baby Boomer generation retires, more jobs in healthcare will continue to be needed.

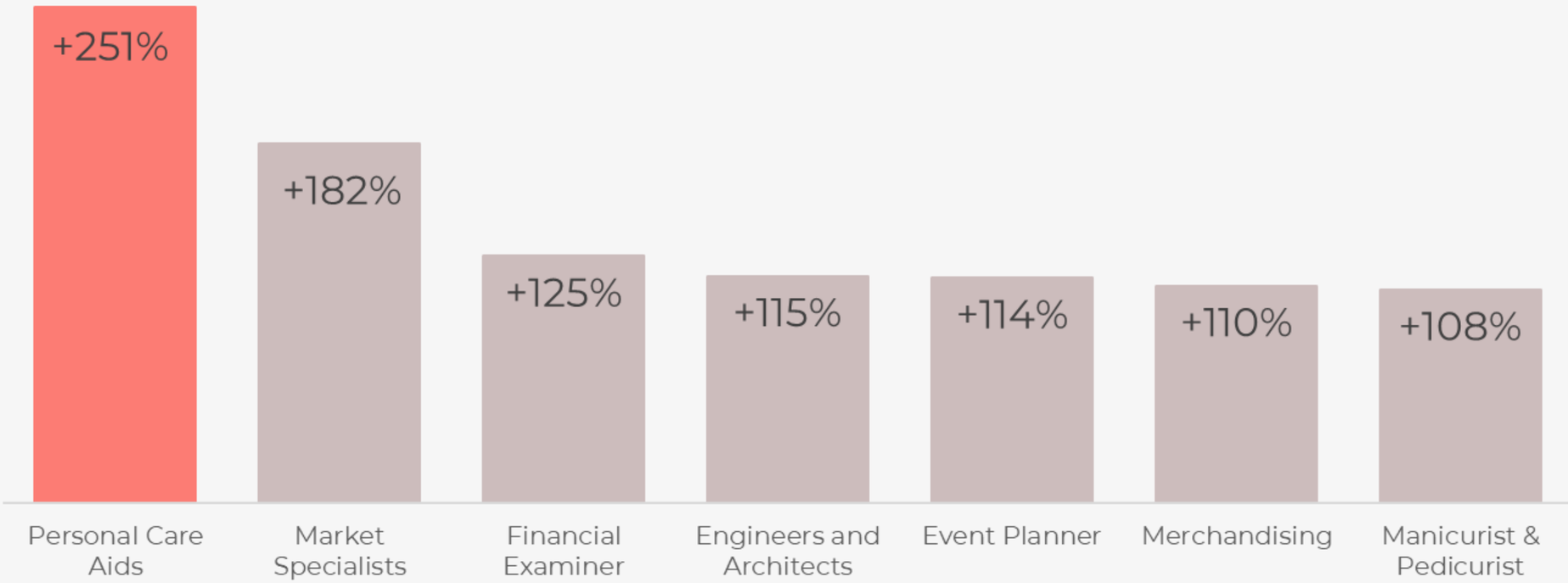
12

Source: https://www.commercialcafe.com/blog/fastest-growing-jobs/

Chunking + Preattentive Attributes

Personal Care Aide Jobs Almost Tripled in the Last Decade

Top seven jobs that experiences growth over 100% in the last 10 years



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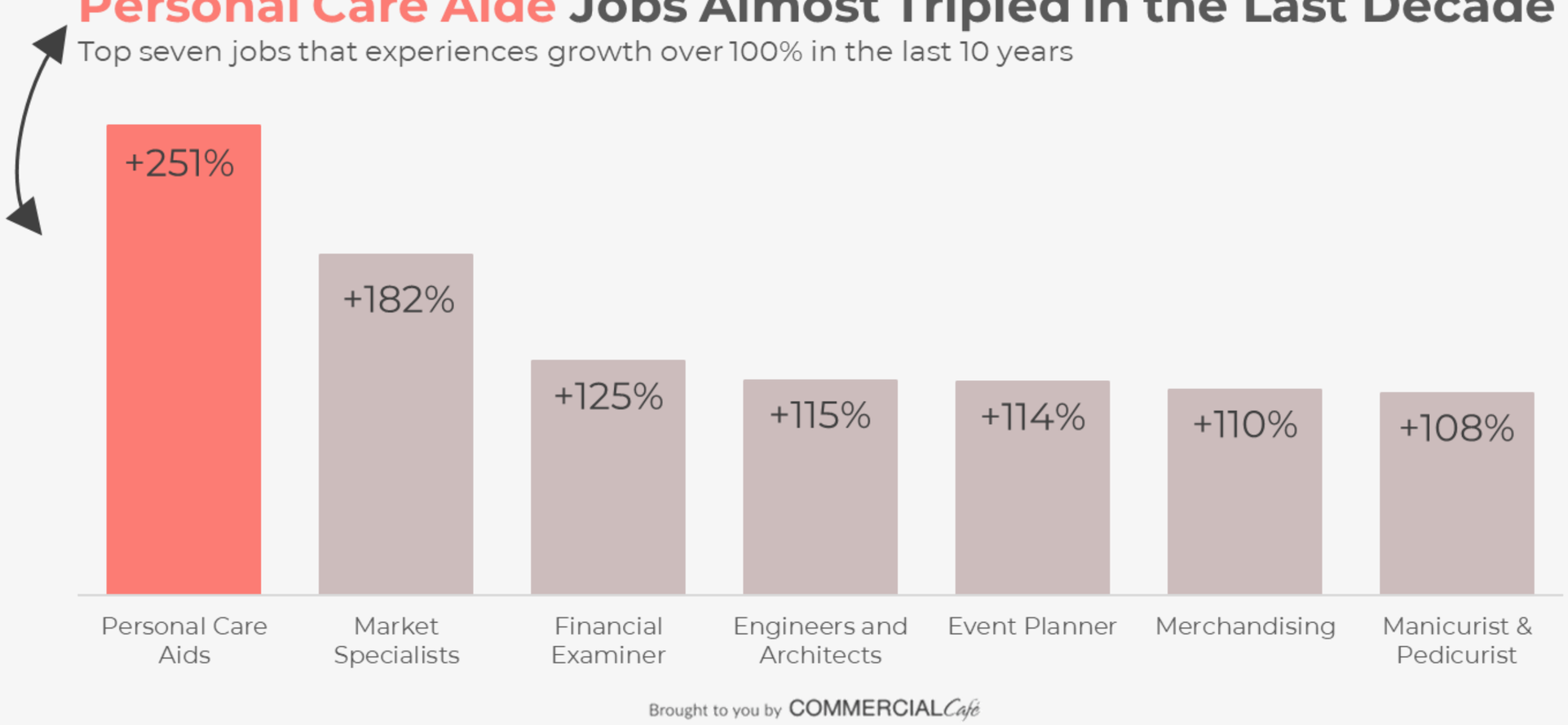
Chunking + Preattentive Attributes

CHUNK



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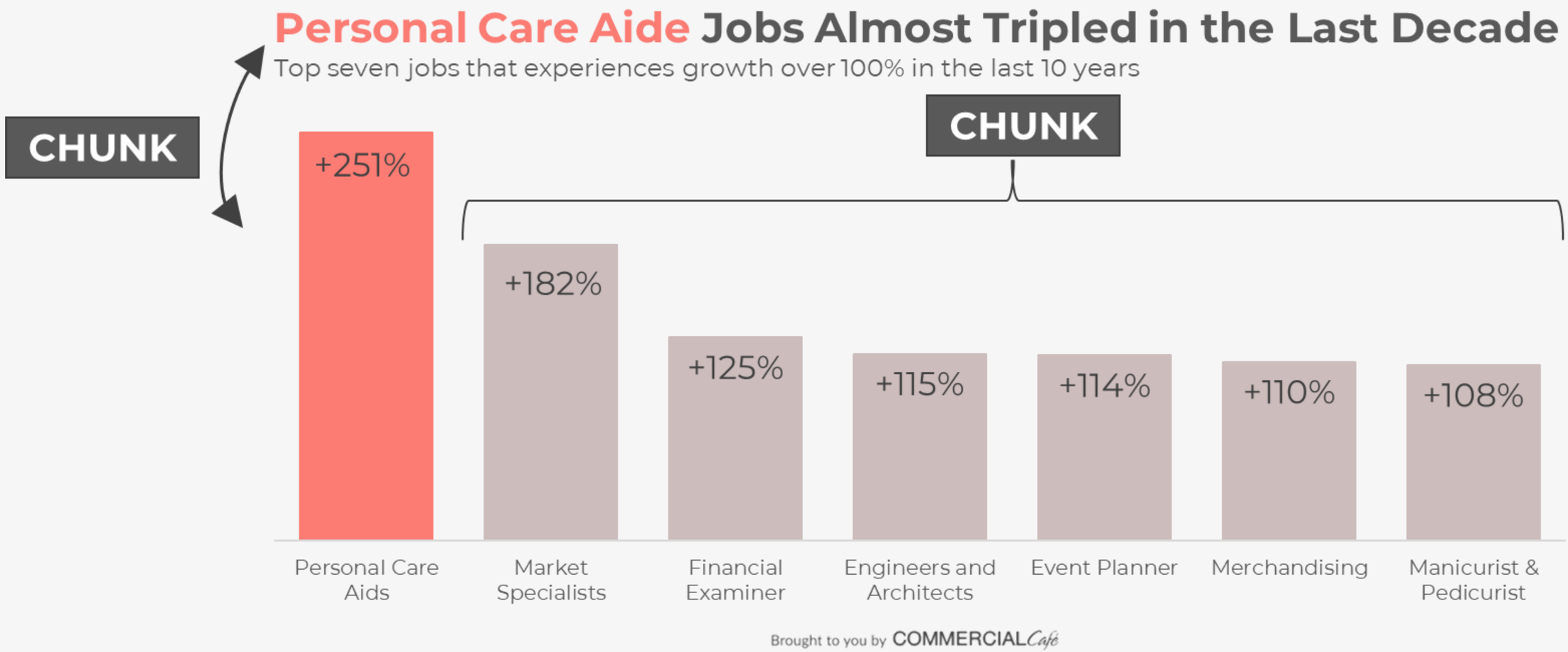
Chunking + Preattentive Attributes



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BEFORE

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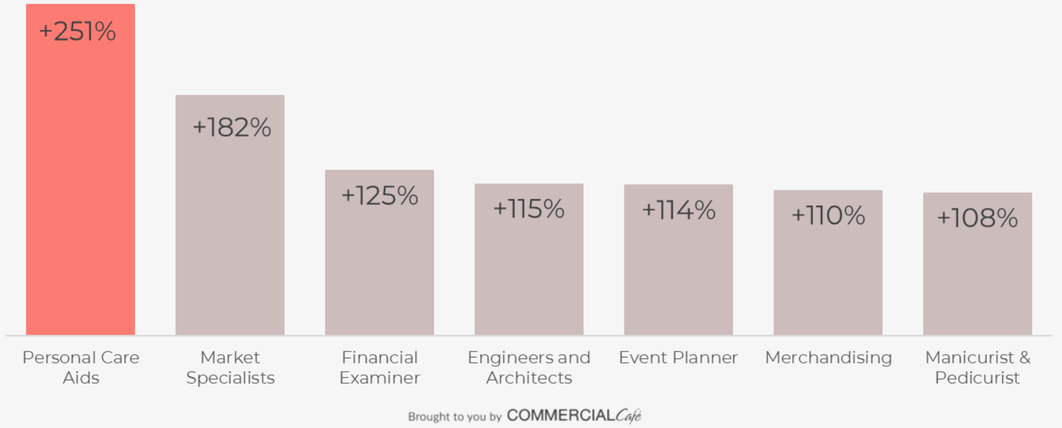
AFTER

Personal Care Aide Jobs Almost Tripled in the Last Decade

Top seven jobs that experiences growth over 100% in the last 10 years



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Iconic memory

Working memory

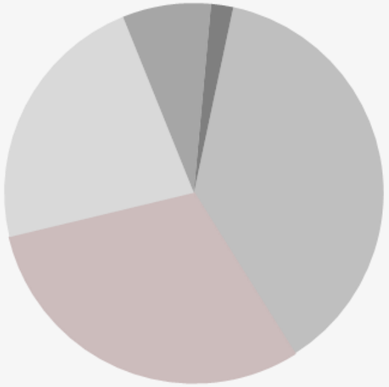
Long-term memory

DECISION TO STORE INFO

REPETITION

LONG-TERM MEMORY

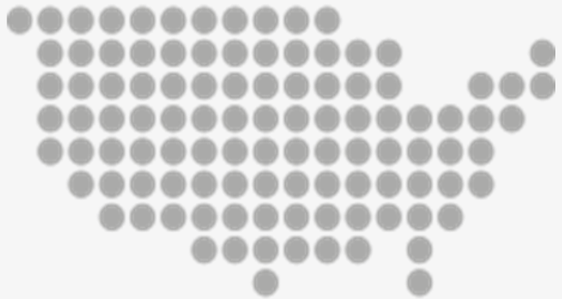
pie chart



bar chart

line chart

map



METRICS

HANNAH FAIRFIELD

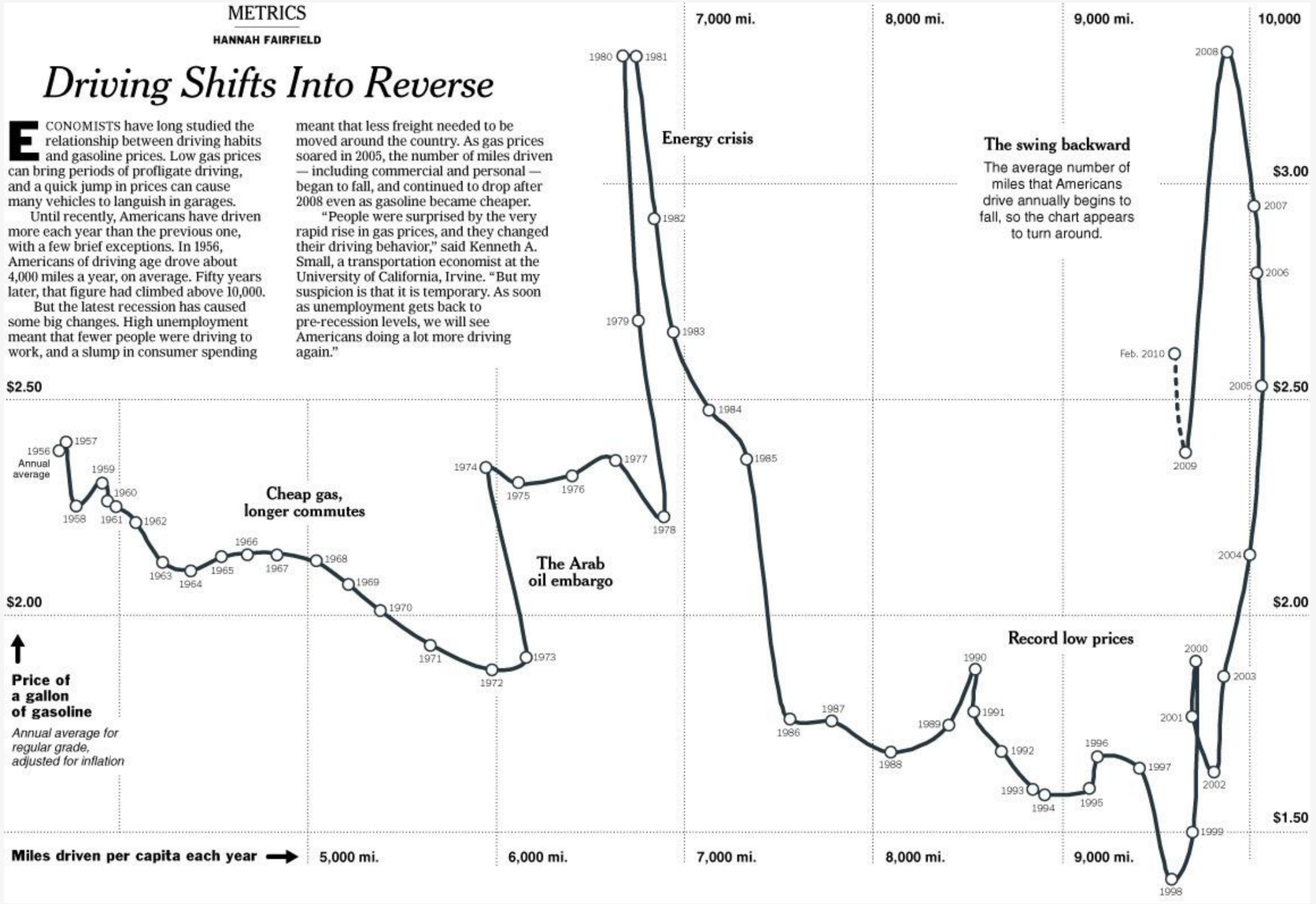
Driving Shifts Into Reverse

ECONOMISTS have long studied the relationship between driving habits and gasoline prices. Low gas prices can bring periods of profligate driving, and a quick jump in prices can cause many vehicles to languish in garages.

Until recently, Americans have driven more each year than the previous one, with a few brief exceptions. In 1956, Americans of driving age drove about 4,000 miles a year, on average. Fifty years later, that figure had climbed above 10,000.

But the latest recession has caused some big changes. High unemployment meant that fewer people were driving to work, and a slump in consumer spending meant that less freight needed to be moved around the country. As gas prices soared in 2005, the number of miles driven — including commercial and personal — began to fall, and continued to drop after 2008 even as gasoline became cheaper.

"People were surprised by the very rapid rise in gas prices, and they changed their driving behavior," said Kenneth A. Small, a transportation economist at the University of California, Irvine. "But my suspicion is that it is temporary. As soon as unemployment gets back to pre-recession levels, we will see Americans doing a lot more driving again."



Source: https://www.nytimes.com/2010/05/02/business/02metrics.html

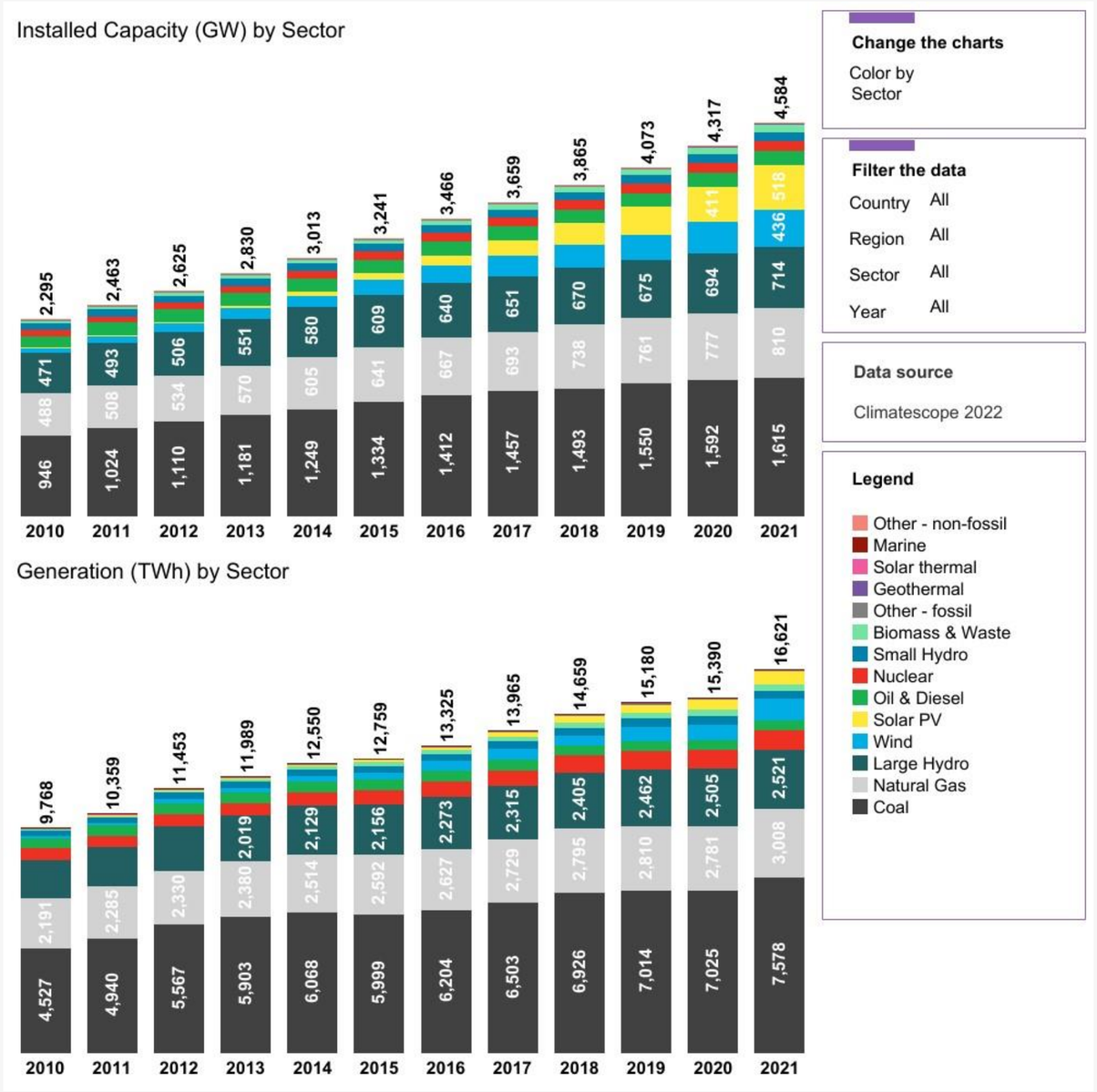
EXERCISE

Take a look at the graph on the next slide.

How could you apply preattentive attributes and chunking to improve it?

Do you think the graph is likely stored in the audience’s long-term memory?

Sketch your revised version of the graph and share your answers on Canvas.



Source: https://public.tableau.com/app/profile/bloomberg.new.energy.finance/viz/ClimatescopeCapacityGeneration/CapacityGeneration