GEOG5927M

Predictive Analytics

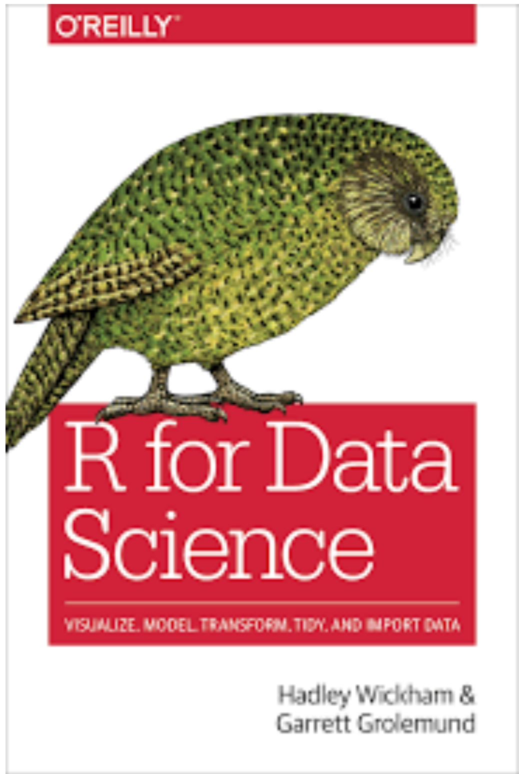
Targeted Marketing and Response Modelling

Roger Beecham

www.roger-beecham.com

R

RStudio®


O'REILLY
R for Data Science
VISUALIZE, MODEL, TRANSFORM, TIDY, AND IMPORT DATA
Hadley Wickham &
Garrett Grolemund

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Targeted Marketing

Examples

- Recommender systems
- Loyalty cards
- Microtargeting
- Segmentation — RFM, geodemographics

Practice

- Select variables (demographic and behavioural)
- Select "outcomes"
- Generate target

Targeted Marketing
df.

Use of data and analytics to

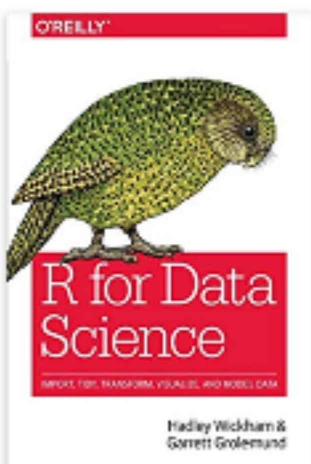
characterise customer populations, such that groups of customers likely to **respond best** to a message can be **targeted**

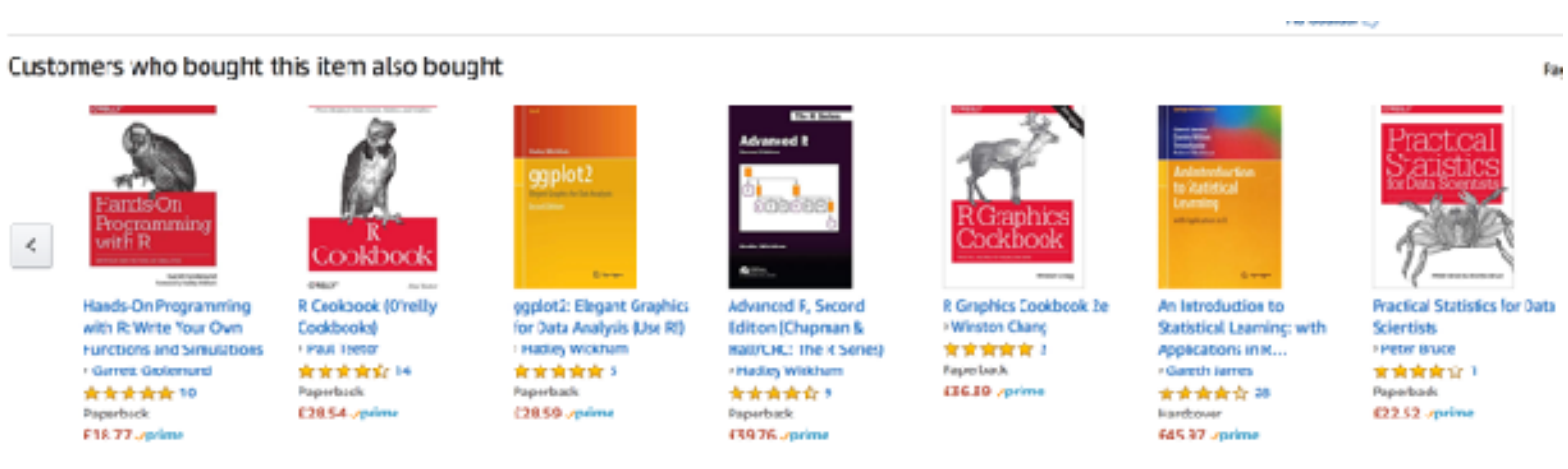
and marketing **messages** can be **personalised** according to customer group

Recommender systems

Recommender systems

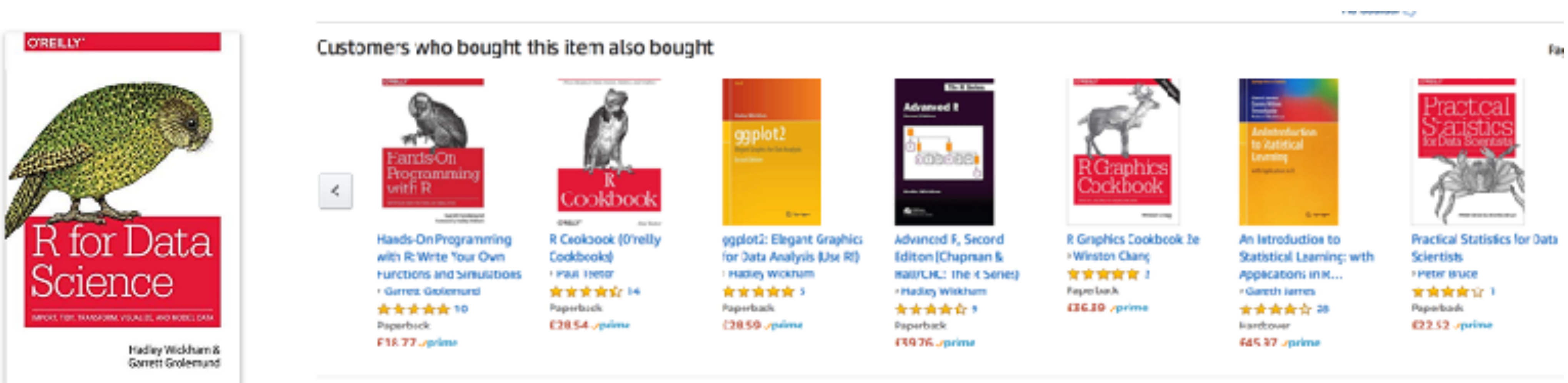
amazon





Linden, G., Smith, B. and York, J. (2003) Amazon.com Recommendations: Item-to-Item Collaborative Filtering, IEEE Internet Computing, 7(1): 76-80

Recommender systems



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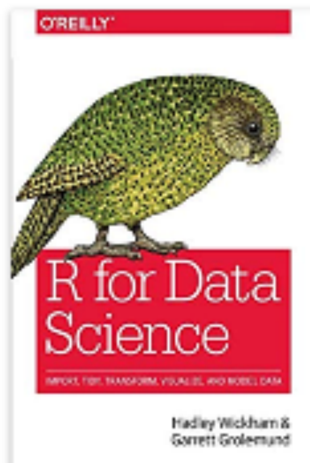

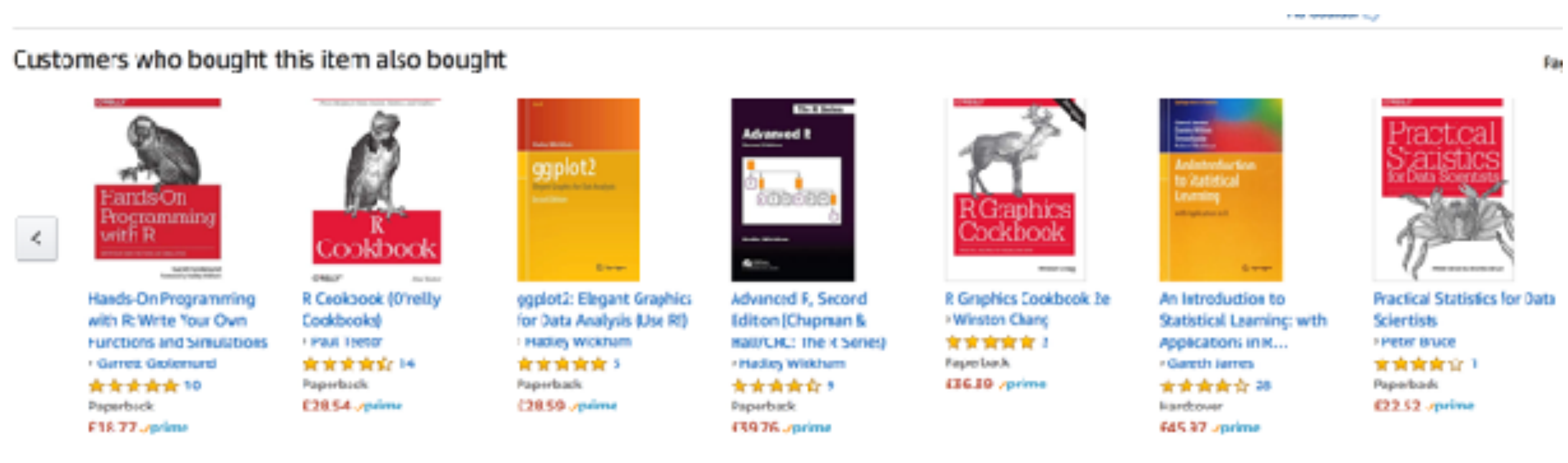

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content based

generate probabilities that a user will like a particular product based on past likes — e.g. spotify recommending tracks

demographic based

recommend based on similar users and past behaviour

A/B testing and personalisation

A/B testing and personalisation

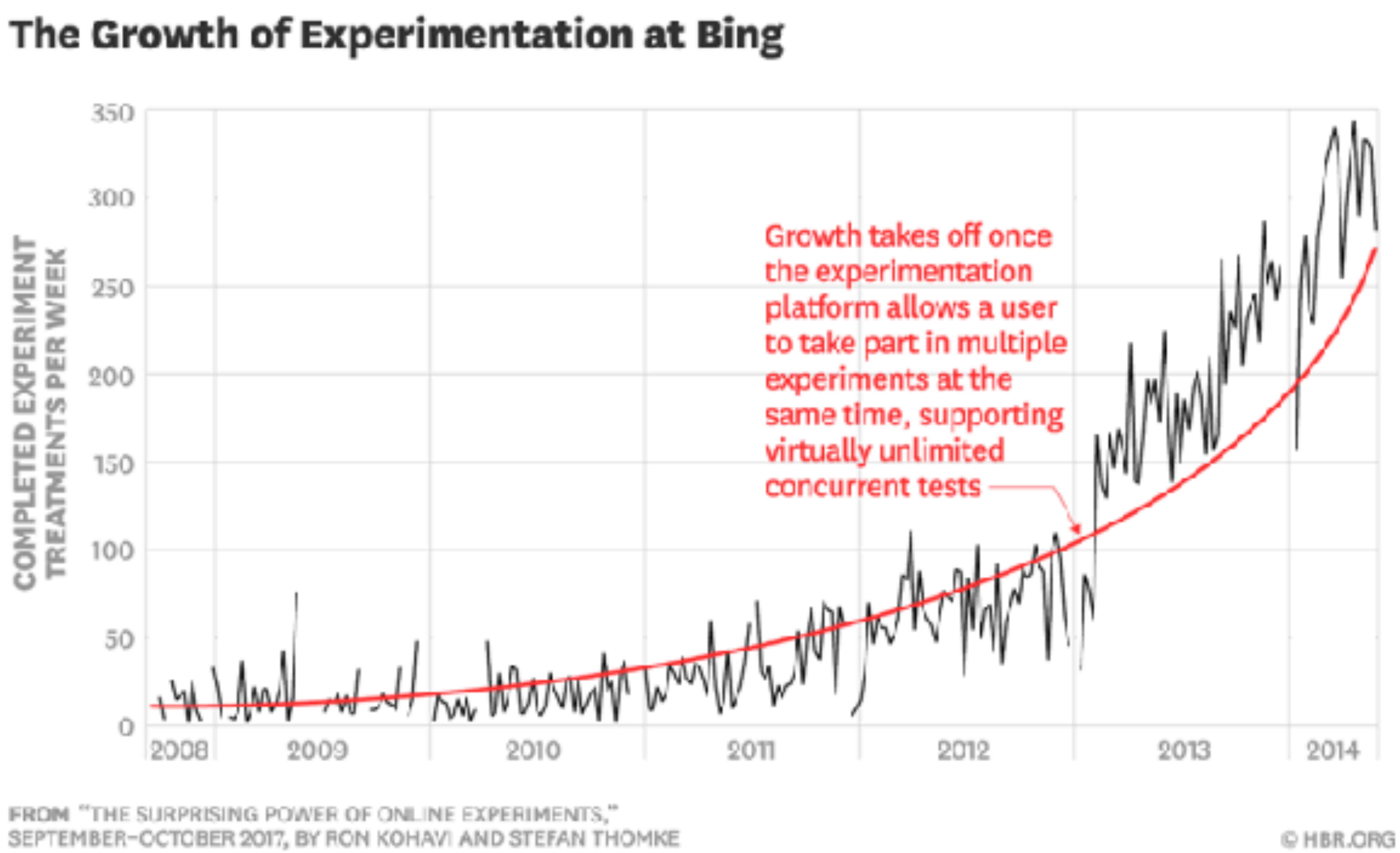
EXPERIMENTATION

The Surprising Power of Online Experiments

Harvard Business Review

by Ron Kohavi and Stefan Thomke

From the September–October 2017 Issue



Micro-targeting and personalisation

Micro-targeting and personalisation

micro-targeting is a marketing strategy that capitalizes on the consumer's demographic, psychographic, geographic, and behavioral data to predict his buying behavior, interests, opinions, and influence that behavior with the help of a hyper-targeted advertising strategy

Pawha, 2018

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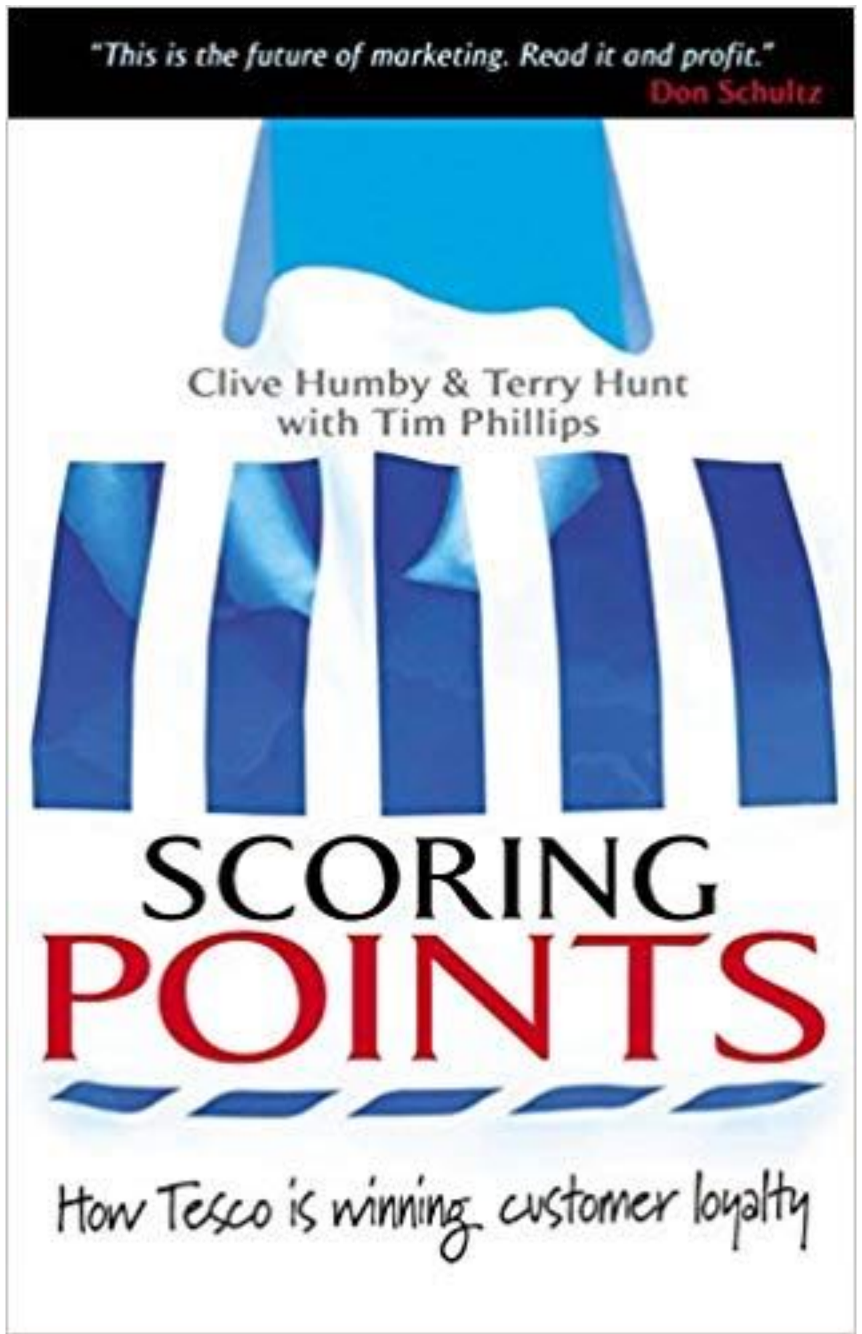
Pawha, 2018

Targeting and personalisation in 1990s



data mining techniques on 12million transactions per week for:

- tailored campaigns/promotions targeted to certain groups
- pricing strategies for target groups
- new products new ranges (e.g. *Finest)*
- products bought by loyal customers prioritised

Segmentation

Segmentation

df.

Partition objects — places, businesses, **customers** — into groups according to shared characteristics

age
income
occupation
geographic location

often indirect measures clearly defined and generally static

purchase behaviour
brand awareness
ad response

direct measures

defined analytically and can change

Segmentation : techniques

Recency-Frequency Monetary Value (RFM) —

quantile-based

4 min read : https://bit.ly/2KrVUia

Clustering —

k-means, density-based, hierarchical

11 min read : https://bit.ly/355i01K

Decision Trees —

chaid, cart, id3

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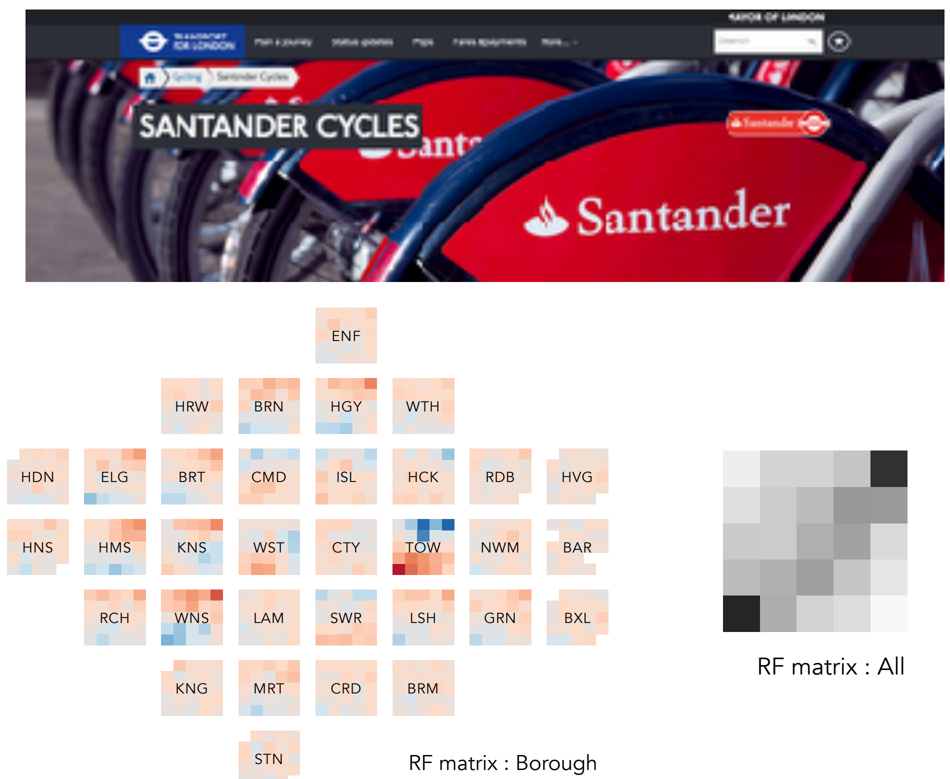
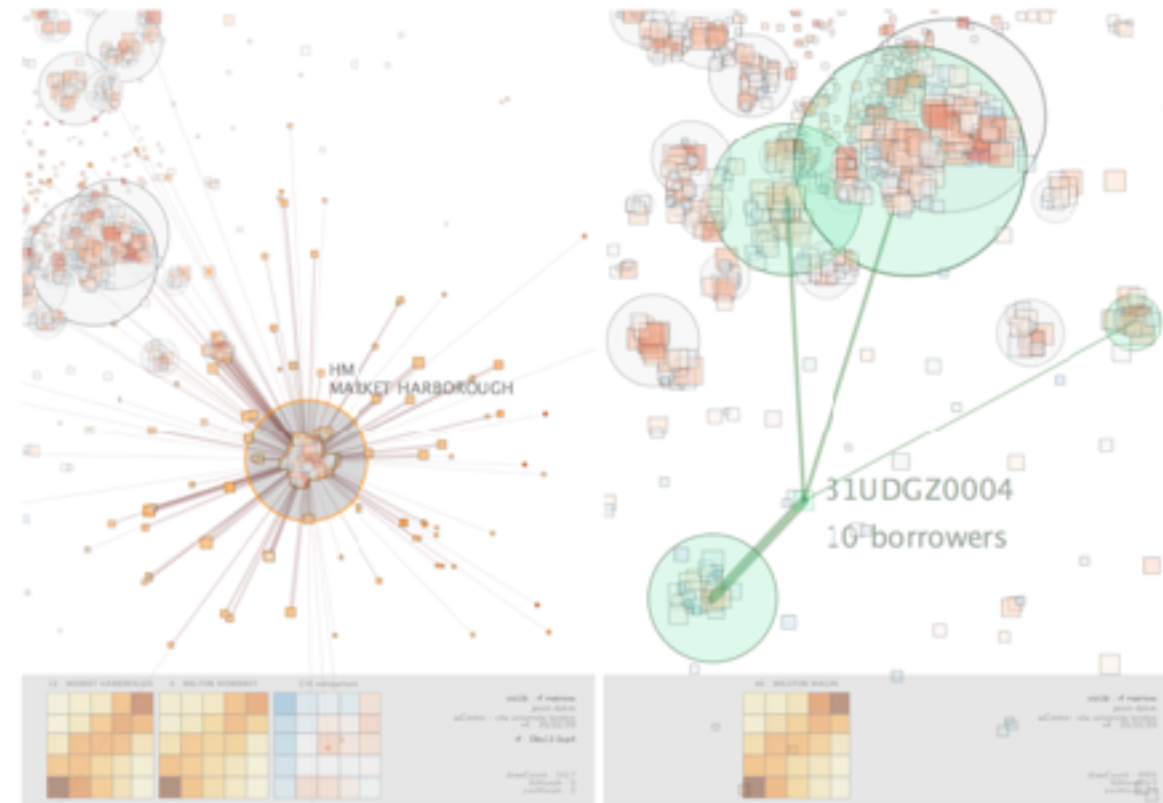
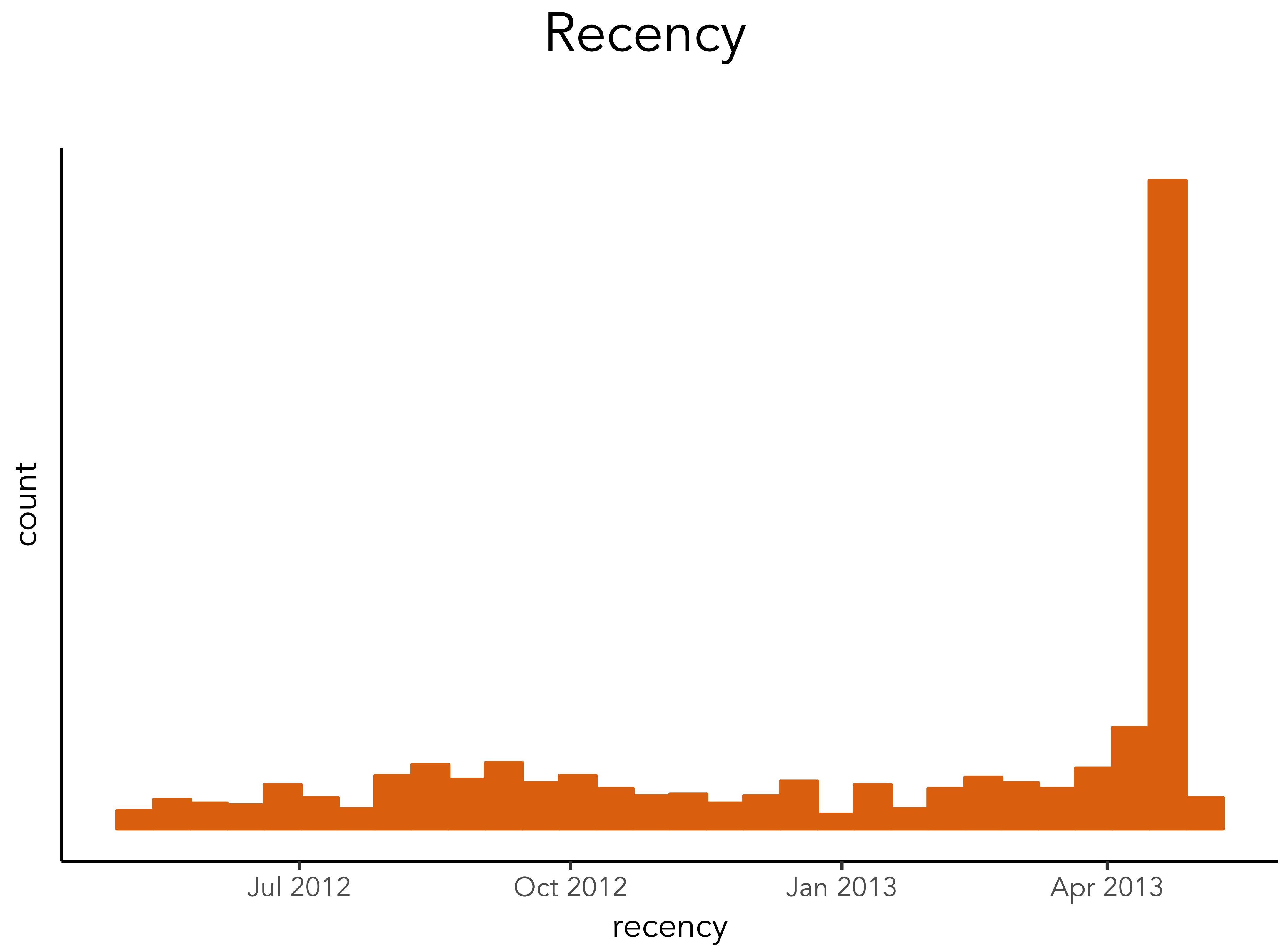


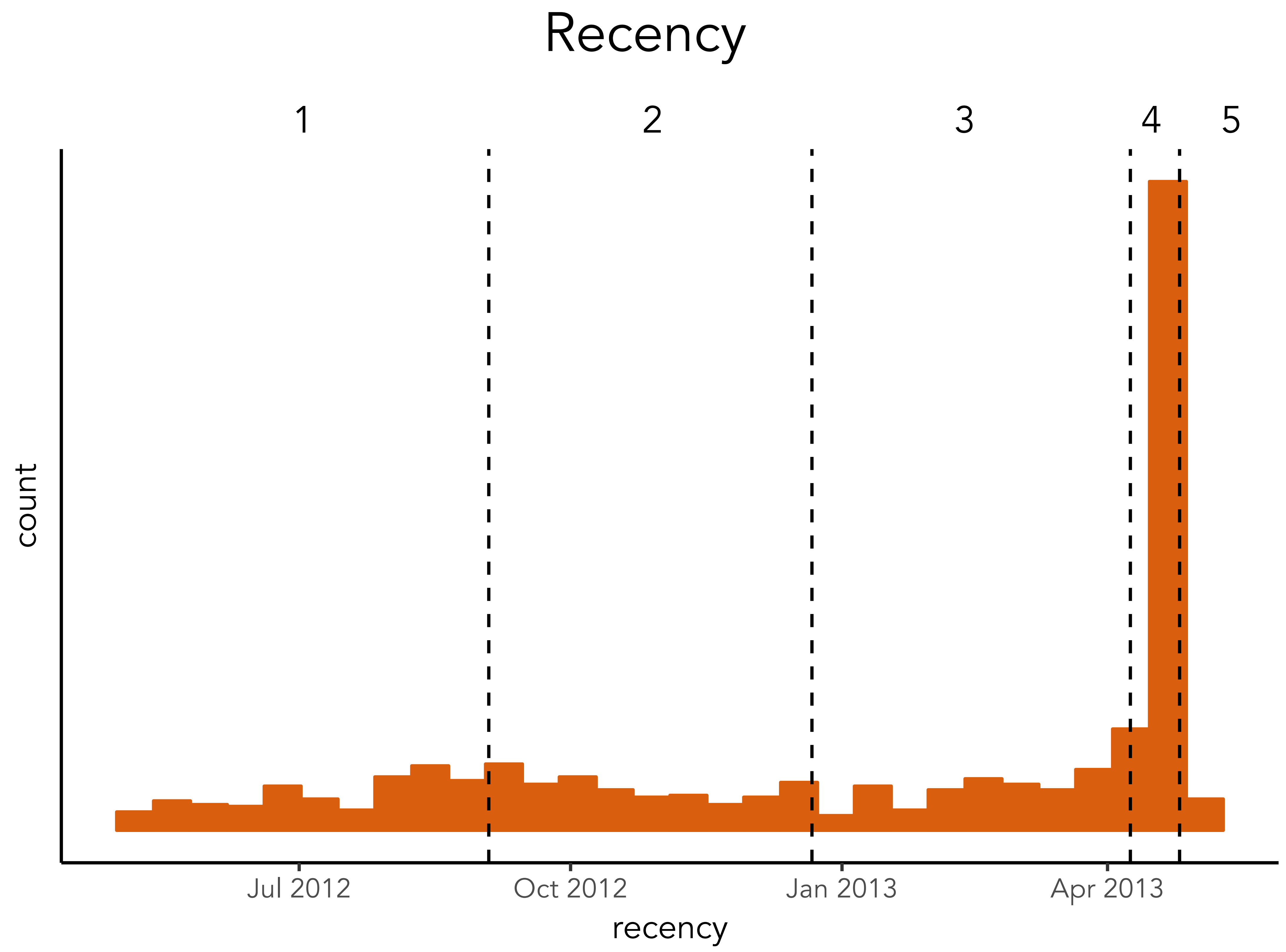
Beecham, R. & Wood, J.
Exploring gendered cycling behaviours
Transport Planning & Technology
doi: 10.1080/03081060.2013.844903



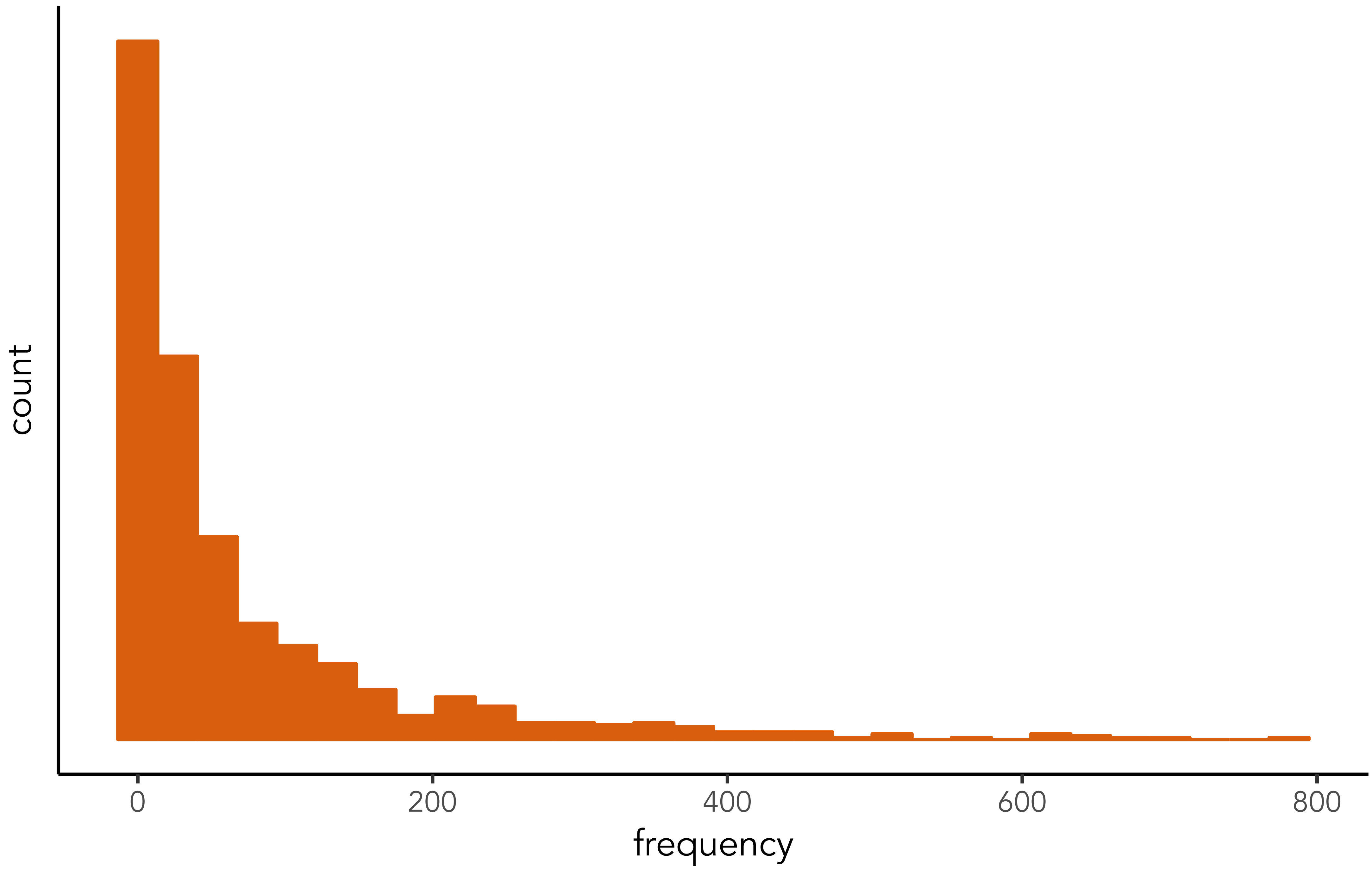
Radburn, R., Dykes, J. & Wood, J.
vizLib: Using The Seven Stages of Visualization to Explore Population Trends and Processes in Local Authority Research

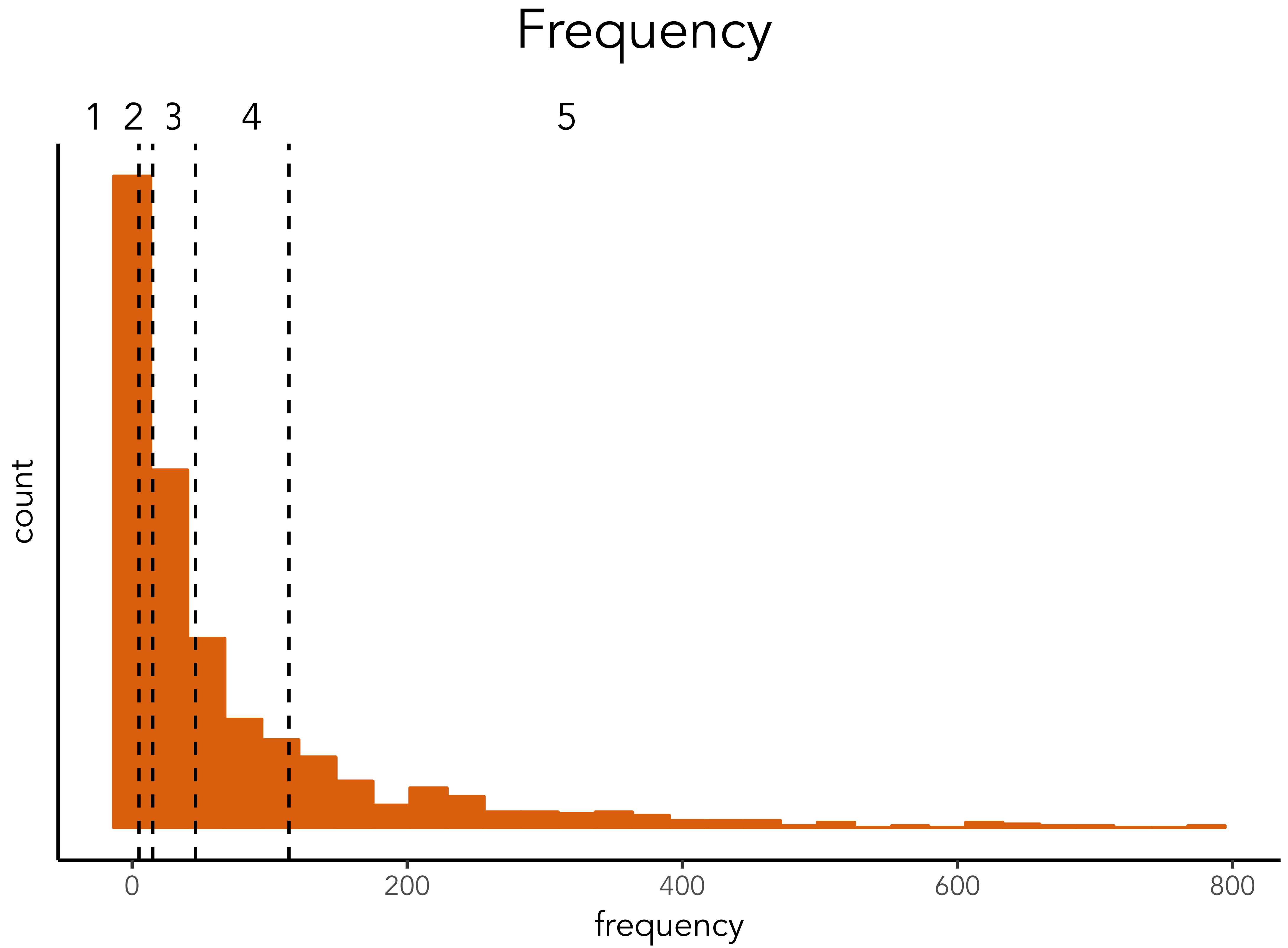
Recency - Frequency Segmentation


Recency
count
Jul 2012
Oct 2012
Jan 2013
Apr 2013
recency

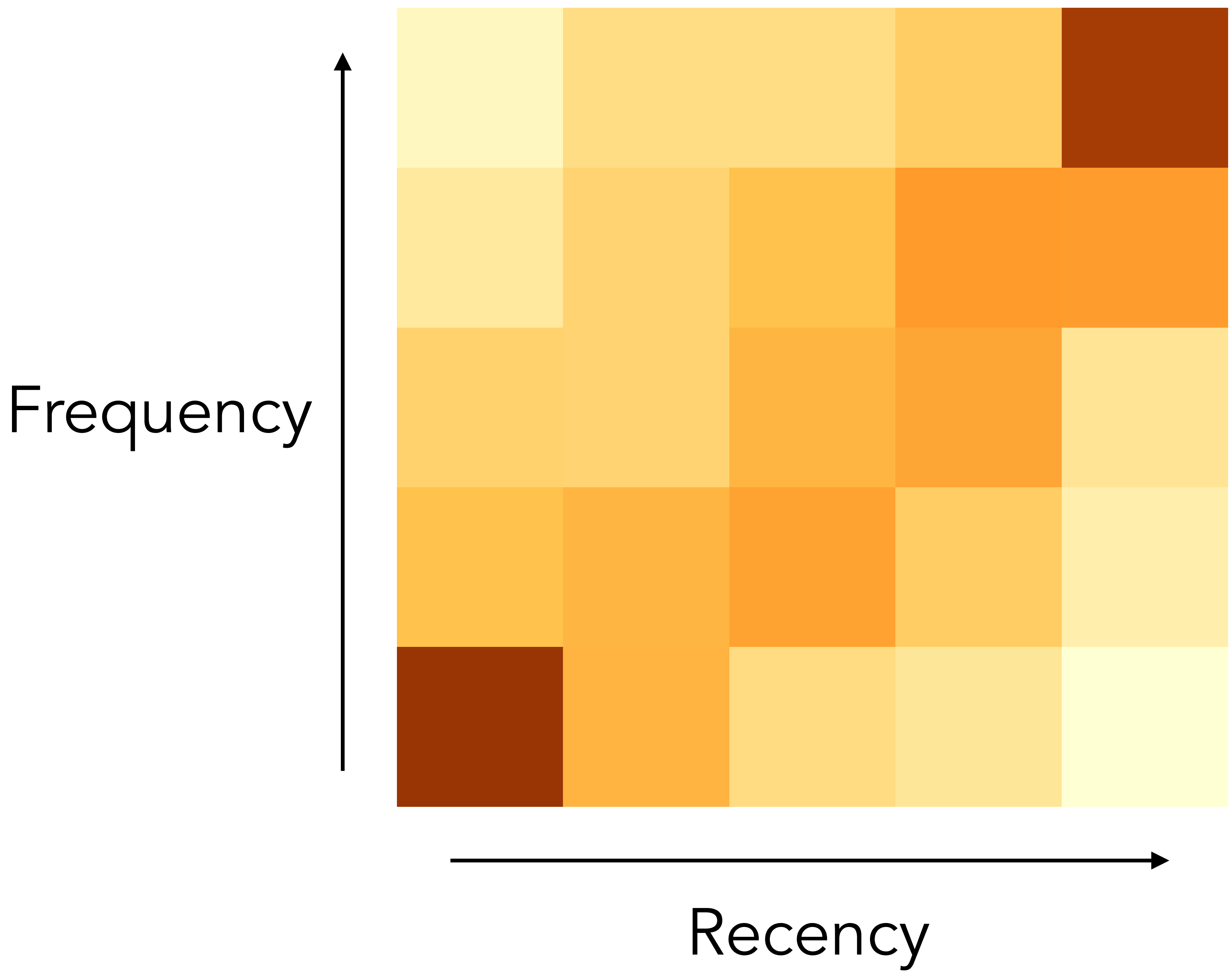

Recency
1
2
3
4
5
count
Jul 2012
Oct 2012
Jan 2013
Apr 2013
recency

Frequency





Frequency
1
2
3
4
5
count
0
200
400
600
800
frequency


Frequency
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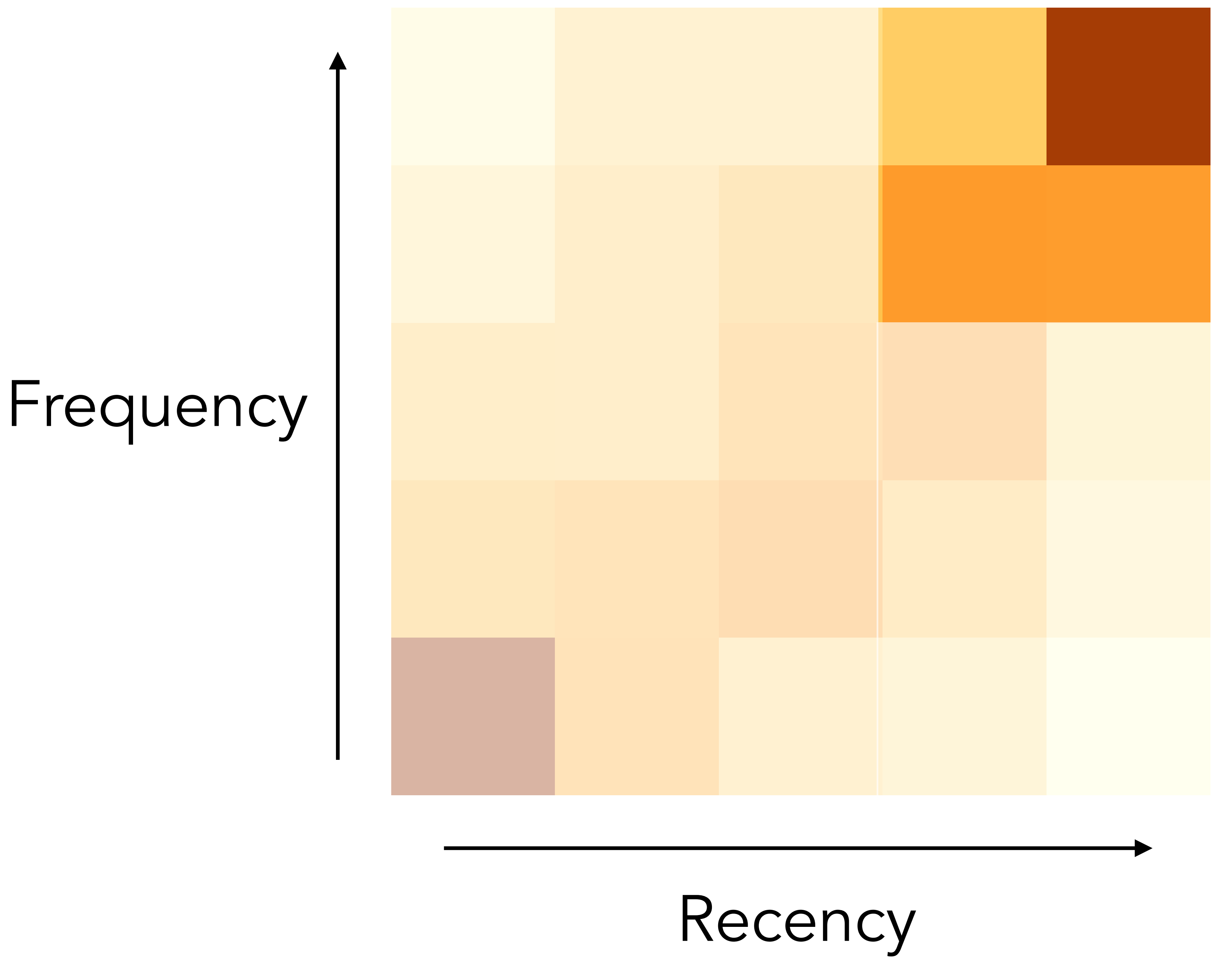
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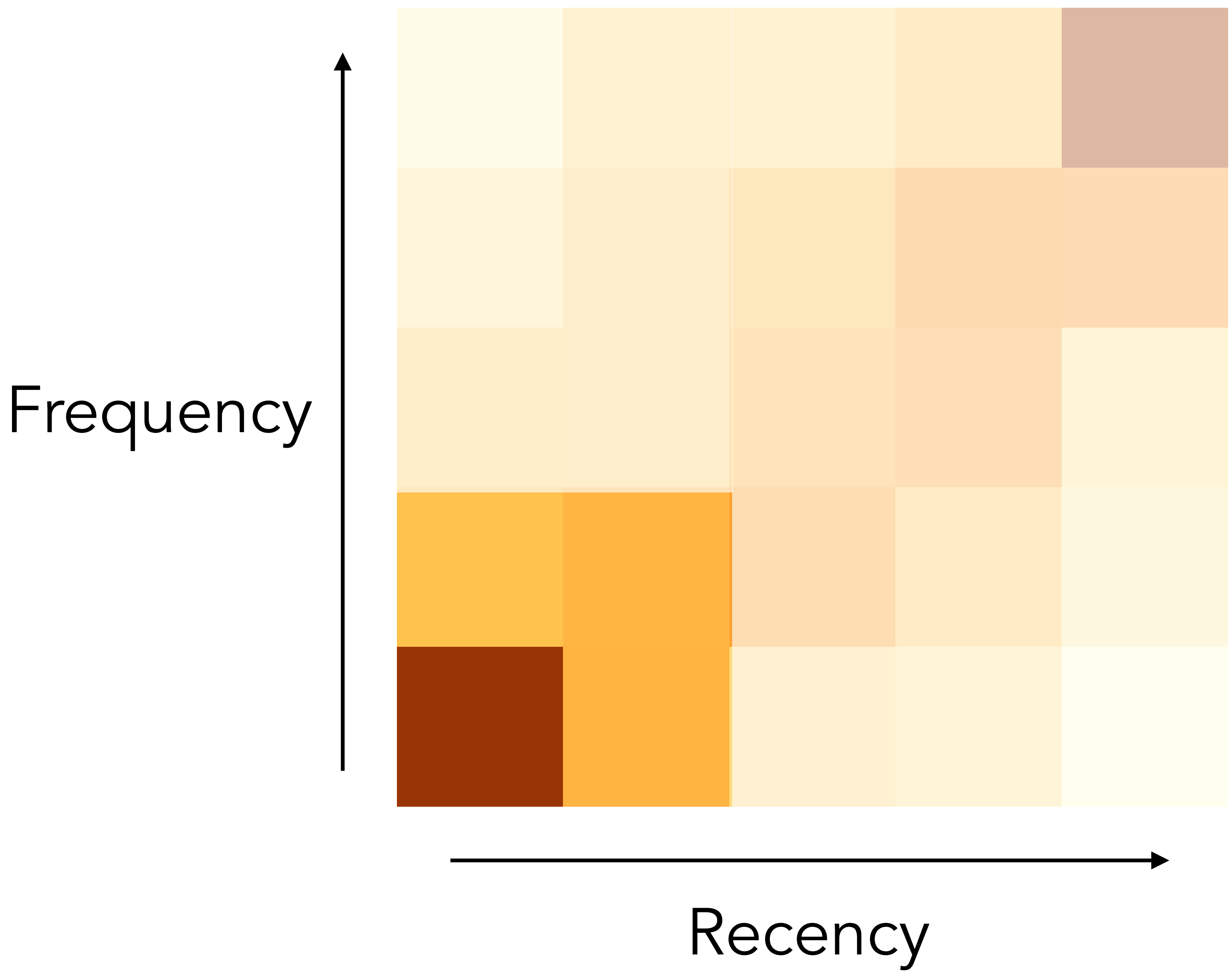
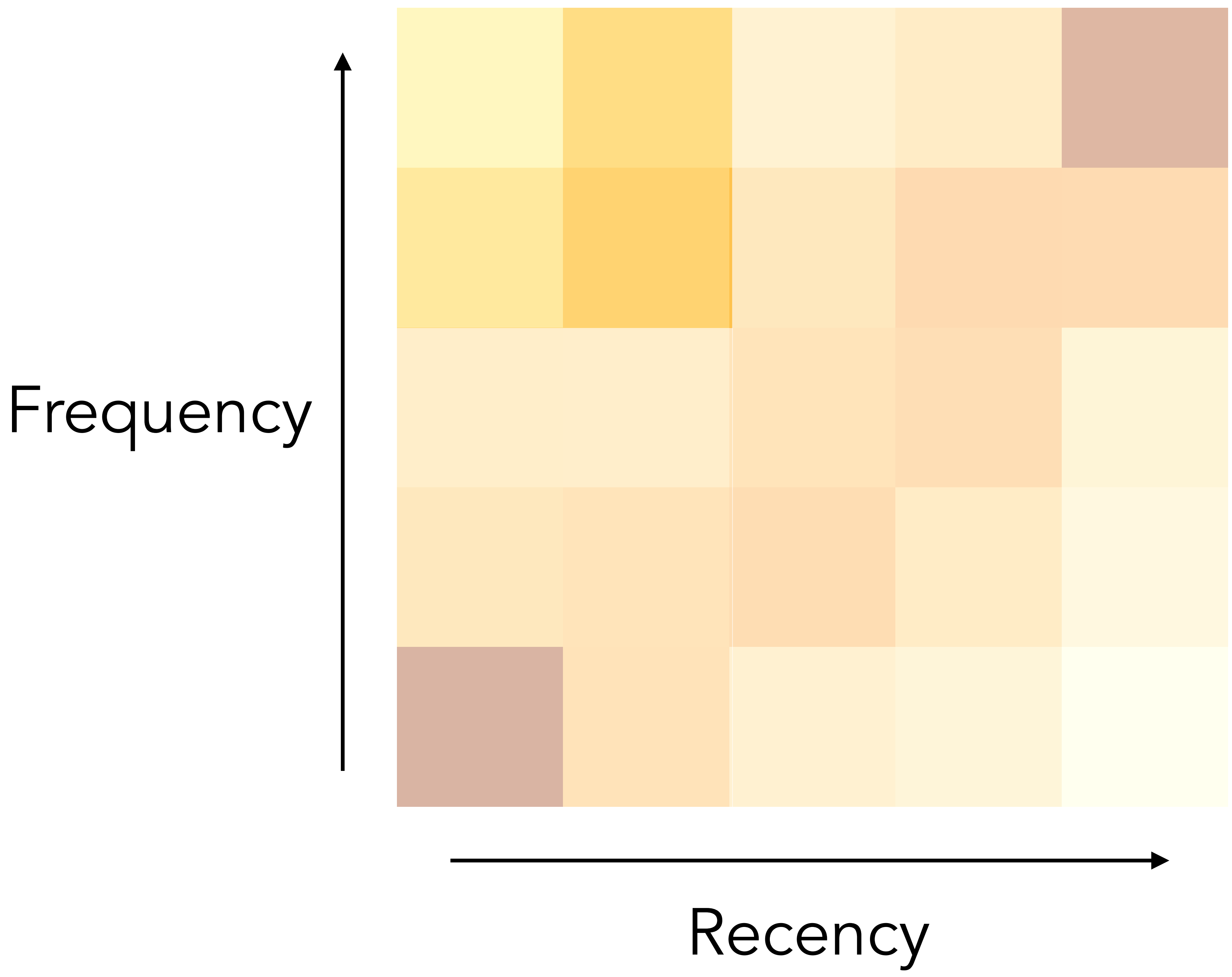
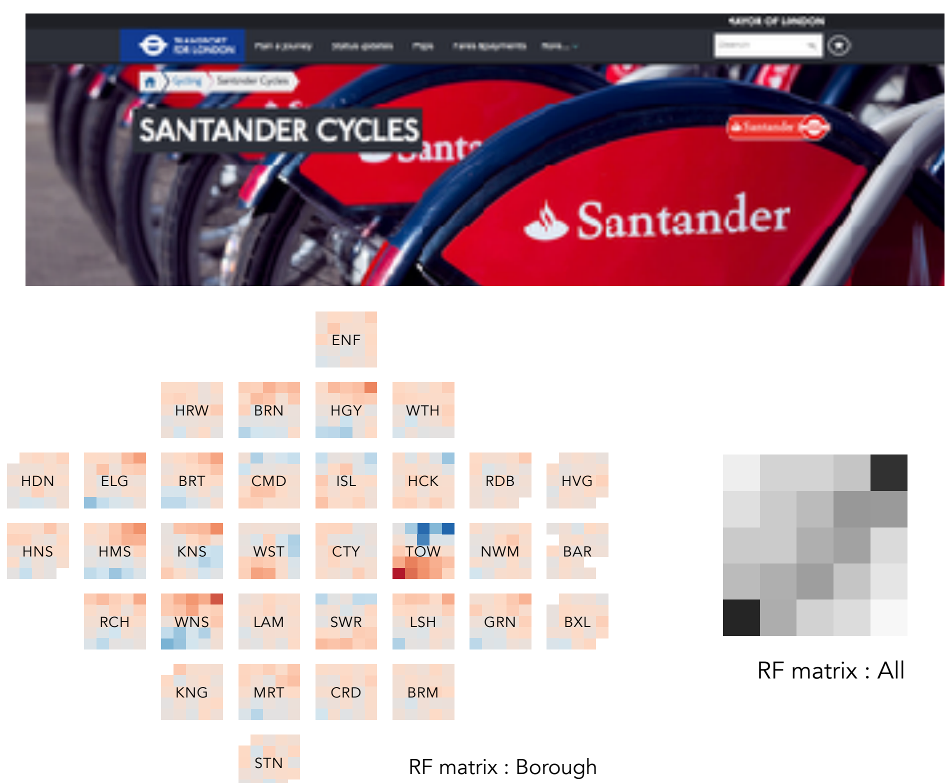
Recency


Frequency
Recency


Frequency
Recency



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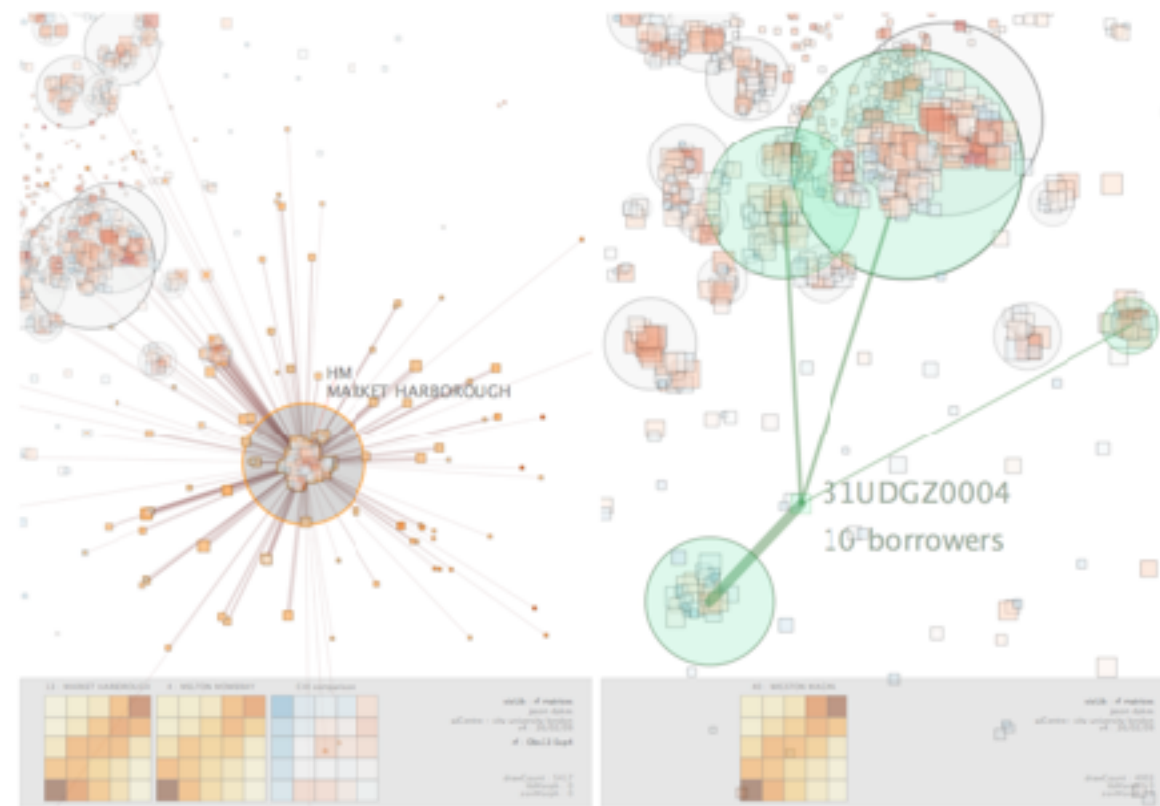

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Segmentation — clustering

df.

Partition objects — places, businesses, people — into groups according to shared characteristics

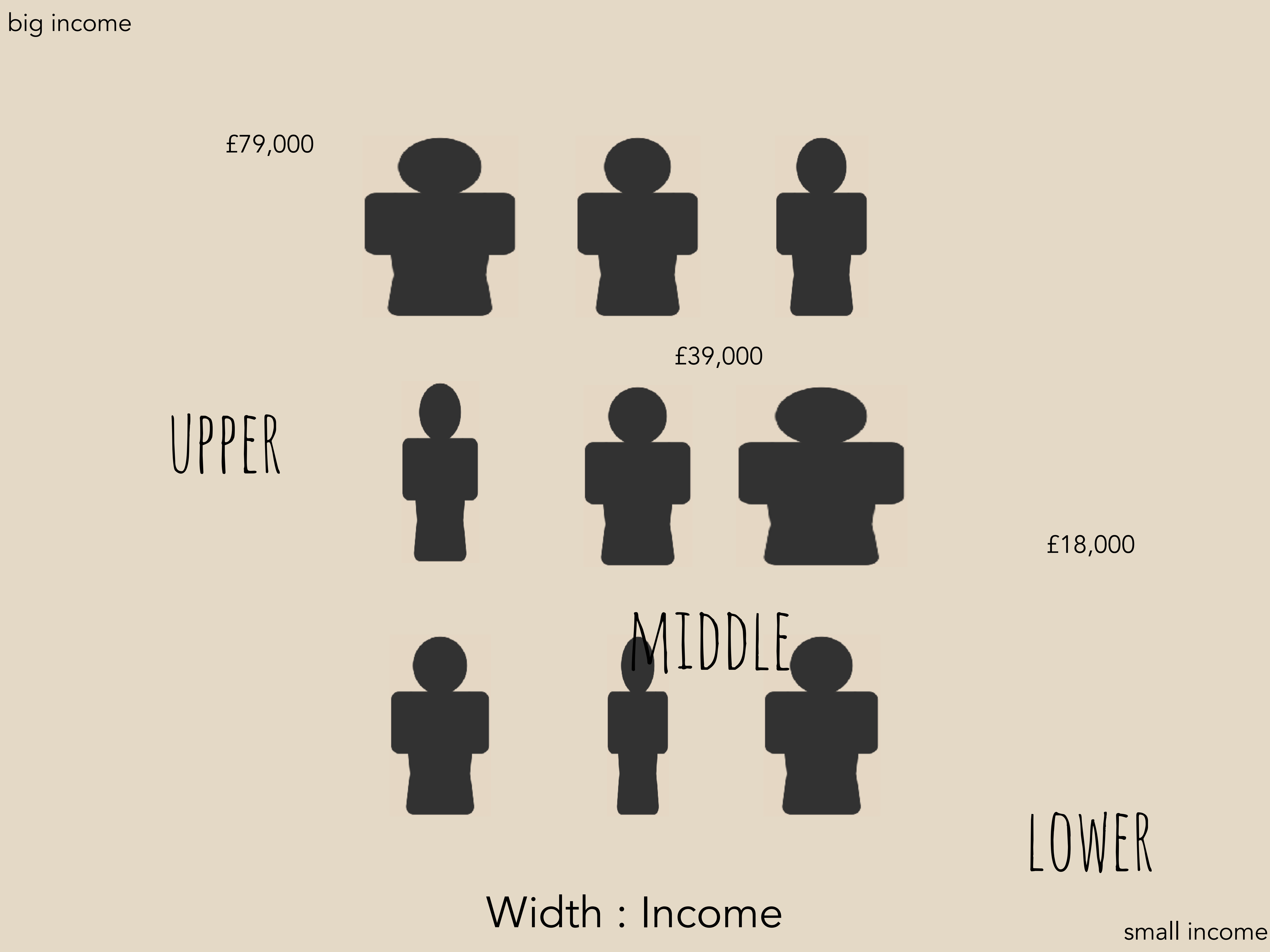
such that

objects **within** groups are similar

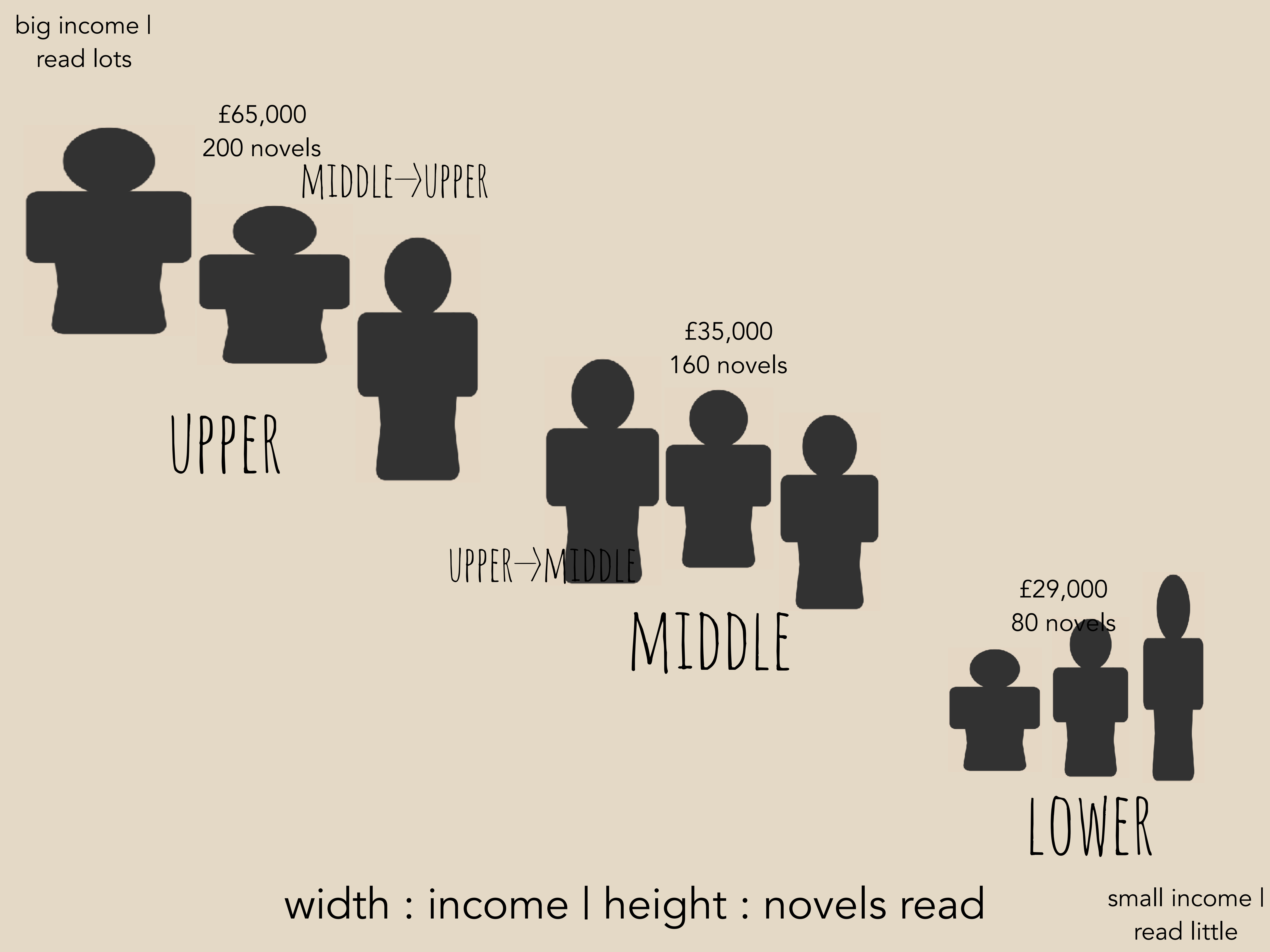
AND

objects **between** groups are different

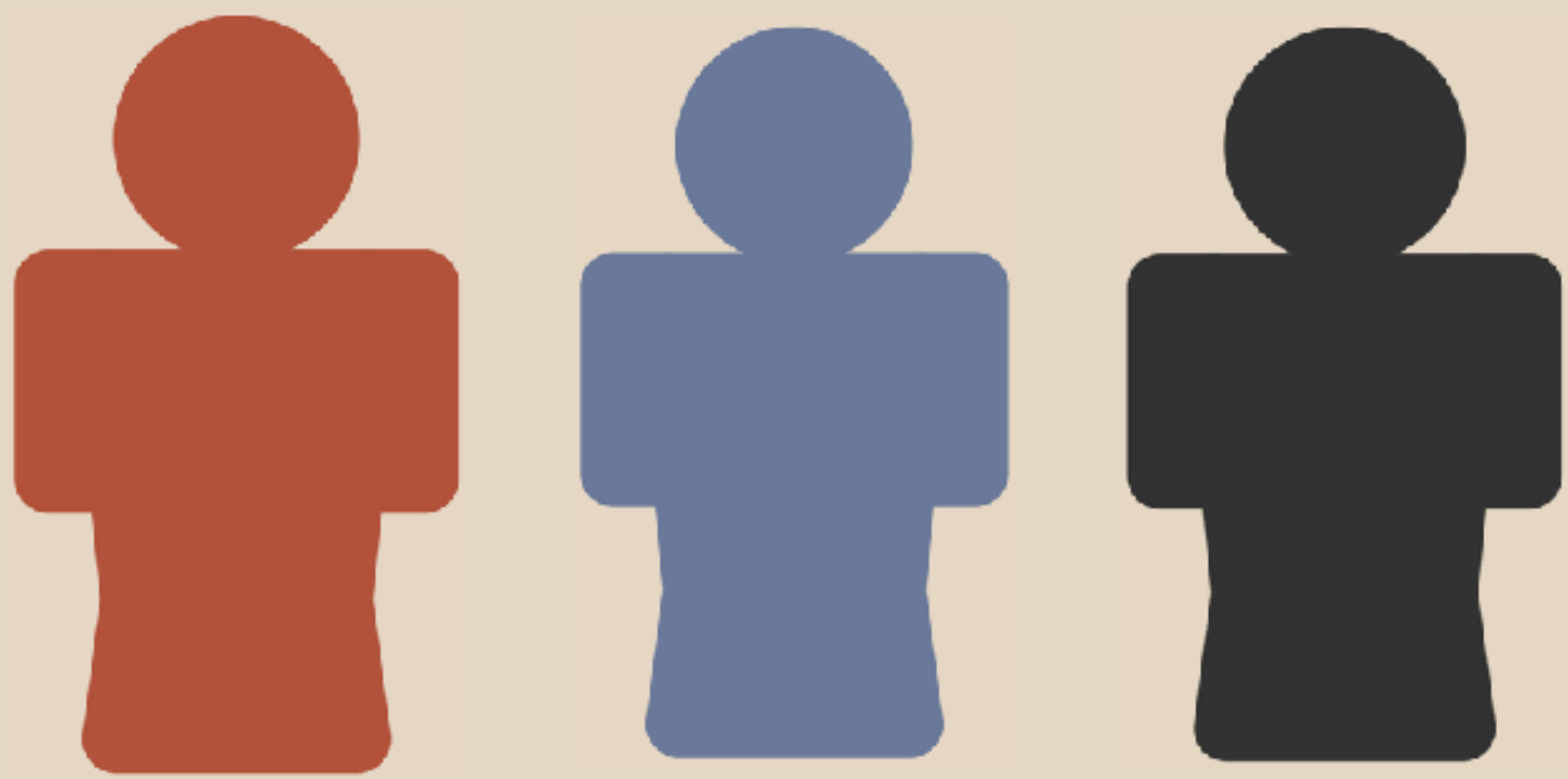
Width : Income


big income
£79,000
£39,000
UPPER
£18,000
MIDDLE
LOWER
Width : Income
small income

Height : novels read

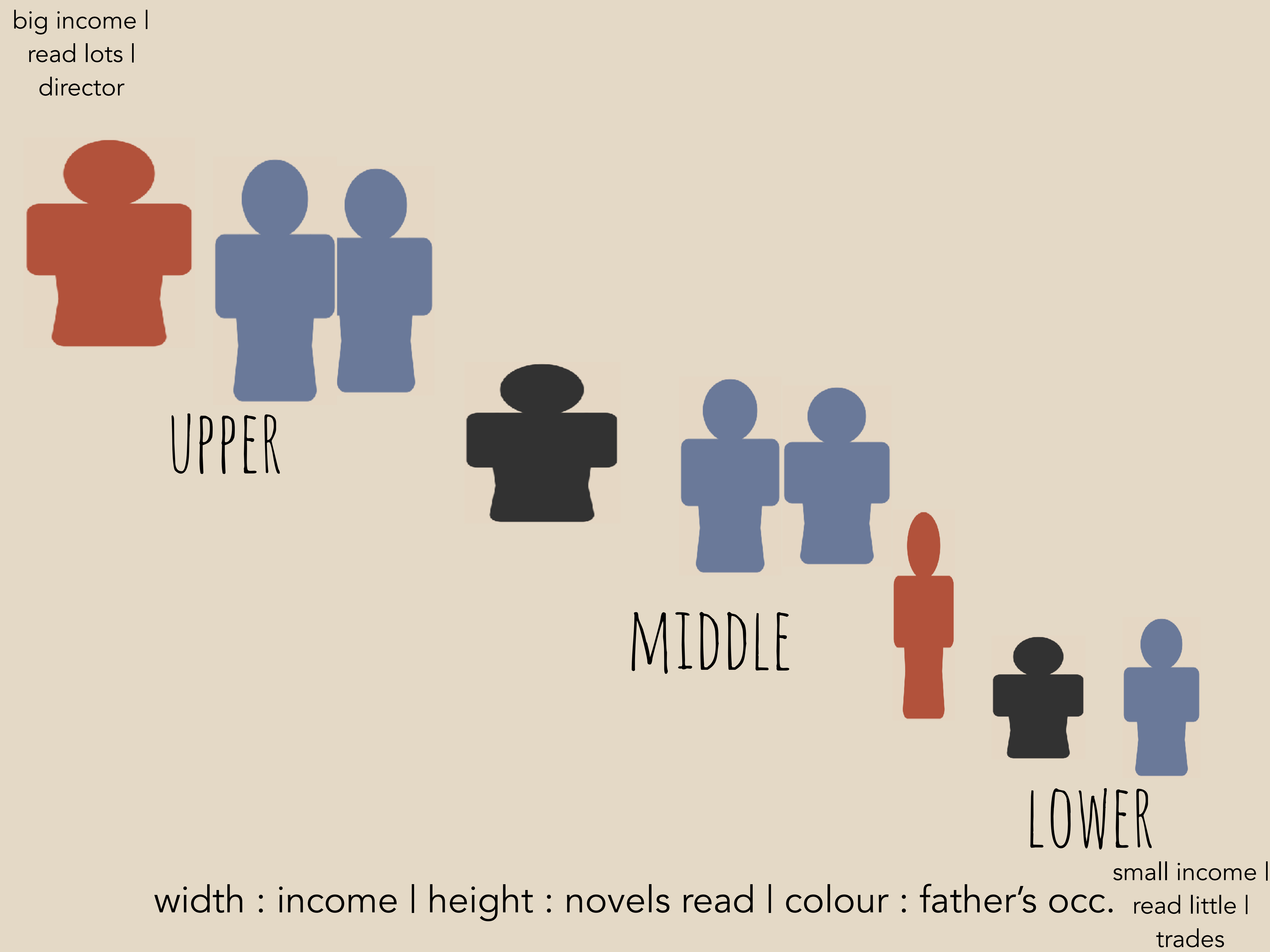


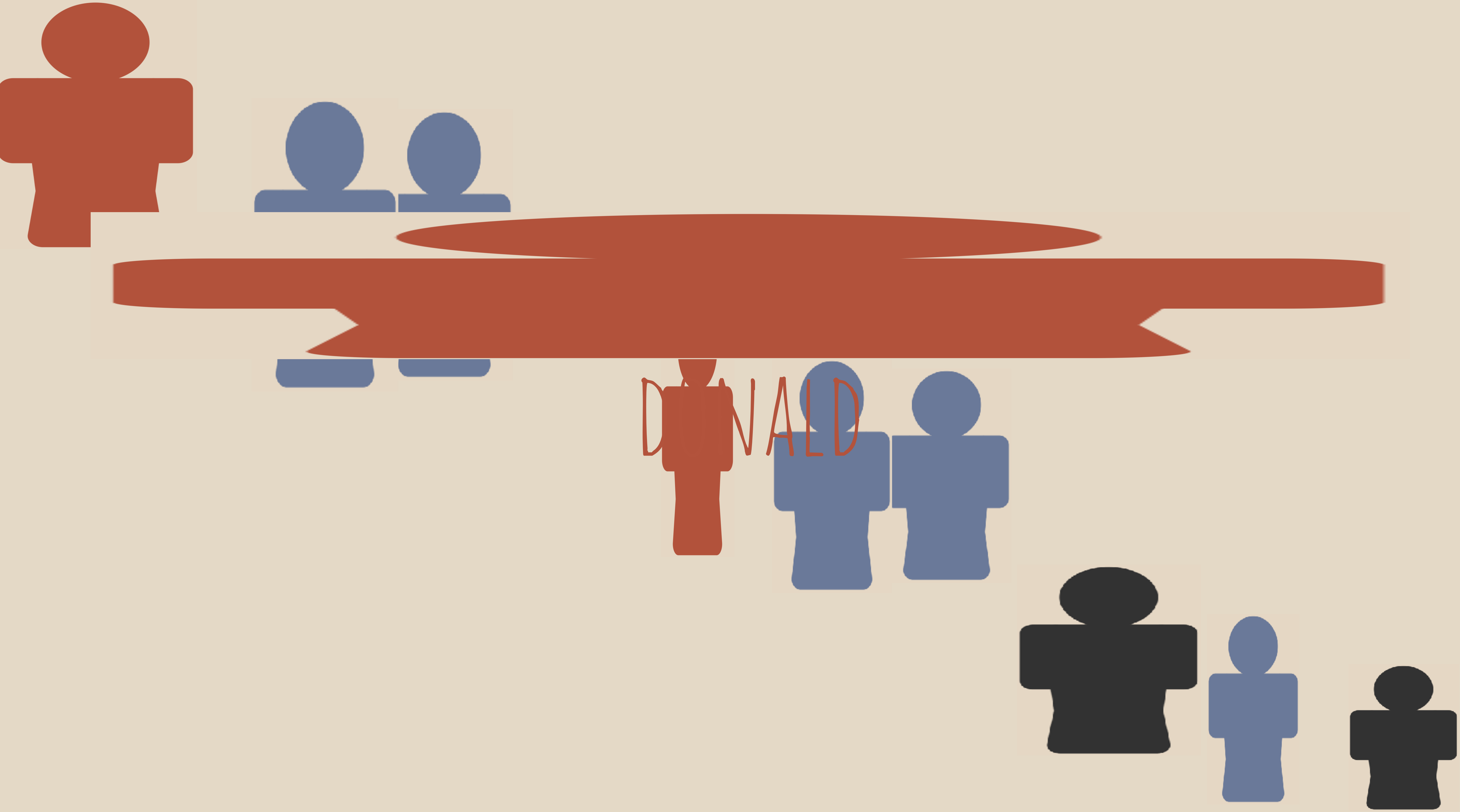
big income |
read lots
£65,000
200 novels
MIDDLE→UPPER
UPPER
£35,000
160 novels
UPPER→MIDDLE
MIDDLE
£29,000
80 novels
LOWER
width : income | height : novels read
small income |
read little



Directors Professionals Trades

Colour : Father's occupation


big income | read lots | director
UPPER
MIDDLE
LOWER
width : income | height : novels read | colour : father's occ.
small income | read little | trades



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Think critically

About characteristics on which we choose to group.

They should be semantically unique and context appropriate.

About how coherent and stable groupings are.

Within-group similarity and between-group difference.

Remember that groupings are relative.

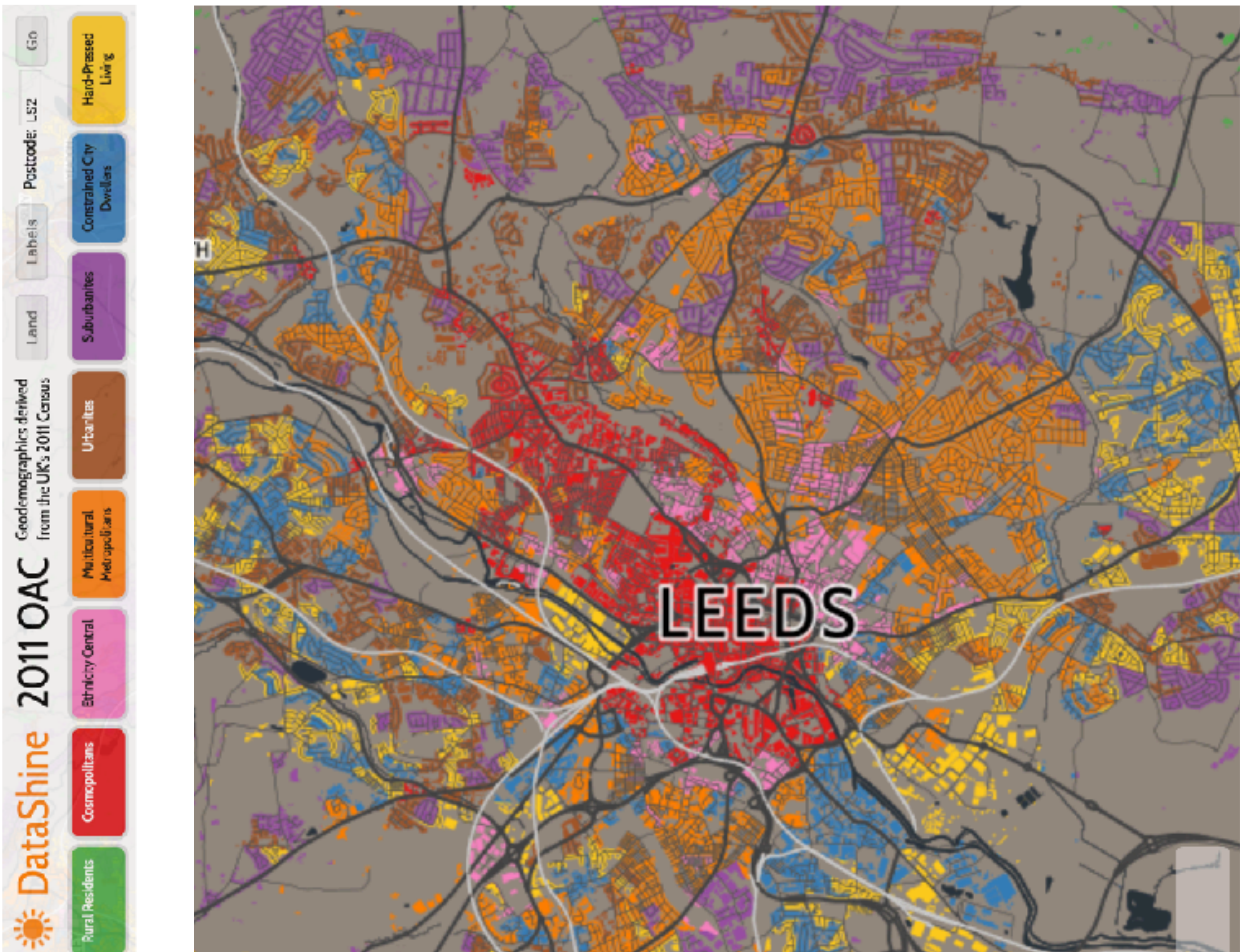
Groupings will change as new data arrive.

They are persuasive: they hide uncertainty.

YouGov profiles.

Geodemographics

Output Area Classification

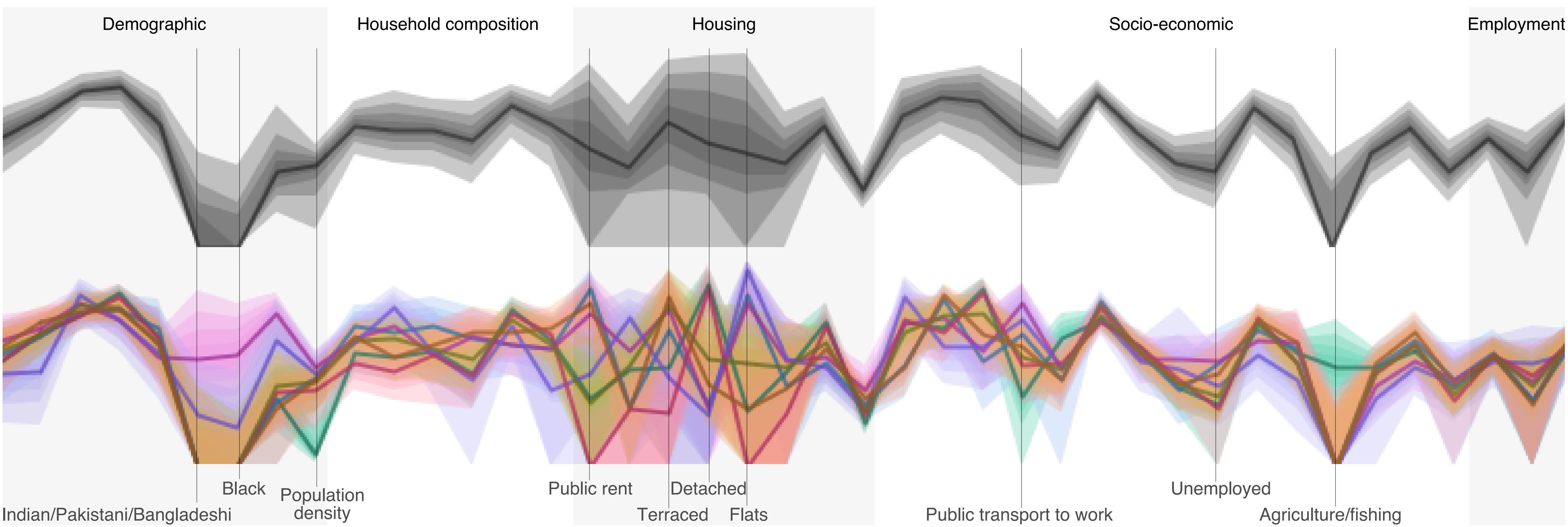


Geodemographics

Output Area Classification

Exploring Uncertainty in Geodemographics with Interactive Graphics

Aidan Slingsby, *Member, IEEE*, Jason Dykes, and Jo Wood, *Member, IEEE*



PRACTICAL 2 : TARGETED MARKETING

The aim of this practical is to perform a data analysis on the synthetic dataset you generated las week in order to identify a group (or groups) of customers at whom a marketing strategy could b targeted. You will generate summary statistics and data graphics that will characterise what ma your customer groups distinctive from the Leeds population as a whole.

?

break ?

PRACTICAL 2 : TARGETED MARKETING

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Assignment #1

You will take on the role of a customer segmentation expert for a travel company. Your task is to identify a **specific segment** of customers who could be targeted with a marking strategy. You will use the 'synthetic' population produced through microsimulation during practical sessions 1 and 2 to identify the target customers. The **type of holiday destination** and **choice of customer sub-group(s)** to target is up to you. Note that your job is to identify the sub-population(s) to be targeted, explain your methods and clearly present your results. There is **no need** to discuss how you would reach the customers you identify. You are expected to incorporate at least some appropriate academic literature in to your report.

An indicative structure for your report is below.

1. **Introduction:** Identify and justify the scope of your study -- the destinations, holiday type and customer groups of focus and why they are of interest.
2. **Data and methods:** Describe the data on which your study is based, the variables you have selected and any derived variables you have created. Be sure to justify these decisions with reference to your study's scope.
3. **Results and analysis:** A combination of charts, maps and tables – judiciously designed to address the area of focus outlined in the introduction.
4. **Conclusions:** Synthesise over the findings to identify the customers to which a marketing campaign could be targeted. Be sure to do so with reference to the evidence presented in your data analysis (section 3).

Assignment #1

GEOG5927M <student-id>

Please use this document to complete assignment 1.
DELETE all of the blue boxes that contain instructions – they are just for guidance.
Use 'Styles' in Word to remove this formatting – revert paragraphs to 'Normal' style to remove boxes!

TITLE

INTRODUCTION

Use this section to identify and justify the scope of your study -- the destinations, holiday type and customer groups of focus and why they are of interest.

Approx length: 200 words.

DATA AND METHODS

Describe the data on which your study is based, the variables you have selected and any derived variables you have created. Be sure to justify these decisions with reference to your study's scope.

Approx length: 300 words

RESULTS

Profile your target market using a combination of charts, maps and tables – judiciously designed to address the area of focus outlined in the introduction.

Approx length: 300 words

CONCLUSIONS

Synthesise over the findings to identify the customers to which a marketing campaign could be targeted. Be sure to do so with reference to the evidence presented in your data analysis.

Approx length: 200 words

microdata.csv

15,189 records

Person_ID	OA_GRP	Sex	Ageband	NumberCh	CombinedH	OverSeasAi	UKAirport	OverallHoli	AgeSex	Supergroup
11603	8c	F	a35to49	2	26-30K	LEI	MAN	Excellent	F35to49	Hard-Presse
11285	8c	F	a25to34	0	0-10K	IBZ	MAN	Fair	F25to34	Hard-Presse
13938	8c	M	a50to64	1	16-20K	LCA	BHX	Fair	M50to64	Hard-Presse
10255	8c	F	a25to34	1	26-30K	ALC	LBA	Poor	F25to34	Hard-Presse
831	8c	M	a50to64	0	26-30K	AGA	MAN	Good	M50to64	Hard-Presse
1754	8c	M	a65over	0	Not Answei	DLM	MAN	Good	M65over	Hard-Presse
2330	8c	F	a65over	0	Not Answei	DLM	MAN	Excellent	F65over	Hard-Presse
10818	8c	M	a25to34	0	36-40K	KGS	MAN	Fair	M25to34	Hard-Presse
8237	8c	M	a65over	2	16-20K	FUE	MAN	Good	M65over	Hard-Presse
11508	8c	F	a35to49	2	71-80K	ZTH	LBA	Poor	F35to49	Hard-Presse

ageBand	demographics
incomeBand	demographics
oac	geodemographics
originAirport	preference
destinationAirport	preference/attitude
satisfactionScore	preference/attitude





microdata.csv

15,189 records

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Dataset

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11285	8c	F	a25to34	0	0-10K	IBZ	MAN	Fair	F25to34	Hard-Presse
13938	8c	M	a50to64	1	16-20K	LCA	BHX	Fair	M50to64	Hard-Presse
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1754	8c	M	a65over	0	Not Answe	DLM	MAN	Good	M65over	Hard-Presse
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microdata.csv
15,189 records

ZoneID	Person_ID	OA_GRP	Sex	Ageband	NumberCh	CombinedH	OverSeasAi	UKAirport	OverallHoli	AgeSex	Supergroup
E00056750	11603	8c	F	a35to49	2	26-30K	LEI	MAN	Excellent	F35to49	Hard-Pressed Living
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simulated_population.csv
320,596 records

Targeting

Identify and profile a target market using:

Demographics –
income, age, household structure

Geography –
where and what types of areas they tend to live in

Psychographics –
their motivations and preferences

Targeting

`microdata.csv`

`ageBand`	demographics
`incomeBand`	demographics
`numChildren`	demographics
`oac`	geodemographics
`originAirport`	preference
`destinationAirport`	preference/attitude
`satisfactionScore`	preference/attitude

Targeting

What makes your target market distinct when compared to the population as a whole?

`ageBand`	demographics
`incomeBand`	demographics
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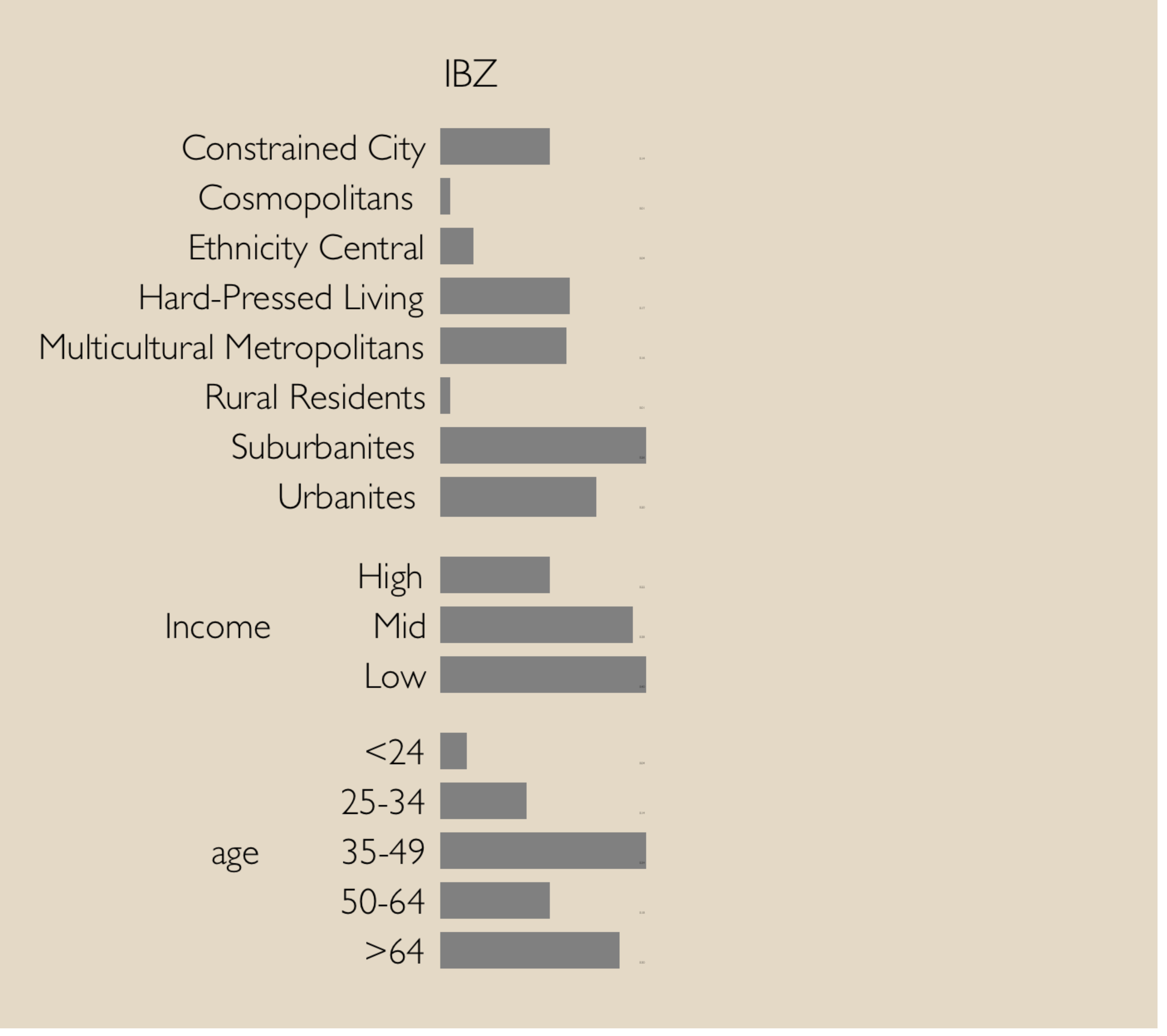
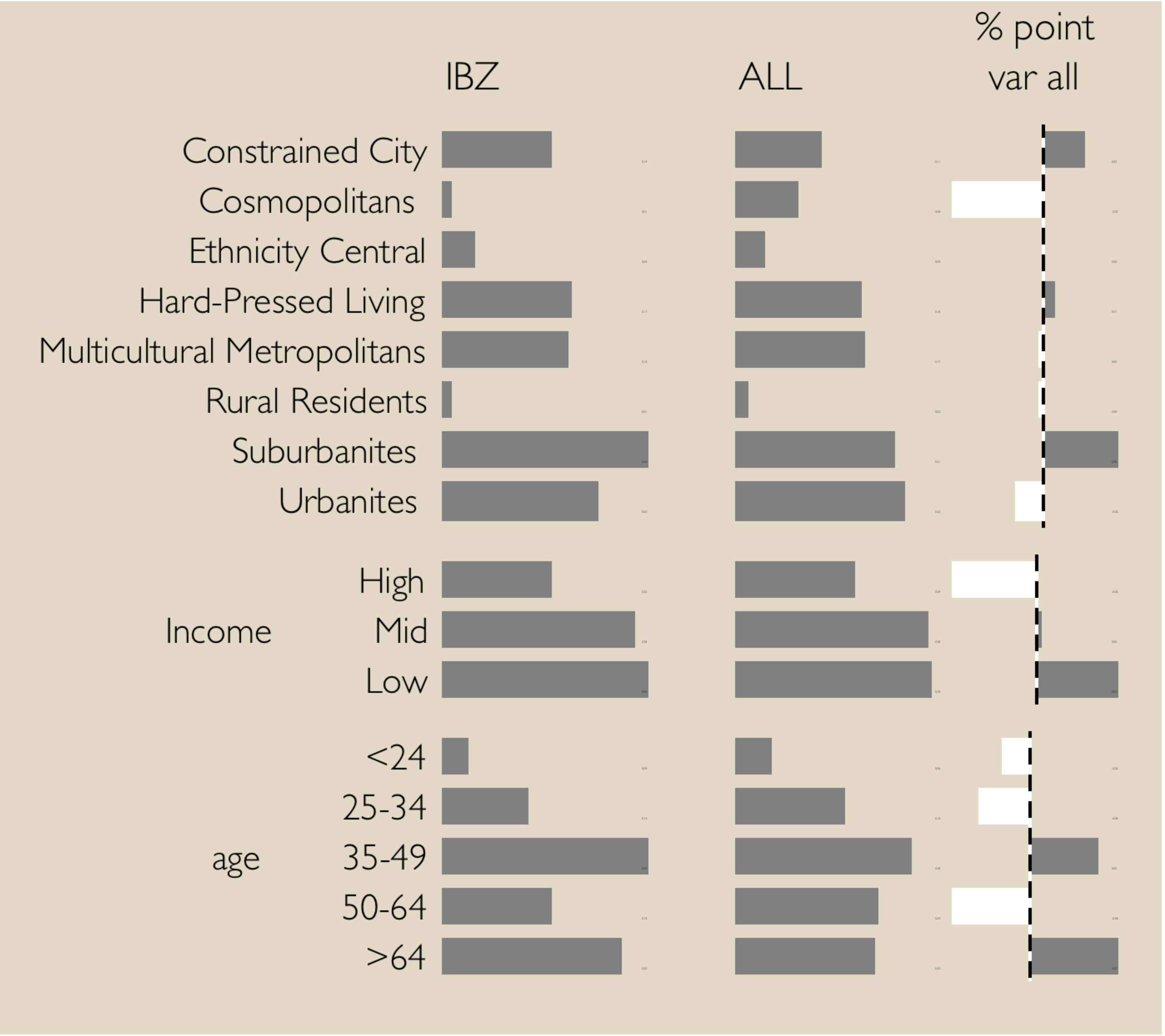
Targeting


IBZ
Constrained City
Cosmopolitans
Ethnicity Central
Hard-Pressed Living
Multicultural Metropolitans
Rural Residents
Suburbanites
Urbanites
Income
High
Mid
Low
age
<24
25-34
35-49
50-64
>64

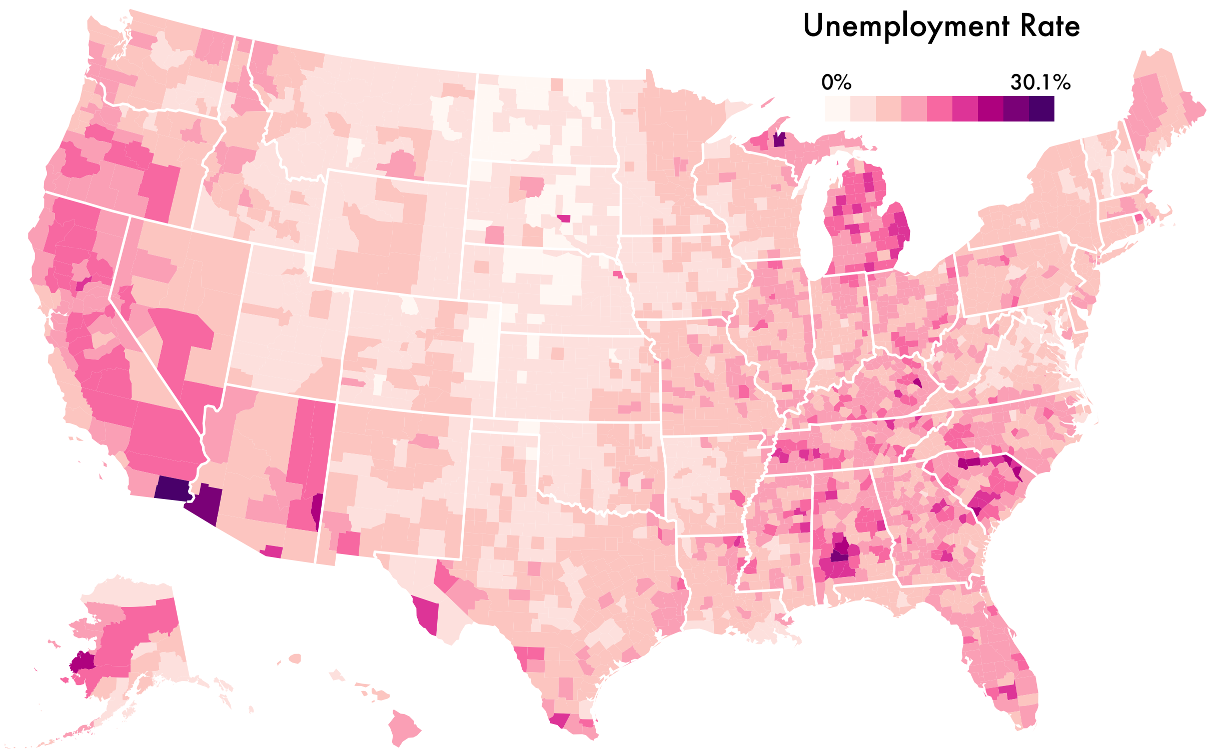
Targeting



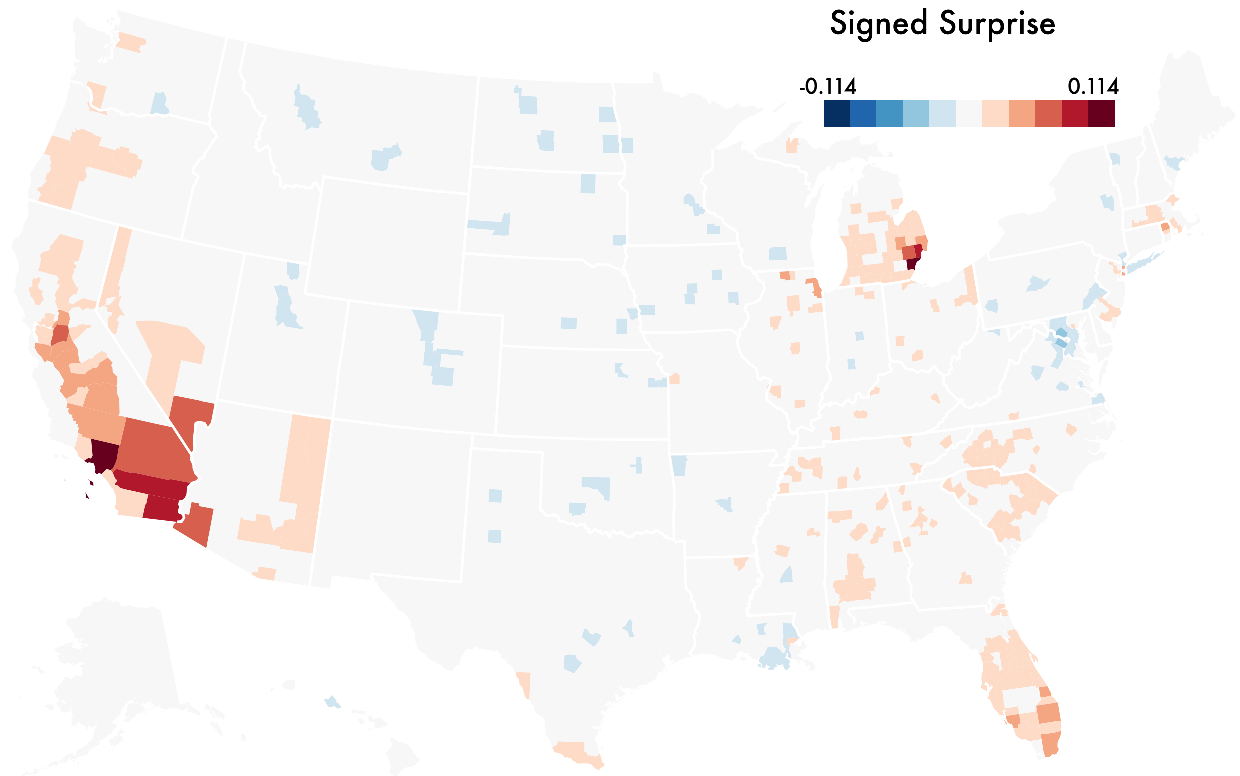
IBZ
ALL
% point var all
Constrained City
Cosmopolitans
Ethnicity Central
Hard-Pressed Living
Multicultural Metropolitans
Rural Residents
Suburbanites
Urbanites
Income
High
Mid
Low
age
<24
25-34
35-49
50-64
>64

Deviation from **Expectation**

evidence model

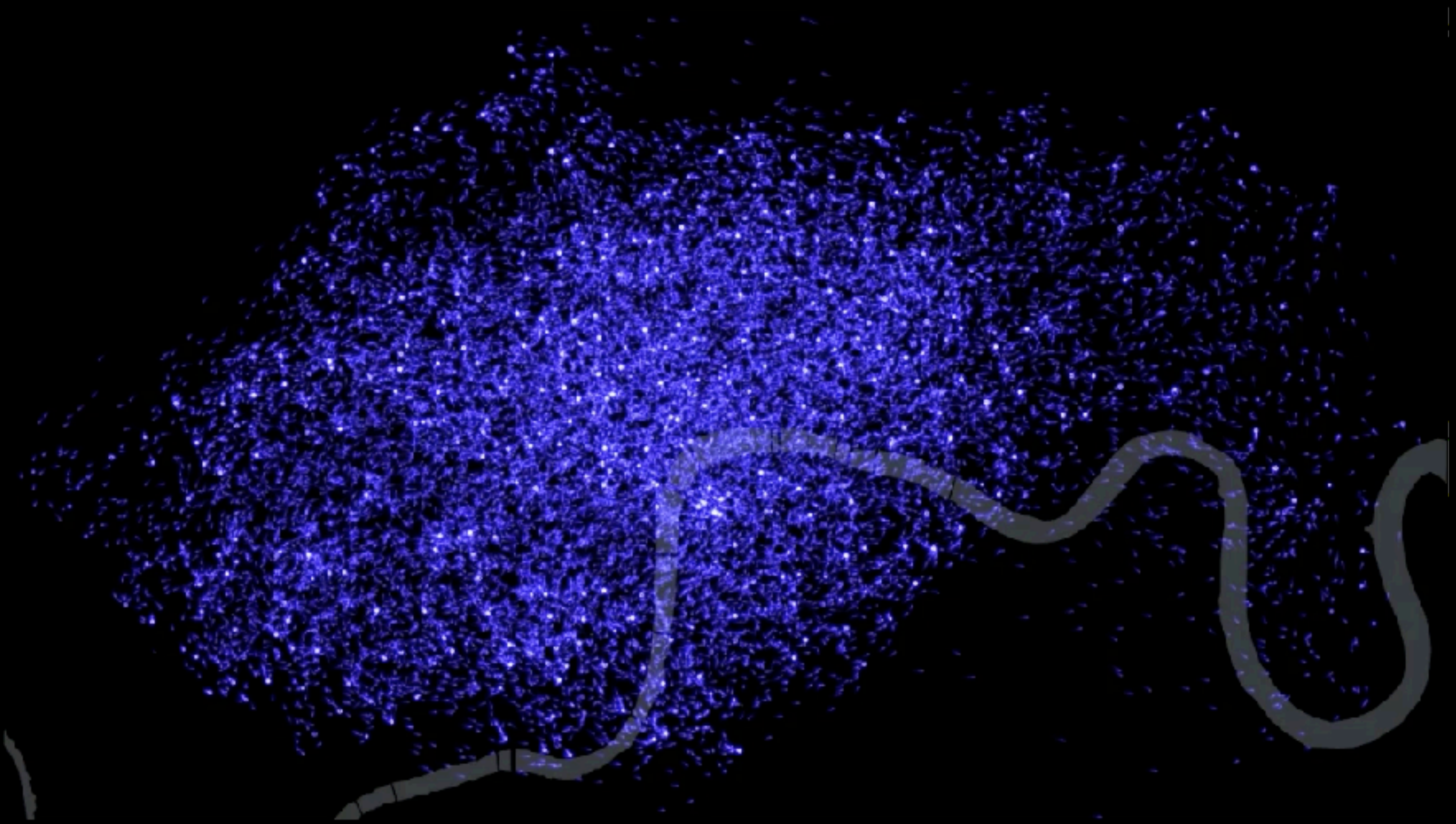


(a) Per capita event rate map.

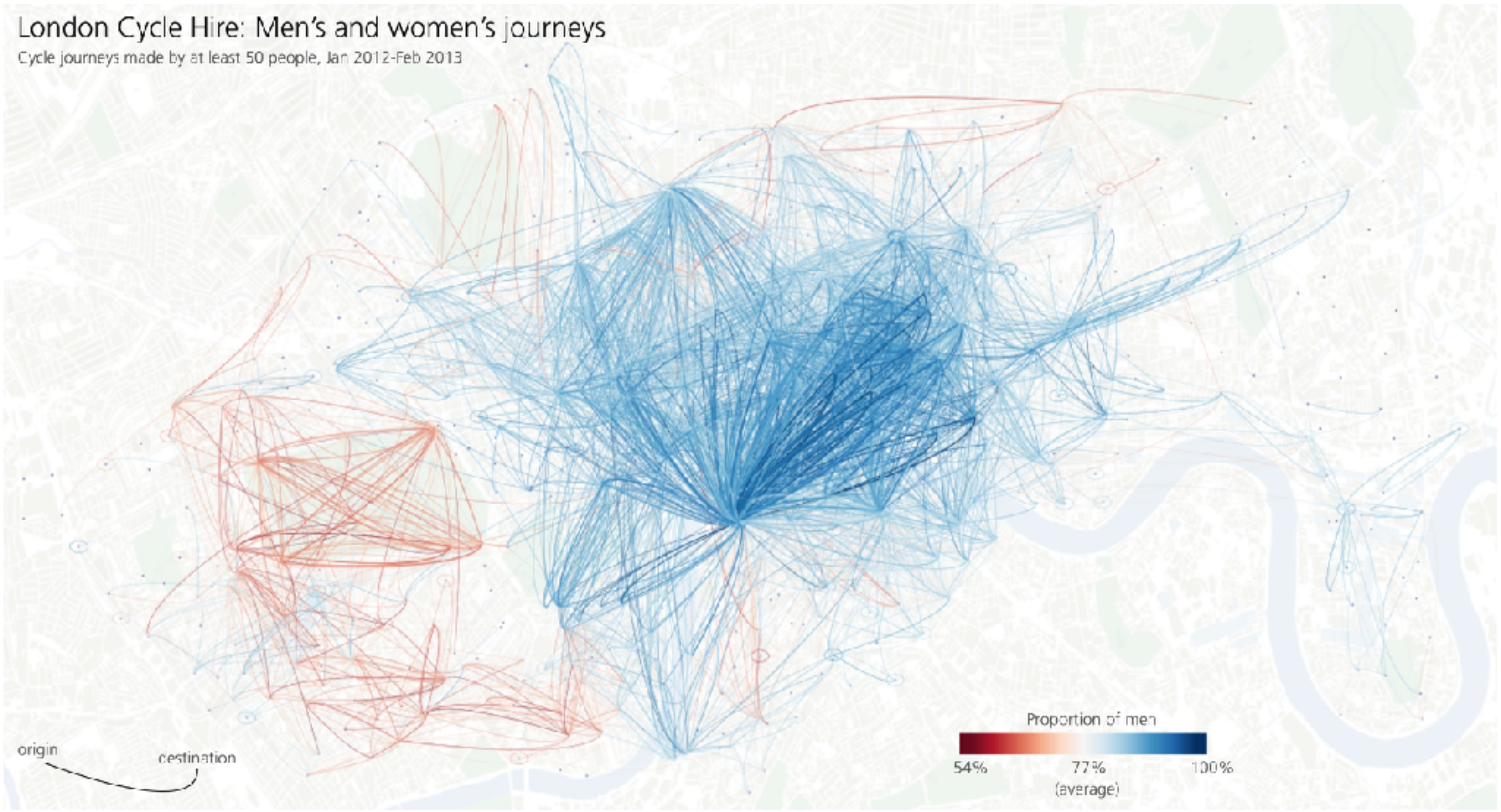


(b) Signed Surprise Map.

Correll & Heer (2017) Surprise! Bayesian Weighting for De-Biasing Thematic Maps, IEEE TVCG



Jo Wood



Beecham and Wood, 2014

YouGov Profiles

YouGovProfiles[LITE]

UK Independence Party supporters

Welcome Roger! LOGOUT

YOU ARE CURRENTLY USING THE REDUCED FREE VERSION OF PROFILES - **UPGRADE TO THE PROFESSIONAL TOOL TO EXPLORE ANY GROUP!**

Now showing: Shows what is particularly true of UK Independence Party supporters compared to other groups of the same type. | Sample size: 13728 | Oct 12, 2016 | © YouGov | What is this data?

- DEMOGRAPHICS
- LIFESTYLE
- PERSONALITY
- BRANDS
- ENTERTAINMENT
- ONLINE
- MEDIA
- HELP!
- UPGRADE TO PROFESSIONAL VERSION

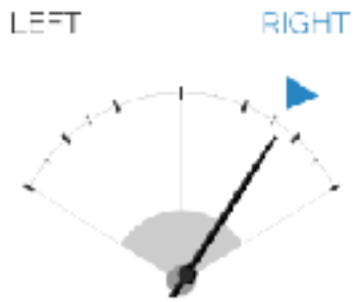
DEMOGRAPHICS

- GENDER: MALE
- AGE: 65+
- SOCIAL GRADE: C2DE

TOP REGIONS

- SOUTH COAST
- EAST ANGLIA
- MIDLANDS

POLITICS

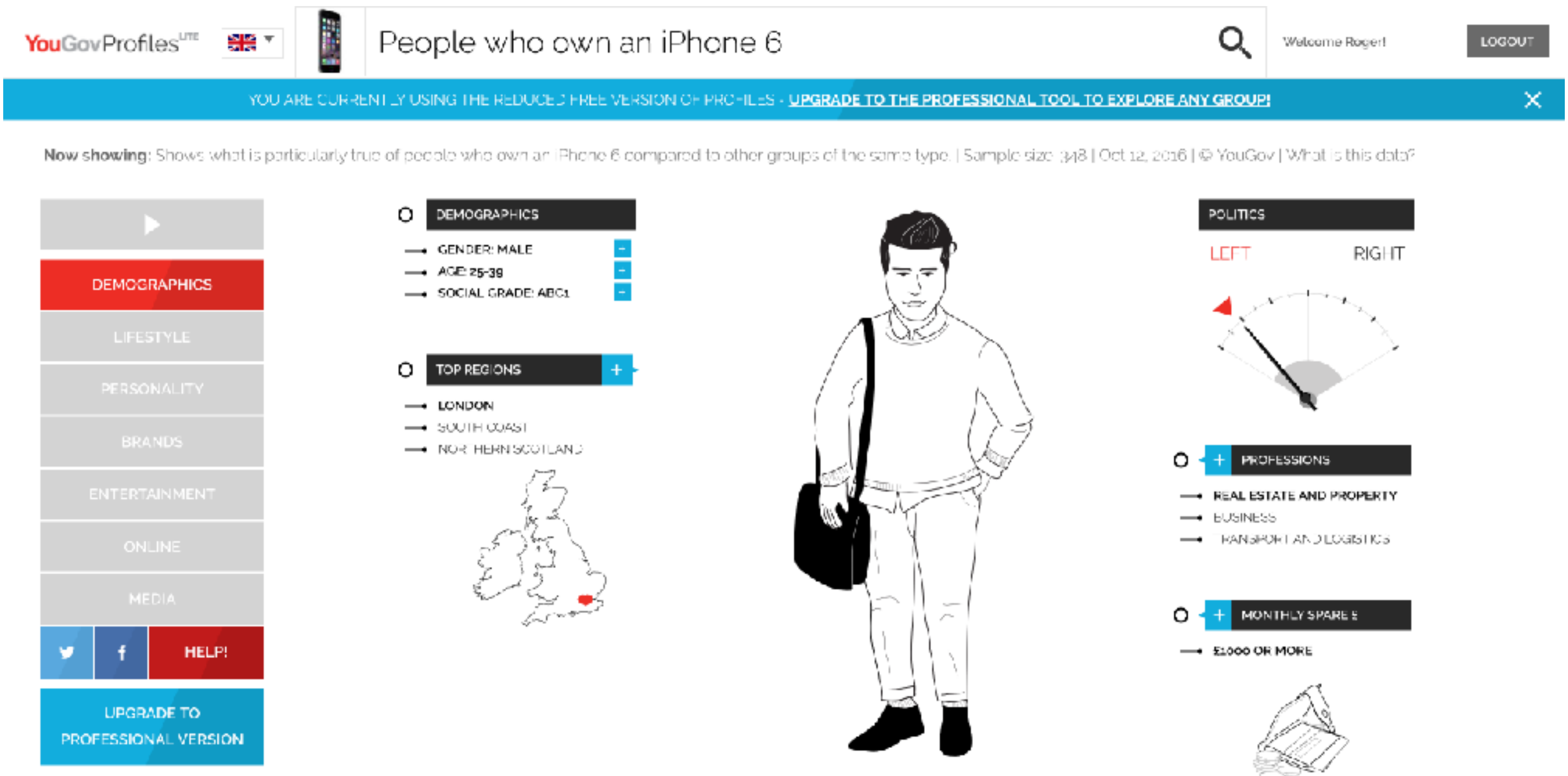


PROFESSIONS

- MILITARY AND DEFENCE
- MANUFACTURING
- POLICE AND EMERGENCY SERVI...

MONTHLY SPARE £

- LESS THAN £125



YouGovProfiles LITE
People who own an iPhone 6
Welcome Roger!
LOGOUT
YOU ARE CURRENTLY USING THE REDUCED FREE VERSION OF PROFILES - UPGRADE TO THE PROFESSIONAL TOOL TO EXPLORE ANY GROUP!
Now showing: Shows what is particularly true of people who own an iPhone 6 compared to other groups of the same type. | Sample size: 348 | Oct 12, 2016 | © YouGov | What is this data?
DEMOGRAPHICS
LIFESTYLE
PERSONALITY
BRANDS
ENTERTAINMENT
ONLINE
MEDIA
HELP!
UPGRADE TO PROFESSIONAL VERSION
DEMOGRAPHICS
GENDER: MALE
AGE: 25-39
SOCIAL GRADE: ABC1
TOP REGIONS
LONDON
SOUTH COAST
NORTHERN SCOTLAND
POLITICS
LEFT
RIGHT
PROFESSIONS
REAL ESTATE AND PROPERTY
BUSINESS
TRANSPORT AND LOGISTICS
MONTHLY SPARE £
£1,000 OR MORE

PRACTICAL 2 : TARGETED MARKETING

The aim of this practical is to perform a data analysis on the synthetic dataset you generated las week in order to identify a group (or groups) of customers at whom a marketing strategy could b targeted. You will generate summary statistics and data graphics that will characterise what ma your customer groups distinctive from the Leeds population as a whole.

?