



# B9651 – Marketing Analytics

## Session 1: Course Introduction + Marketing Datasets

Professor Hortense Fong

Professor Malek Ben Sliman

# About Me



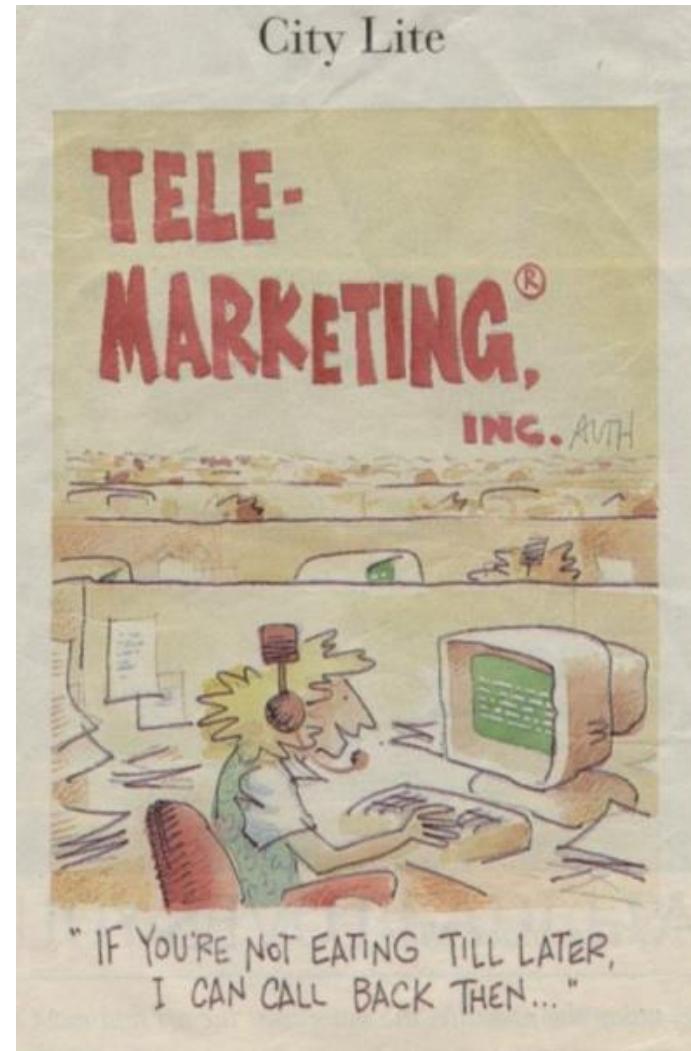
- From Tunisia
- Studied in France (Louis Le Grand/Ecole Centrale Paris)
- Studied at Columbia IEOR (MSOR)
  - Please reach out!
- Joined Ph.D. in Marketing at Columbia Business School
  - Thesis: Essays on Social Networks with Applications to Seeding and Art Valuation
  - Consulting: e.g., **coteacher**
  - Teaching: Created (with others) MOOC on EdX (Marketing Analytics)
- Former AVP, Senior Data Scientist @Sotheby's
  - Built in-house art pricing model
- Now: Senior Data Scientist @ Oden Technologies
  - Industry 4.0

# A Primer on Marketing Problems: Online Banking

- 1990's: many firms started preparing for the “digital revolution”:
  - Example: banks started investigating online banking
  - First analysis: compared profits generated by offline (traditional) vs online customers:
    - What happened? **Offline customers were much more profitable than online!**
    - What went wrong? In-depth analysis showed that online customers were much younger
- By the end of this class, you should be able to:
  - Ask relevant marketing questions
  - Know where and how to collect information/datasets
  - Extract meaningful insights!

# **What is Marketing?**

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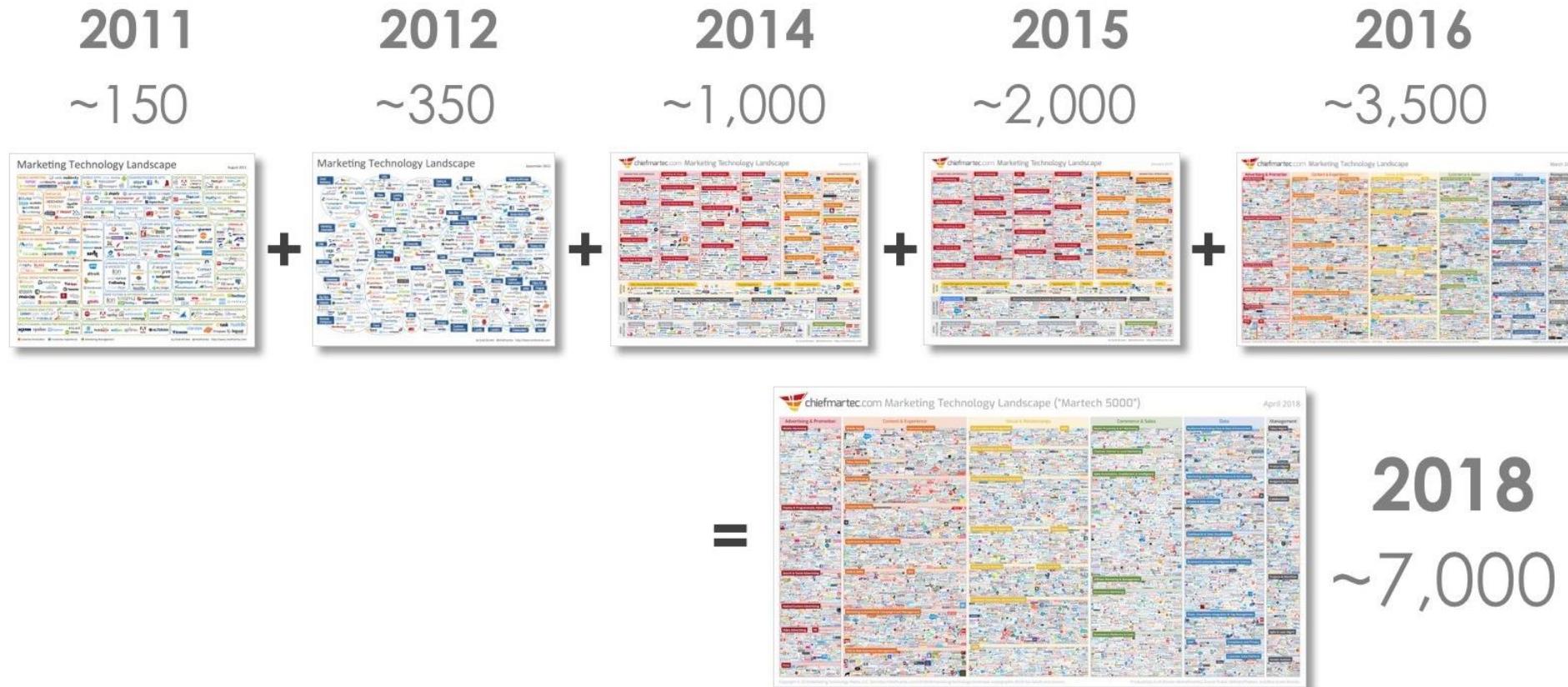
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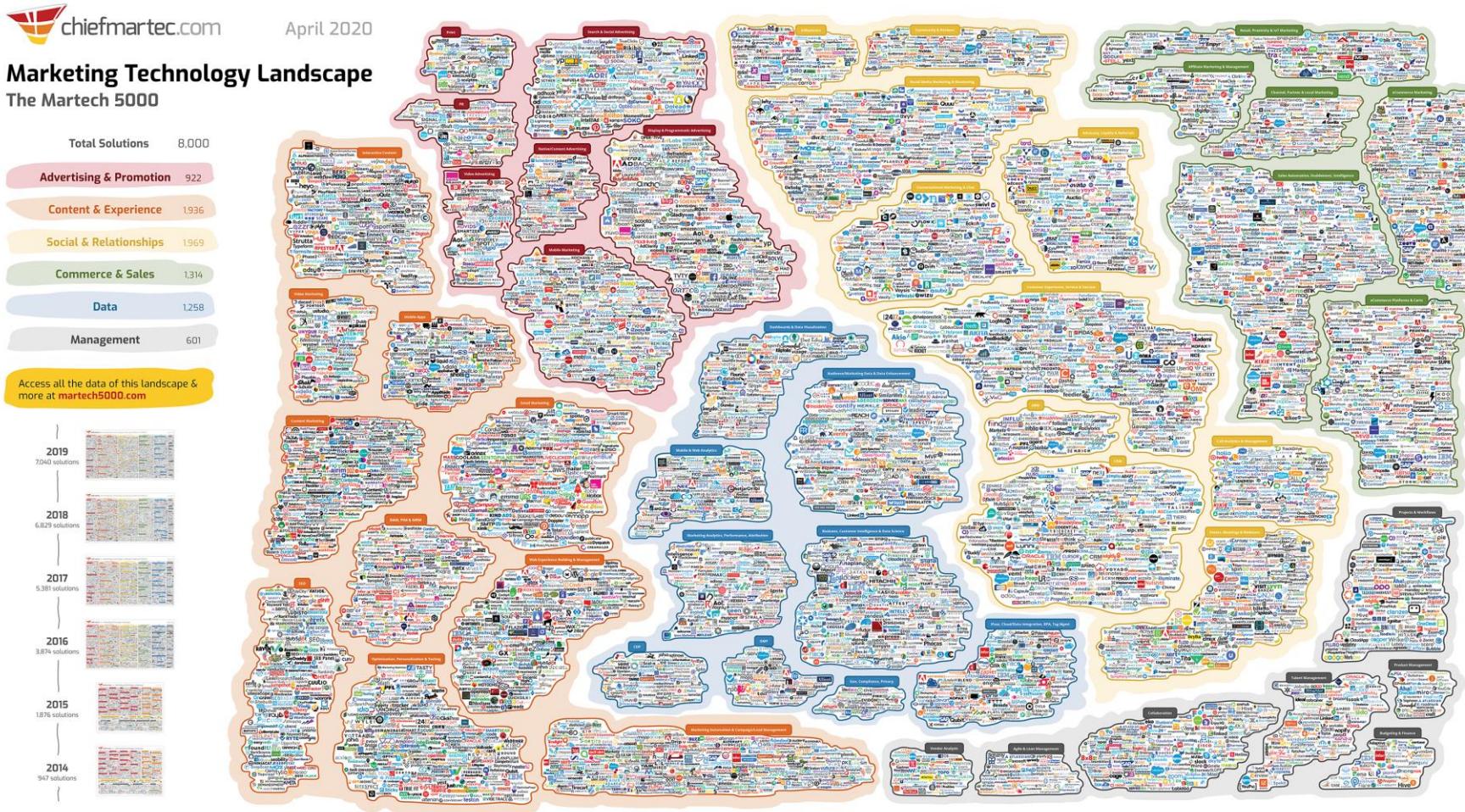
Results 1 - 25 – Cost. Of course, **Manhattan rentals** are pricey! You can expect to pay roughly \$3,000 a month for a studio **apartment**. Part of that is because of ...

# Marketing Evolution – More Analytical & Complex

Number of Marketing Technology Firms

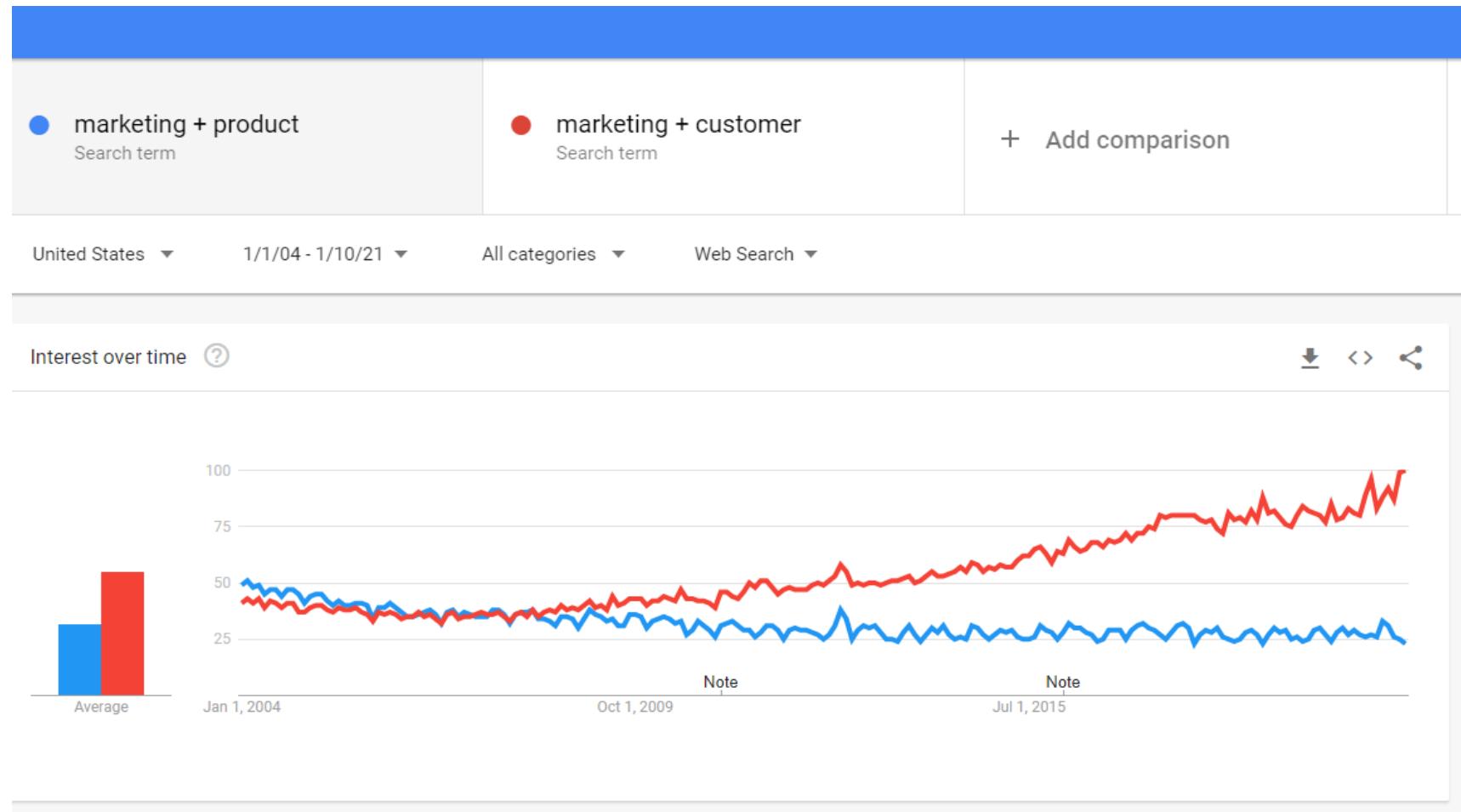


# Marketing Today





# Google Trends on Marketing



# This is (Mostly) the Past



# Prior to the 90's

Products and brands were the center of the marketing activity (e.g., mass market, mass media, and impersonal transactions)



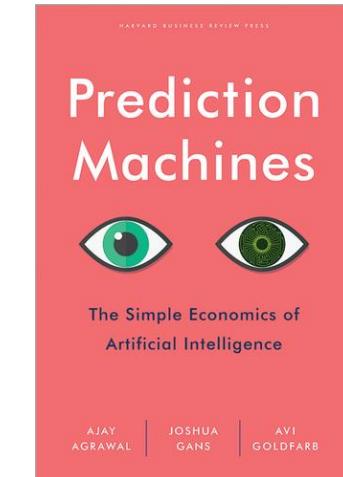
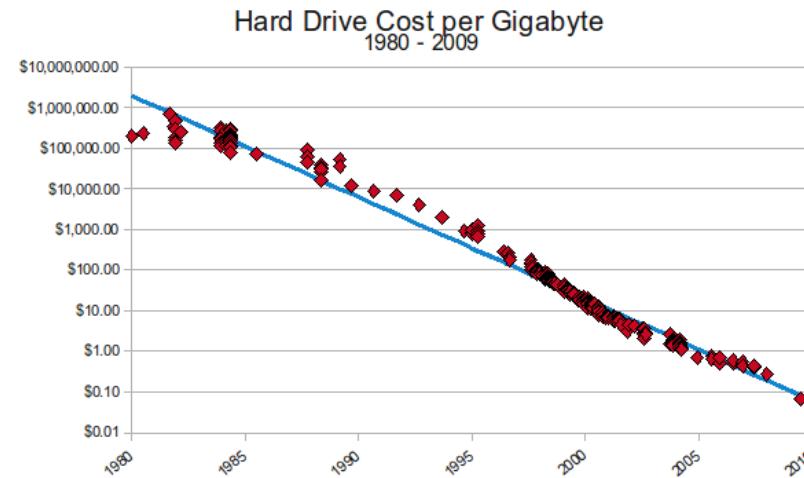
# Build it and they will come!

(Customers exist to serve the marketplace)



# A Few Environmental Trends

- Internet – real time!
- Data – cheaper to store  
→ more and more data
- Computing – faster and cheaper to process information → more computing



# The 1990's

- Initial findings from financial services:
  - A high concentration of profits among customers

**The profit distribution of a west coast US bank**

Table 1.2 Percentage profit per household

\$ Profit/ Household	% of Household	% of Balance	\$ Profit
Over \$600	0.19%	2.34%	\$3 021 332
\$550 to 599	1.45%	1.53%	\$945 321
\$350 to 549	1.78%	4.22%	\$1 353 798
\$200 to 349	2.80%	9.35%	\$4 354 323
\$150 to 199	3.88%	7.55%	\$3 456 387
\$100 to 149	6.03%	31.87%	\$2 435 678
\$0 to 99	13.88%	12.44%	\$978 453
-\$1 to -25	22.34%	14.32%	-\$7 345 234
-\$26 to -49	33.78%	9.90%	-\$2 435 654
-\$50 to -74	13.64%	5.50%	-\$877 954
Under -\$75	0.23%	0.98%	-\$324 165
Total	100.00%	100.00%	\$5 544 285

All customers are not equal

# The Result – Customer as a Unit of Analysis

- Aiming to proactively manage the ways individual customers, not only products, create profitability



# Customer Centricity & Drivers of Revenue

- Before:
  - New product development
  - One-way street in terms of communication
- Now:
  - Acquisition (of new customers)
  - Retention (of current customers)
  - Expansion (of revenue from current customers)

# The New Rules of Customer Centricity

All Customers Are  
Created Equal

**The  
Customer  
*is*  
Always  
Right**

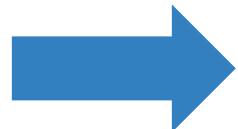
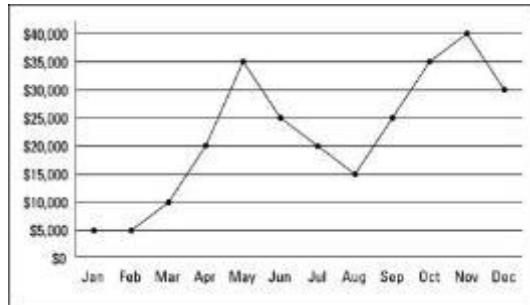


Customer Pyramid



Trained service  
based on segment

Sales Statistics



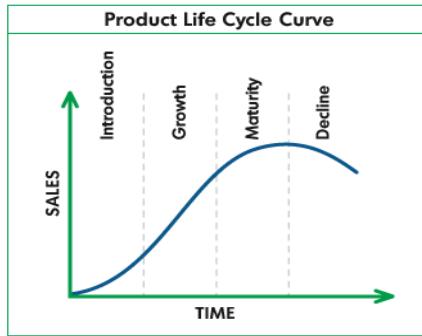
Customer (Predictive) Analytics



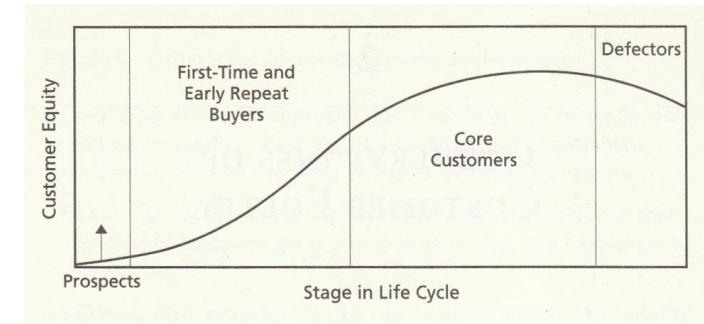
Promotions based  
on life events

# The New Rules of Customer Centricity

Product Life Cycle



Customer Life Cycle



Product Portfolio



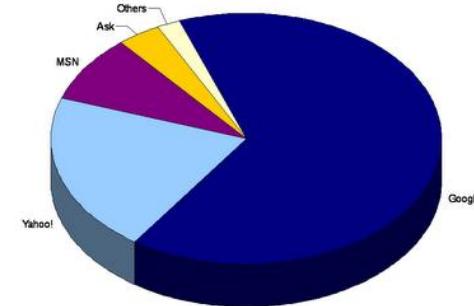
Customer Portfolio



Boston  
Consulting  
Group Matrix

# The New Rules of Customer Centricity

Market Share



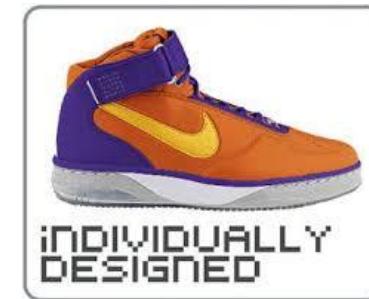
Share of Wallet



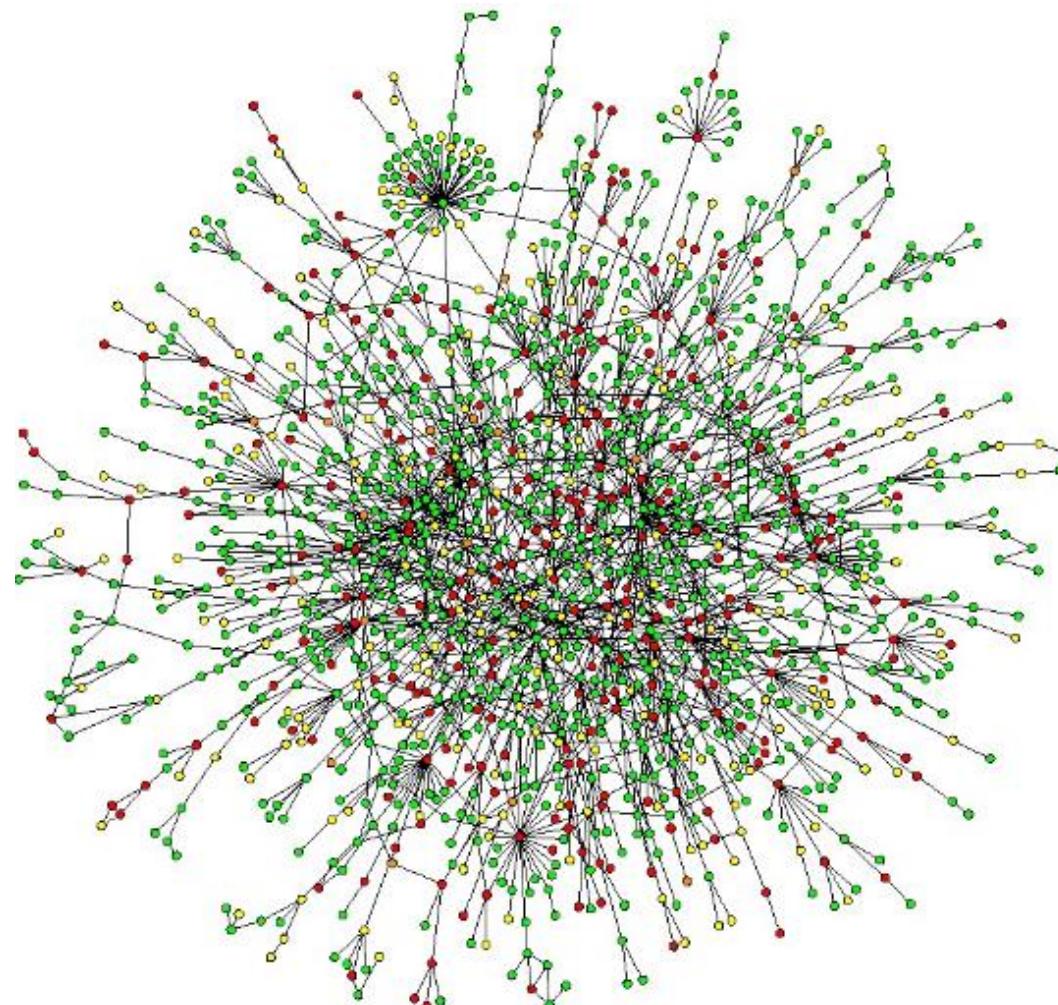
Segmentation



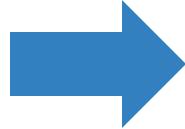
Customization



# And Then Came Online Social Networks...



# Moving to a Non-linear World...



From bowling

To pinball

# ... to Complicate Things Further

Sotheby's – Pre-2020



Sotheby's – 2020



Some practices will be completely changed in the foreseeable future...  
creating new challenges and opportunities!

# So... What is Marketing?

Marketing is the art and science of identifying,  
delivering, and capturing value by  
understanding customers and their needs

Marketing Analytics is about bridging the gap  
between quantitative tools and substantive  
marketing questions

# “Why Marketing Analytics Hasn’t Lived Up to Its Promise”

- 198% increase in planned allocation of marketing budgets to analytics in 3 years
- But the effect of analytics on company-wide performance is modest (4.17 out of 7, on average)
- **Why?**

# Marketing Analytics Promise - Data Challenge

- Data can be completely disorganized and hard to merge
  - e.g., mobile & PC browsing
- Companies want to collect everything but don't know what they can and **cannot** do with it
- Overall, some companies lack direction when obtaining data

# Marketing Analytics Promise – Analyst Challenge

- Business/Analyst Gap
  - Managers/Marketers are often unaware of the data that is available
  - Analyst are often agnostic to the company's goals/business problems
- Mapping Tools to Business Problems
  - Tools can rarely be used as a black-box
- Communication
  - Different teams often have different jargons

# Marketing Analytics Promise - Solution

- Overall, analysts/engineers need to understand
  - The algorithm/models that can be used
    - Theoretically and practically
    - Requires staying up-to-date with literature
  - What are the business problems?
    - Tools are here to help us solve substantive problems
    - No company wants to invest in a model if it doesn't answer a problem
  - Which data is available and what kind of questions we can answer?
    - Help solving problems fast and initiate questions
- This class's objectives:
  - Learn technical skills and business problems/questions
  - Provide you with the tools to be an integrated/modern engineer
  - Help you become a creative force at your future job

# Today's Agenda



Course Outline



Expectations



Marketing Datasets

# Today's Agenda



Course Outline

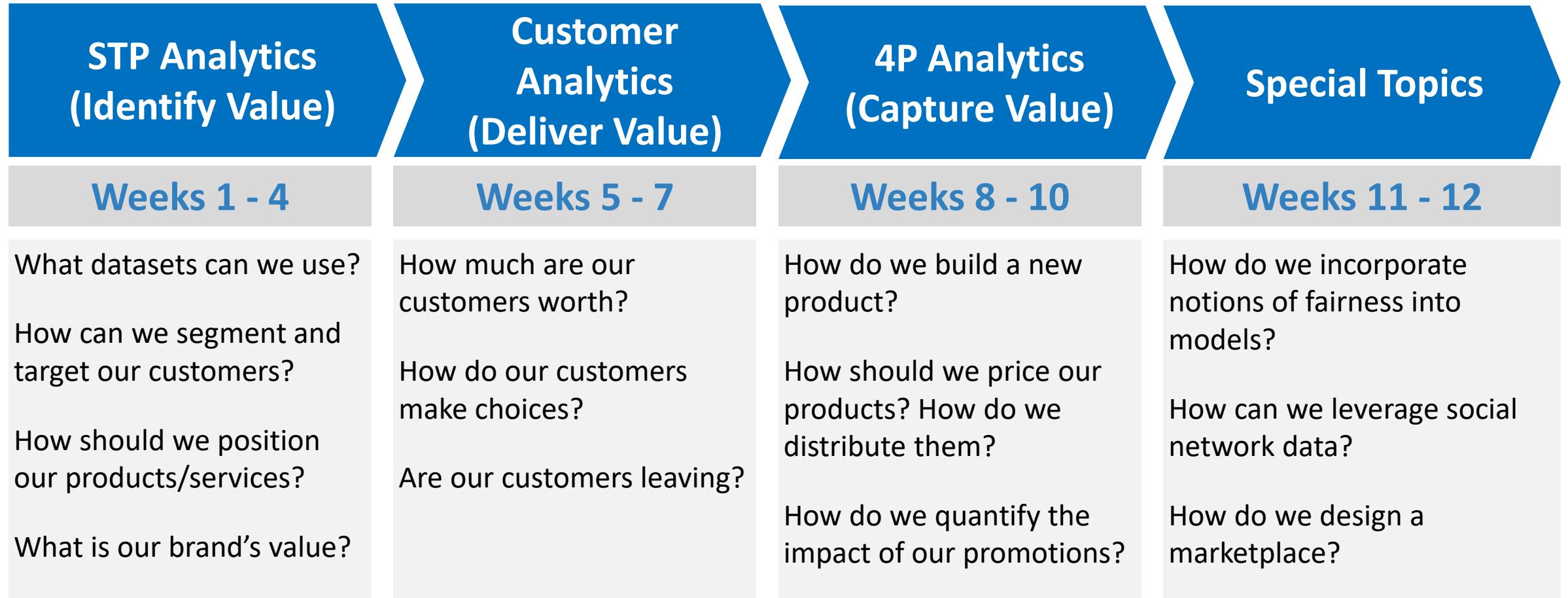


Expectations



Marketing Datasets

# Course Roadmap



# By the end of this class, you will become an informed...

## Provider of Data & Analysis

- Marketing research
- Marketing analytics
- Business analytics
- Data scientists

## Provider and Consumer of Data & Analysis

- Tech
- Start-ups
- Consulting

## Consumer of Data & Analysis

- Product management
- Brand management
- Venture capital
- Finance

# Evaluation

- Participation & Attendance (10%)
  - In-class discussions
  - Pre-class case surveys and/or concept checks
    - Graded on completion
- Assignments (50%):
  - Two individual (10% each)
  - Three group (groups of four formed randomly) (10% each)
  - No late assignments will be accepted
- Midterm & Final Exam (40%)
  - Midterm – closed book (15%), one hour
  - Final – open book (25%), two hours

# Today's Agenda



Course Outline



Expectations



Marketing Datasets

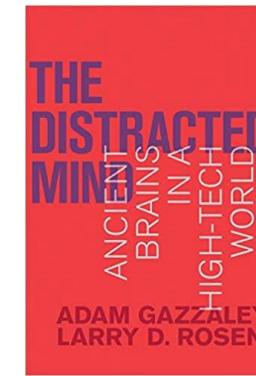
# What should you expect from us?

- Emails will be returned usually within 24-48 hrs
- Fair evaluation of student work
- Open-door policy
  - Office Hours – flexible
- Slides posted before class
- TAs
  - Xinyu Wei (xw2748@gsb.columbia.edu)
  - Eli Sugerman (esugerman25@gsb.columbia.edu)
  - Himanshu Jagwani (hjagwani23@gsb.columbia.edu)
  - Jinhwa Chun (jchun23@gsb.columbia.edu)



# What do I expect from you?

- Brush up on Python/Excel if needed
- Attendance is required
- Come to class prepared
  - Do the pre-class surveys and readings
  - Prepare the assigned cases
- Need full attention in class
  - Cellphones are turned off
  - No laptops, tablets are okay for notes
  - Have a pen and paper for note taking
- Be engaged in class discussion with classmates
- Challenge me: make sure you understand!
- Submit assignments on time



# On-Demand Evening Shuttle

- Columbia (through Via) provides a door-to-door shuttle service from 8pm-3am year-round
- Information here:  
<https://transportation.columbia.edu/content/via-evening-shuttle>
- Feel free to schedule a ride in advance (if so, plan for 9:05pm)
- Columbia also provides other options:  
<https://transportation.columbia.edu/content/manhattanville-loop>



# Today's Agenda



Course Outline

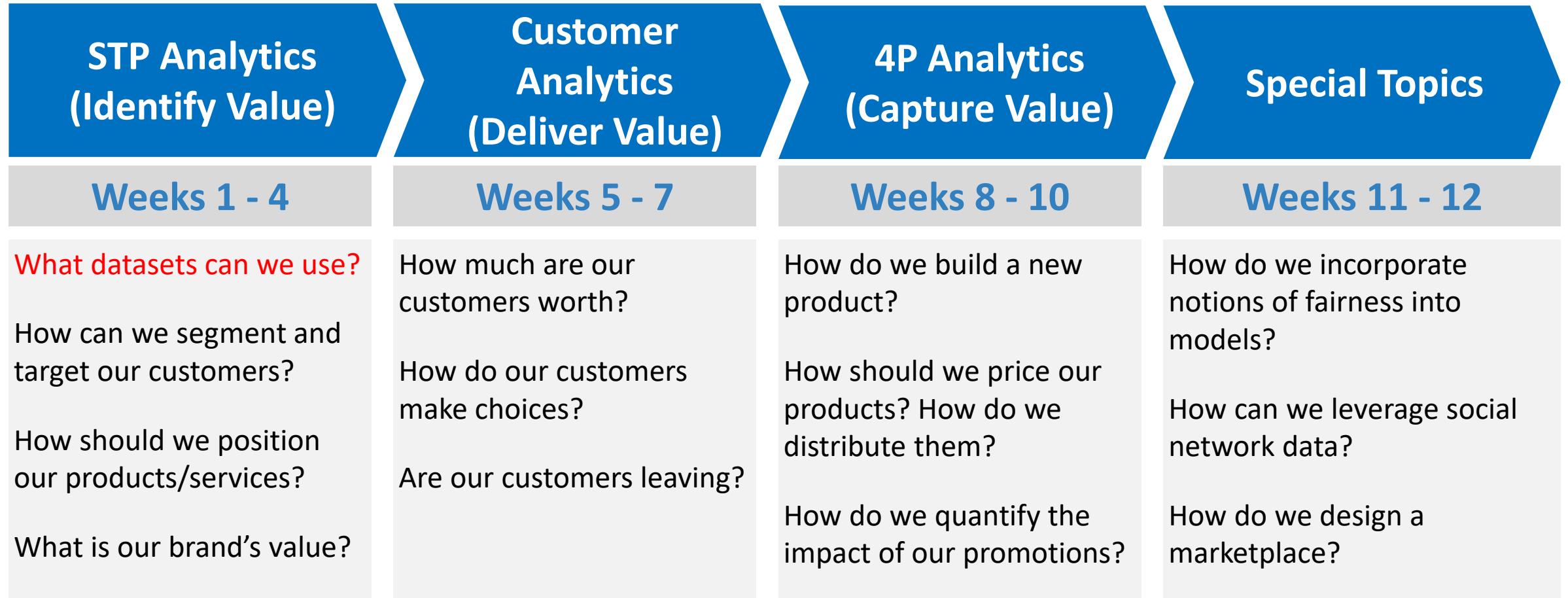


Expectations



Marketing Datasets

# Course Roadmap



# The Starting Point: Data



# We Generate TONS of Data!

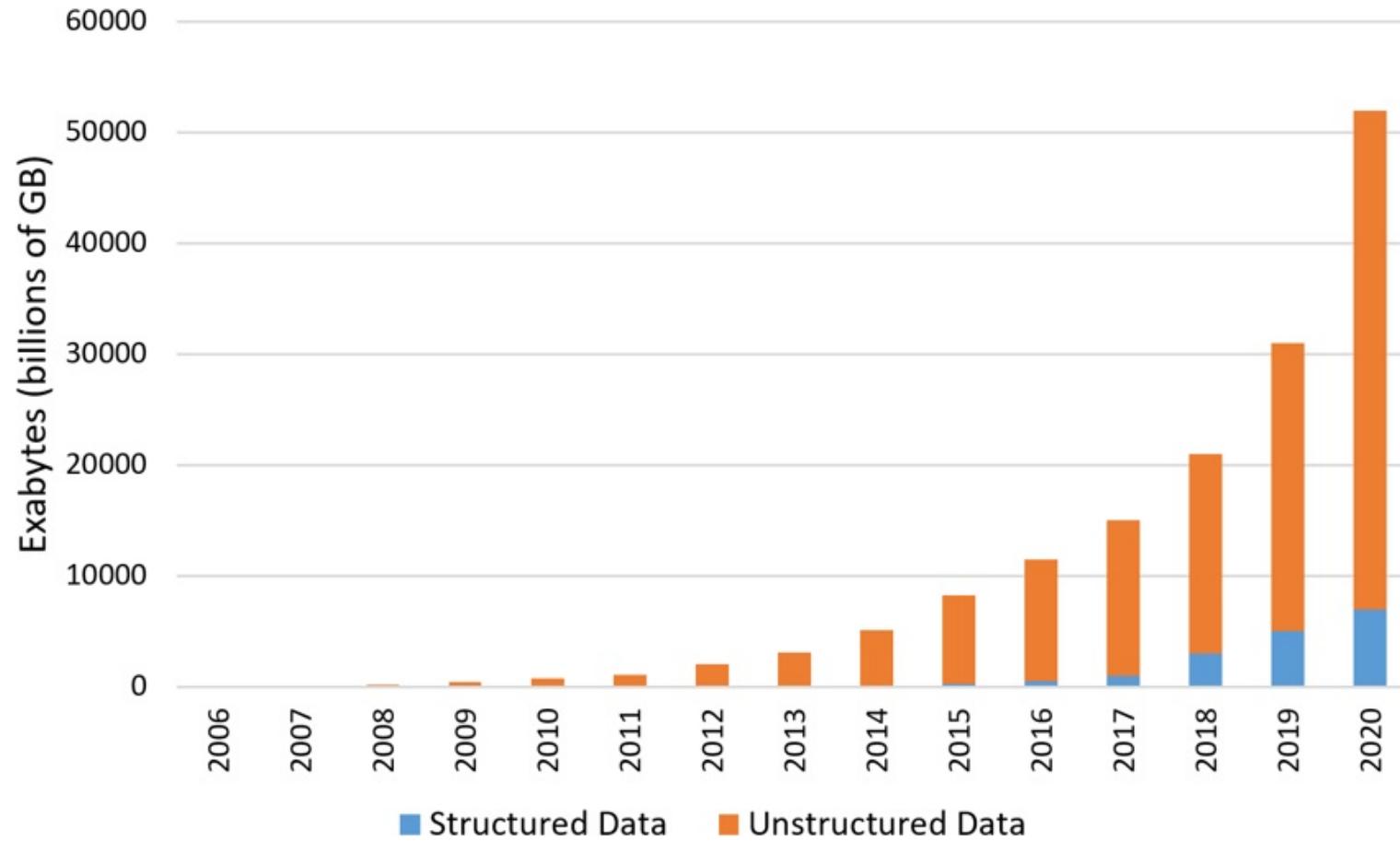
- ~44 zettabytes of data in the world beginning of 2020
  - One zettabyte =  $10^{27}$
- Predicted to be ~175 zettabytes of data by 2025

**40x more data than observable stars in the universe!**



Source: <https://seedscientific.com/how-much-data-is-created-every-day/>

# Data Explosion!



Source: [https://www.eetimes.com/author.asp?section\\_id=36&doc\\_id=1330462](https://www.eetimes.com/author.asp?section_id=36&doc_id=1330462)



**But... Why do we need data? Are there more words that begin with the letter K or more words that have K as their third letter?**

Words that begin with the letter K

Words that have K as their third letter

Total Results: 0

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Session 1 - 42

# But...Why do we Need Data?

A typical text contains twice as many words that have K as the third letter rather than the first

## K first

1. Kitchen
2. Kangaroo
3. Kale

## K third

1. Ask
2. Cake
3. Biking
4. Fake
5. Hiking
6. Ink

## **Availability Bias:**

People assess the likelihood of something by the ease with which instances of that thing can be brought to mind.

Source: Tversky, Amos, and Daniel Kahneman. "Availability: A Heuristic for Judging Frequency and Probability." Cognitive Psychology 5, no. 2 (1973): 207–32.

# Why do we Need Data/Analysis to Make Decisions?

1. Humans have limited memory, and a limited ability to process and synthesize data
2. People are bad at learning from experience
  - **Overconfidence bias:** subjective confidence is greater than objective accuracy
  - **Confirmation bias:** *the tendency to search for, interpret, favor, and recall information in a way that confirms one's preexisting beliefs*
3. People are bad at judging probabilities

# We (also) Need Structure

- Each dataset has pros and cons
  - What are they?
  - What type of question can I answer?
- Important to quickly know what is and is not possible with your data
- We need data and question taxonomies!

# Data Taxonomy

	<b>Primary Data</b>	<b>Secondary Data</b>
<b>Structured</b>	<p><i>Data that is gathered by the researcher for the purpose of answering a specific question.</i></p> <p>Surveys (ratings, choice) Experiments</p>	<p><i>Data that was gathered for a purpose other than answering the specific question.</i></p> <p>Transaction logs Scanner panel data Ad tracking Product usage data</p>
<b>Unstructured</b>	<p><i>Data that cannot be meaningfully stored in a traditional data structure (spreadsheet) without further processing. Examples include text, images, video, and voice.</i></p> <p>Focus groups Interviews Surveys (free response) Observation Eye tracking Physiological/neural</p>	<p>Online reviews Social media Most digital content Call logs</p>

# Types of Marketing Research

## Exploratory Research

(Ambiguous Problem)

“Our sales are declining and we do not know why.”

## Descriptive Research

(Aware of Problem)

“What kinds of people are buying our products?”

“Who buys our competitors’ products?”

## Causal Research

(Problem Clearly Defined)

“Will buyers purchase more of our product in a new package?”

# Types of Marketing Research

## Exploratory Research

(Ambiguous Problem)

“Our sales are declining and we do not know why.”

Use to...

1. Develop initial hunches or insights
2. Run a pilot study

Tools: secondary data, focus groups, survey opinion leaders, observation, etc.

# Types of Marketing Research

## Descriptive Research

(Aware of Problem)

“What kinds of people  
are buying our  
products?”

“Who buys our  
competitors’ products?”

Use to...

1. Generate data describing characteristics of relevant customers
2. More specific and systematic than exploratory

Tools (similar to exploratory): secondary data, focus groups, surveys, etc.

# Types of Marketing Research

## Causal Research

(Problem Clearly Defined)

“Will buyers purchase more of our product in a new package?”

Use to...

1. Identify **cause-and-effect** relationships: If I do X, then Y.

Tools: Usually requires an **experiment** (e.g., A/B testing), there are quantitative techniques to identify causal relationships without an experiment

# Still not convinced?

New Coke, 1985

Taste tests showed that consumers preferred the taste of New Coke over old Coke and Pepsi, but...



## How could this have happened?

# Explanations

- Drinking experience (short sip versus full can)
- None of the marketing research informed the tasters that New Coke was going to replace the old Coke
  - Coke had a strong brand identity and consumers identified with the old brand
  - Consumers wanted to retain 'The Real Thing'
- Target market: bringing new customers in vs. pleasing existing ones

**In short: they mistook exploratory for conclusive!**

# Primary Data

Unstructured

# Data Taxonomy

	<b>Primary Data</b> <i>Data that is gathered by the researcher for the purpose of answering a specific question.</i>	<b>Secondary Data</b> <i>Data that was gathered for a purpose other than answering the specific question.</i>
<b>Structured</b> <i>Data that can be easily and meaningfully represented and manipulated in a traditional database (spreadsheet). Typically numeric or “choice” data.</i>	Surveys (ratings, choice) Experiments	Transaction logs Scanner panel data Ad tracking Product usage data Geospatial tracking
<b>Unstructured</b> <i>Data that cannot be meaningfully stored in a traditional data structure (spreadsheet) without further processing. Examples include text, images, video, and voice.</i>	Focus groups Interviews Surveys (free response) Observation Eye tracking Physiological/neural	Online reviews Social media Most digital content Call logs

# Insights from Primary Marketing Data

- **Demographic characteristics** (Who)
- **Attitudes / opinions** (Thoughts)
- **Awareness** (Consideration set)
- **Intentions** (Intended actions)
- **Motivation/Protocol** (Why)
- Can explain discrepancy between:
  - Intention vs behavior ("I intended to buy, but...")
  - Attitude vs intention ("I like this product, but I won't buy it")



# How to Gather Primary Data?

**Ask:** *what do people say/think*

- Qualitative methods → *interpret* what people say
  - In-depth interviews
  - Focus groups
- Quantitative methods → *measure* what people think/say
  - Surveys

**Observe:** *what do people do*

- Direct observation
- Field experiments

# How to Gather Primary Data?

**Ask: what do people say/think**

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**Observe: what do people do**

- Direct observation
- Field experiments

# Qualitative Research

- **Qualitative research** aims to **interpret what people say** about their experiences
- Studies tend to be exploratory – useful for
  - Probing attitudes and behaviors & looking for new opportunities
    - E.g., during new product development, you need to understand a market and identify gaps
  - Establish basis for quantitative research
    - E.g., during diagnostic evaluation of a brand, you might want to first get an understanding of how a customer perceives the brand
- Methods enable participants to express themselves openly/without constraint

# Qualitative Research: In-depth Interviews

- **In-depth interviews** attempt to obtain detailed insights into consumers' lived experiences.
- **Format** is flexible (conducted at place of business, home, point of consumption, etc.)
- Can aid in:
  - **New Product Development:** Understand a market and identify gaps
  - **Repositioning:** Understand how a customer perceives the brand





# And yet, Febreze didn't sell...

"The first inkling came when they visited a home outside Phoenix. They could smell her **nine cats** before coming inside. The house's interior, however, was **clean** and **organized**. She was somewhat of a **neat freak**, the woman explained... when they walked into the living room, where the cats lived, **the scent was so overpowering** that one of them gagged."



**Q:** What do you do about the cat smell?

**A:** It's usually not a problem

**Q:** How often do you notice the smell?

**A:** Oh, about once a month

**Q:** Do you smell it now?

**A:** No



# In-depth Interviews – Potential Concerns

- **Observer Interference:** being observed changes what we say
- **Spreading activation:** memories retrieved through network of ideas
  - The ideas we prompt first determine the path
- **Representativeness:** does the sample match our customer base?
- **Leading questions:** risk pushing participants in a particular direction

# Qualitative Research: Focus Groups

- Focus groups attempt to capture the dynamics of consumer attitudes, feelings, beliefs, experiences, and reactions
- Typically:
  - 8-10 carefully chosen (and incentivized) individuals
  - 1-2 moderators
  - 1 hour
- When is it useful?
  - Developing product
  - Testing ads
  - Testing questionnaires

# Focus Groups - Guidelines

- When an idea comes up for discussion, stick to that idea until the group finishes with it
- One speaker at a time
- Everyone has to participate
- Encourage participants to disagree, if they do
- Have and follow a script
- Collect demographics at the end

# In-depth Interviews – Potential Concerns

- **Observer Interference:** being observed changes what we say
- **Spreading activation:** memories retrieved through network of ideas
  - The ideas we prompt first determine the path
- **Representativeness:** does the sample match our customer base?
- **Leading questions:** risk pushing participants in a particular direction
- Verbal and nonverbal **power and dominance cues** from participants

# Interviews vs. Focus Groups

	<b>Focus Groups</b>	<b>Interviews</b>
<b>Social effects</b>	Interpersonal idea stimulation	No peer pressure or power/dominance
<b>Information content</b>	More people per unit time (breadth)	More information per respondent (depth)
<b>Logistics</b>	Difficult to schedule, especially with targeted recruiting  Small interviewer commitment  Moderate analysis cost	Easy to schedule, especially with targeted recruiting  Huge interviewer commitment  High analysis cost?

# How to Gather Primary Data?

**Ask:** *what do people say/think*

- Qualitative methods → *interpret* what people say
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  - Focus groups
- Quantitative methods → *measure* what people think/say
  - Surveys

**Observe:** *what do people do*

- Direct observation
- Field experiments

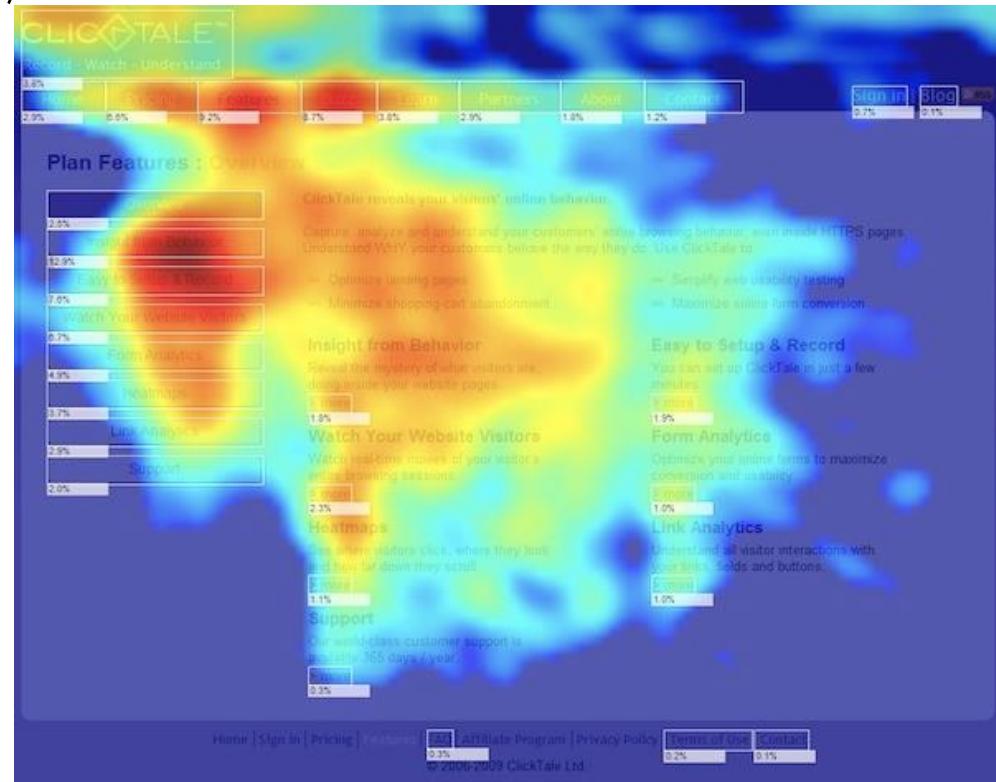
# Direct Observation

- **Observation** attempts to **watch** how customers interact with products/services in the “real world”
- “**Hidden observer**” – researcher disguised as a shopper
- Can identify:
  - How long are the lines?
  - What are people looking at?
  - How easy is it for them to find products?

# Direct Observation

- **Observation** attempts to **watch** how customers interact with products/services in the “real world”

- **Observing product usage**
  - In-person experiences
  - Online user testing
  - Biometrics



## Walmart Sample Video

1 of 4 Think of a gift you want to buy for someone. Try to find that gift on the site

[View Scenario and Previous Tasks](#)

**suddentom** 57 – male – \$80,000 - \$99,999 – United States

Next Task

Walmart.com

Google Hotmail

**Walmart** Save money. Live better.

Shop Unbelievable Tax Refund Online Specials!

New customer? Sign In Help

Value of the Day Local Ad Store Finder Registry Gift Cards

Track My Orders My Account My Lists

Search All Departments Search Go My Cart(0) My Store Los Angeles

Now! FREE SHIPPING on hundreds of thousands of items. [Learn More](#)

**Shop Unbelievable Tax Refund Online Specials! Celebrate refund**

Huge savings you don't want to miss.

Vizio 32" Class LCD Just \$268

Sony Pink 11.6" VAIO Laptop Just \$498

Pandigital Planet Color Tablet PC & eBook Just \$129

Emily Convertible Futon, Black just \$169

Goodyear Viva 2 Tire 185/70R14 just \$59

125-Pc Home Tool Set just \$58

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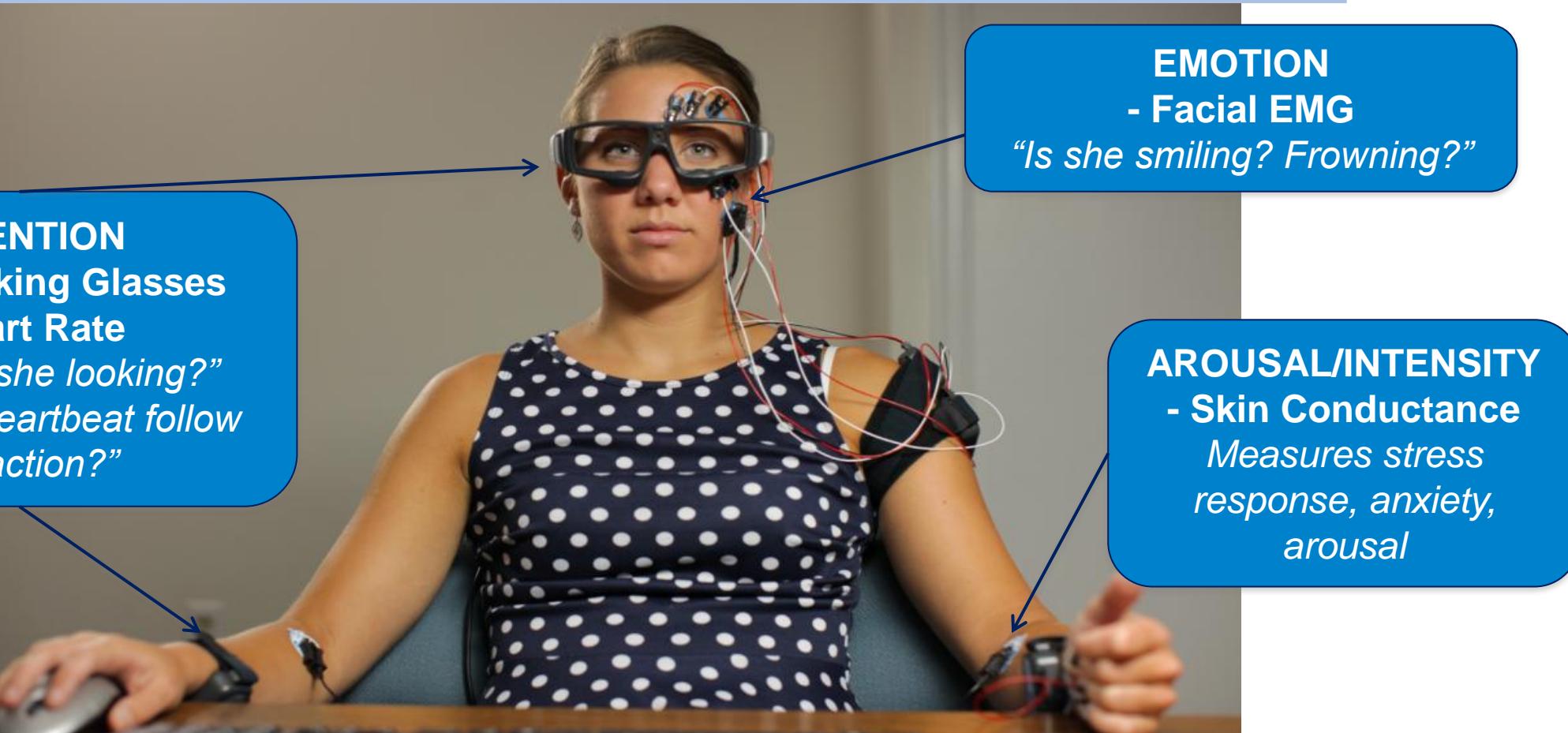
belVita

The screenshot shows a user testing session on the Walmart website. The top navigation bar includes links for Google and Hotmail, and a search bar with 'All Departments' selected. A banner at the top right offers 'FREE SHIPPING' on hundreds of thousands of items. A large central banner promotes 'Shop Unbelievable Tax Refund Online Specials!' with various discounted items like a Vizio LCD TV, a Sony VAIO laptop, a Pandigital tablet, a futon, tires, and a home tool set. Below this is a section for 'All Apple, Always for Less' featuring iPods and iPads. At the bottom, there are promotional sections for outdoor play equipment, backyard retreats, and Kraft Foods products like belVita.



# Direct Observation – Biometrics Data

Obvious benefit of biometric data: don't have to rely on self report



# Primary Data for Exploratory Research

## Ask

- Qualitative methods:
  - In-depth interviews
  - Focus groups
- Quantitative methods:
  - Surveys

## Observe

- Direct observation
- Field Experiments

## Pros and Cons?

	Questioning	Observation
Versatility	+	-
Realness (Accuracy)	-	+
Respondent convenience	-	+
Depth of Insights	+	-

# Types of Marketing Research

## Exploratory Research

(Ambiguous Problem)

“Our sales are declining and we do not know why.”

## Descriptive Research

(Aware of Problem)

“What kinds of people are buying our products?”

“Who buys our competitors’ products?”

## Causal Research

(Problem Clearly Defined)

“Will buyers purchase more of our product in a new package?”

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# Primary Data

Structured

# How to Gather Primary Data?

**Ask: what do people say/think**

- Qualitative methods → interpret what people say
  - In-depth interviews
  - Focus groups
- Quantitative methods → measure what people think/say
  - Surveys

**Observe: what do people do**

- Direct observation
- Field experiments

# Quantitative Research

- Goal: **observe** and **measure** how people think and behave
- Studies tend to be **descriptive** or **causal/confirmatory**:
  - Identify the target base of customers (who are they)
  - Identify what and why customers do what they do
- Methods narrow in on a particular attitude or behavior:
  - Observation
  - Surveys
  - Experiments

# Quantitative Research: Surveys

- **Surveys** directly measure what consumers think, feel, or intend to do
- We need to think about a few things when designing surveys:
  - How do we ask the question? (to avoid unsavory effects)
  - Should the questions be open-ended or close-ended?
  - What question type should we use? (measurement scales)
  - Are the questions reliable? Are they valid?
  - Is the sample representative of our customers?

# Quantitative Research: Survey

How do we ask the questions?

# Surveys – Asking Questions

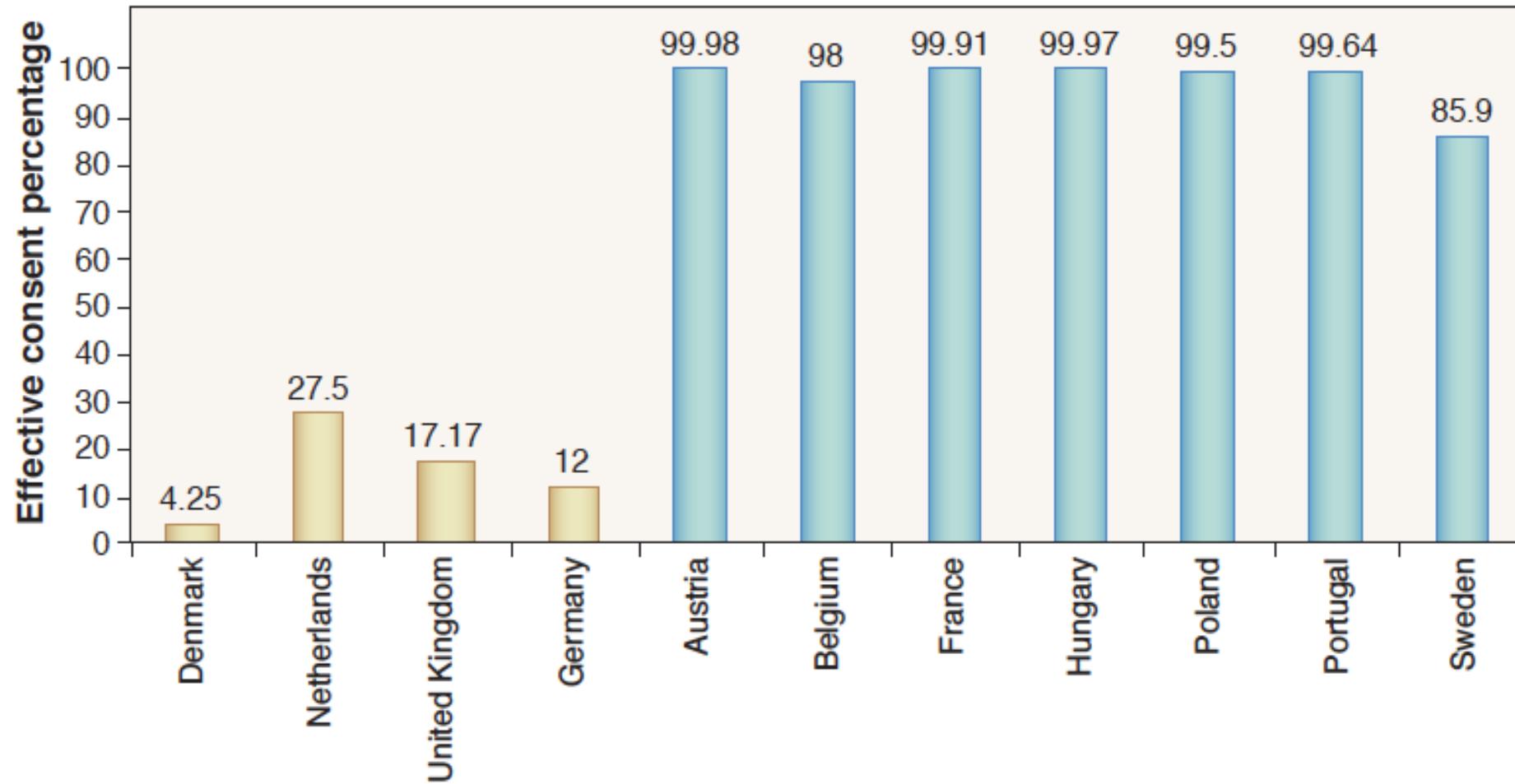
- **Surveys** directly measure what consumers think, feel, or intend to do
- When designing surveys, the way in which you ask questions is crucial:
  - **Priming effects:** preceding questions may influence response to focal questions
  - **Framing effects:** the way you frame the question may change the answer
  - **Leading questions:** when the question suggests a desired answer
  - **Demand effects:** respondents may figure out your hypothesis and try to “help” you out

# Priming Effects

**Preceding questions** may influence responses to the focal question:  
*How interested are you in buying this product?*

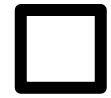
<b>Questions preceding the buying interest question</b>	<b>“Very Much Interested” in Buying</b>
1. No question asked	2.8%
2. Asked only about advantages	16.7%
3. Asked only about disadvantages	0.0%
4. Asked about both advantages and disadvantages	5.7%

# What Explains this Difference in Organ Donations?



# Framing Effects

This is an example of a **default effect** – the tendency of people to stick with the default option.



Check this box if you want to opt in



Uncheck this box if you want to opt out

# Framing Effects

- A company designed a new automated car. Although the company worked hard on the security issues, it is expected to injure 600 people. To reduce this number, they designed two algorithms.
- Assume the exact scientific estimate of the consequences of the algorithm are as follows:

**22%** Algorithm A: 200 people will be spared

**78%** Algorithm B: There is a  $1/3$  probability that 600 people will not be injured, and a  $2/3$  probability that no people will be spared.

# Leading Questions

- **Leading:** when the question suggests a desired answer:
  - “Are you more likely to purchase now?” (Leading) vs.  
“How likely are you to purchase now?” (Neutral)
  - “How good was your experience?” (Leading) vs.  
“How do you feel about your experience?” (Neutral)

## Why is it important?

***Could potentially cue participants to answer consistent with what you want to hear and increase demand!***

# Quantitative Research: Surveys

Open-ended vs. Close-ended

# Surveys – Open vs Close Ended

## Open-ended questions

(Unstructured)

### **Advantages:**

- Similar to qualitative methods (depth)
- Captures things in the consumer's own language

### **Disadvantages:**

- Depends on consumer's ability to articulate
- Difficult to analyze

## Close-ended questions

(Structured)

### **Advantages:**

- Easy to use, analyze, quantify
- Less threatening for respondent
- Less interviewer bias
- May jog respondent's memory

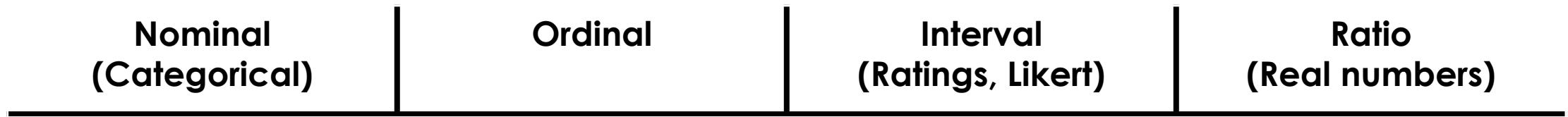
### **Disadvantages:**

- Difficult to design
- Limited scope
- Usually requires pre-testing

# Quantitative Research: Survey

What question type should we use?  
(measurement scales)

# Surveys – Measurement Scale



# Surveys – Measurement Scale

Nominal (Categorical)	Ordinal	Interval (Ratings, Likert)	Ratio (Real numbers)
<p>When craving fast food, which of the following are you most likely to order?</p> <p>1. Burger and fries 2. Pizza 3. Fried chicken</p> <p><b>Labels have no order or meaning</b></p>			

# Surveys – Measurement Scale

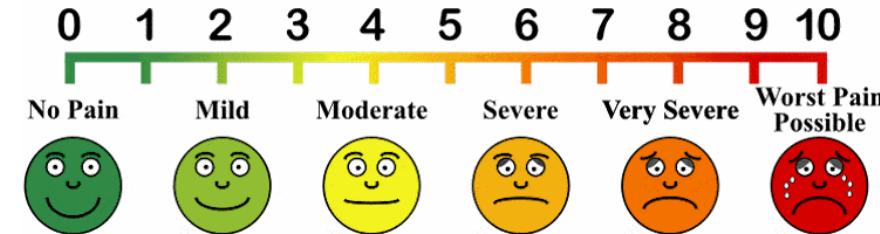
Nominal (Categorical)	Ordinal	Interval (Ratings, Likert)	Ratio (Real numbers)
<p>When craving fast food, which of the following are you most likely to order?</p> <ul style="list-style-type: none"><li>1. Burger and fries</li><li>2. Pizza</li><li>3. Fried chicken</li></ul> <p><b>Labels have no order or meaning</b></p>	<p>What is the highest degree or level of education you have completed?</p> <ul style="list-style-type: none"><li>1. Some high school</li><li>2. High school</li><li>3. Bachelor's Degree</li><li>4. Master's Degree</li><li>5. Ph.D. or higher</li></ul> <p><b>Options have an order, but no other numeric meaning</b></p>		

# Surveys – Measurement Scale

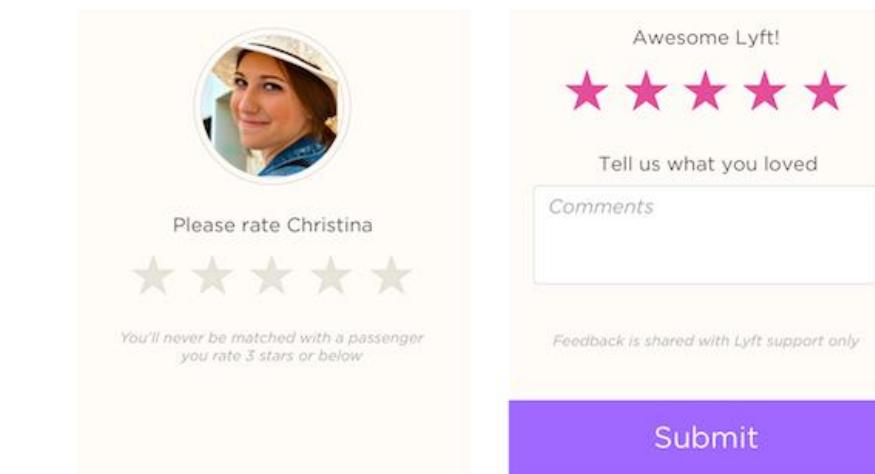
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# Interval Scales: Considerations

- Individual-level perceptions:



- Are scale differences truly equal?



# Surveys – Measurement Scale

Nominal (Categorical)	Ordinal	Interval (Ratings, Likert)	Ratio (Real numbers)
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# Surveys – Measurement Scale

- The scale determines which analyses are possible!
- Example: **Central tendency**: what is the most representative response?
  - **Nominal scale**: can only use **mode**
    - e.g., most people crave pizza
  - **Ordinal scale**: **median** and **mode**
    - e.g., the median education level of this class is a Bachelor's Degree
  - **Interval and ratio scale**: **mean**, **mode**, **median**
    - e.g., the average pre-tax income for members of this class is...

# Quantitative Research: Survey

Are the questions reliable? Are they valid?

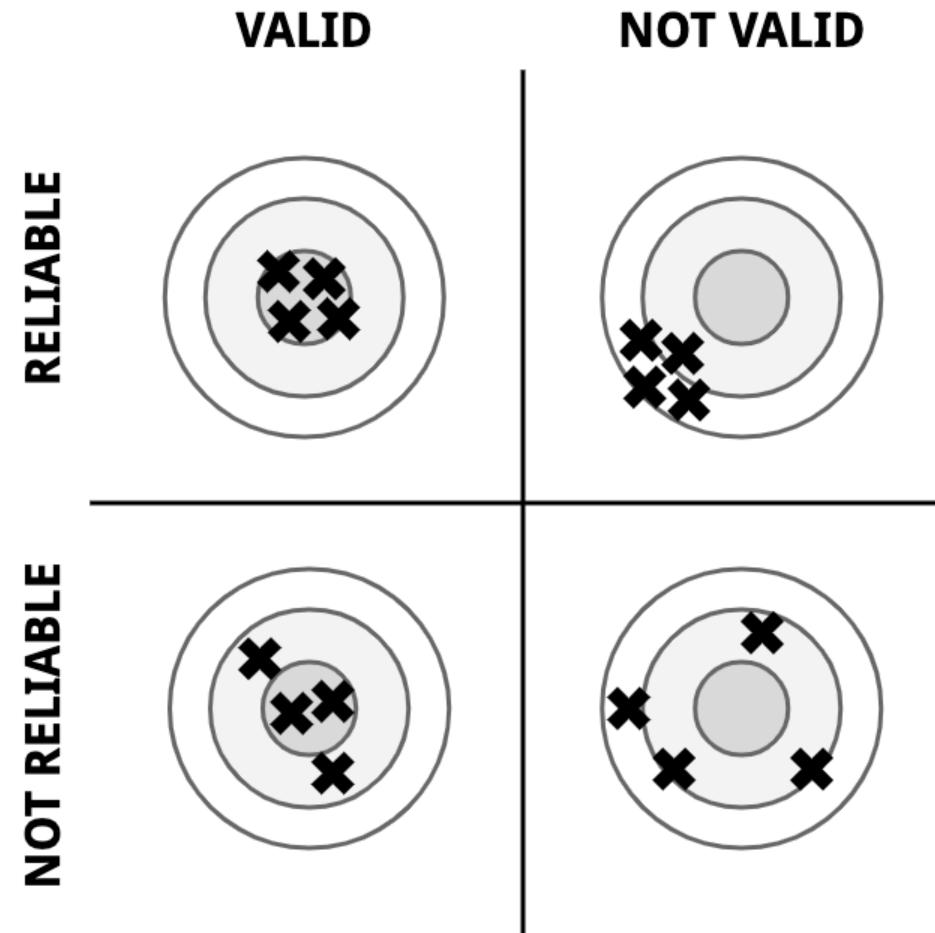
# Surveys - Reliability

- **Reliability:** Do people understand the question and how to respond?
- **Test-retest reliability:** is the measure consistent over time?
  - If you were to re-measure brand love next year, would you get the same thing (assuming nothing changes in the environment)?
- **Internal consistency:** is the measure consistent across related items?
  - If you were to use 3 questions to measure brand love, do the answers move in the same direction?
- **Inter-rater reliability:** is the measure consistent across different researchers/judges?
  - If you were to ask two experts in branding whether the question measures brand love, will they agree?
- Always a good idea to pretest!

# Surveys - Validity

- **Validity:** Is the question measuring something meaningful?
- Some questions to always ask ourselves:
  - What is the metric **capturing**?
    - e.g., are you really measuring satisfaction if you ask, “Do you like our brand?”
  - How does it **compare** with **other metrics**?
    - e.g., is there a better way to measure satisfaction?
  - How does the metric link with **managerial outcomes**?
    - e.g., does this measure of satisfaction have implications for how you do business?

# Surveys – Reliability & Validity



# Quantitative Research: Survey

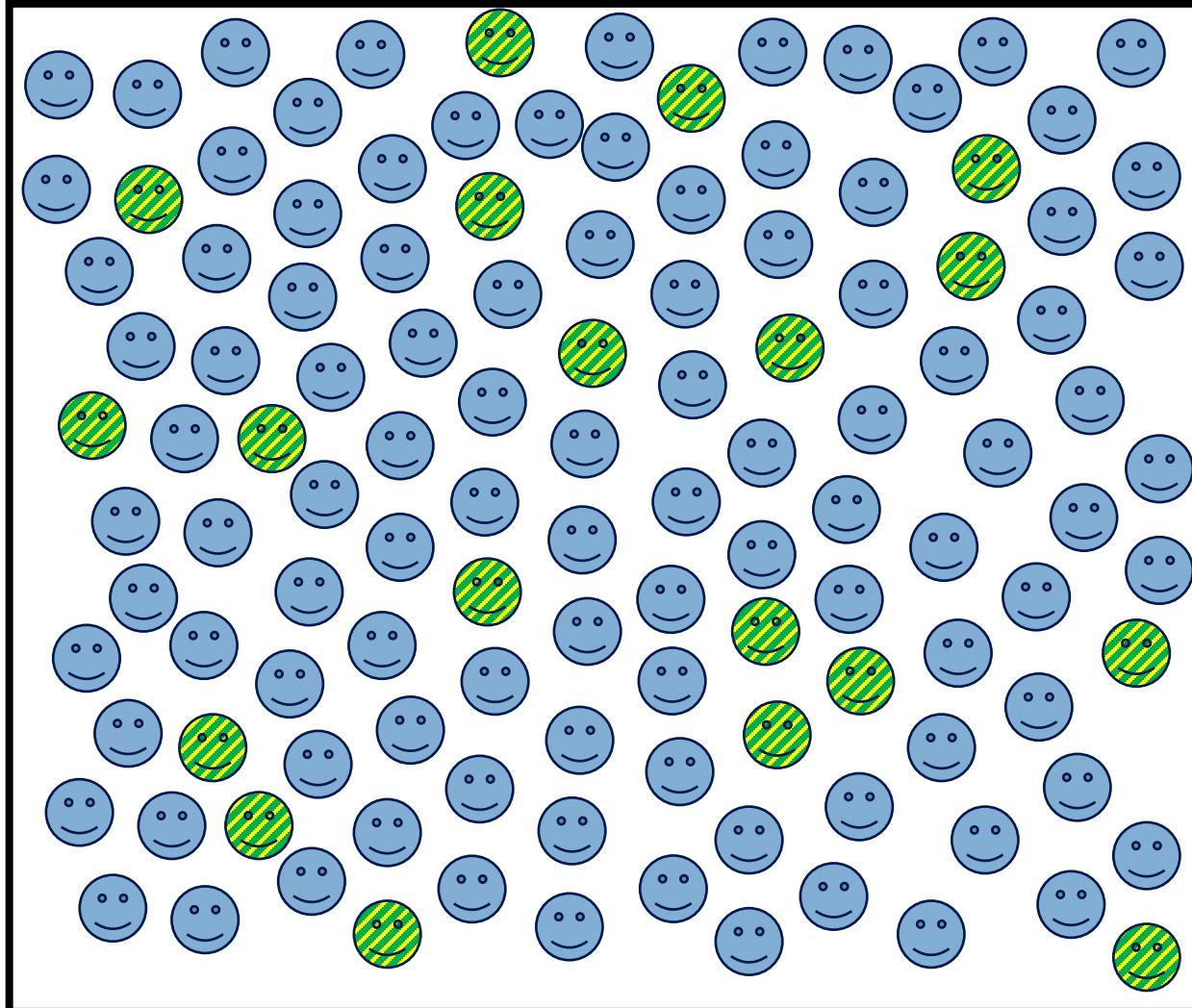
Is the sample representative of our customers?

# Sampling and Representativeness



*“This is interesting, 70% of the respondents to our survey said they don't respond to surveys.”*

# Quantitative Research: Surveys



For survey results to be meaningful, the set of people who respond must **represent** your customers.

**Idea:** Randomly sample the population

- Every person in the population has an equal chance of being sent the survey

# How Many People do I Need?

- Surveys are costly
- In practice, this will be your boss's first question!
- Overall steps to determining an appropriate sample size:
  1. What are you measuring? (Mean rating, proportion, ...)
  2. How precise do you want to be? (The margin of error)
  3. Determine the sample size by working backwards

**We will address this question later in the class**

# Types of Marketing Research

## Exploratory Research

(Ambiguous Problem)

“Our sales are declining and we do not know why.”

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“Will buyers purchase more of our product in a new package?”

# How to Gather Primary Data?

**Ask:** *what do people say/think*

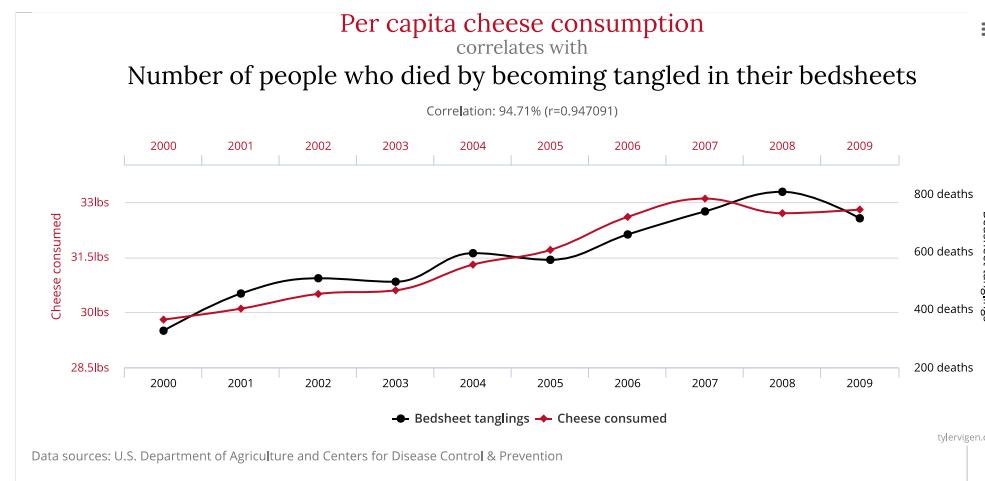
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  - In-depth interviews
  - Focus groups
- Quantitative methods → *measure* what people think/say
  - Surveys

**Observe:** *what do people do*

- Direct observation
- Field experiments

# Shortcomings of Surveys?

- Surveys are great at uncovering and describing a problem but:
  - Correlation (relation between X and Y) is not Causation (X causes Y)



- It guides us but doesn't allow us to take a stand: e.g., will my promotion work?
- Experimentation aims to understand the counterfactual universes

# Why Can't Surveys Address those Questions?

***No causation without (quasi-)experimentation.***

We can guarantee that an observed effect is a causal effect by running an experiment where ...

***No experimentation without manipulation.***

... subjects are assigned to different conditions in which causal variables are systematically and differentially manipulated

***And randomization is necessary***

**Note: more advanced statistical tools can be used when an experiment is not feasible**

# Causal Research

- Experiments are everywhere
- **Field experiments:** large-scale studies in “real life”
  - Facebook (secretly) manipulated users’ mood by filling their news feeds with more negative vs. positive content from friends, then measured what type of content people posted (emotional contagion)
- **A/B (split) testing:** compare two or more versions of a variable
  - e.g., web page, advertisement,
- Facebook for Business has an A/B testing feature

# Types of Marketing Research

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# Data Taxonomy

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# Secondary Data

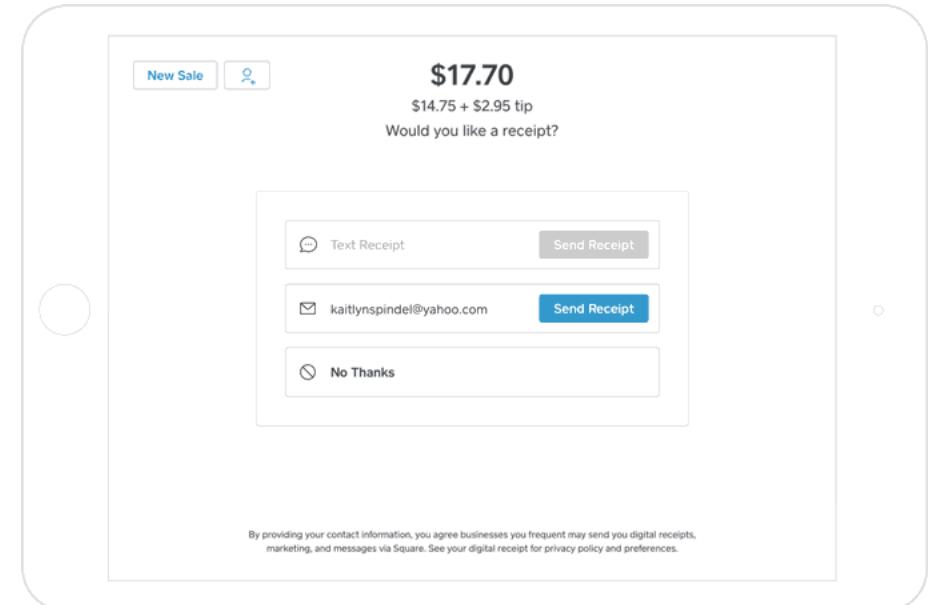
- How to collect this data?
  - Scanner & Point-of-Sale
  - Geodemographics
  - Media
  - Web
  - Mobile
- Most of the data is secondary!



# Secondary Data

Structured

# Secondary Data: Point-of-sale & Scanner Data



# Secondary Data: Point-of-sale & Scanner Data

- The value of POS data:

**Geography x Product x Time x Variables** (e.g., price, promo)

- Retail market: where is the data?

- 80-100 CPG manufacturers
- 60-100 major warehouse and distribution centers
- 30K supermarkets
- 80M households



**Each layer has its own data, and its own questions... which may require another layer's data!**



# Providers of POS & Scanner Data

**nielsen**

INSIGHTS SOLUTIONS NEWS CENTER ABOUT

Search All Nielsen

## SOLUTIONS

RETAIL MEASUREMENT

WHAT WE MEASURE

Measuring what consumers buy is at the core of Nielsen's mission. We track more than 1 million households in 25 countries through our industry-leading scanner panel.

Nielsen also offers a unique set of tools that combine consumer panel data with retailer scanner-based sales and cause-and-effect modeling. This information enables you to identify trends and opportunities across all retail outlets. This information enables you to identify sales for fine-tuned marketing strategies.

HOW WE DO IT

To ensure projectable results, Nielsen Consumer Panel tracks approximately 100,000 households in the United States. Nielsen's panel includes a representative cross-section of the U.S. population, including all income levels, ethnicities, geographic regions, and consumer characteristics of the universe being measured. Nielsen's panel represents all-outlet purchases including brick-and-mortar stores, e-commerce sites, and mobile devices.

Measure what's happening

Having point-of-sale information is a vital first step in understanding what's happening in your store. With Nielsen's Market Measurement Solutions, you can analyze sales data to understand trends, manage inventory, understand the competition, and much more.

Market Measurement Solutions offer complete visibility into what's happening in your store, from how much you're selling but how you're doing it.

**IRi**  
Growth delivered.

SOLUTIONS RESULTS INSIGHTS COMPANY

SPINS

SCAN DATA INSIGHTS APPLICATIONS COALITION ABOUT SPINS

## SPINScan Natural

Access information from the channel innovating products and defining the industry.

NATURAL SPECIALTY GOURMET CONVENTIONAL STORE LEVEL

Identify, understand and anticipate the needs of your natural consumers.

**The Natural Channel represents an \$11.5 billion market opportunity and is at the epicenter of our industry.**

NATURAL CHANNEL GROWTH OVER THE PAST 5 YEARS:

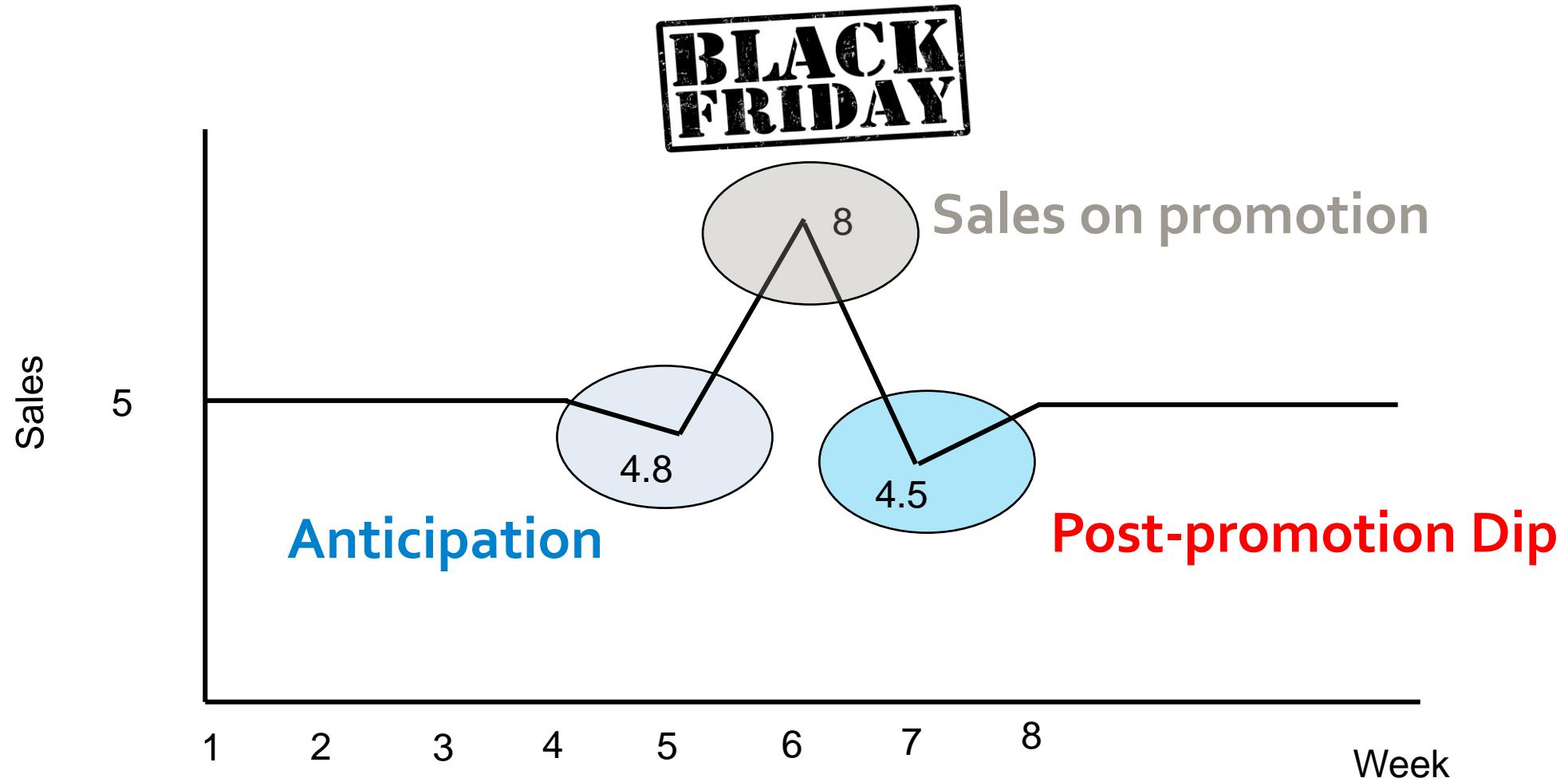
**60%** Growth in sales volume (ACV)      **28%** Growth in store count

2013 versus 2008

# Why would firms pay for this data?

- The biggest factor: **Completeness**
  - Linking aggregate sales to marketing instruments
  - Individual-level purchase and marketing mix data
  - Obtaining a richer set of performance measures beyond market share
- What can you do with this data?
  - **Pricing:** What is the optimal price?
  - **Promotions:** Are they working? What's the impact?
  - **Display:** Which type of displays (e.g., end of aisle) work better?
  - **Basket composition:** Which categories are substitutes / complements?

# Example: Understanding Promotions



# Limitations of “Old-school” POS Data

- Not totally comprehensive: some stores manage their own POS data (e.g., Trader Joe's)
- Not causal – if we change the price, what will happen?
- Not detailed:
  - Who are these customers? (Demographics, psychographics)
  - How many are new/existing customers?
  - What does the path-to-purchase look like?

# POS Data Solutions

## Solution 1: self-report scanner panel data (e.g., iNFOSCOUT)

InfoScout operates America's largest and richest source of household purchase data across all retailers, both brick-and-mortar and online. We do this by monitoring consumers along every step of their path to purchase via our proprietary mobile apps. [Learn More »](#)

The diagram consists of three circular icons connected by a sequence of three small grey dots, followed by a larger grey arrow pointing right. The first icon is green and shows a stylized figure pushing a shopping cart. The second icon is blue and shows a shopping list with items like bread, eggs, milk, detergent, hand soap, and gatorade. The third icon is orange and shows a smartphone displaying a receipt or list. To the right of the orange icon is a larger grey arrow pointing right, with the text "See All »" next to it.

**Start with the shopper**  
Over 1-million Americans use InfoScout's proprietary mobile apps as part of their every day shopping activities - no matter where they shop or what they buy.

**Shopper plans their trip**  
InfoScout built one of the world's most used shopping list apps: Out of Milk.

**Shopper snaps a receipt pic**  
InfoScout captures receipt pictures with engaging mobile apps on the one device that's always with us. This allows us to capture 15x as many shopping trips per day as legacy consumer panels.

[See All »](#)

# POS Data Solutions

## Duracell Consumer Insights

### Who buys Duracell?

#### Duracell Consumer Receipt Data

The sample data below is captured directly from our users' consumer shopping receipts.



Brand \$ per Basket  
**\$7.49**

% of Basket \$ (median)  
**16.8%**

Total Basket \$ (median)  
**\$44.61**

**Users:** 65+ years with \$80—125k income

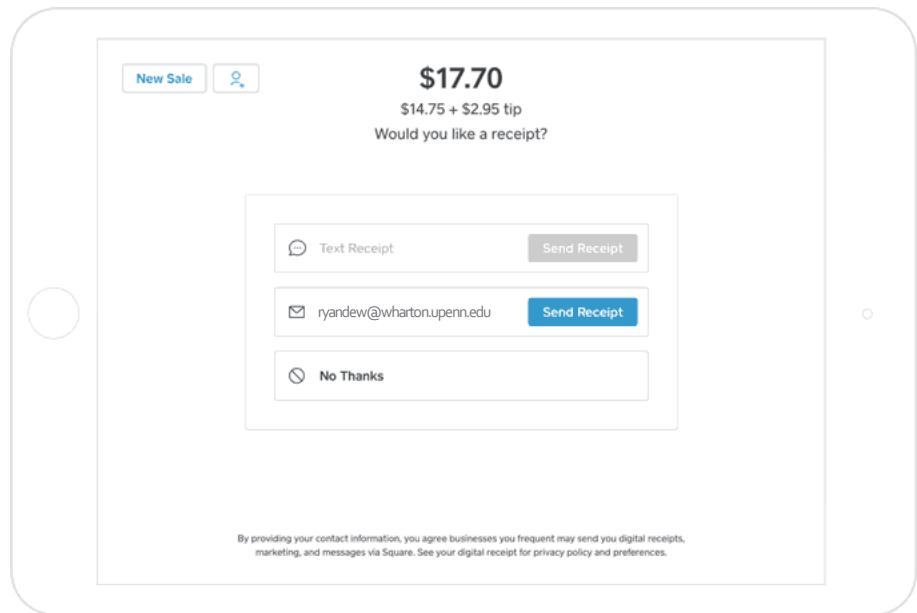
#### Duracell Consumer Demographics

?

demographic	index
Female	100
Male	102
<24	69
25-34	77
35-44	100
45-54	113
55-64	131
65+	181
African American	67
Asian	111
Caucasian	104
Hispanic	77
Has Kids	98
No Kids	104
- \$20k	71
\$20k-40k	81
\$40k-60k	88
\$60k-80k	98
\$80k-100k	110
\$100k-125k	115
\$125k +	141
No College	89
College	99
Adv. Degree	119

# POS Data Solutions

## Solution 2: modern POS technology



Loyalty programs, email receipts  
**Match offline with online**

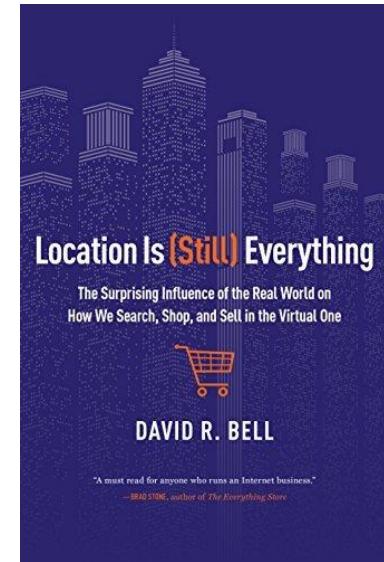


Smart shelves, store beacons, apps  
**Track the whole in-store experience**

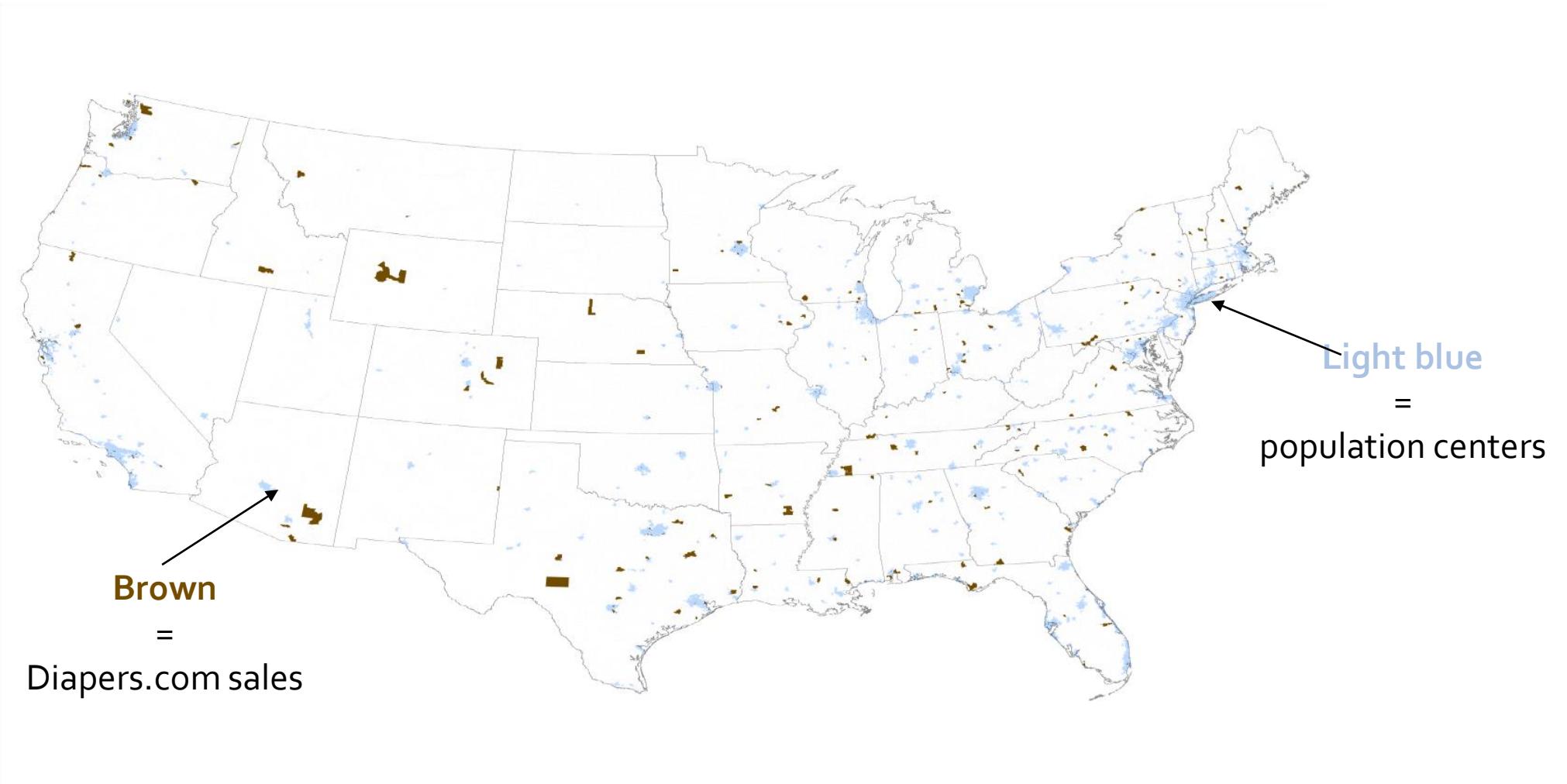
# Secondary Data: Geodemographics

- Geography is **actionable**:
  - Market scouting (open a store!)
  - Advertising planning and targeting
- **Market sizing**: understanding potential contagion
- Correlate with other outcomes:
  - Where are my best performing stores?
  - Who are the customers there?

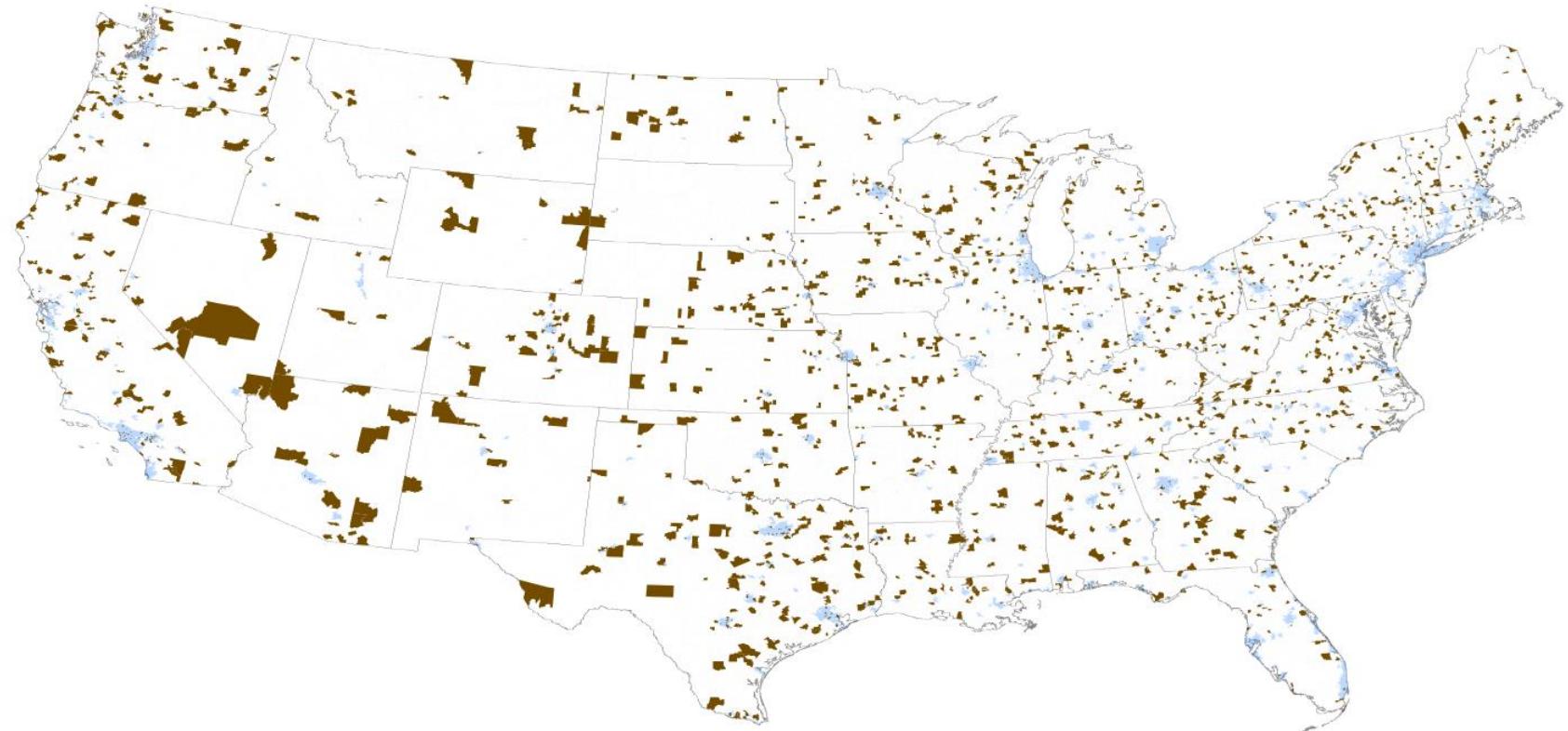
# Location Still Matters



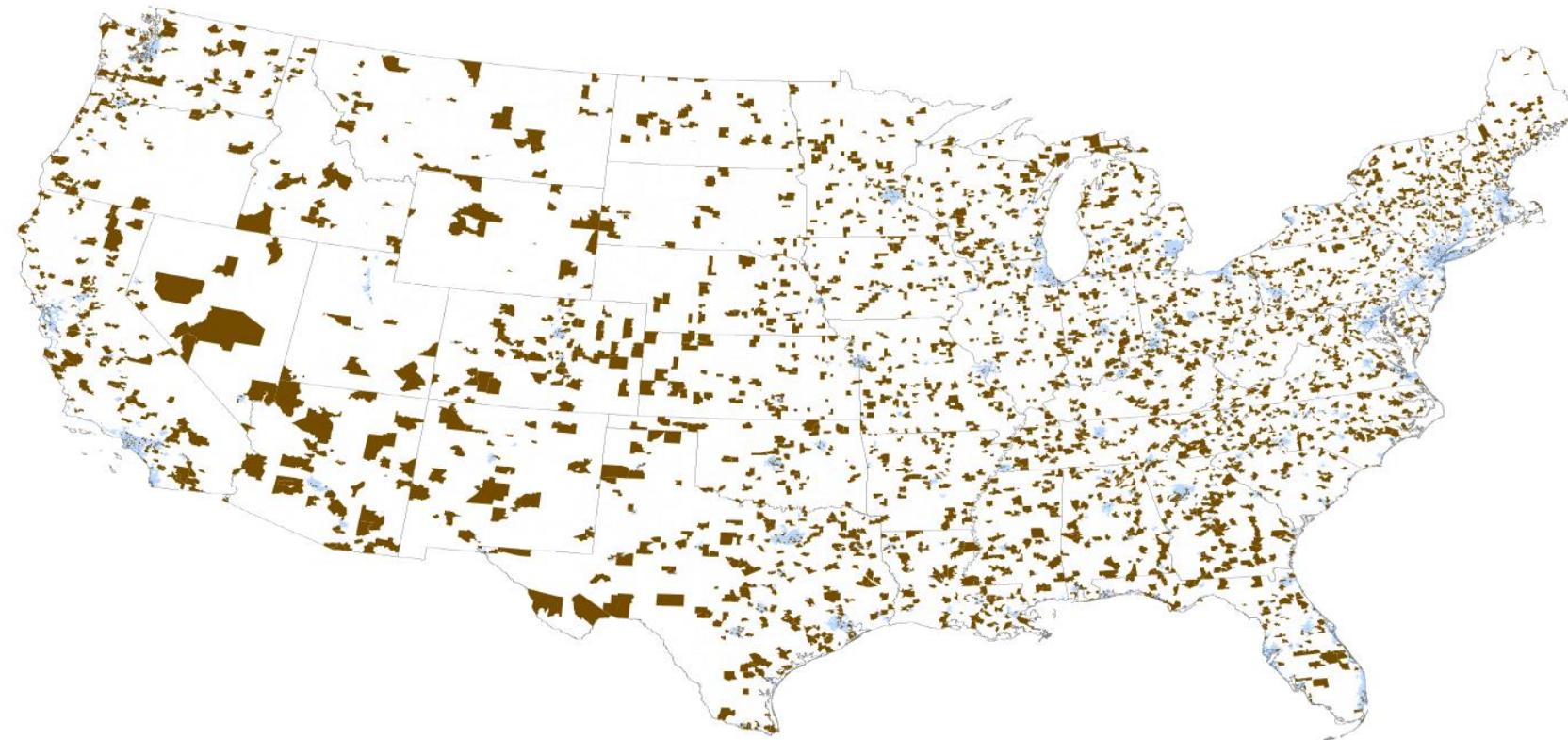
# 6 Months



# 18 Months



# 30 Months



# 42 Months



**What do you notice about the growth pattern?**

# Secondary Data: Geodemographics

**Beware of demographic profiling!** Similar demographics can conceal different lifestyles and interests.

Male  
Caucasian  
25 years old  
Some college  
<\$80,000/year



**Manhattan, NY**



**Manhattan, KS**

To make information more insightful and actionable: combine demographics with geography (and other data, e.g., purchasing)

# Secondary Data

Unstructured

# Secondary Data: Media Data

The image shows a collage of four media measurement websites:

- Kantar Media:** A black header with the Kantar Media logo and a menu icon. Below it, a section titled "Audience Measurement" discusses measuring media consumption.
- Rentrak:** A dark header with "RENTRAK PRECISELY MEASURING MOVIES & TV EVERYWHERE". Below it, a "TV Essentials" section highlights their measurement of over 35 million screens and 16 million households across the country.
- Nielsen:** A dark header with the Nielsen logo and navigation links for Insights, Solutions, News Center, and About. Below it, a "SOLUTIONS" section for Television discusses the evolution of television measurement from 1950 to modern multi-device viewing.
- Total Audience:** A dark header with "TOTAL IT UP TOGETHER, LET'S COUNT THE TOTAL AUDIENCE". Below it, a "LEARN MORE" button.

Below the websites, a note states: "Our capabilities provide relevant metrics that are necessary to inform successful marketing and programming."

# Changing Landscape: Streaming Media Planning

NETFLIX



Spotify®

hulu

pandora®

# Secondary Data: Web Data

## Psychological Language on Twitter Predicts County-Level Heart Disease Mortality



**Johannes C. Eichstaedt<sup>1</sup>, Hansen Andrew Schwartz<sup>1,2</sup>,  
Margaret L. Kern<sup>1,3</sup>, Gregory Park<sup>1</sup>, Darwin R. Labarthe<sup>4</sup>,  
Raina M. Merchant<sup>5</sup>, Sneha Jha<sup>2</sup>, Megha Agrawal<sup>2</sup>,  
Lukasz A. Dziurzynski<sup>1</sup>, Maarten Sap<sup>1</sup>, Christopher Weeg<sup>1</sup>,  
Emily E. Larson<sup>1</sup>, Lyle H. Ungar<sup>1,2</sup>, and Martin E. P. Seligman<sup>1</sup>**

<sup>1</sup>Department of Psychology, University of Pennsylvania; <sup>2</sup>Department of Computer and Information Science, University of Pennsylvania; <sup>3</sup>Graduate School of Education, University of Melbourne; <sup>4</sup>School of Medicine, Northwestern University; and <sup>5</sup>Department of Emergency Medicine, University of Pennsylvania

# Secondary Data: Web Behavior Has Meaning

- **Hostility** and **chronic stress** are known risk factors for heart disease, but costly to assess
- Can we capture **community psychological characteristics** through social media?
- Specifically, **can language patterns on Twitter help us predict mortality from heart disease?**

# Secondary Data: Web Behavior Has Meaning



Twitter Topics Negatively Correlated With County-Level AHD Mortality



# Secondary Data: Web Behavior Has Meaning



Twitter Topics Positively Correlated With County-Level AHD Mortality

Boredom,  
Fatigue

boring  
text  
entertain  
extremely bored  
boredom  
incredibly  
entertained  
bore

$r = .18$

sore  
bed  
extremely  
tired  
soooooo  
freaking  
yawn  
tire

$r = .18$

bed  
goodnight  
sleep  
ready  
cute  
outta  
exhausted  
crawl  
shower  
layin  
cuddle

$r = .20$

Hate,  
Interpersonal  
Tension

jealousy  
mad  
bitches  
envy  
hate  
haters  
lovers  
famous  
hater  
phase  
hated  
ya'll

$r = .16$

nasty  
allergic  
games  
head  
fake  
bullshit  
shit  
drama  
liars  
sneeze

$r = .17$

grr  
passion  
pit  
absolutely  
officially  
burning  
despise  
hates  
mentioned  
hating

$r = .21$

Hostility,  
Aggression

bullshit  
fuck  
fucking  
damn  
fucked  
fucks  
fucking  
gass  
shit  
shitty  
dude  
pissed

$r = .18$

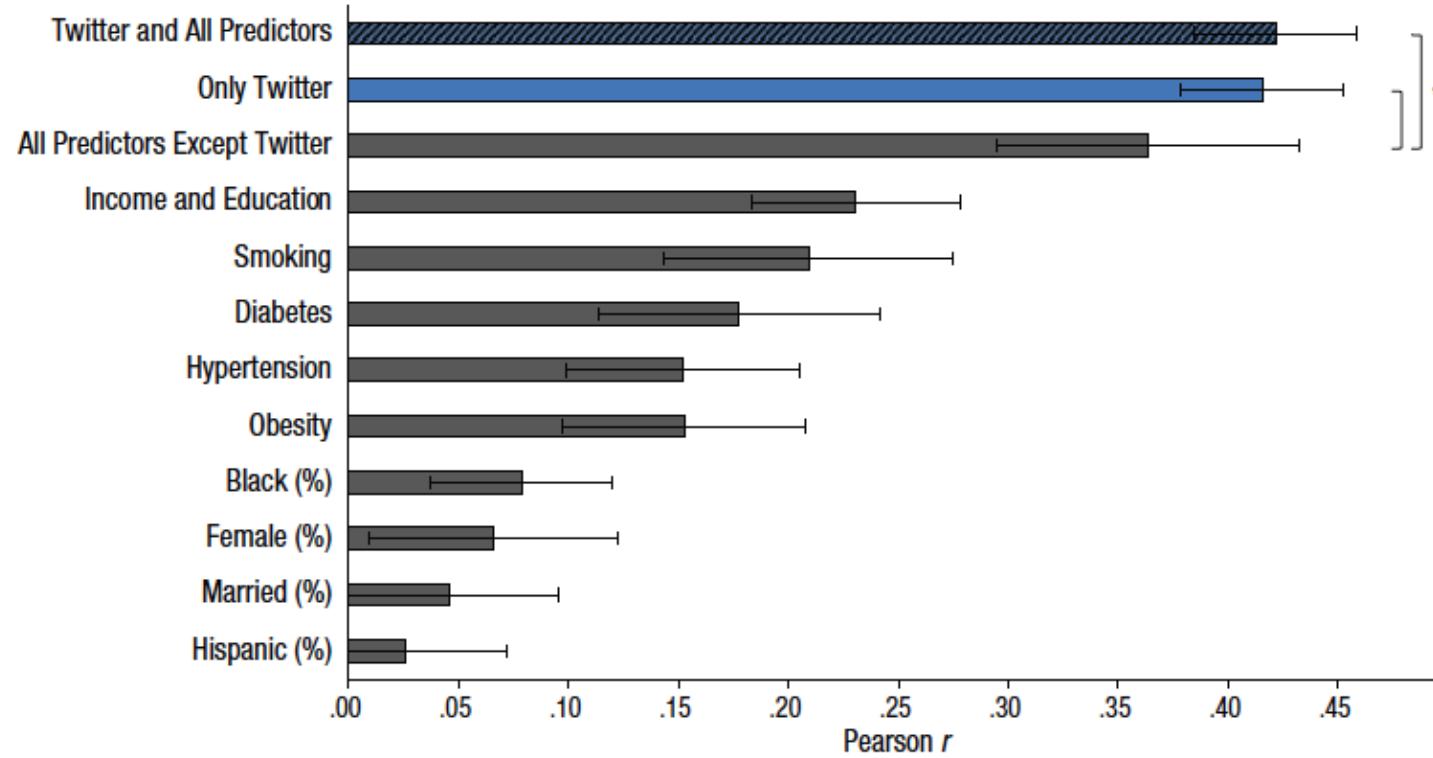
dick  
motherfucker  
pussy  
fuckin  
asshole  
bitch  
shit  
dumb  
fuck

$r = .21$

shitty  
bitch  
omfg  
stupid  
idiot  
annoying  
bullshit  
piss  
asses  
cu  
hate  
shit  
kidding

$r = .27$

# Secondary Data: Web Behavior Has Meaning



**Takeaway:** social media chatter and sentiment can be powerful predictors of real-life outcomes

# Secondary Data: Web Data – Usages

- Audience **engagement** for a campaign
- Brand **mentions** vs. competitors: tracking “buzz”
- **Sentiment analysis**: do people like or hate us?
- **Segmentation**: understanding consumers by their social media
- **Brand perception**: when do people tag us?

# Secondary Data: Web Search

## Web Search vs. Social Media:

What can search data reveal that social media data might not?

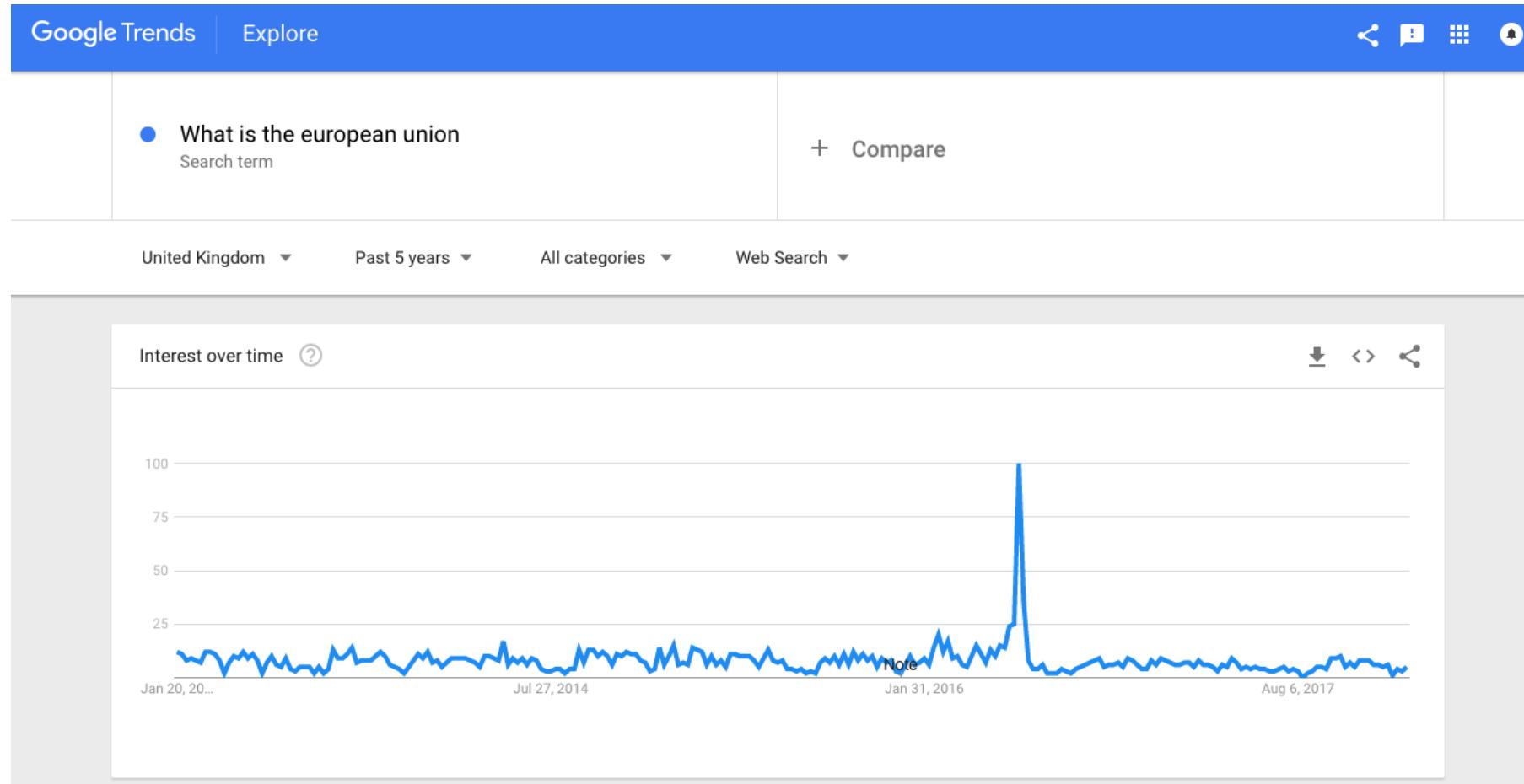


The Switch

## The British are frantically Googling what the E.U. is, hours after voting to leave it



# Secondary Data: Web Search



# Secondary Data: Web Search - Usages

- Exploratory research:
  - The “ebbs and flows” of traffic
  - Where are people coming from?
- Measurement through the funnel:
  - Who is noticing us?
  - How do people become aware of our brand?
  - Where do they go next?
  - What else are they considering?



# Secondary Data: Mobile Data

The image displays two side-by-side screenshots of mobile analytics platforms. On the left is the 'App Store Connect' interface, featuring a sidebar with 'Easy-to-use tools for small business' and a main area showing app analytics with a bar chart for 'Impressions' and a map of the Americas. On the right is the 'FLURRY' mobile dashboard, which includes a navigation bar with 'Overview', 'Analytics', 'API', and 'Sign In' buttons, and a main dashboard with various metrics like '1.4K', '5.1K', '127.7K', and '3.8M'.

Google Marketing Platform

For Small Businesses For Enterprises Resources Blog Partners Support

App Store Connect

Overview Analytics API Sign In

Easy-to-use tools for small business

Get free tools to make the most of your marketing, from intuitive testing and more.

See small-business solutions

Measure user engagement for your app.

FLURRY

Features Customers Documentation Blog Login / Sign Up

App Activity Dashboard

1.4K 5.1K 127.7K 3.8M

Meet the all new Flurry

The right data can help answer your hardest questions and optimize your app experience. Flurry can help by analyzing activity across your app portfolio.

# Types of Marketing Research

## Exploratory Research

(Ambiguous Problem)

“Our sales are declining and we do not know why.”

## Descriptive Research

(Aware of Problem)

“What kinds of people are buying our products?”

“Who buys our competitors’ products?”

## Causal Research

(Problem Clearly Defined)

“Will buyers purchase more of our product in a new package?”

# Data Takeaway

	<b>Primary Data</b>	<b>Secondary Data</b>
<b>Structured</b>	<p><i>Data that is gathered by the researcher for the purpose of answering a specific question.</i></p> <p>Surveys (ratings, choice) Experiments</p>	<p><i>Data that was gathered for a purpose other than answering the specific question.</i></p> <p>Transaction logs Scanner panel data Ad tracking Product usage data</p>
<b>Unstructured</b>	<p><i>Data that cannot be meaningfully stored in a traditional data structure (spreadsheet) without further processing. Examples include text, images, video, and voice.</i></p> <p>Focus groups Interviews Surveys (free response) Observation Eye tracking Physiological/neural</p>	<p>Online reviews Social media Most digital content Call logs</p>

# Marketing Research Takeaway

## Exploratory Research

(Ambiguous Problem)

“Our sales are declining and we do not know why.”

## Descriptive Research

(Aware of Problem)

“What kinds of people are buying our products?”

“Who buys our competitors’ products?”

## Causal Research

(Problem Clearly Defined)

“Will buyers purchase more of our product in a new package?”

# Marketing Datasets: Takeaways

**This was a whirlwind tour of marketing datasets!**

- The amount of data available today is unprecedented and has created many opportunities
- We only scratched the surface of marketing dataset available, and barely discussed analysis

**In the remainder of this course:**

- We will keep encountering some of those datasets but will focus on the analytical tools
- We will pay close attention to every type of marketing research question (exploratory, descriptive, causal)

# Next Class

- Market Segmentation + Targeting
- Cluster Analysis
- To do:
  - Read Python for Marketing Research and Analytics (chapter 10)