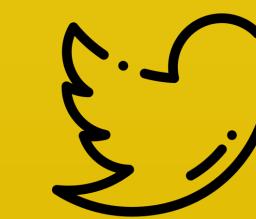




# Using Bayesian methods to build a Data Science Product

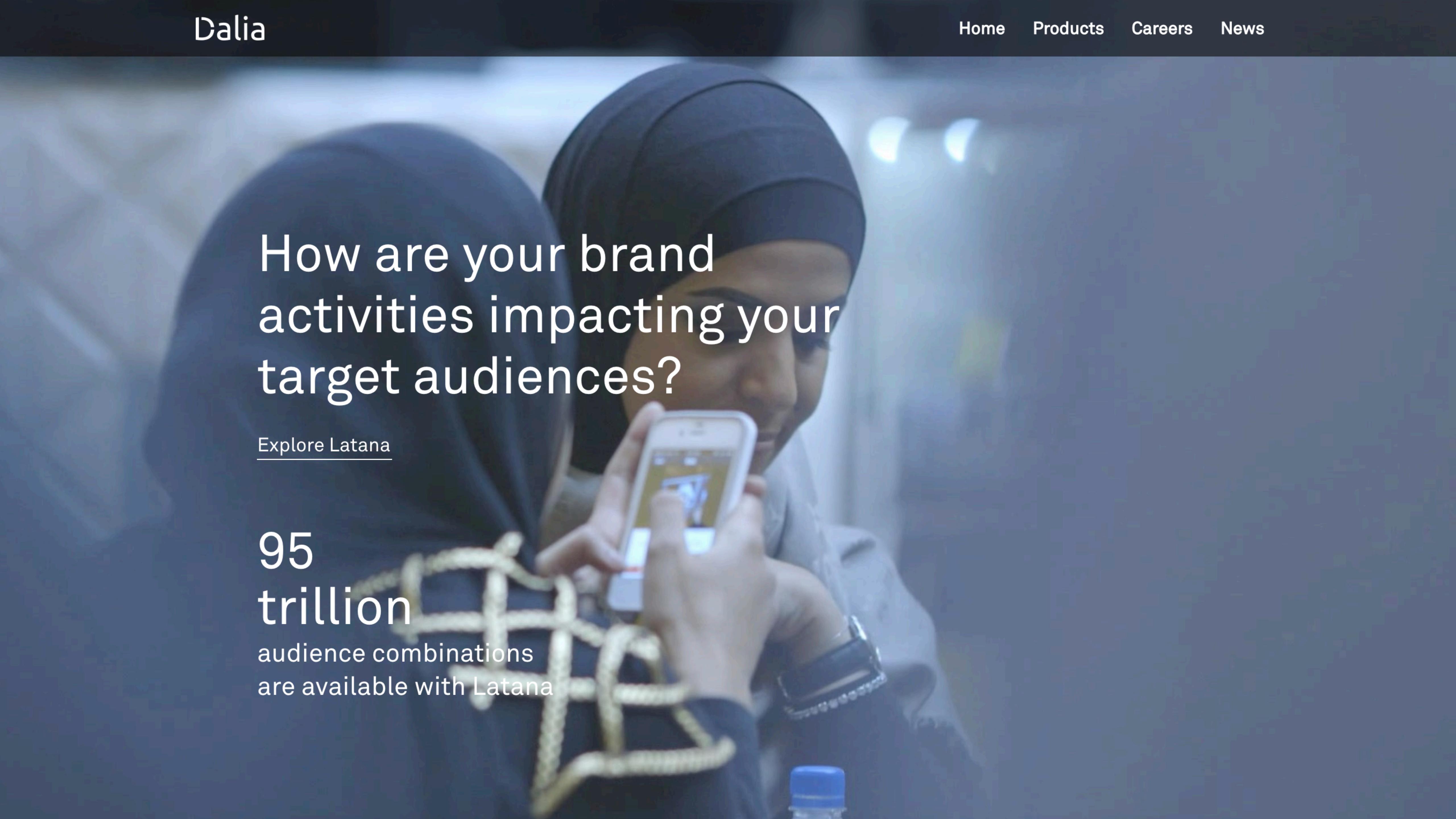
Korbinian Kuusisto  
Data Scientist @ Dalia Research



@kuusisto\_k

A woman with long, light-colored hair is shown from the chest up, looking down at a smartphone she is holding in her hands. She is wearing a dark zip-up hoodie. The background is dark and out of focus, suggesting an outdoor setting at night or in low light. The phone's screen is the primary light source, illuminating her face and hair.

The voices of  
billions

A woman wearing a dark hijab is looking down at a white smartphone she is holding in her hands. She is wearing a light-colored jacket over a dark top. The background is blurred, showing what appears to be an indoor setting with other people.

How are your brand  
activities impacting your  
target audiences?

Explore Latana

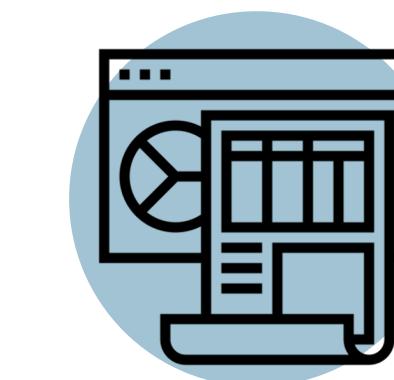
95  
trillion  
audience combinations  
are available with Latana



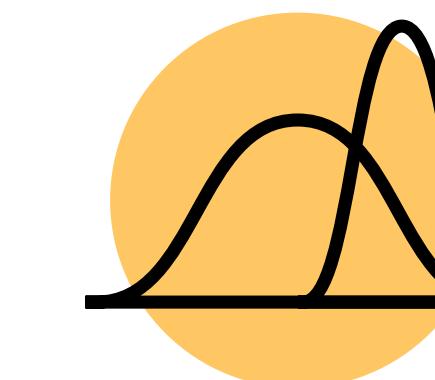
latana



# Outline of talk



Building a next generation  
brand tracker



Why bother with  
Bayesian frameworks



PyMC3 in production

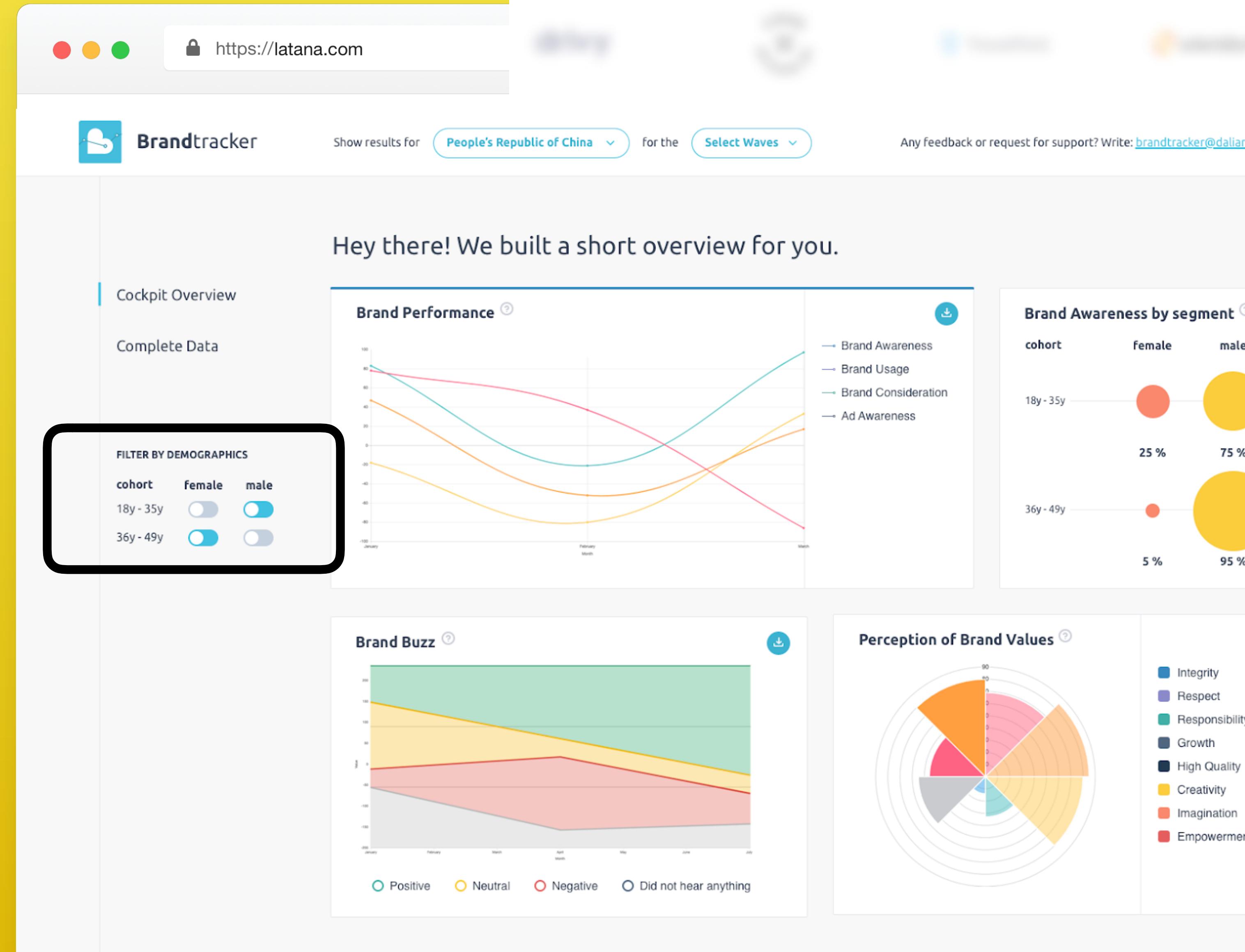


There are hundreds of consumer startups and everyone is investing into brand.

Is this money well spend?



2017 we launched  
BrandTracker





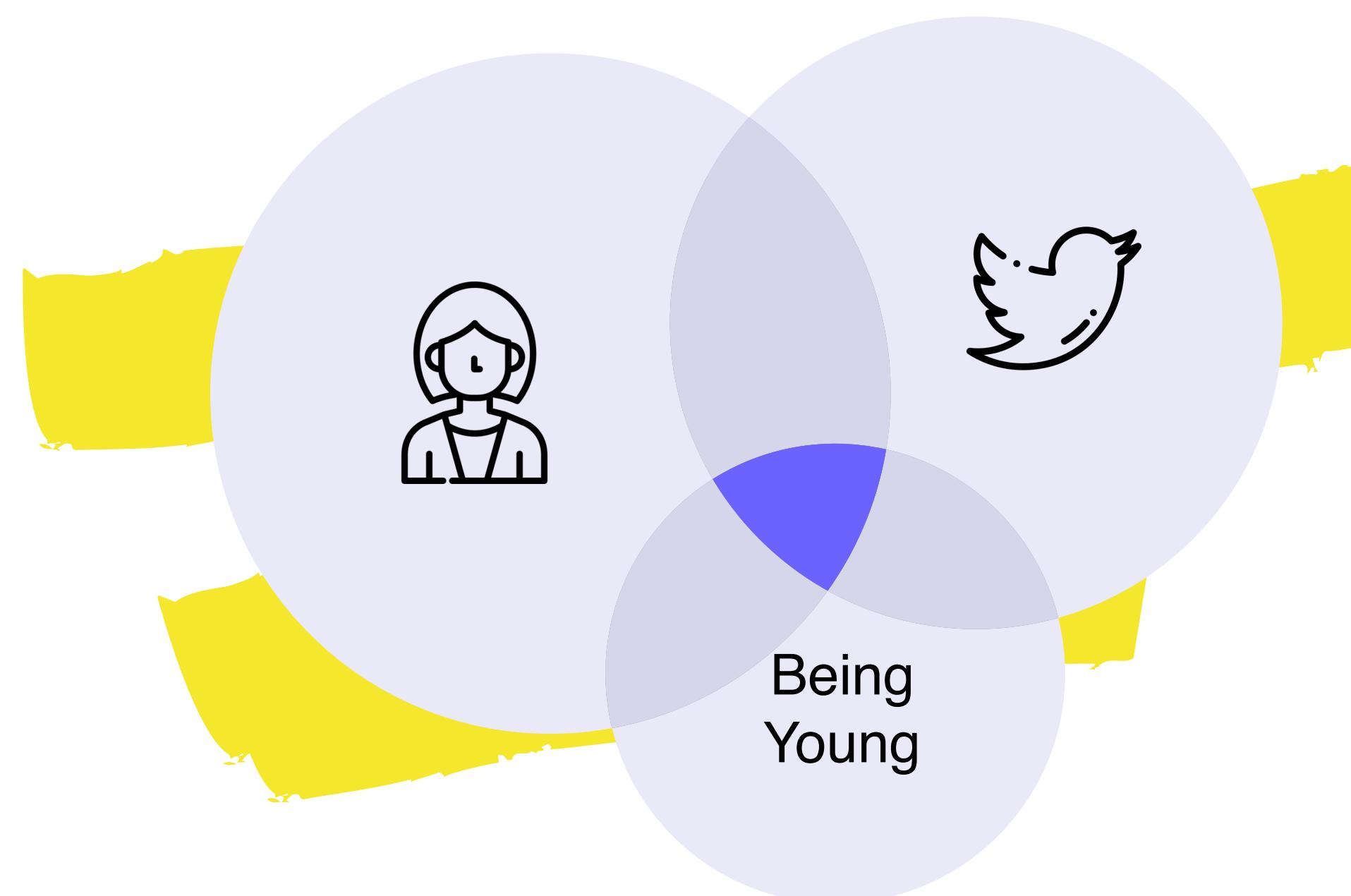
Brand managers are interested in target audiences



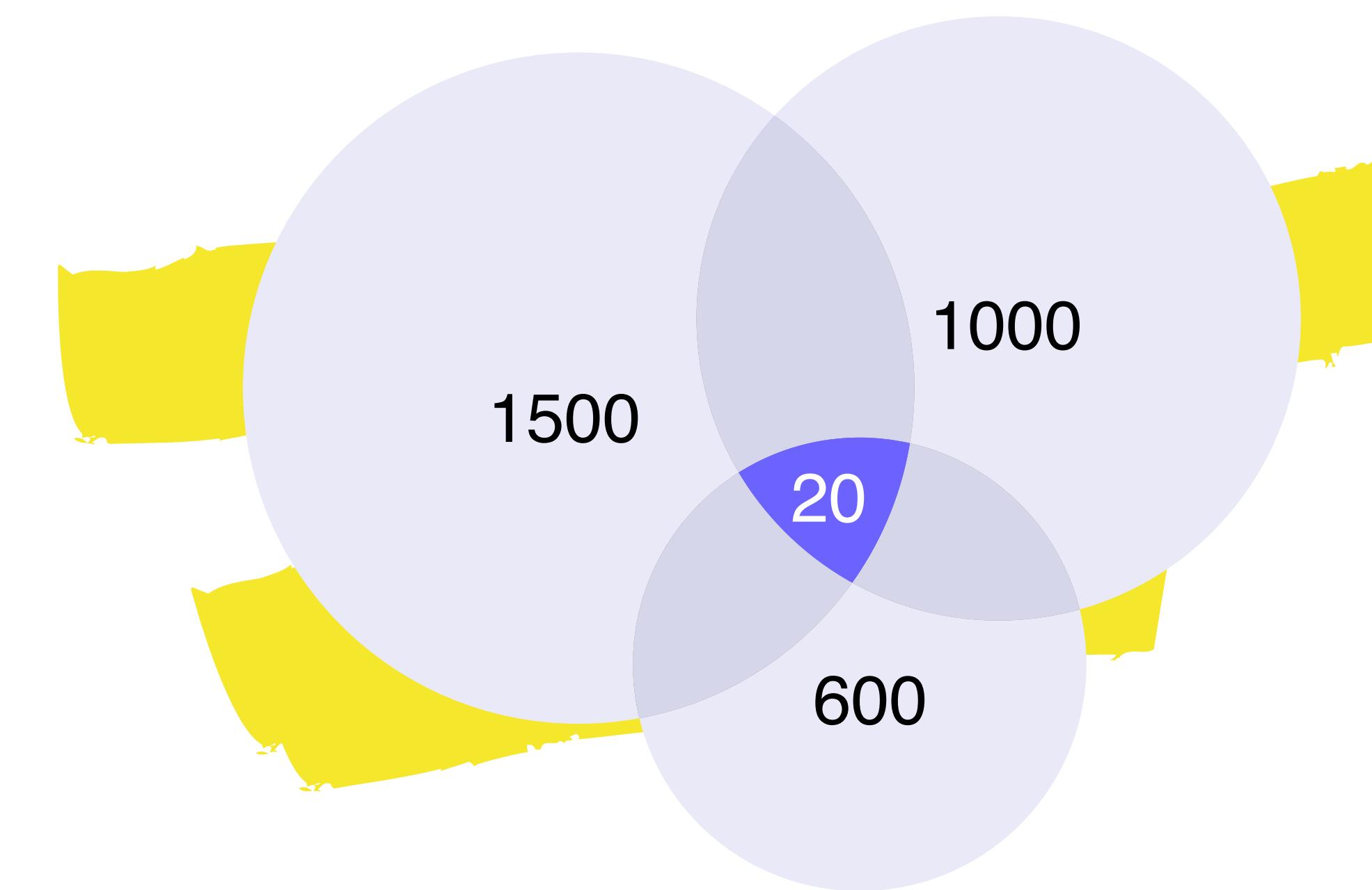
# Target audiences



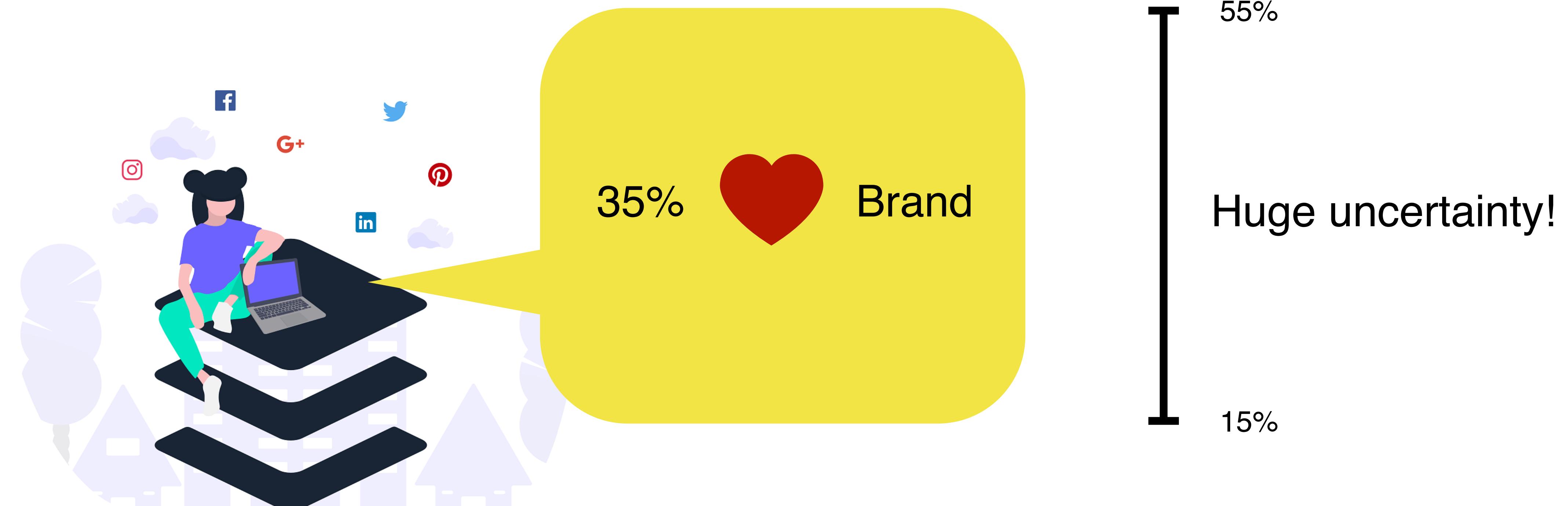
# Why is that a challenge?



n = 3000 people



## Why is that a challenge?



n = 20



We need to  
fundamentally rethink our  
product



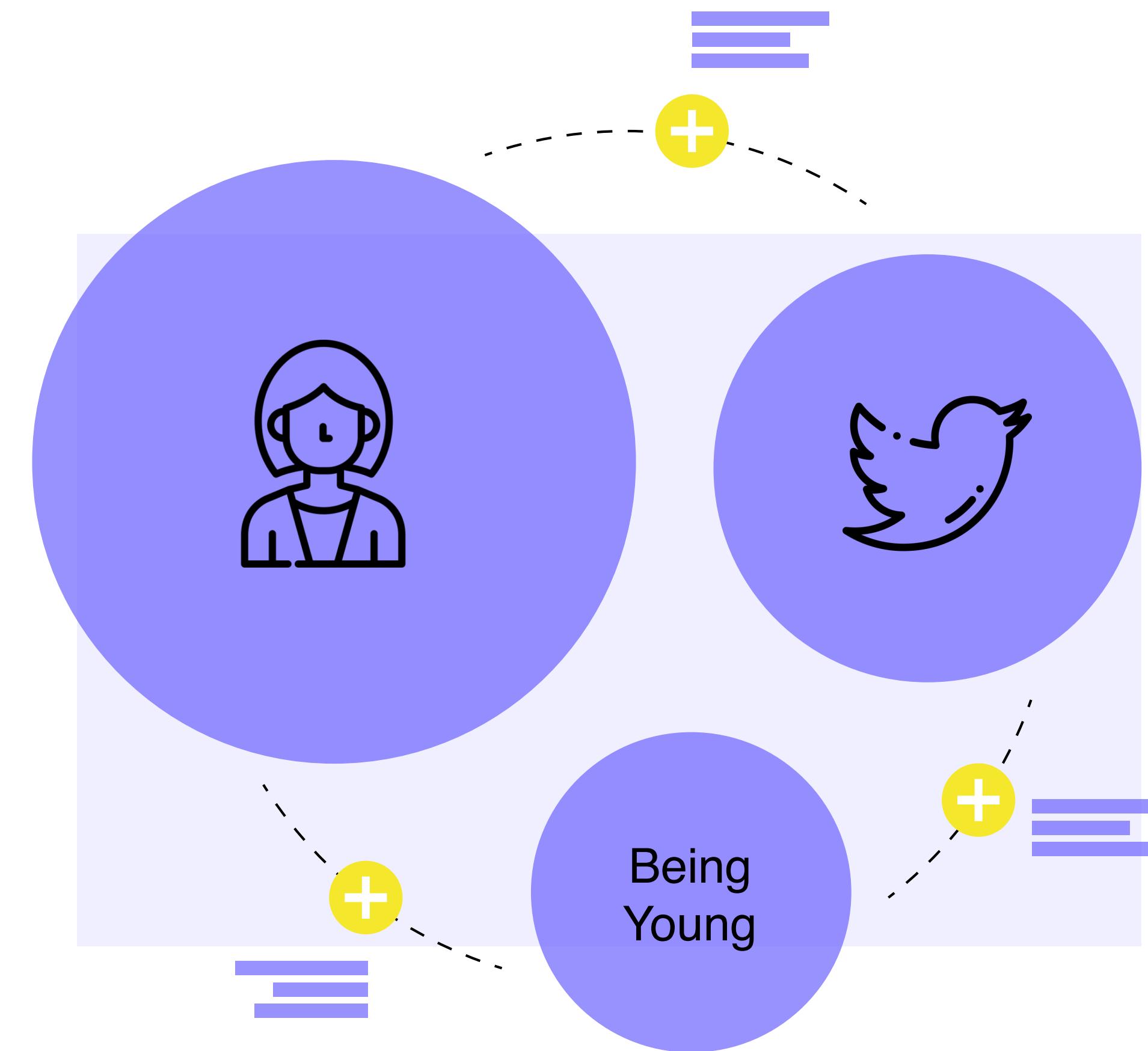
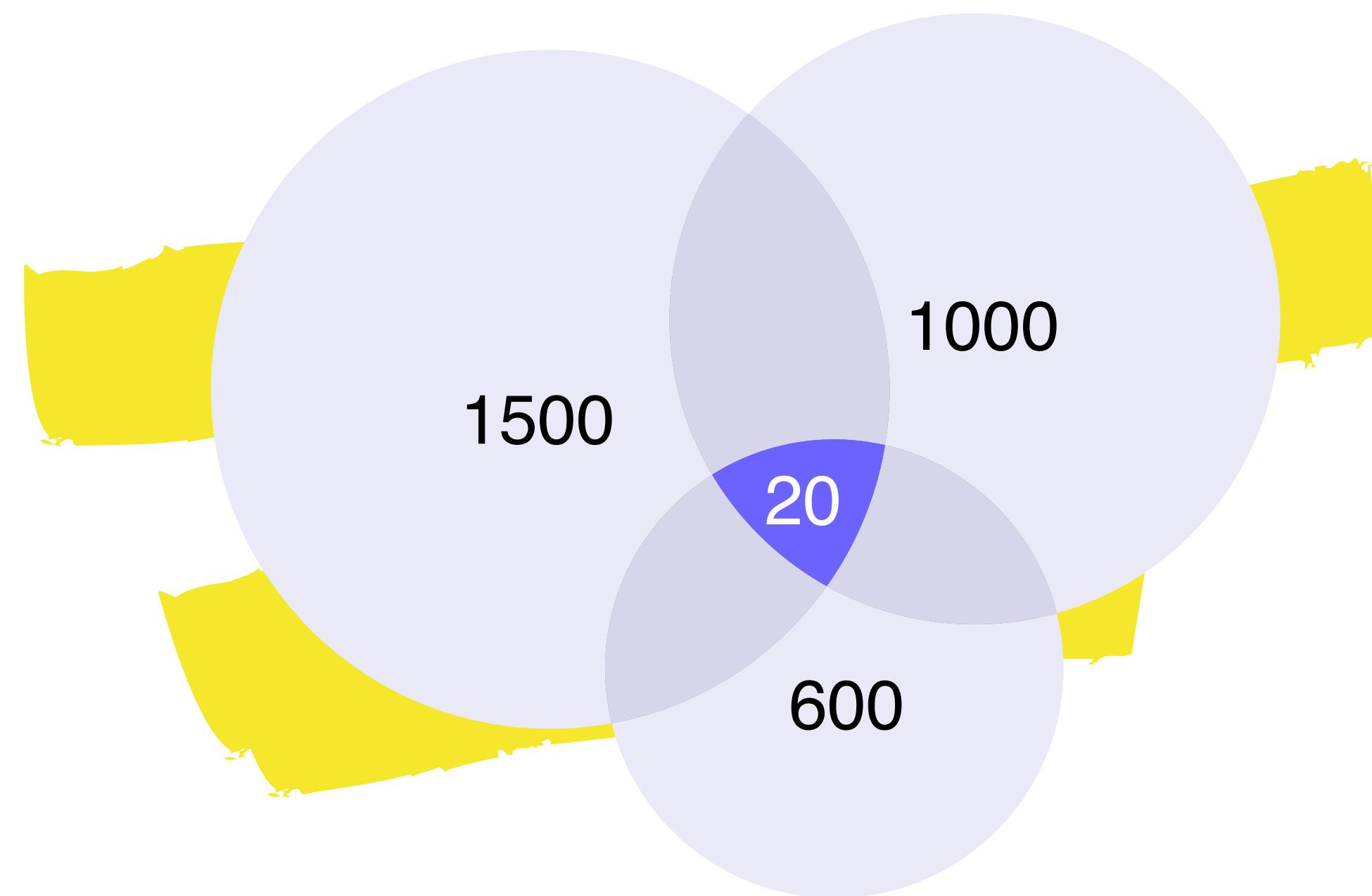
# MRP

Multilevel  
Regression &  
Post-stratification





# MRP





scikit  
*learn*



# BrandTracker

Show results for [People's Republic of China](#) for the [Select Waves](#) Any feedback or request for support? Write: [brandtracker@daliaresearch.com](mailto:brandtracker@daliaresearch.com)

Hey there! We built a short overview for you.

Cockpit Overview

Complete Data

FILTER BY DEMOGRAPHICS

cohort    female    male  
18y - 35y          
36y - 49y       

**Brand Performance** ⚭

Brand Awareness  
Brand Usage  
Brand Consideration  
Ad Awareness

**Brand Awareness by segment** ⚭

cohort	female	male
18y - 35y	25 %	75 %
36y - 49y	5 %	95 %

**Brand Buzz** ⚭

**Perception of Brand Values** ⚭

Integrity  
Respect  
Responsibility  
Growth  
High Quality

**BrandTracker**



**latana**



# Segment by demography & unique audience characteristics.

Age

All    16-25    26-35    36-45    46-55    56-65

Gender

All    Male    Female

Income Level

All    High    Medium    Low    Prefer not to say

Education Level

All    High    Medium    Low

Location

All    Top Three Cities    Other Cities    Rural

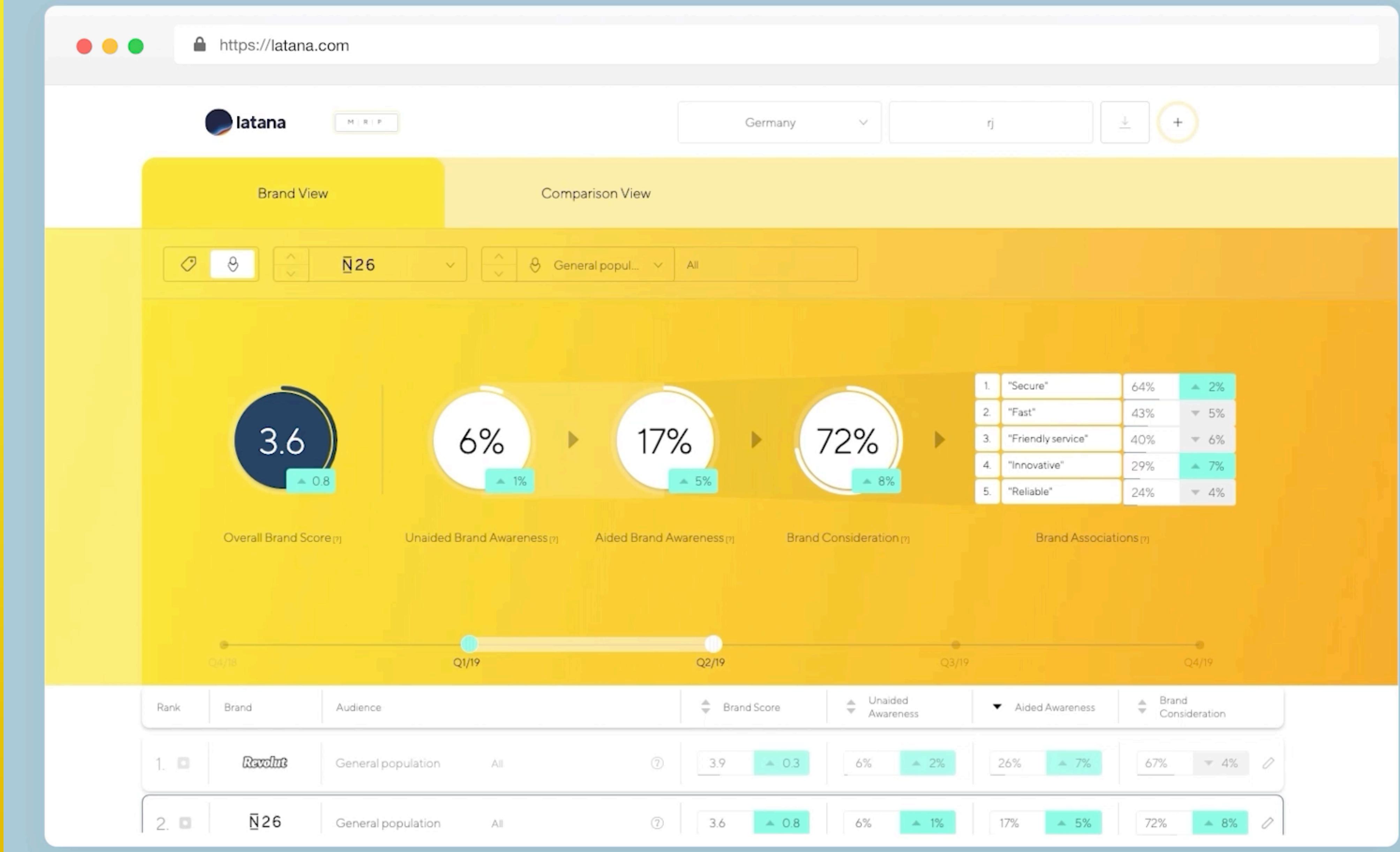
Custom Audience Variables

Early Adopters    or    Music Streaming Users

Create Audience

Sample Audience:  
Victoria







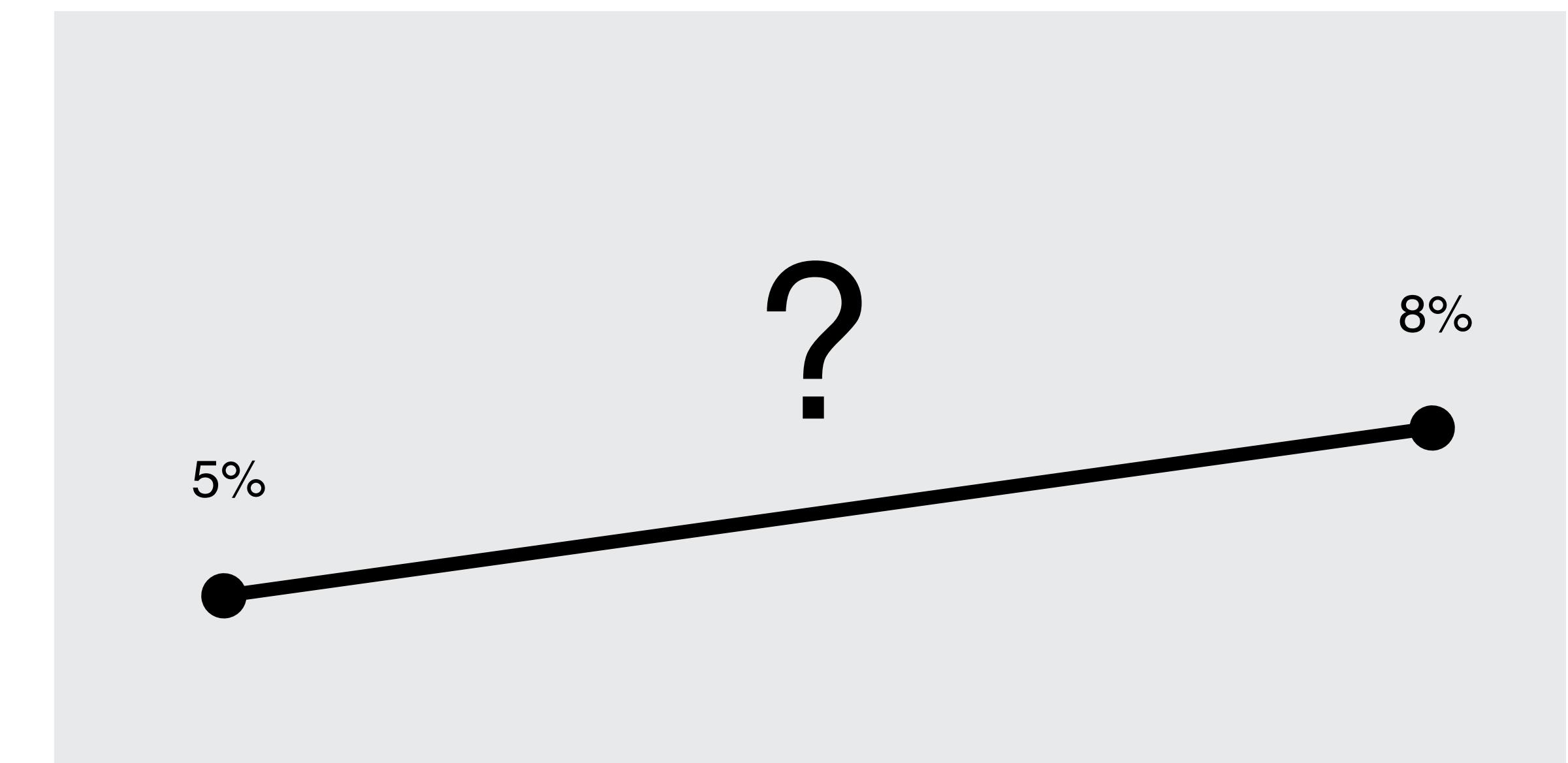
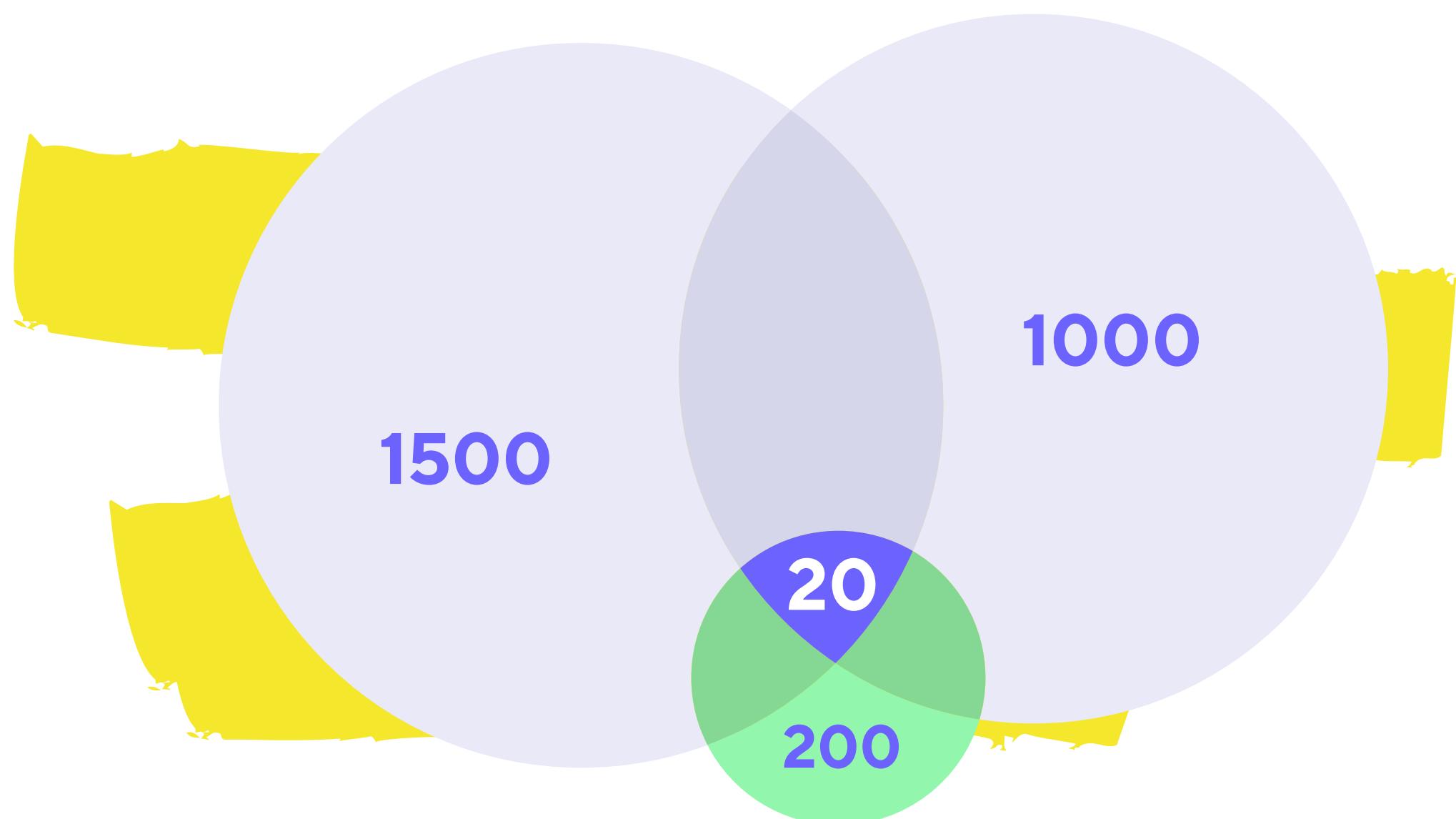
# Why bother with a new model?

1

Very little data

2

No measure of uncertainty

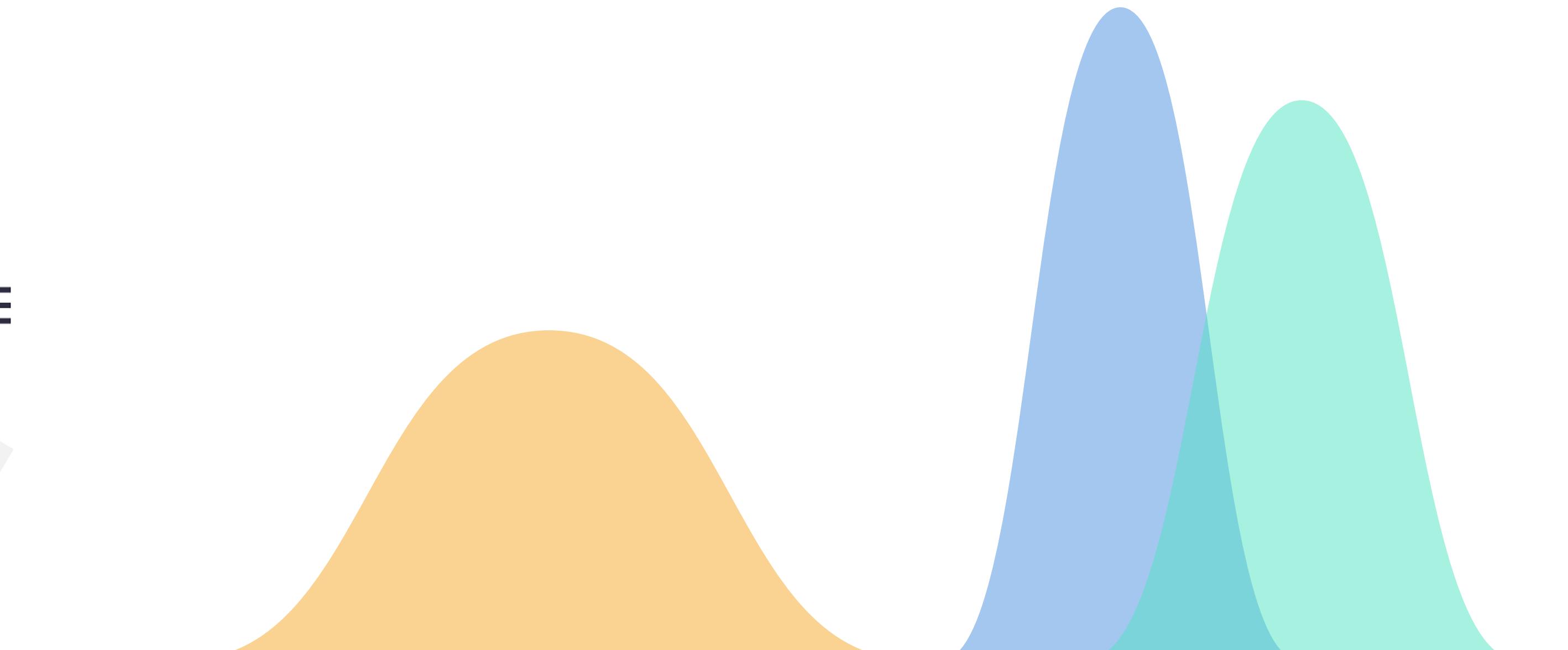
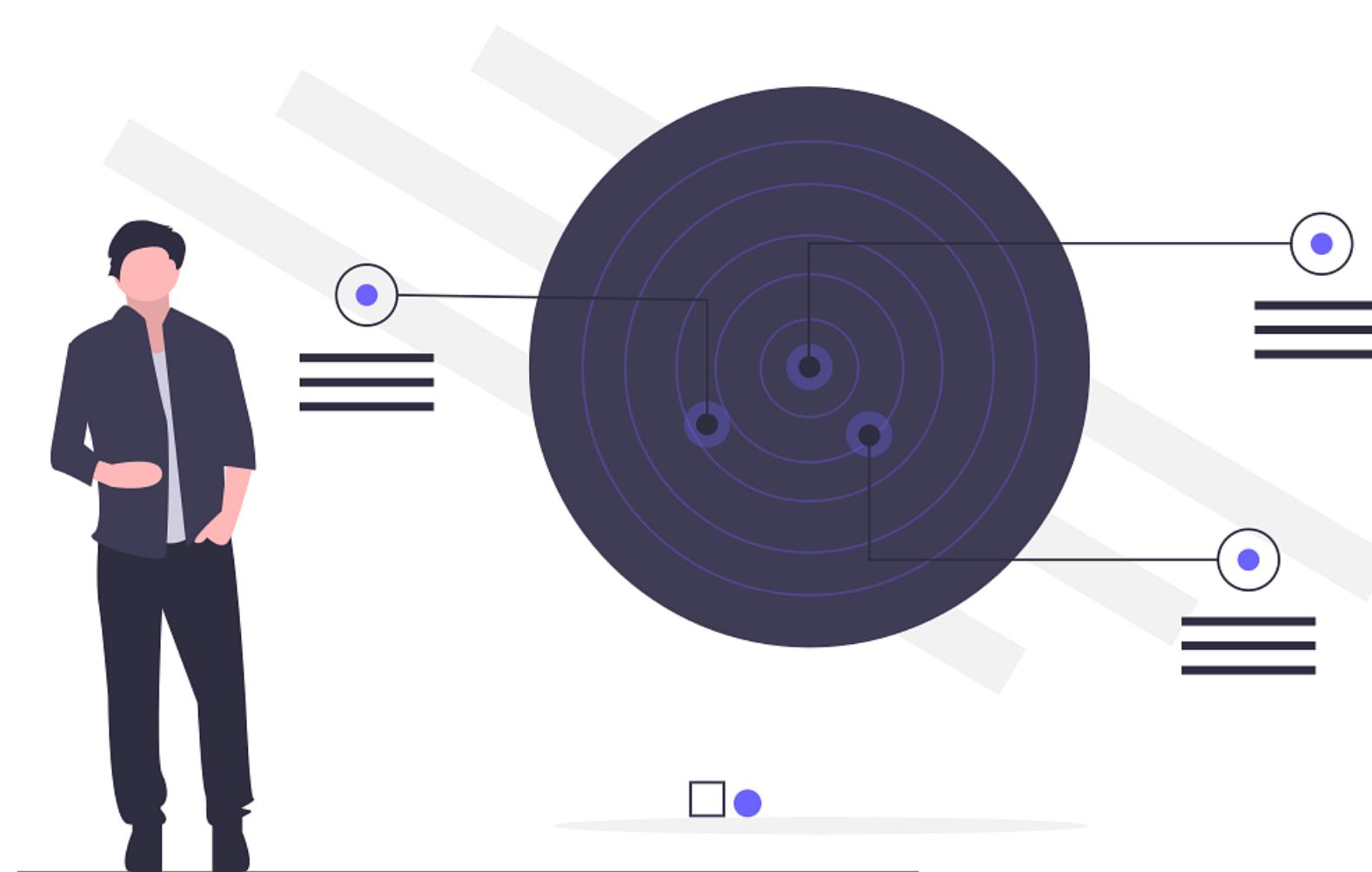


1

Learning from  
prior information

2

Uncertainty  
quantification





# 1 Learning from prior information

The screenshot shows a web browser window for <https://latana.com>. The page features the Blinkist logo at the top left. On the right, there's a large purple title "Bestselling books in brief". Below it, a text block explains the service: "The Blinkist app gives you the **key ideas** from bestselling nonfiction books in 15-minute **text and audio**". A green button with white text says "Start 7-day free trial". To the right, there's a mobile device mockup displaying a summary of the book "The 7 Habits of Highly Effective People" by Stephen R. Covey. The summary includes a small thumbnail image, the author's name, the book title, and two buttons: "Read" and "Listen". Below the device, a teal footer box contains the text: "The Seven Habits of Highly Effective People (1989) is the enormously influential self-help phenomenon that can teach you the principles of effectiveness. Once you make these principles into habits, you'll be well on your way to more success, both in your personal and your professional life." and "Change your habits and your life with this must-know self-help method beloved by millions." At the bottom right of the footer box is the question "Who should read this?".

https://latana.com

Blinkist

Log in

# Bestselling books in brief

The Blinkist app gives you the **key ideas** from bestselling nonfiction books in 15-minute **text and audio**

Start 7-day free trial

Stephen R. Covey  
The 7 Habits of Highly Effective People

Read Listen

The Seven Habits of Highly Effective People (1989) is the enormously influential self-help phenomenon that can teach you the principles of effectiveness. Once you make these principles into habits, you'll be well on your way to more success, both in your personal and your professional life.

Change your habits and your life with this must-know self-help method beloved by millions.

Who should read this?

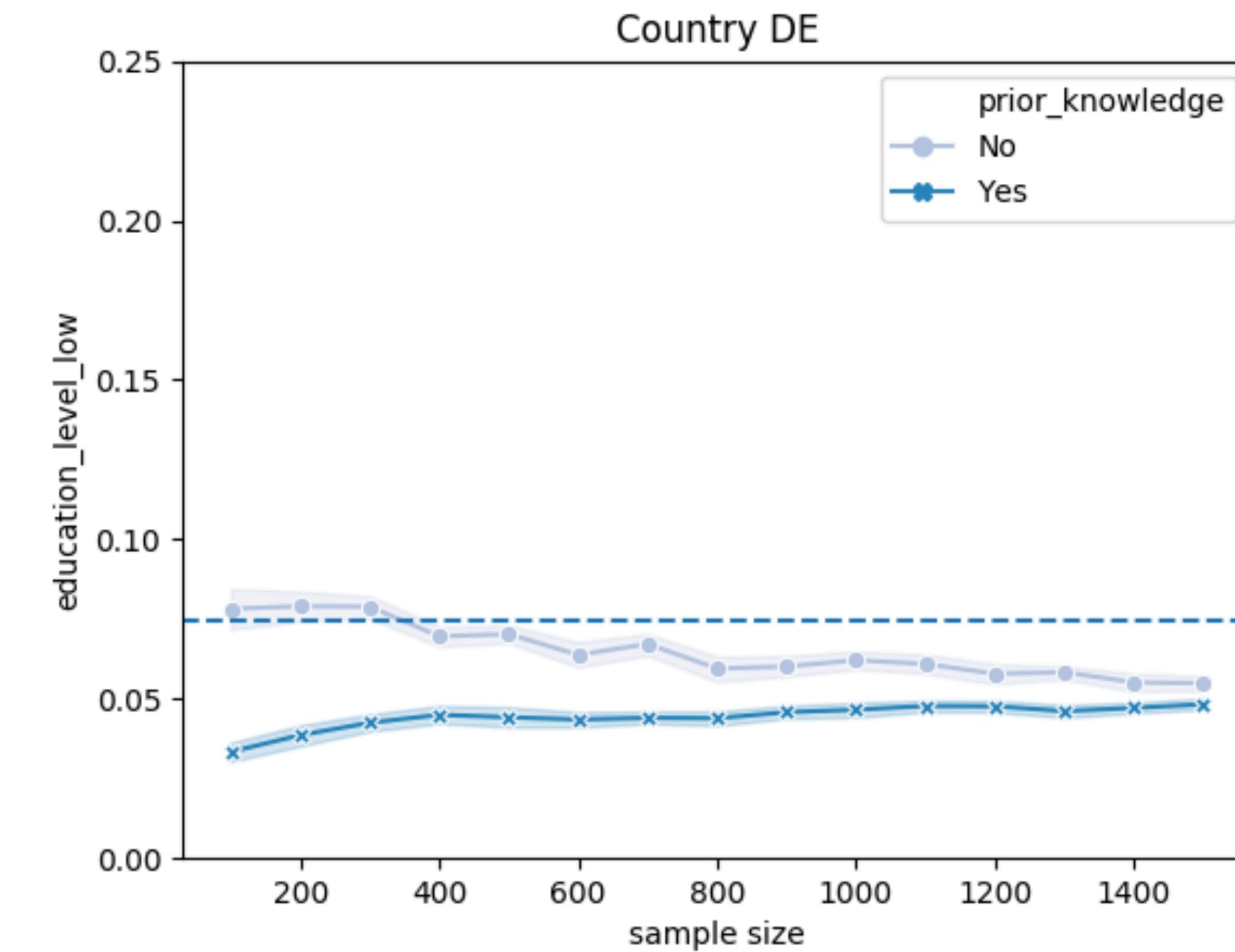


1 Learning from  
prior information

7.5% of people  
living in Germany  
know Blinkist.

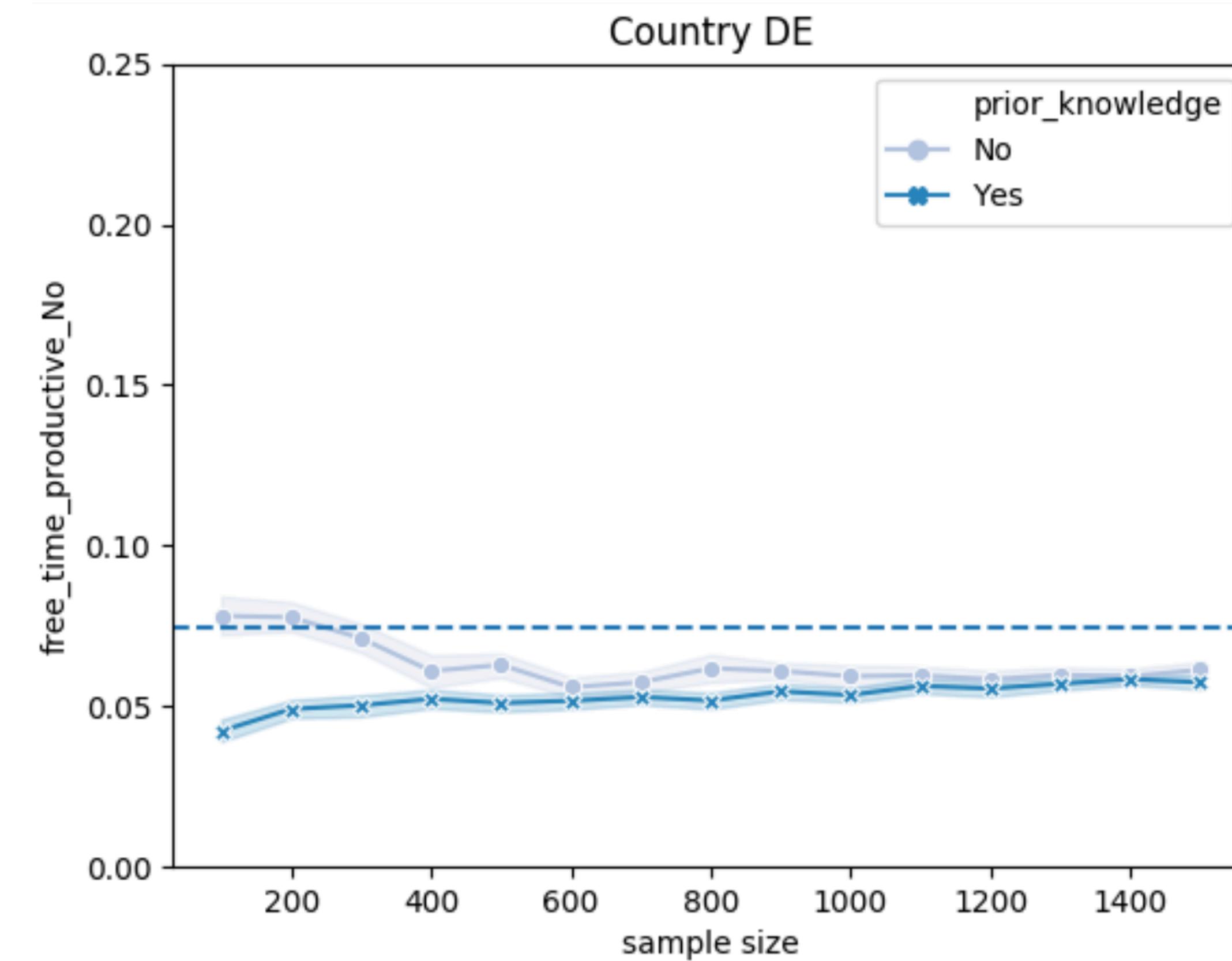
1

# Learning from prior information



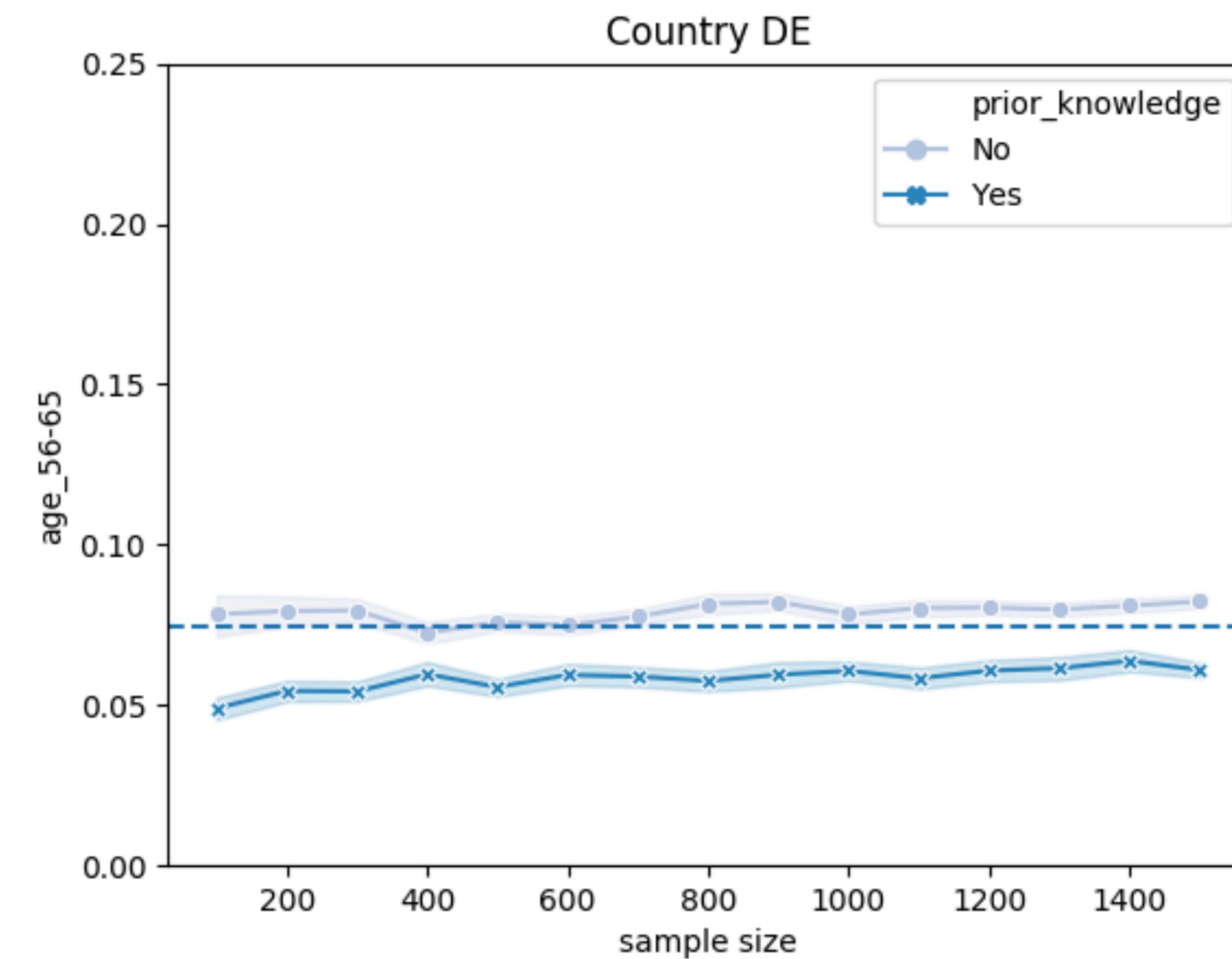
1

# Learning from prior information



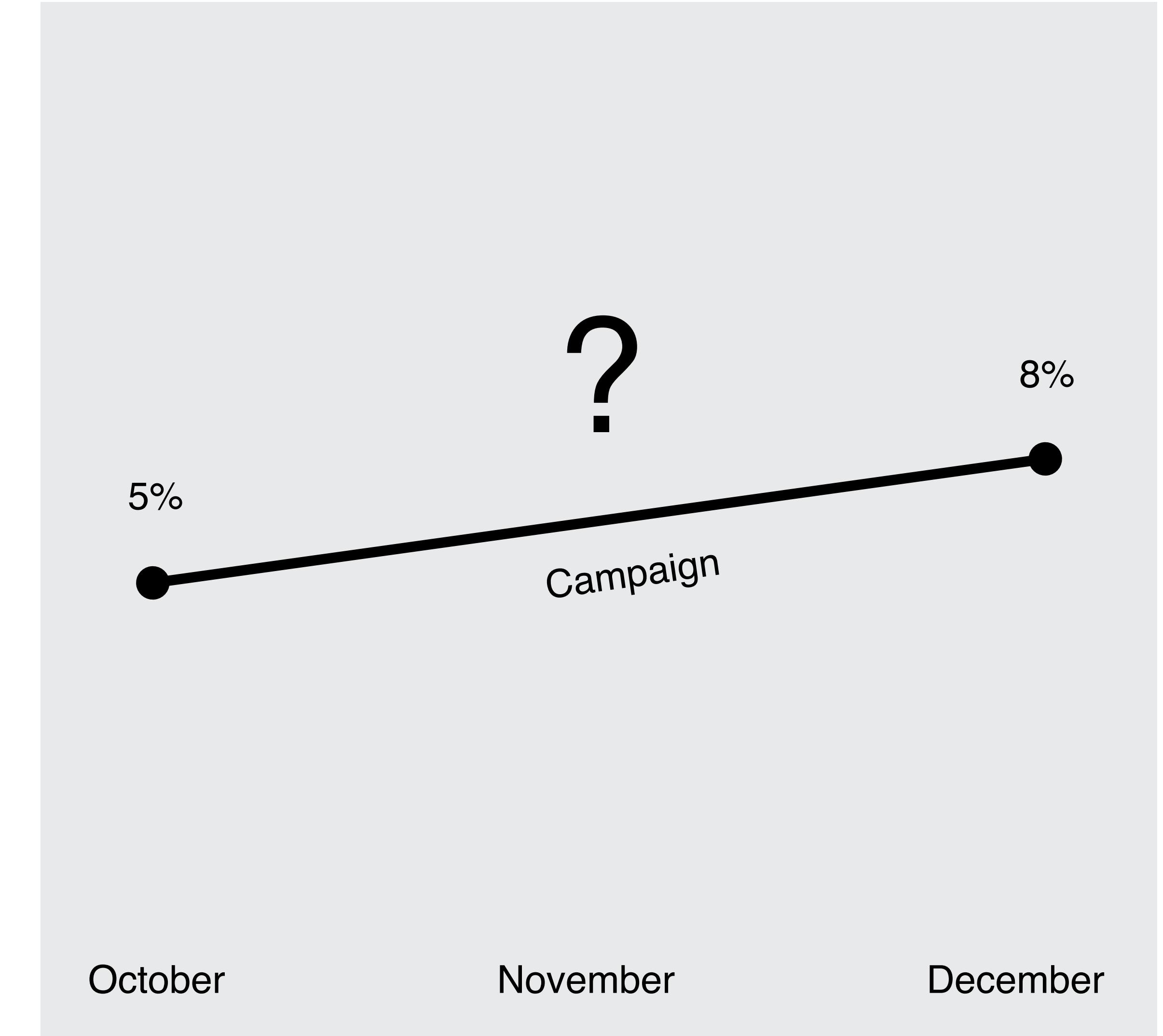
1

# Learning from prior information



2

## Uncertainty quantification



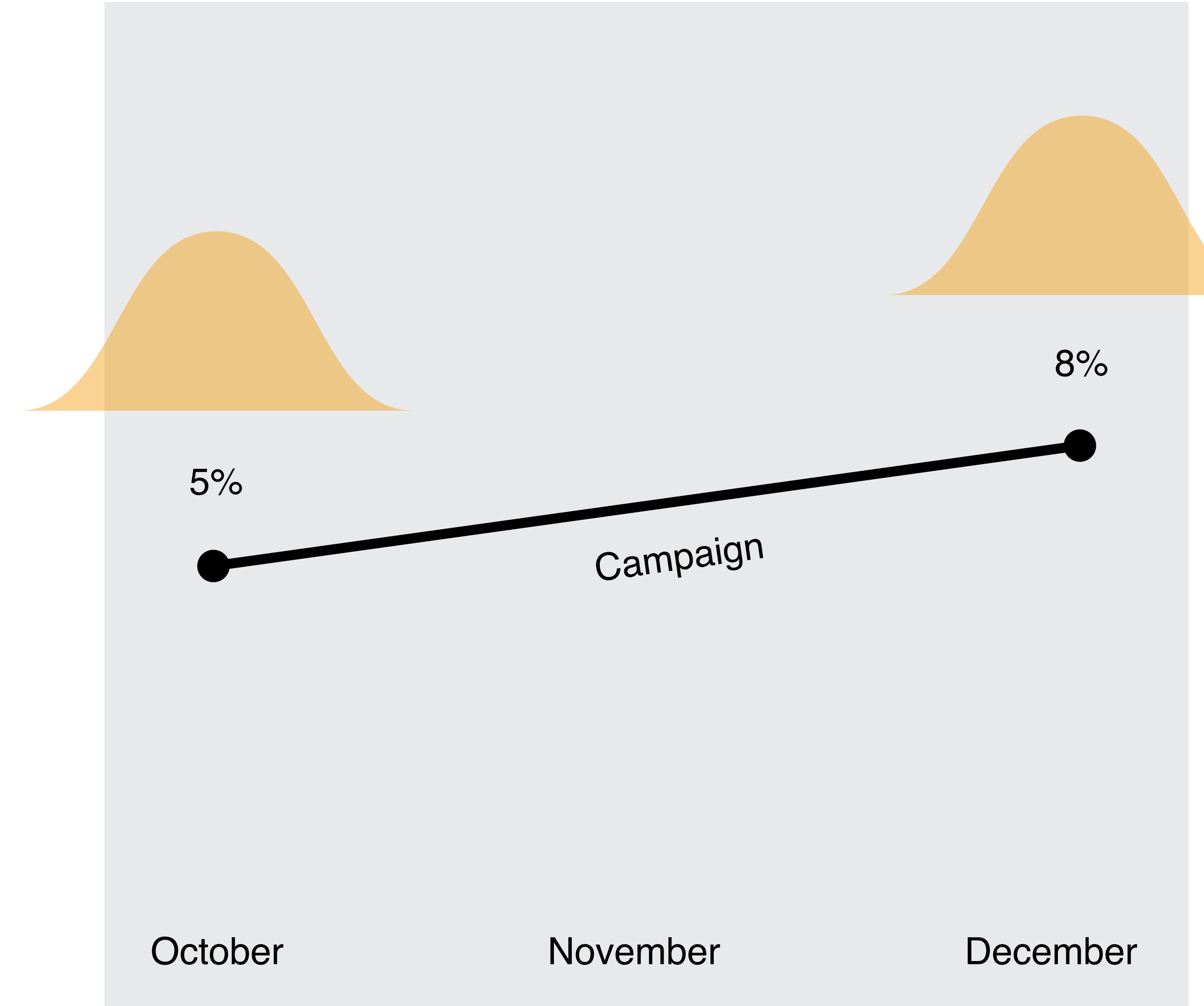
N =

2,000

2,000

2

## Uncertainty quantification



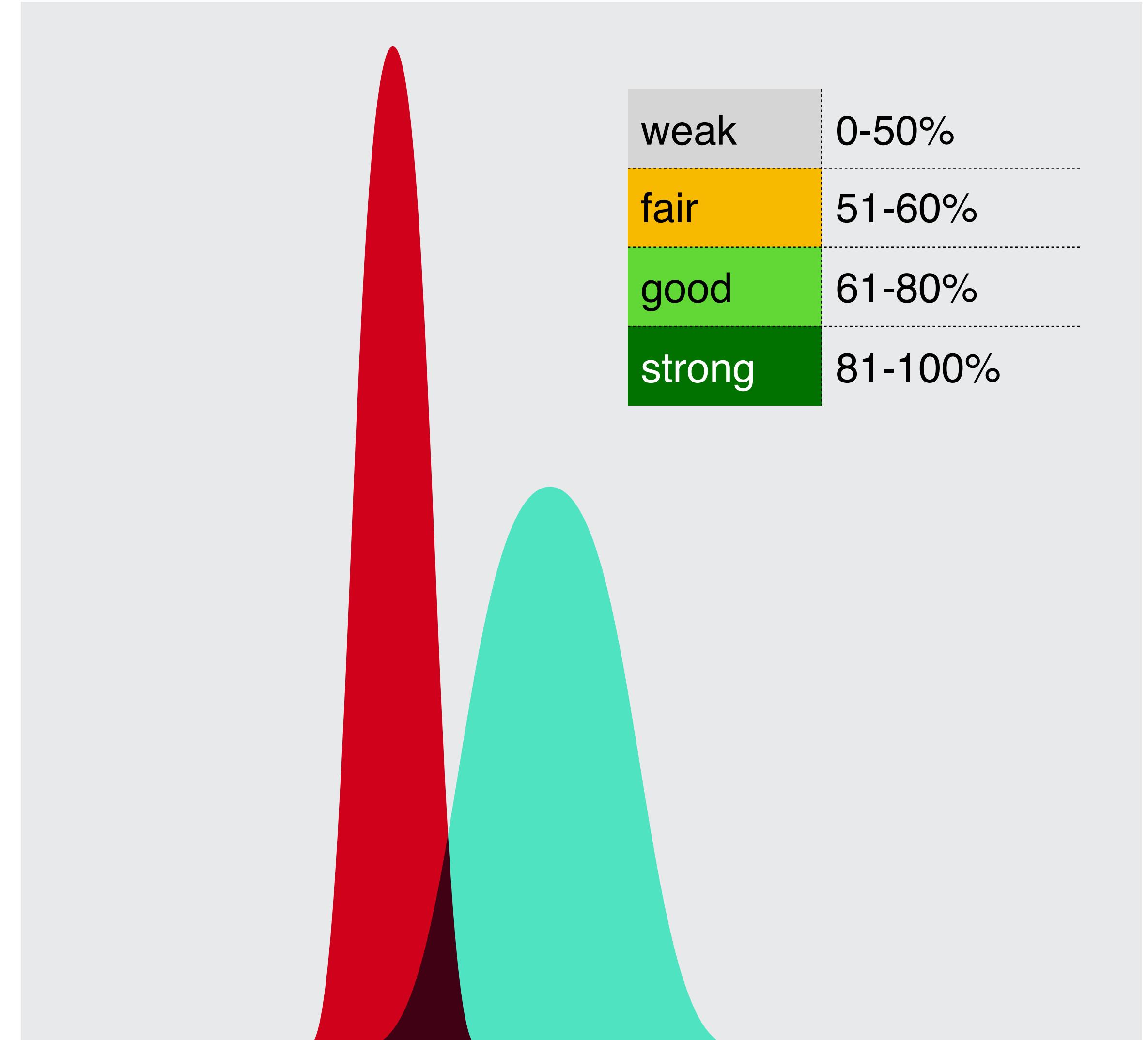
N =

2,000

2,000

2

## Uncertainty quantification



# Uncertainty quantification

## Aided Awareness

Audience:

25-49 Urban

Age: 18-35 | Gender: Male | Income: Low Education: Low, Medium | Loc: Top 3

Aided Awareness

 AirHelp

17%

There is 70 percent brand consideration of your created audience '25-49 urban' in Germany, for Airhelp.

Change:

From: 13th March to: 13th June

▲ 2%

Change Probability:

Low

55%



The probability that the change was due to a real world event is high at (5%)

## Brand Consideration

Audience:

25-49 Urban

Age: 18-35 | Gender: Male | Income: Low Education: Low, Medium | Loc: Top 3

Brand Consideration:

 AirHelp

80%

There is 70 percent brand consideration of your created audience '25-49 urban' in Germany, for Airhelp.

Change:

From: 13th March to: 13th June

▲ 3%

Change Probability:

High

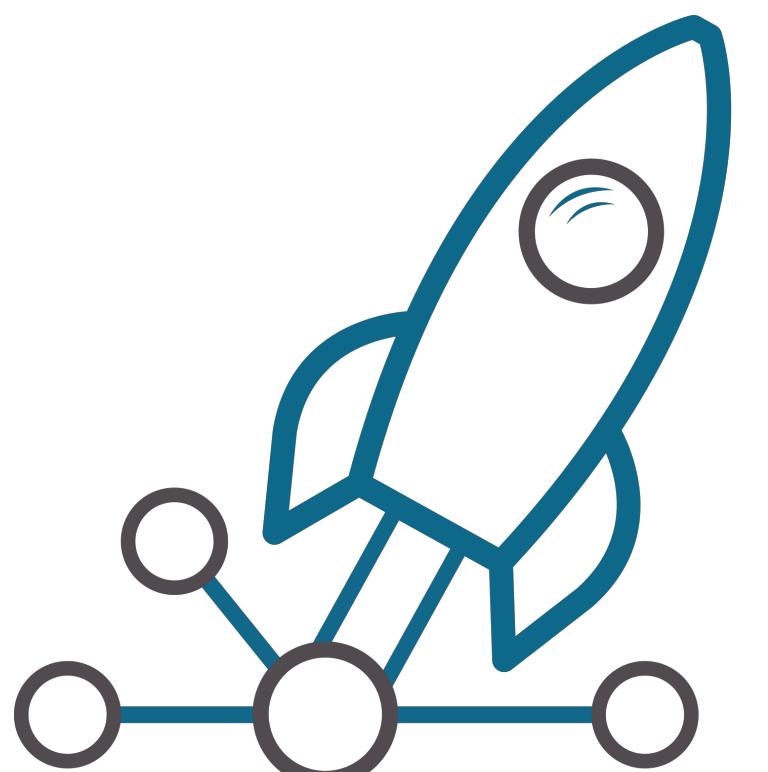
82%



The probability that the change was due to a real world event is high at (82%)



Using  
Bayesian models  
in production



**PYMC3**

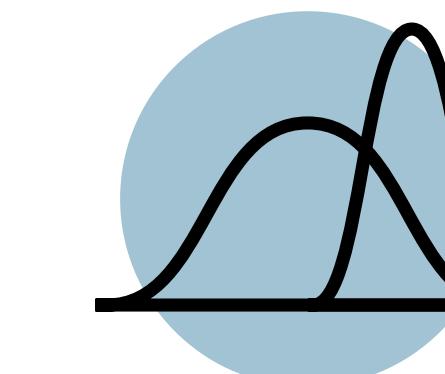




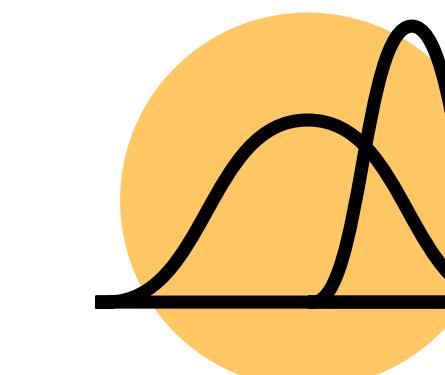
latana



## Summary



Quantify probability of change in brand KPIs



Use prior information to uncover hard to reach audiences



PyMC3 in production is no magic!



Thanks!