The structure of **political media coverage**
as revealed by **quoting patterns:**

QUOting the POTUS

equal contribution

*__Vlad Niculae__ (me) — *Cornell (MPI-SWS)*
*Caroline Suen — *Stanford*
*Justine Zhang — *Cornell (Stanford, MPI-SWS)*
Cristian Danescu-Niculescu-Mizil — *Cornell (MPI-SWS)*
Jure Leskovec — *Stanford*

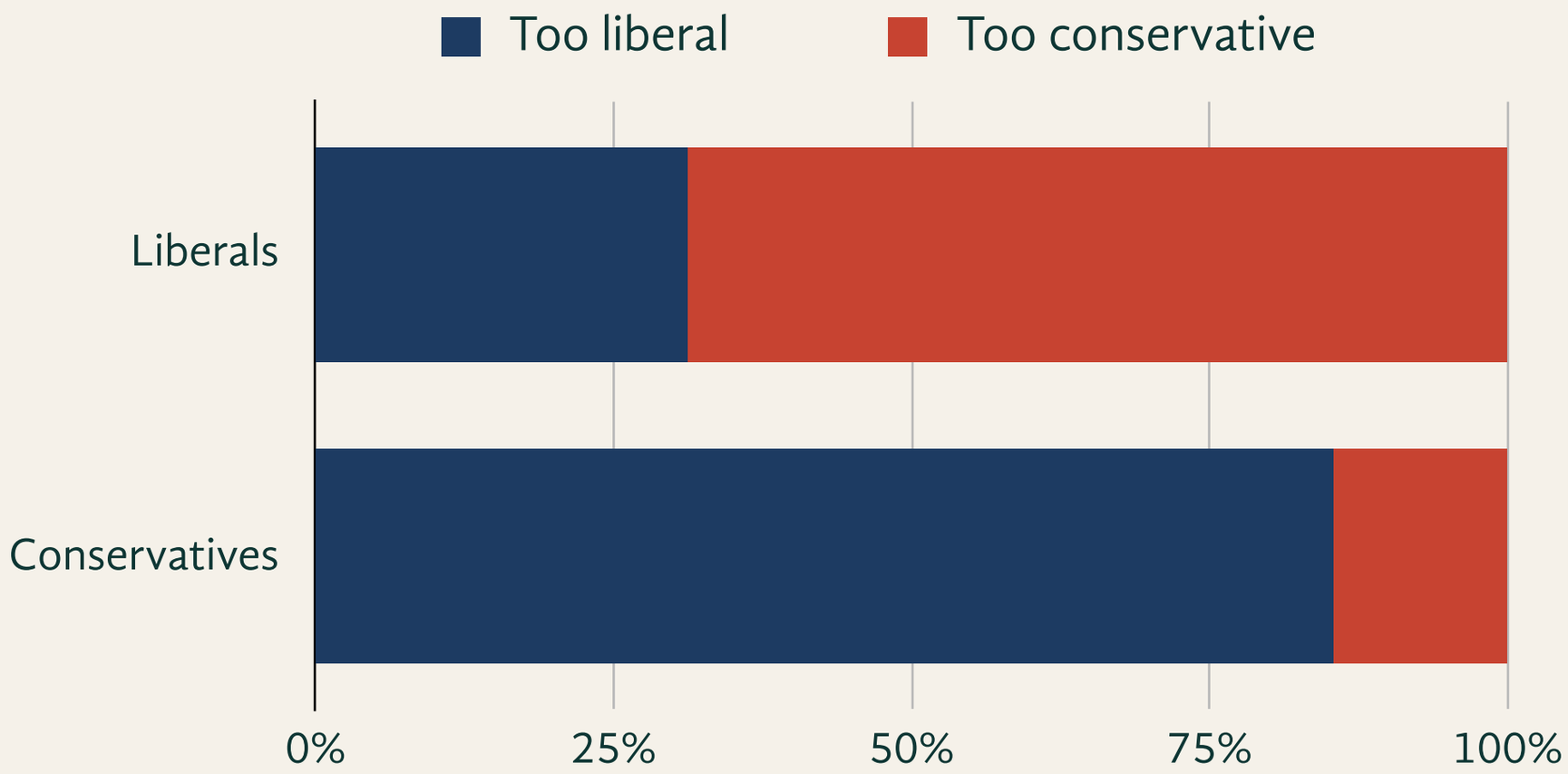
The press claims to be **fair and balanced**.

America's trust in media is at an all time low.

(Source: Gallup poll, Sept. 17 2014)

Tea Party Anti-Tax March, Sep 12, 2010.
Capital Mall, DC
Photo Credit: Bob Simmons
license CC-BY-NC-ND 2.0

“Media Bias” is subjective



(Out of the ones who say it’s biased.)

Source: Gallup poll, Sept. 17 2014

“Media Bias” is subjective
multidimensional
hard to quantify

	Predetermined dimension	Proxy to slant
[Dalton et al, 1998] [Peake, 2007]	Democrat/Republican	Endorsement
[Schiffer, 2006]	Democrat/Republican	
[Gentzkow et al, 2010] [Groseclose et al, 2005] [Lin et al, 2011]	Democrat/Republican	
[Ho et al, 2008]	Liberal/Conservative	Supreme Court Justices
	& other theoretically possible dimensions…	

We want a way to address media bias:

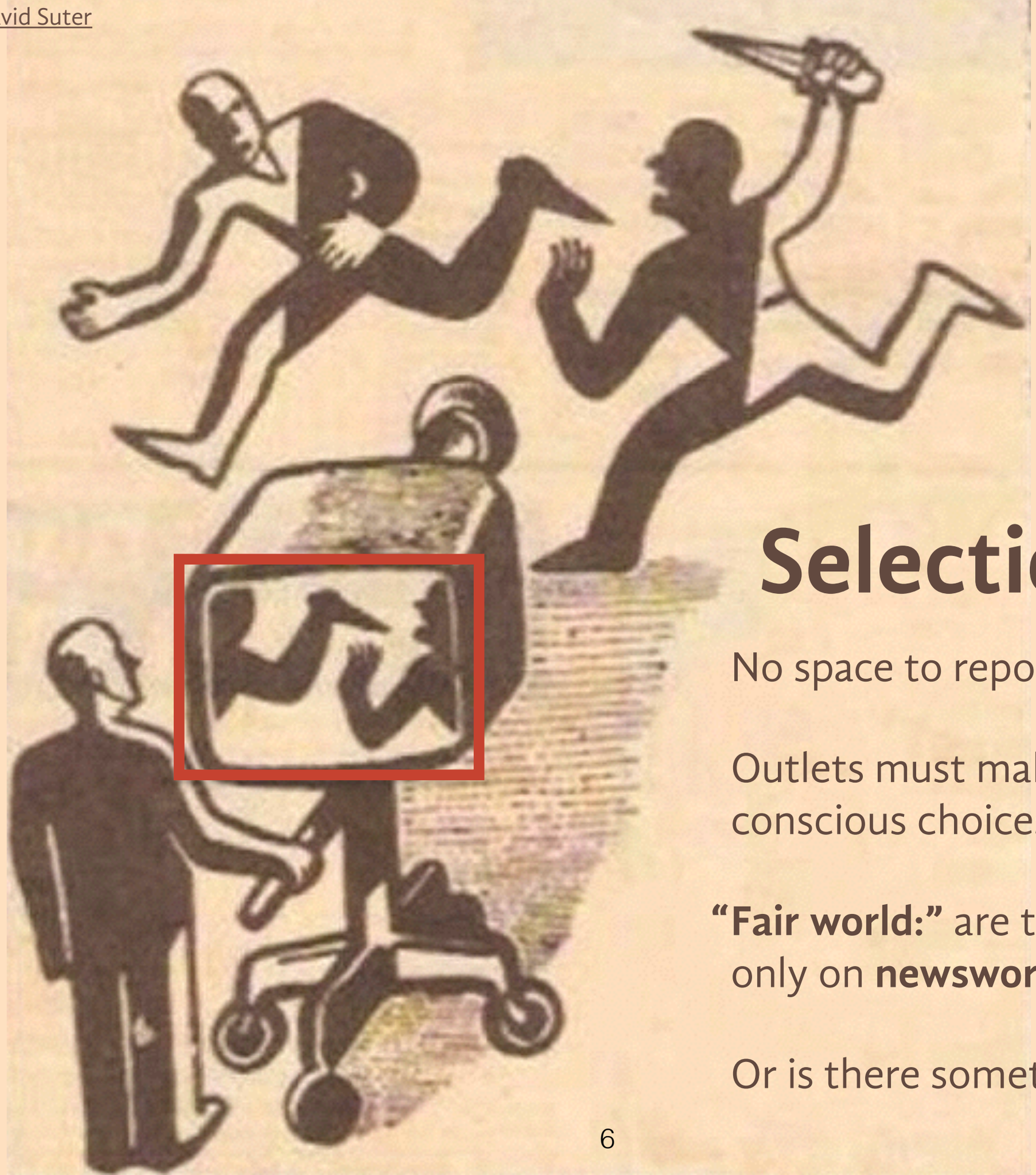
Large Scale,

Unsupervised,

Without fixing a bias dimension.

Insight: *Quoting patterns.*

Photo Credit: David Suter



Selection Bias

No space to report everything.

Outlets must make conscious choices.

“Fair world:” are the choices based only on **newsworthiness?**

Or is there something else behind?

Photo Credit: DonkeyHotey
license CC-BY 2.0

With or without this Congress, I will keep taking actions that help the economy grow. But I can do a whole lot more with your help. Because when we act together, there's nothing the United States of America can't achieve.

Barack Obama, 2012 State Of The Union address.

With or without this Congress, I will keep taking actions that help the economy grow. But I can do a whole lot more with your help. Because when we act together, there's nothing the United States of America can't achieve.

—Right Wing News

With or without this Congress, I will keep taking actions that help the economy grow. But I can do a whole lot more with your help. Because when we act together, there's nothing the United States of America can't achieve.

—CNN, Huffington Post

Are quoting patterns *systematic*?

Do they correspond to *intuition?*

Can *language* characterize the bias?

Are quoting patterns *systematic*?

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Quoting graph

275 online media outlets.
(newspapers, blogs, ...)

54K Obama quotes in 6 years.

Edge = outlet reported quote.
230K edges.

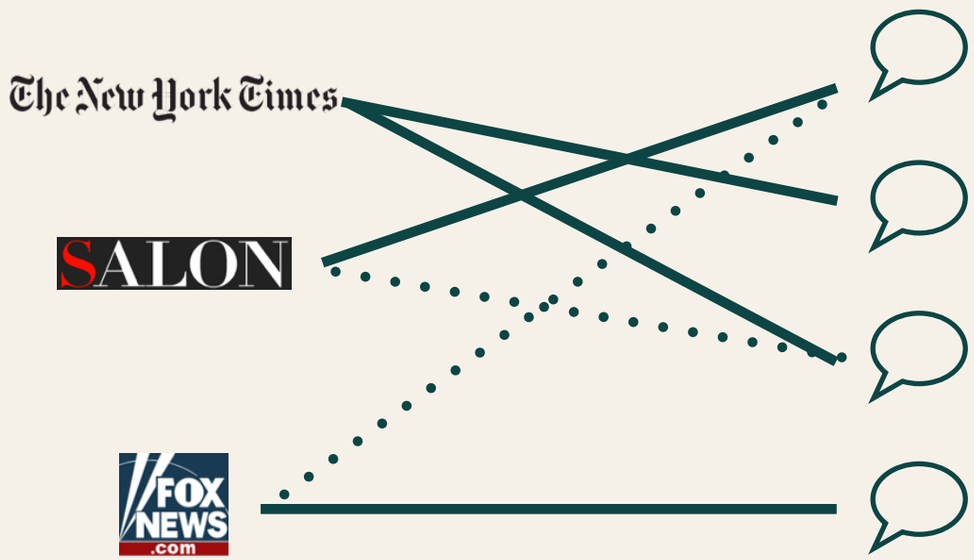
$$X = \left(\right.$$  $$\left. \right)$$

Can we predict quoting?

If we can predict quoting choices, it means there is a pattern.

Can we predict quoting?

Leave out **250K** entries of X.



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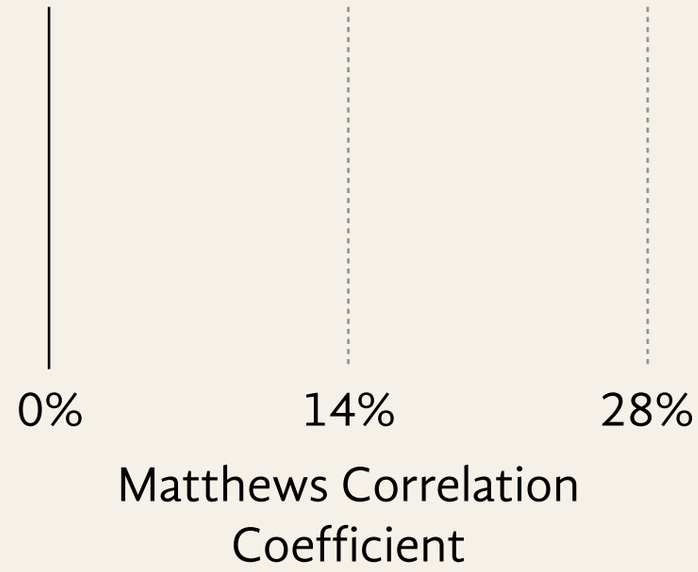

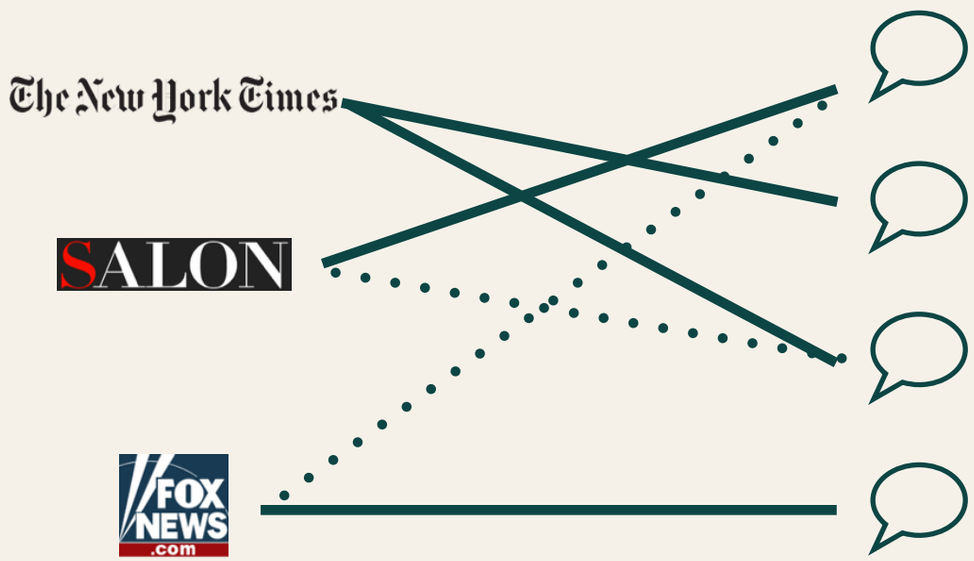

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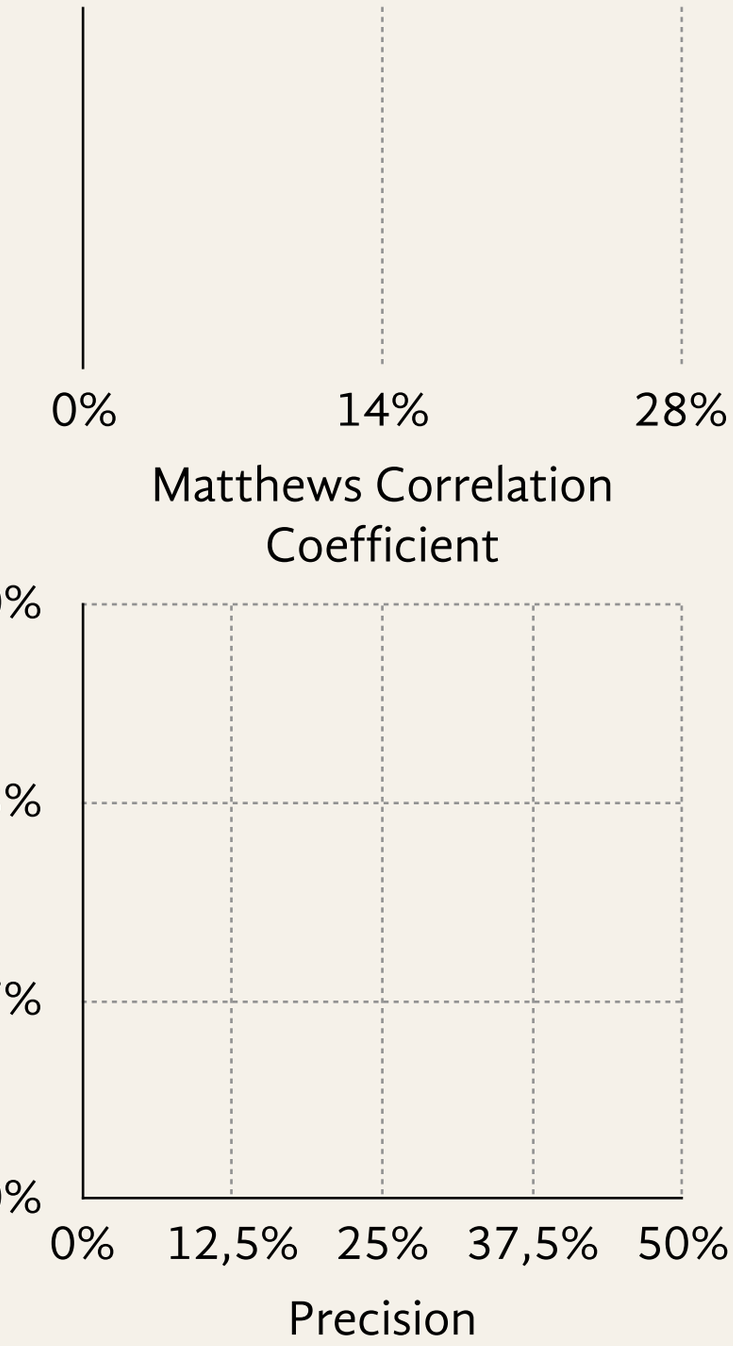

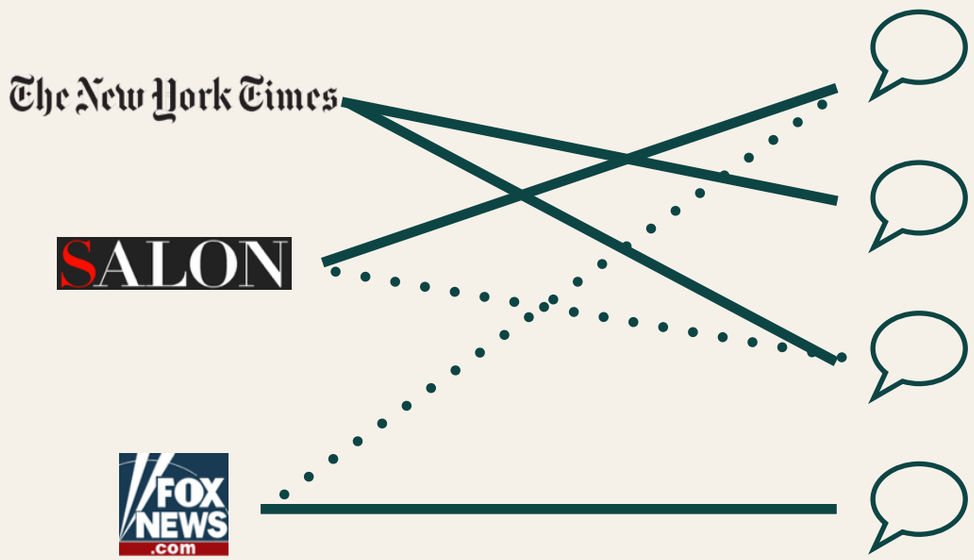

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In a **"fair world"** without bias:
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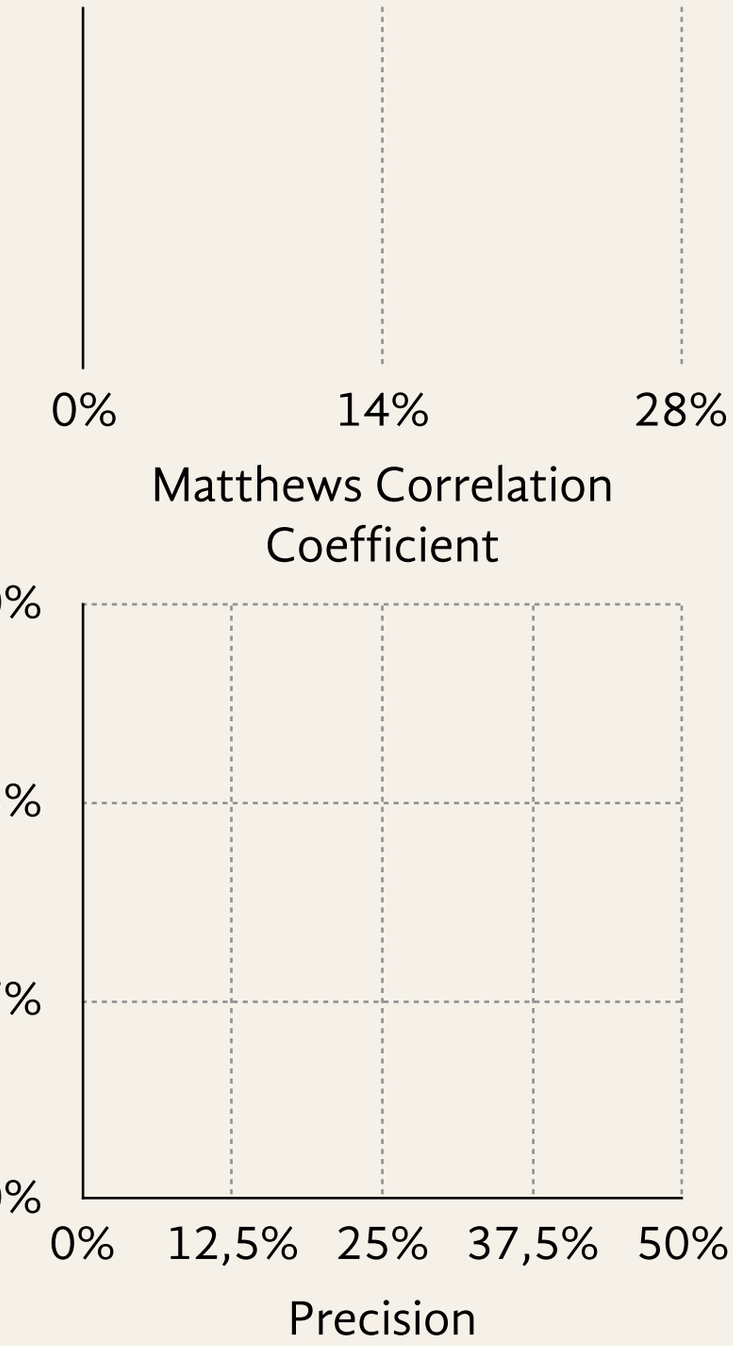

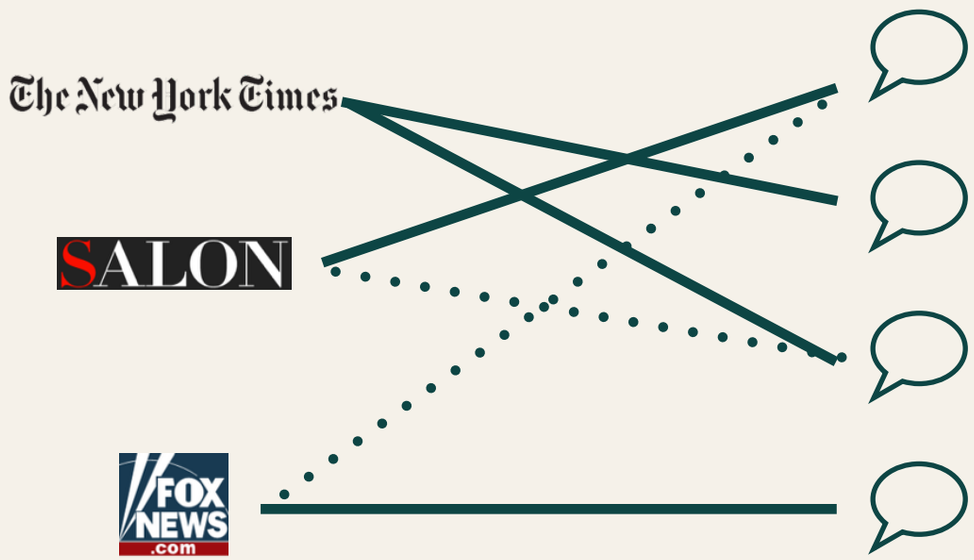

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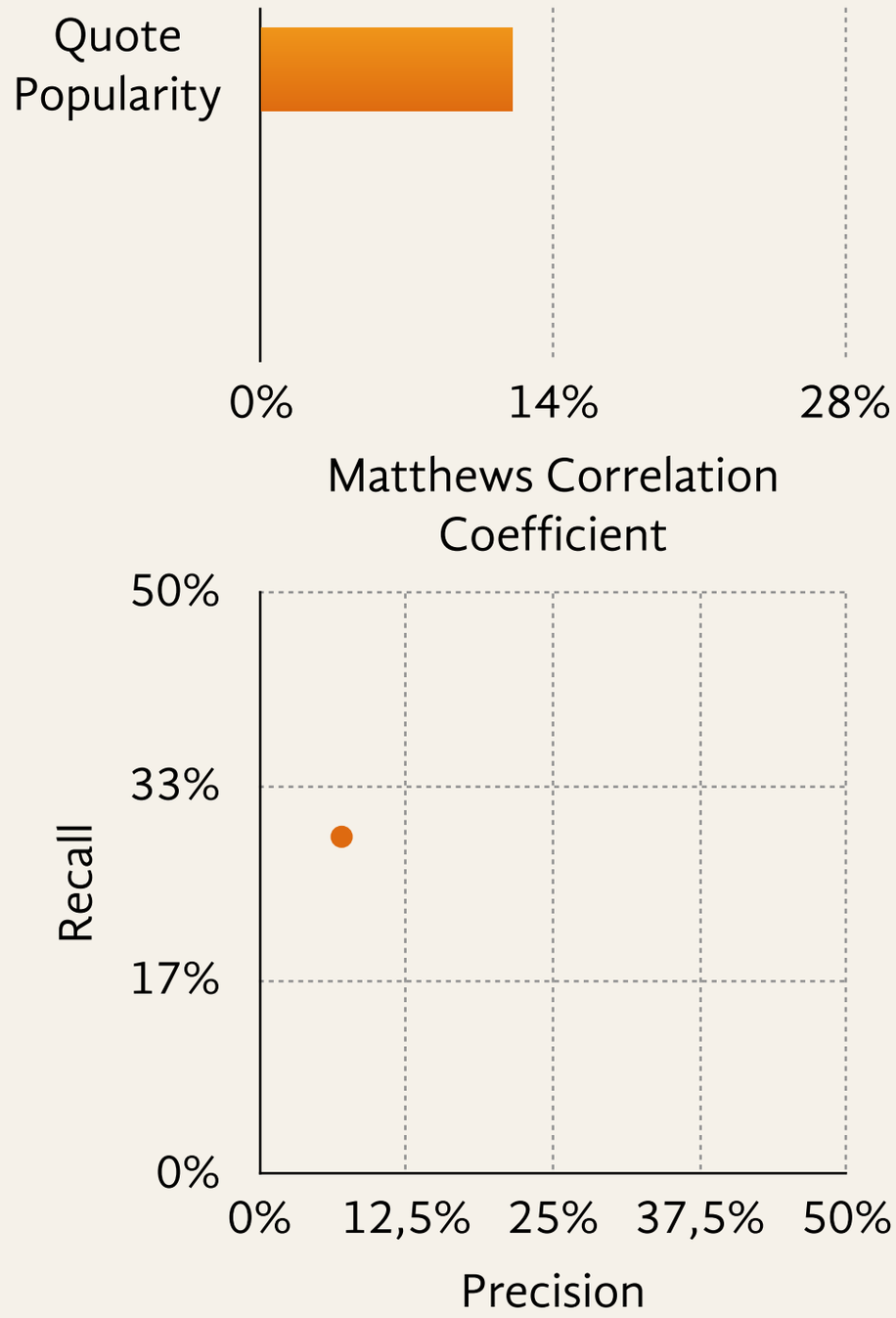

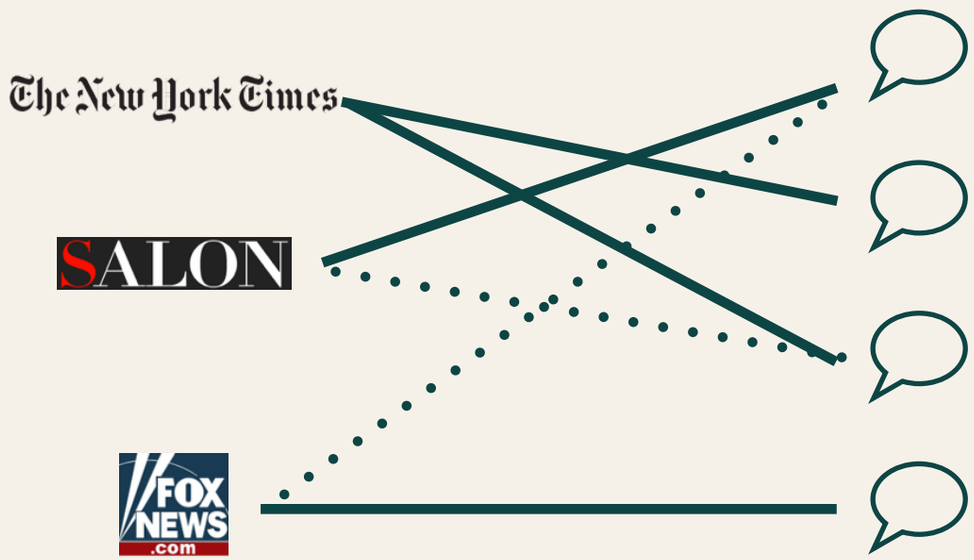

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In a **"fair world"** without bias:
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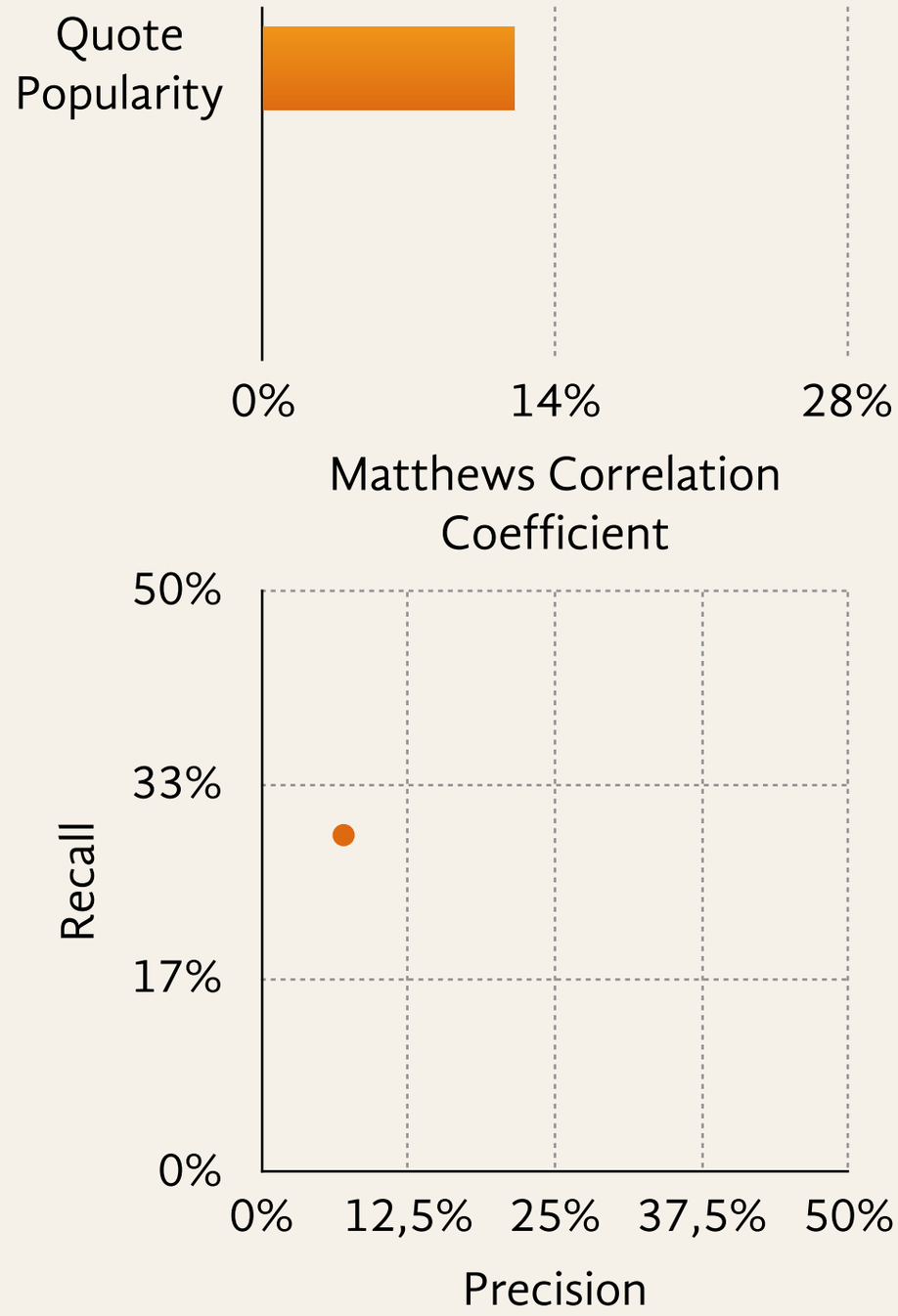

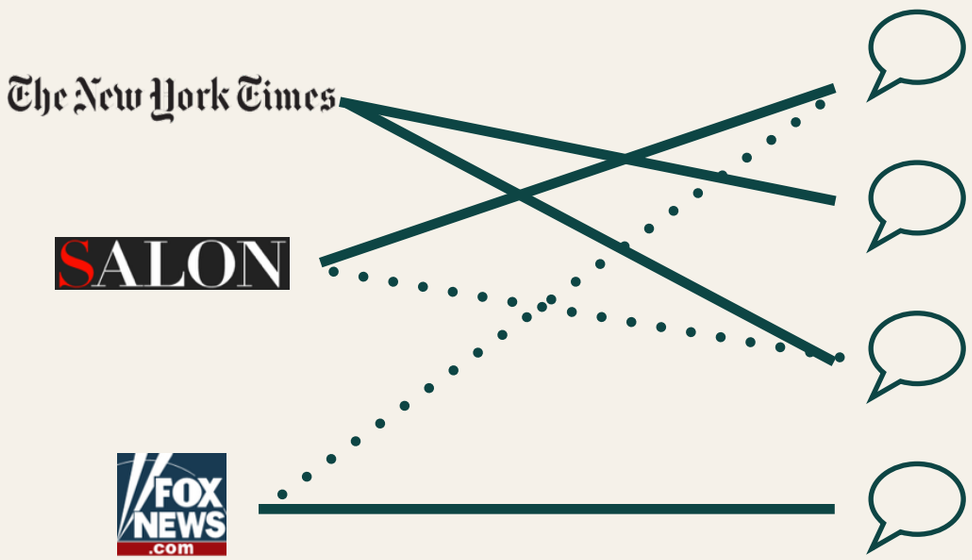

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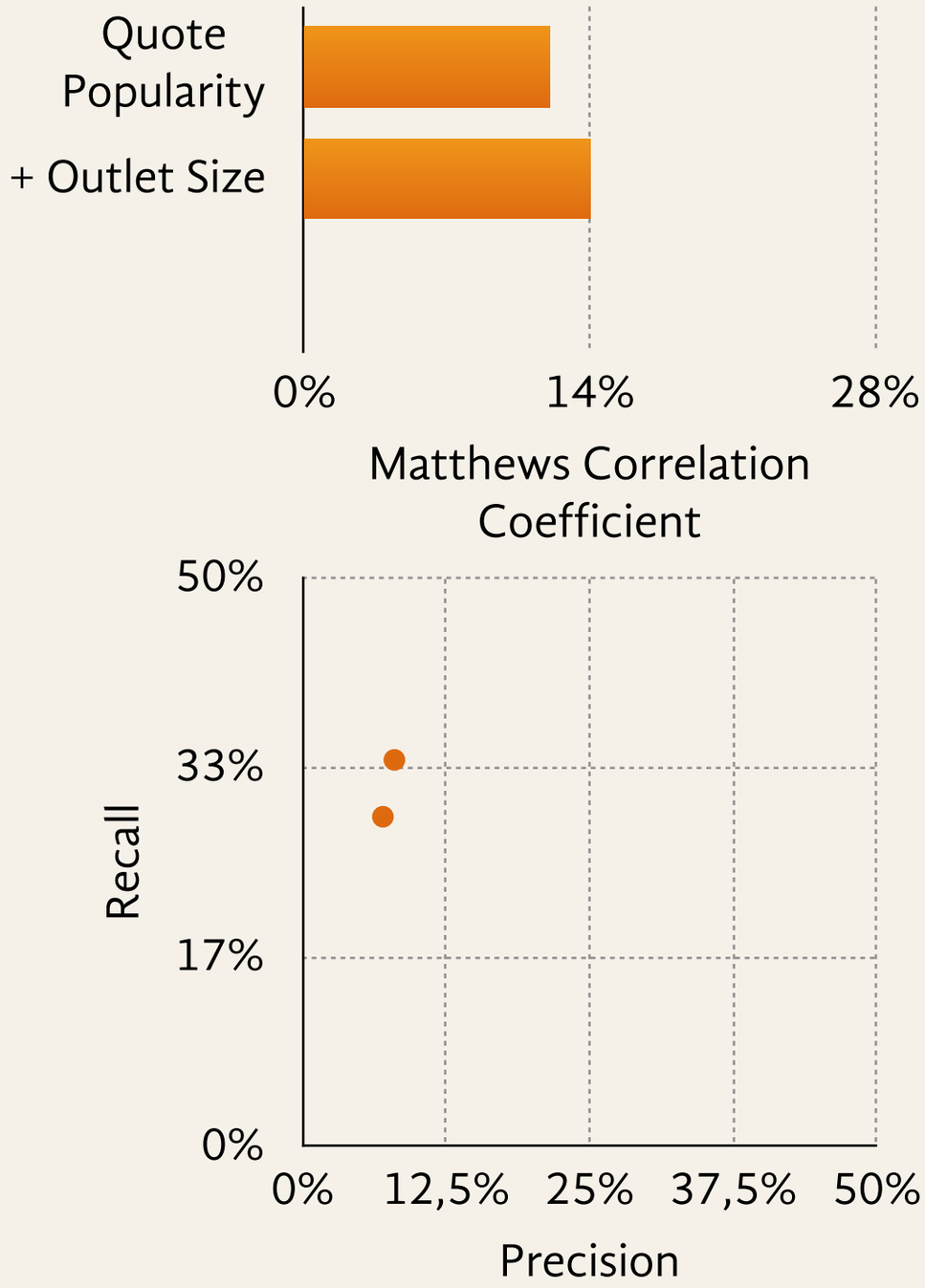
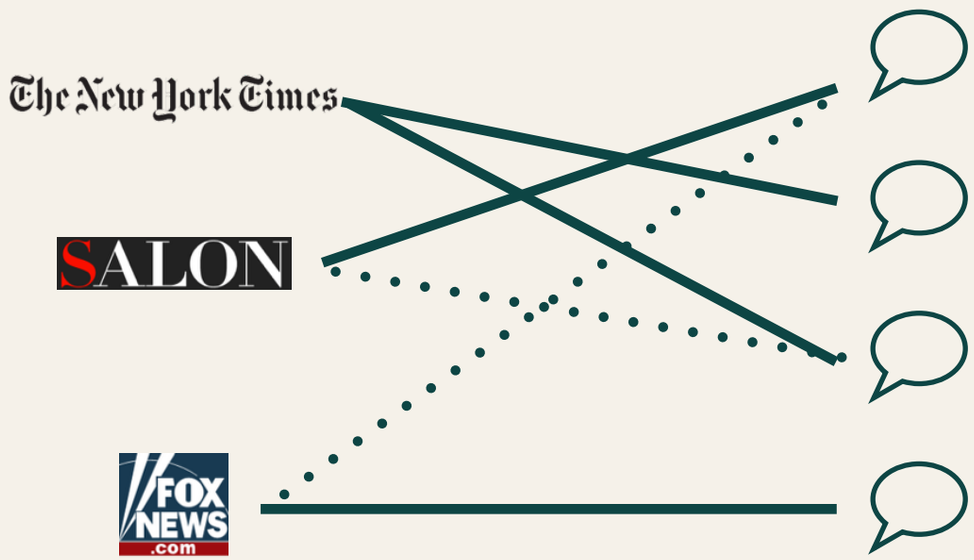
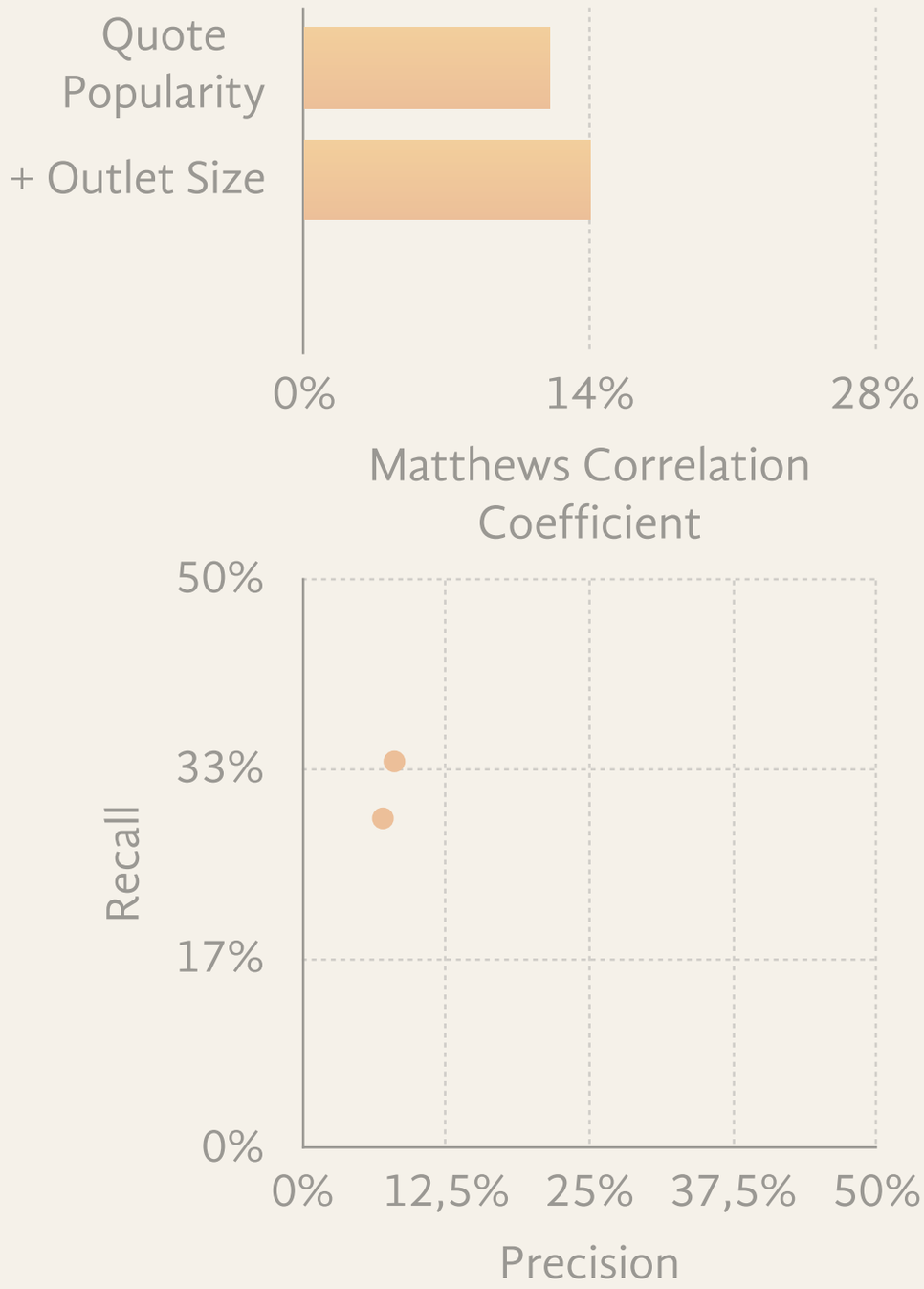


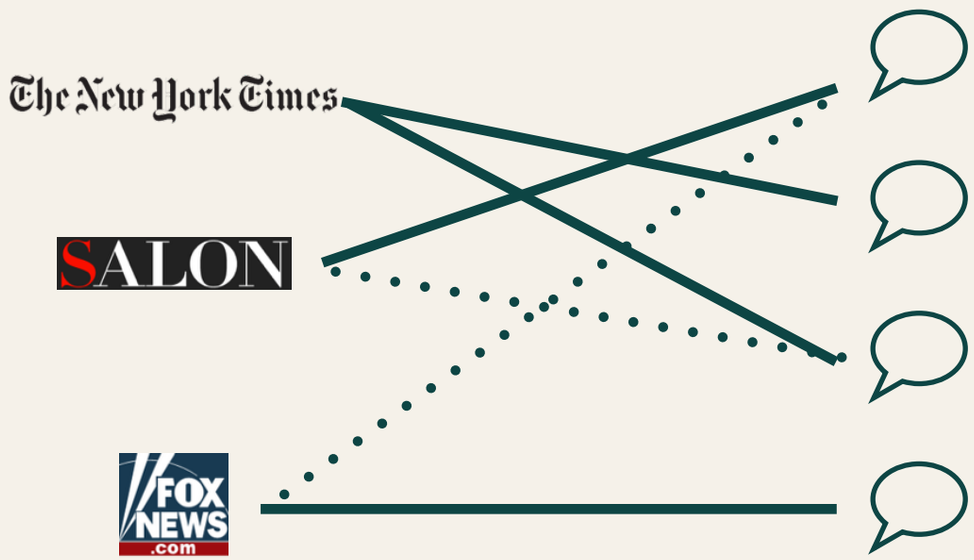


Are quoting patterns *systematic*?

Can we predict quoting?

Matrix completion by
low-rank factorization





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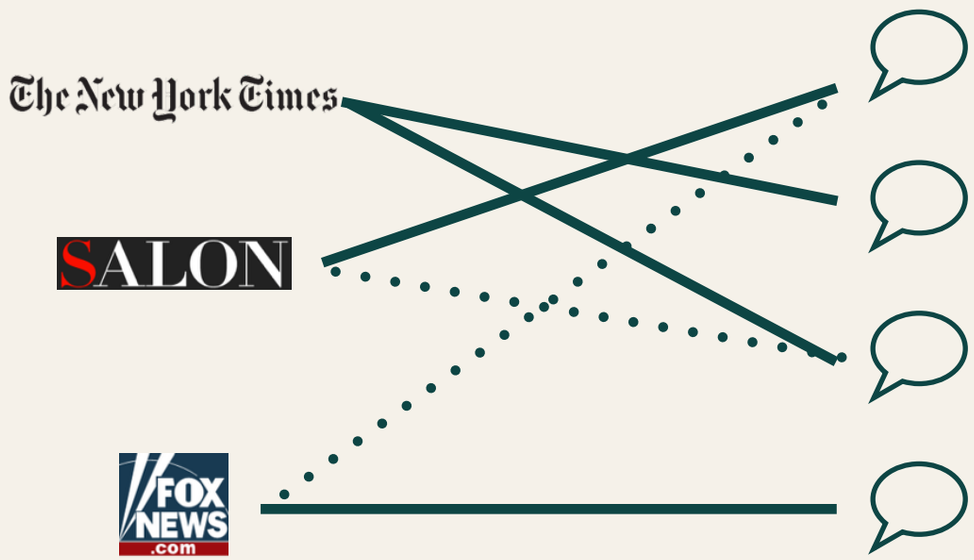
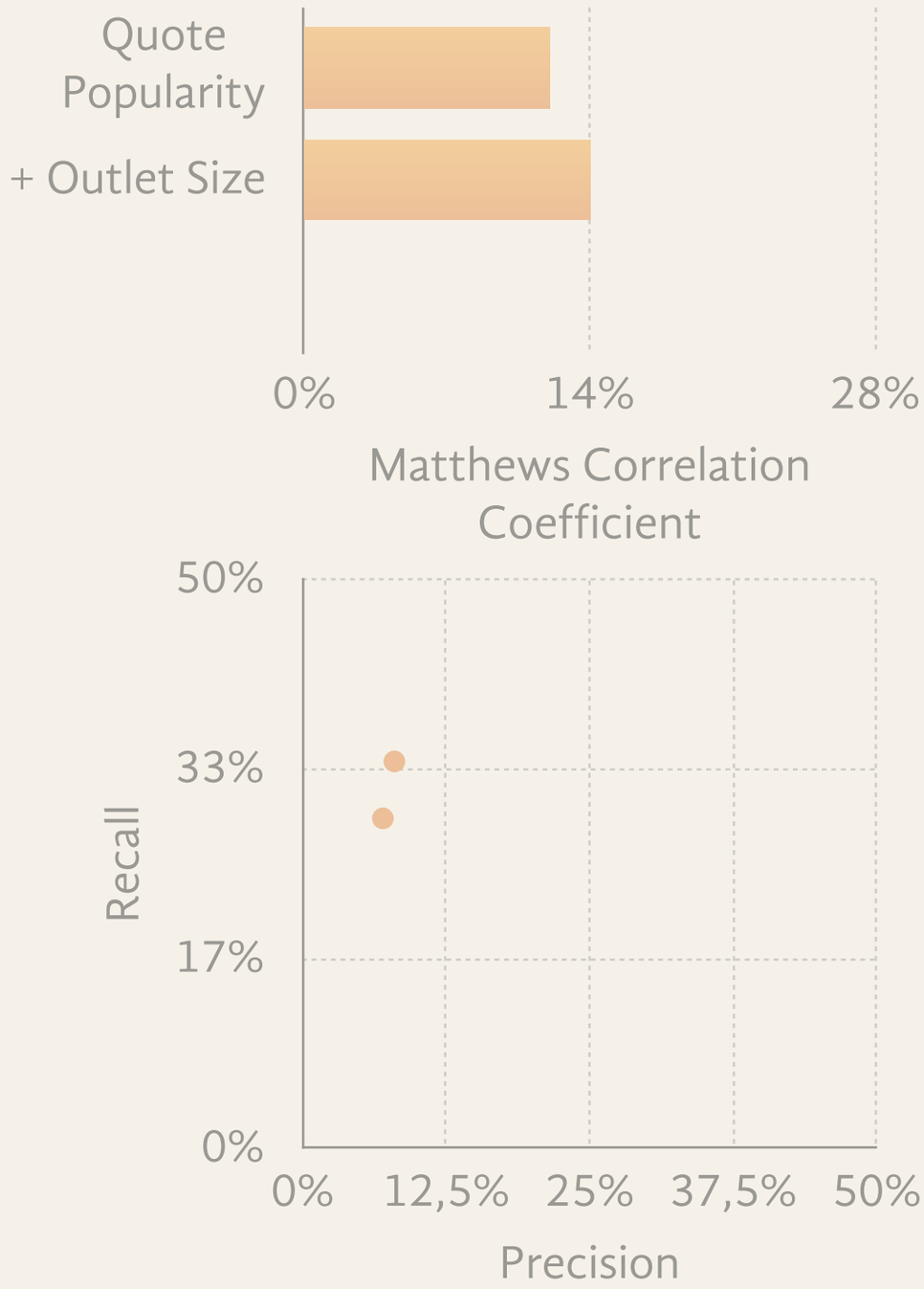
$$X \approx \hat{X} = U \cdot V^T$$





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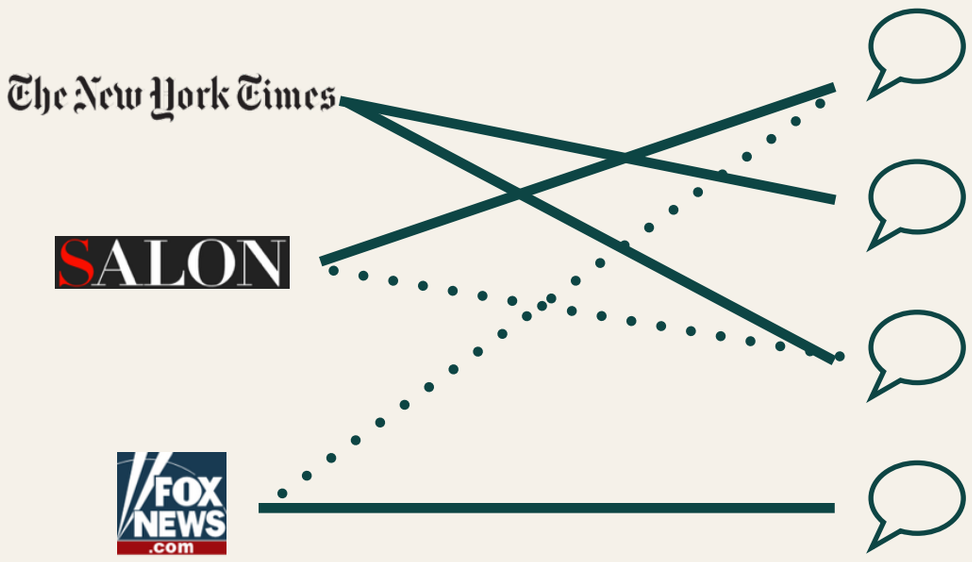
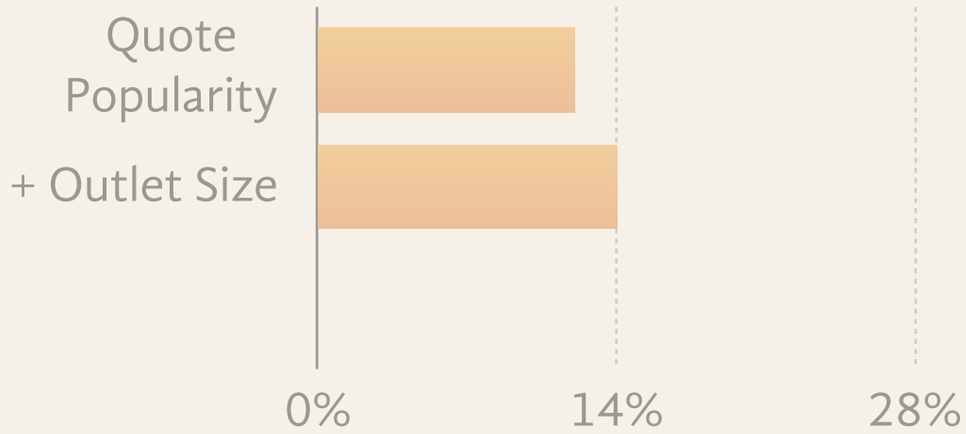
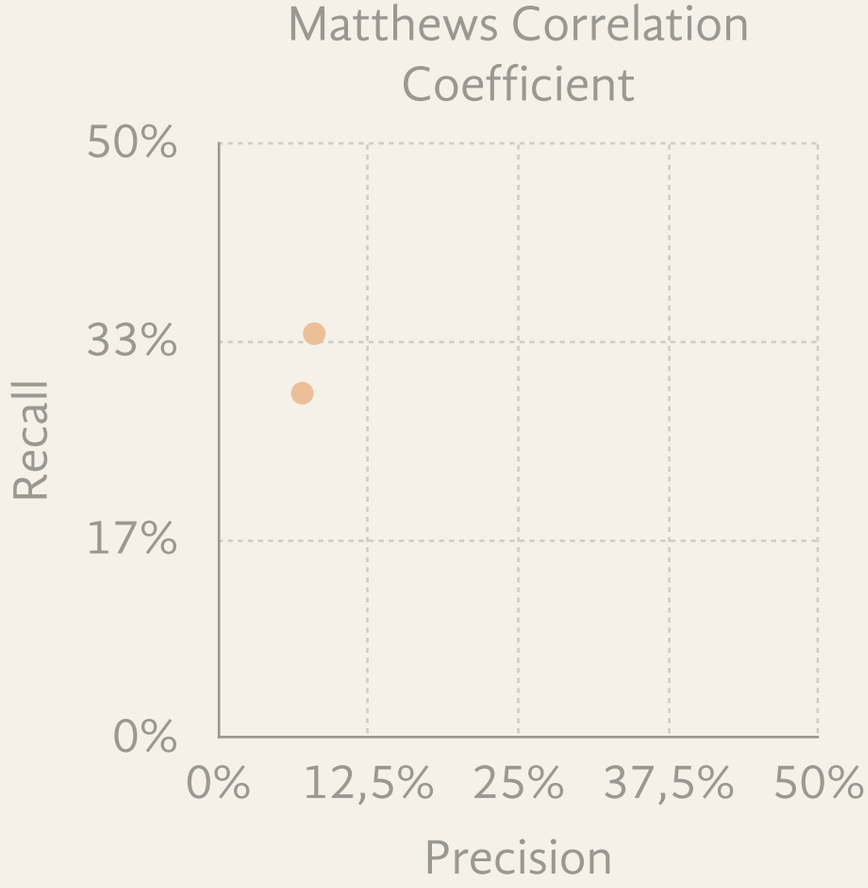
outlet space *quote space*







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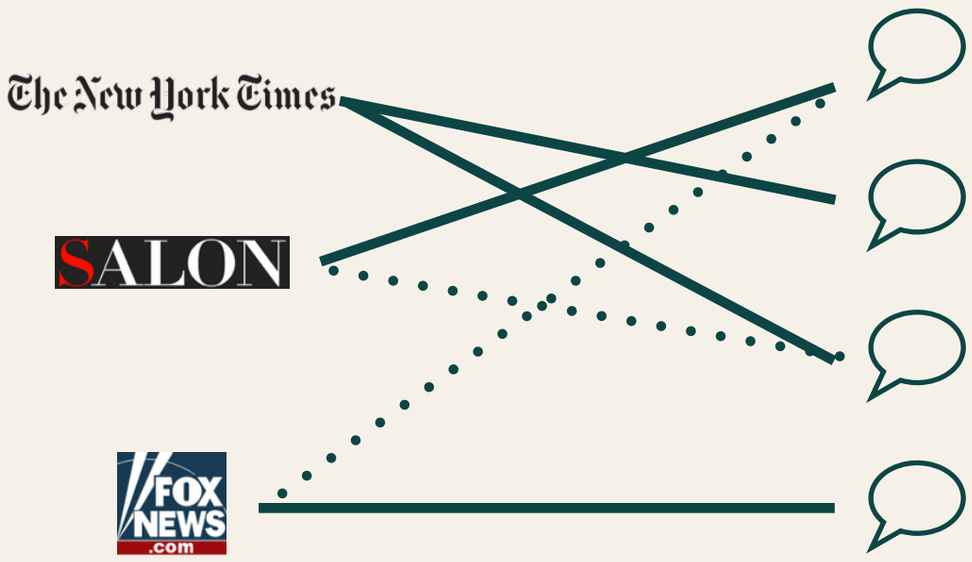

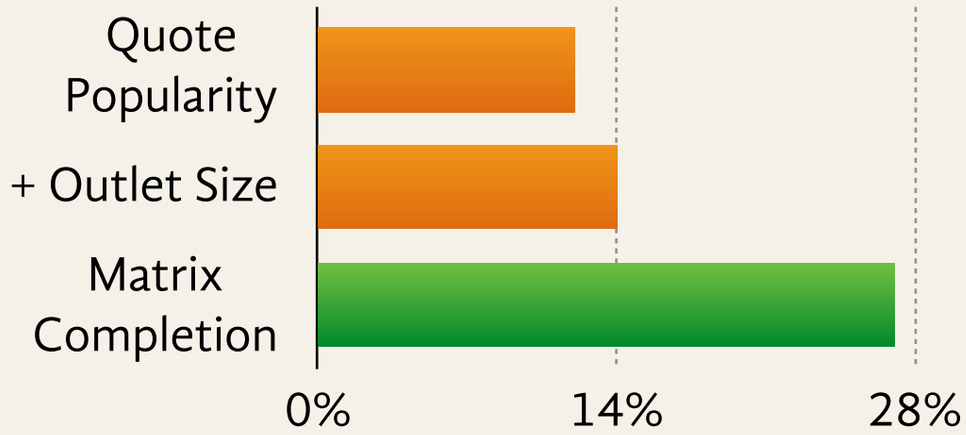

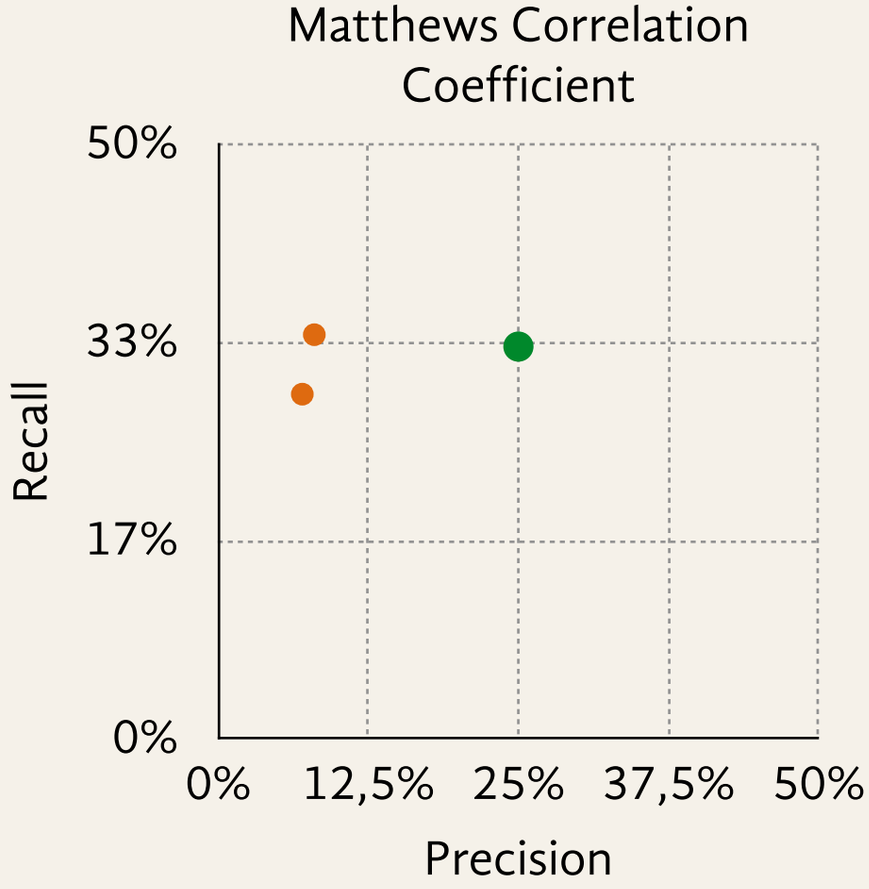

Are quoting patterns *systematic*?

Do they correspond to *intuition?*

Can *language* characterize the bias?

Are quoting patterns *systematic*?

Do

on?

Can *l*

bias?

Yes!
There is systematicity beyond newsworthiness.

Are quoting patterns *systematic*? Yes!

Do they correspond to *intuition?*

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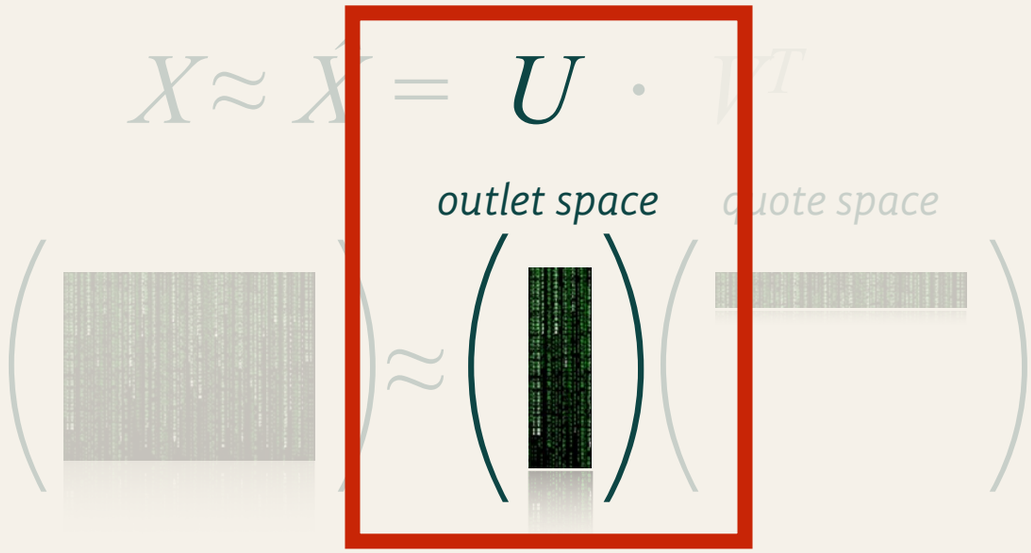
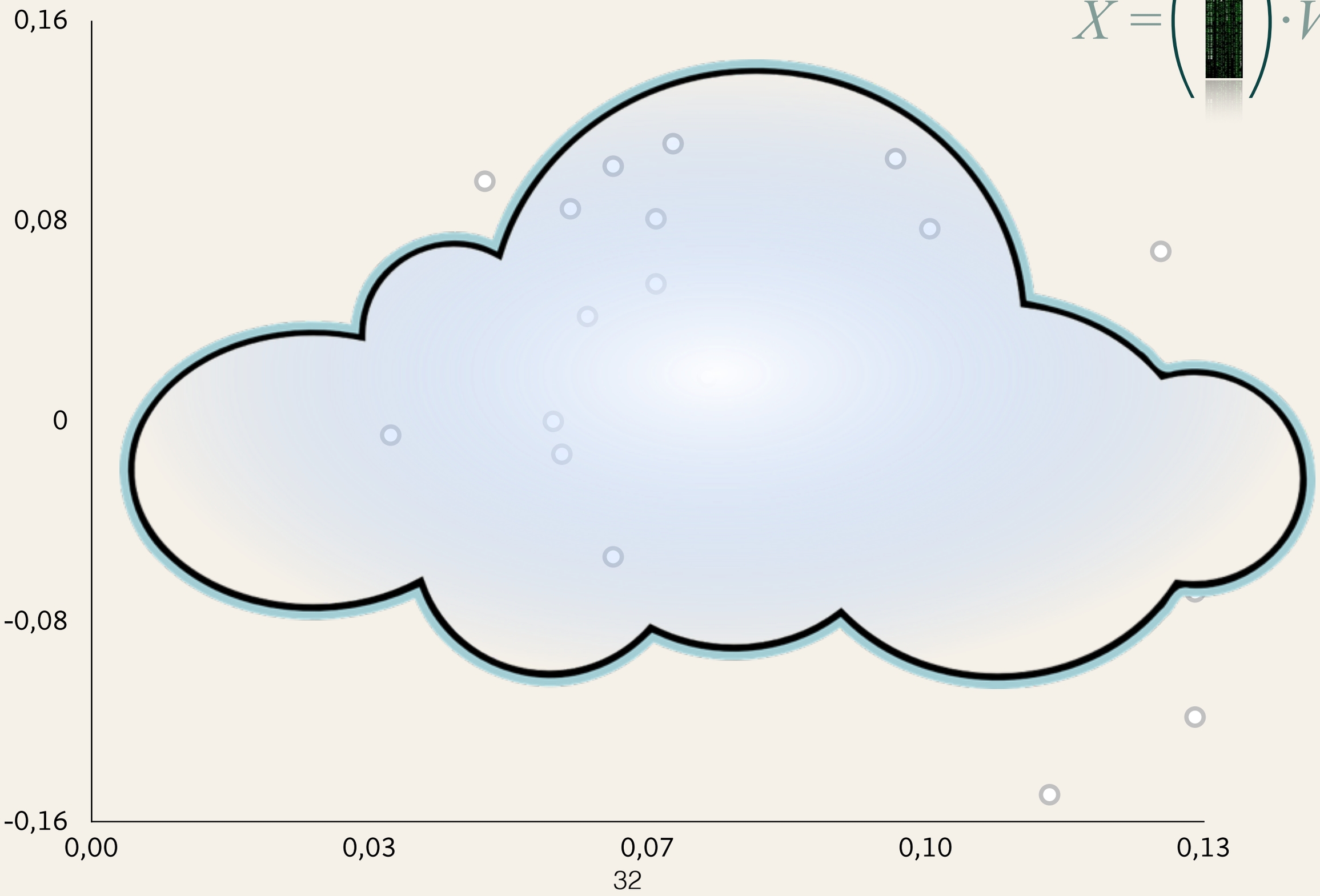


Do they correspond to *intuition?*

The first two latent dimensions:

$$\hat{X} = \left(\text{outlet space} \right) \cdot V^T$$



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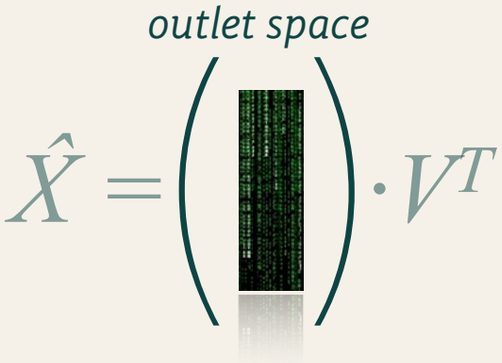

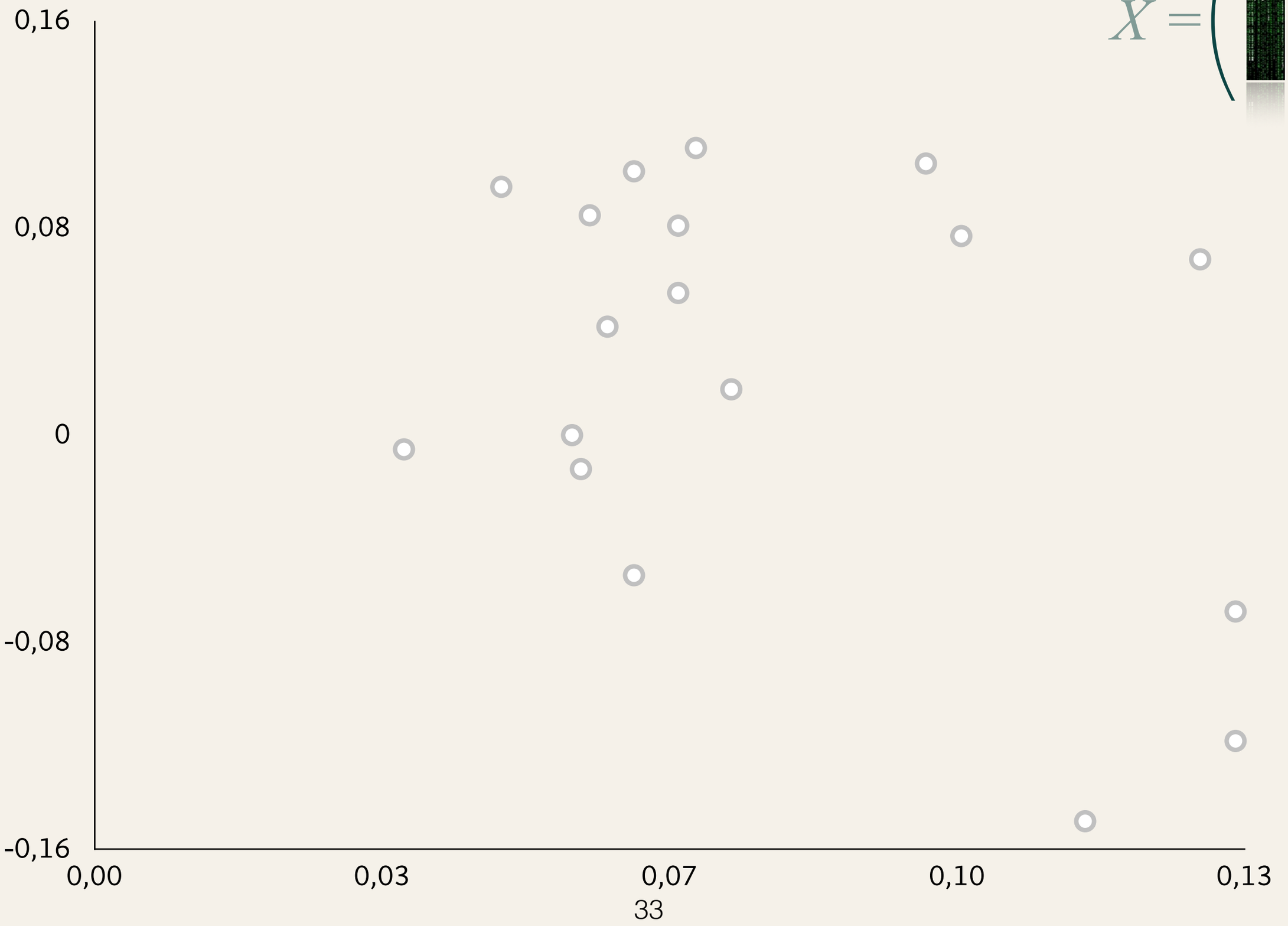

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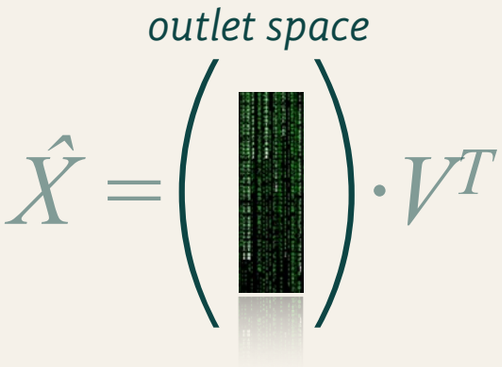

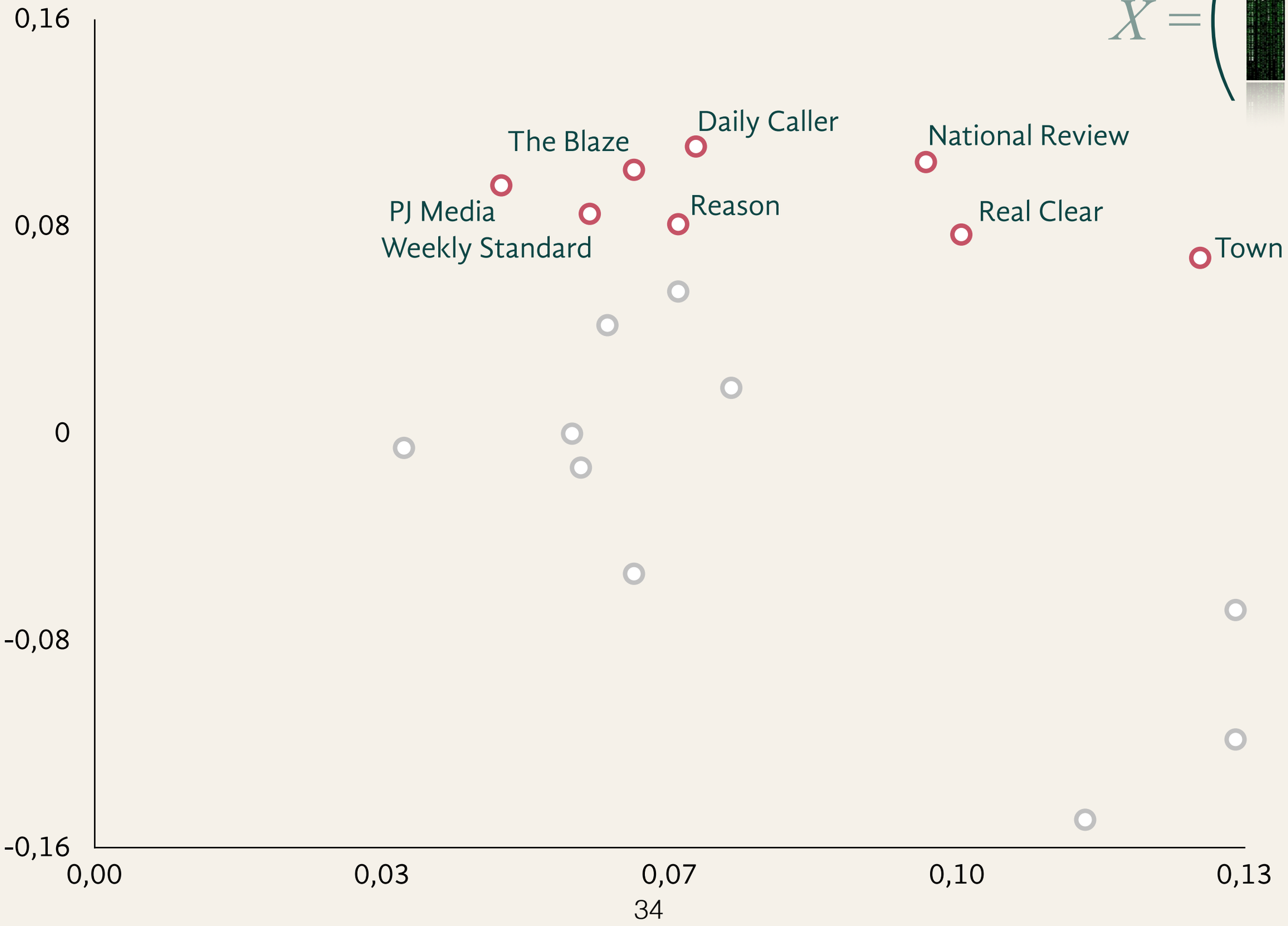

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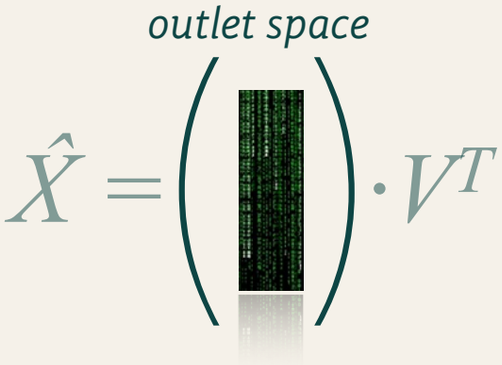
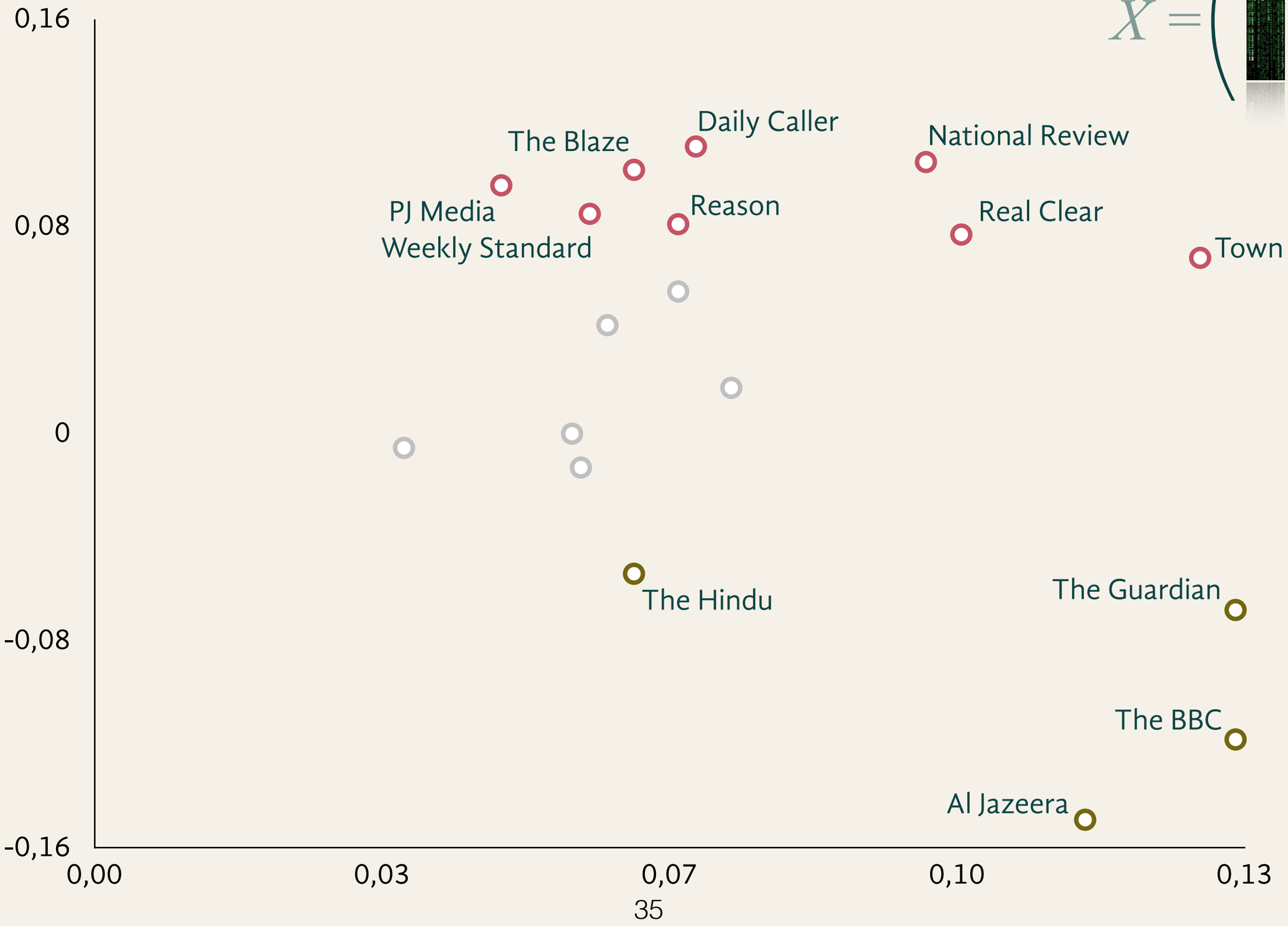
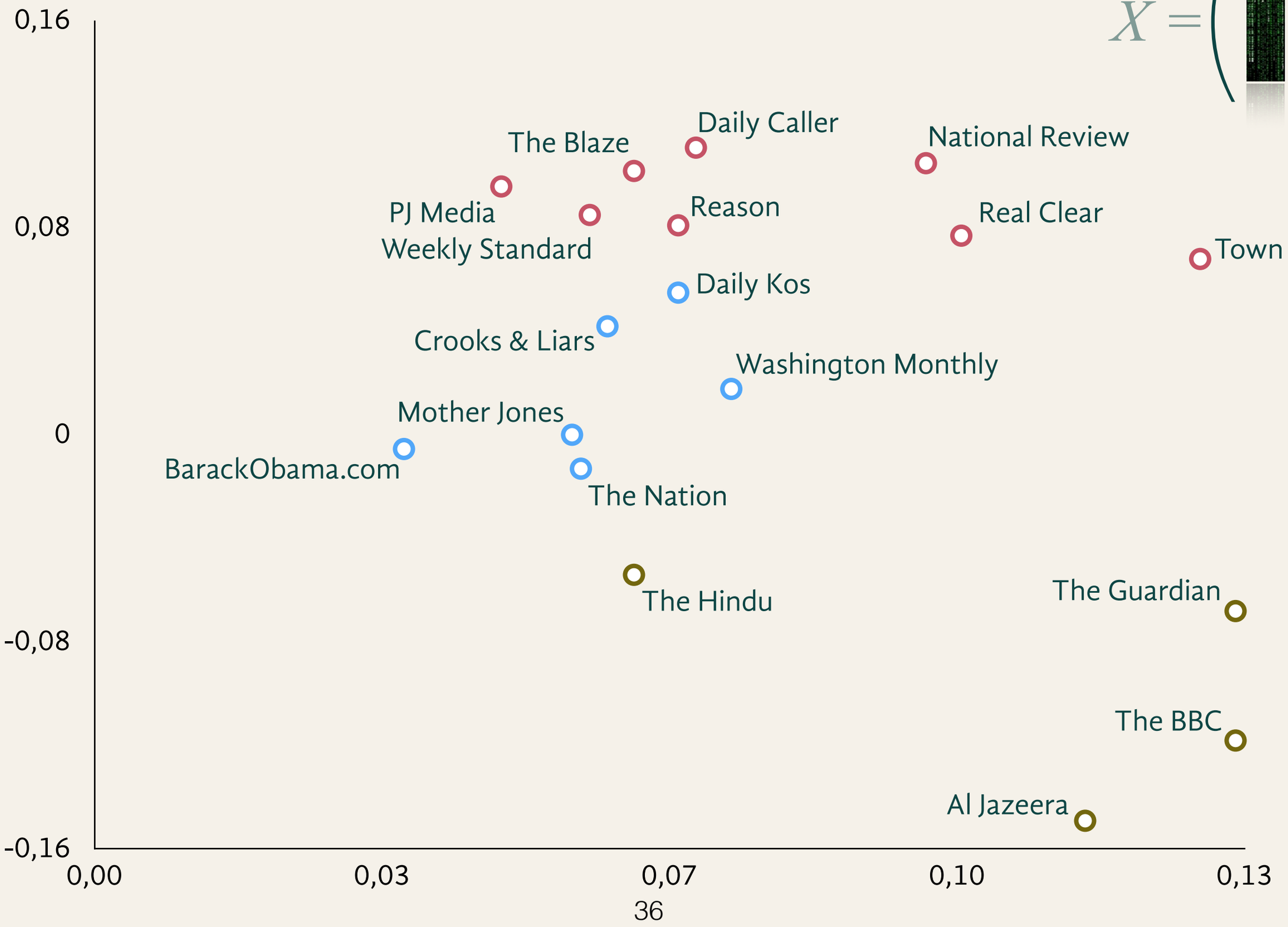




Do they correspond to *intuition?*

The first two latent dimensions:

$$\hat{X} = \left(\text{outlet space} \right) \cdot V^T$$



Does it correspond to *intuition?*

At the top of dimension 2:

Free Republic
Lonely Conservative
Right Wing News
…

Does it correspond to *intuition?*

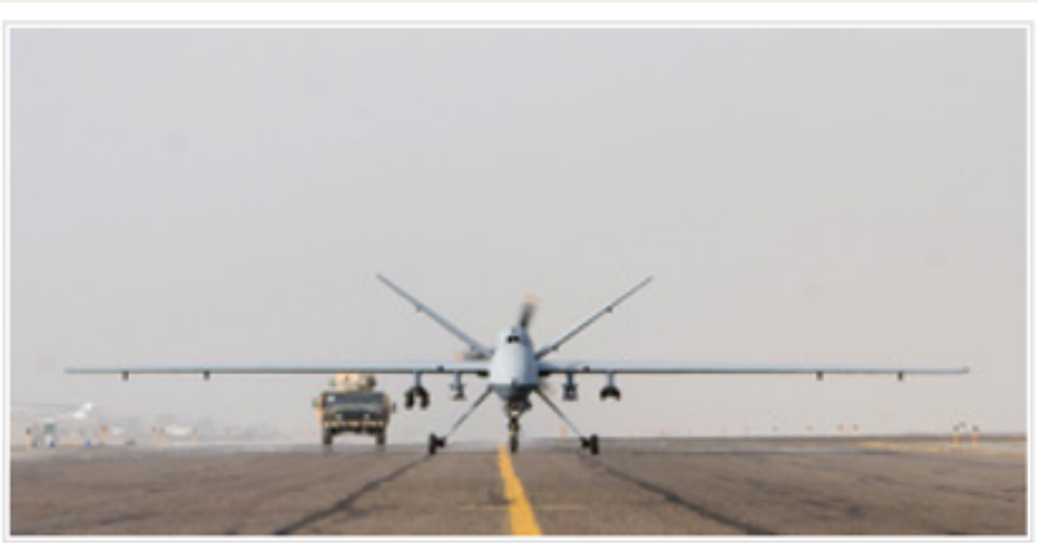
At the top of dimension 2:

WEASEL ZIPPERS
Scouring the Bowels of the Internet

THE PATRIOT POST®
VOICE OF ESSENTIAL LIBERTY

HOT AIR®

Free Republic
Lonely Conservative
Right Wing News
…



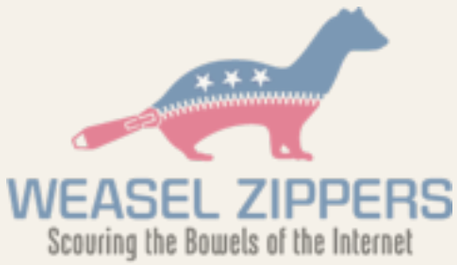
NATIONAL SECURITY

Who Is Watching Obama's Game of Drones?

Obamas drone program lacks transparency and oversight

Does it correspond to *intuition?*

At the top of dimension 2:



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Around zero on dimension 2:

NY Post
The Economist
LA Times
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THE PATRIOT POST®
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HOT AIR®

Free Republic
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Right Wing News
…

Around zero on dimension 2:

DEMOCRATS

wp POLITICS

Supreme Court appears split in hearing on historic gay-marriage cases

Robert Barnes and Fred Barbash 2:20 PM ET

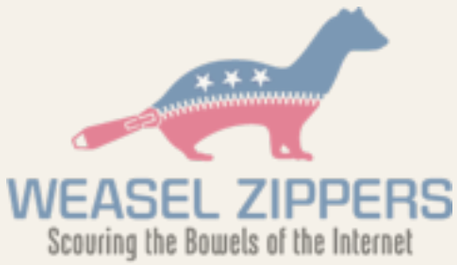
As Supreme Court justices broke along familiar ideological lines, Justice Anthony M. Kennedy, a frequent swing vote, asked tough questions of both sides.

(Allison Shelley / For The Washington Post)

NY Post
The Economist
LA Times
…

Does it correspond to *intuition?*

At the top of dimension 2:



Free Republic
Lonely Conservative
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…

Around zero on dimension 2:

NY Post
The Economist
LA Times
…

Around the bottom of dimension 2:

Sydney Morning Herald
Ottawa Citizen
The Globe And Mail
…

Does it correspond to *intuition?*

At the top of dimension 2:

Around zer

Barack Obama calls for US 'soul searching' as Baltimore braces for more violence

Police and National Guard troops flood the streets to try to head off a second night of rioting

- Violence and vigilantism as Baltimore erupts into rioting

Around the bottom of dimension 2:

news.com.au

NATIONAL POST

The Telegraph

…

Sydney Morning Herald
Ottawa Citizen
The Globe And Mail

…

Are quoting patterns *systematic*? Yes!

Do they correspond to *intuition?*

Can *language* characterize the bias?

Are quoting patterns *systematic*? Yes!

Do they correspond to *intuition?*

Can *l* bias?

Kind of.
It's not only liberal/conservative.

Are quoting patterns *systematic*? Yes!

Do they correspond to *intuition? Kind of.*

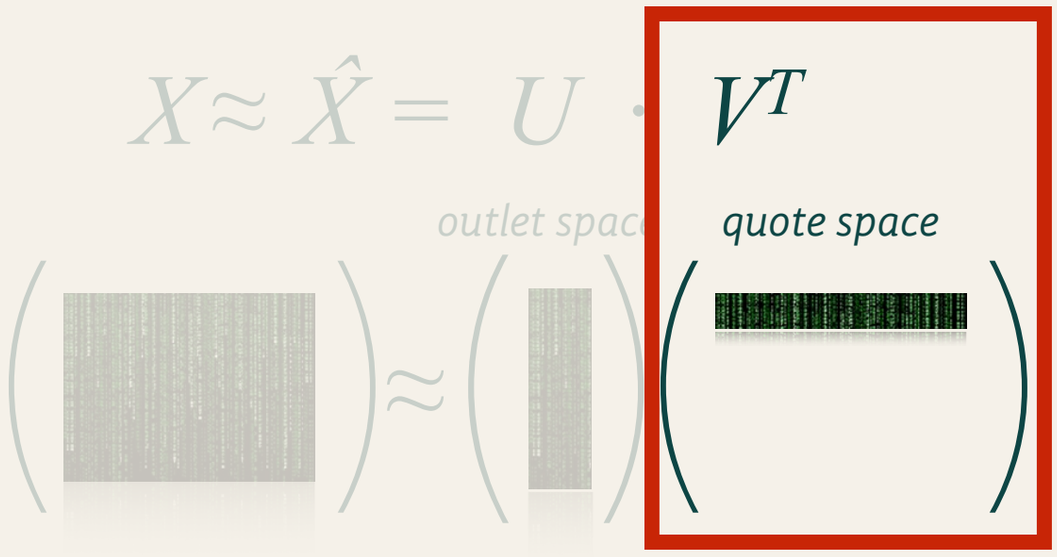
Can *language* characterize the bias?

Can *language* characterize the bias?

$$X \approx \hat{X} = U \cdot V^T$$

outlet space *quote space*

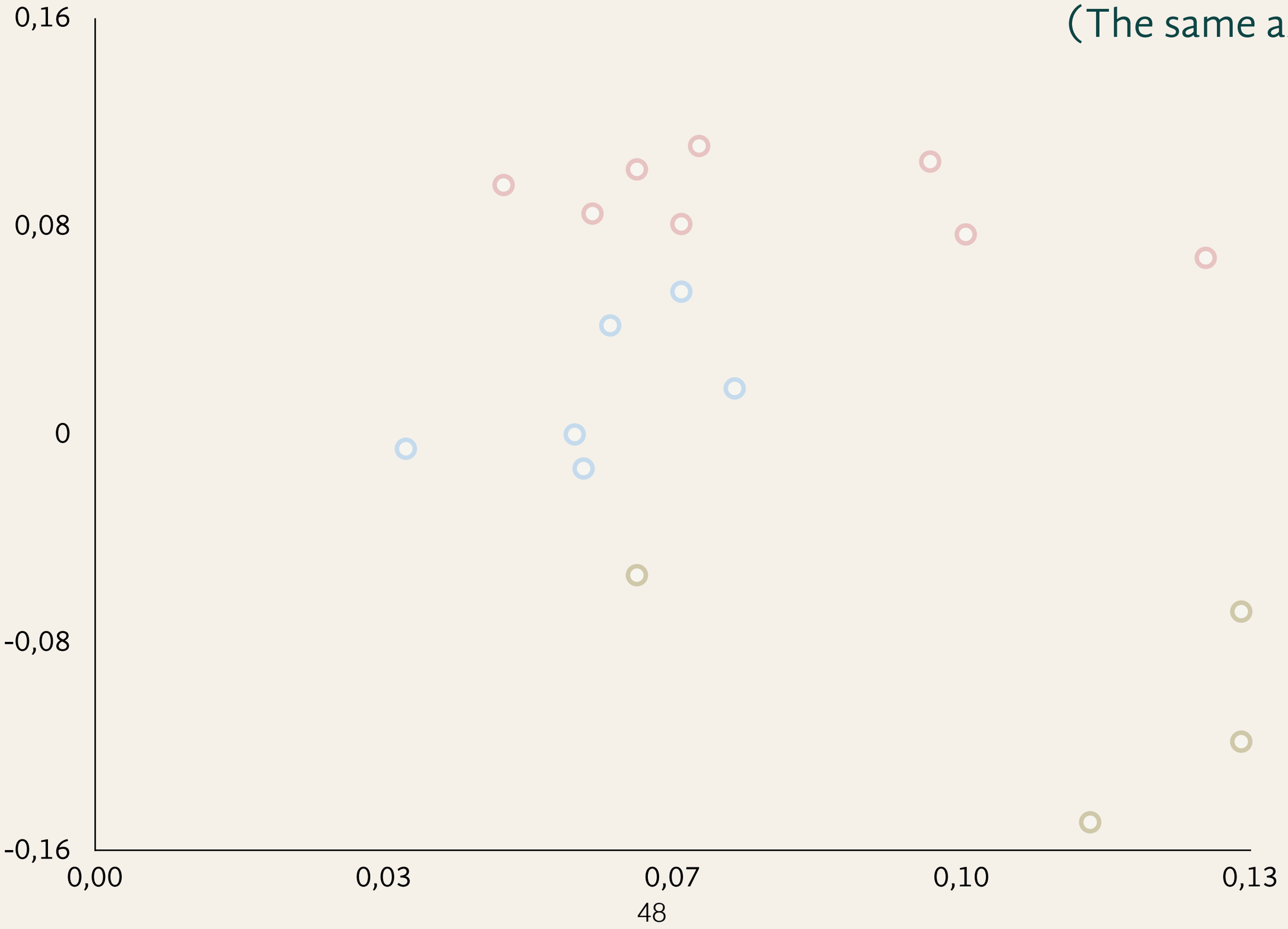
Can *language* characterize the bias?



Can *language* characterize the bias?

$$\hat{X} = U \cdot \left(\begin{array}{c} \textit{quote space} \\ \text{▮▮▮▮▮▮▮▮▮▮} \end{array} \right)$$

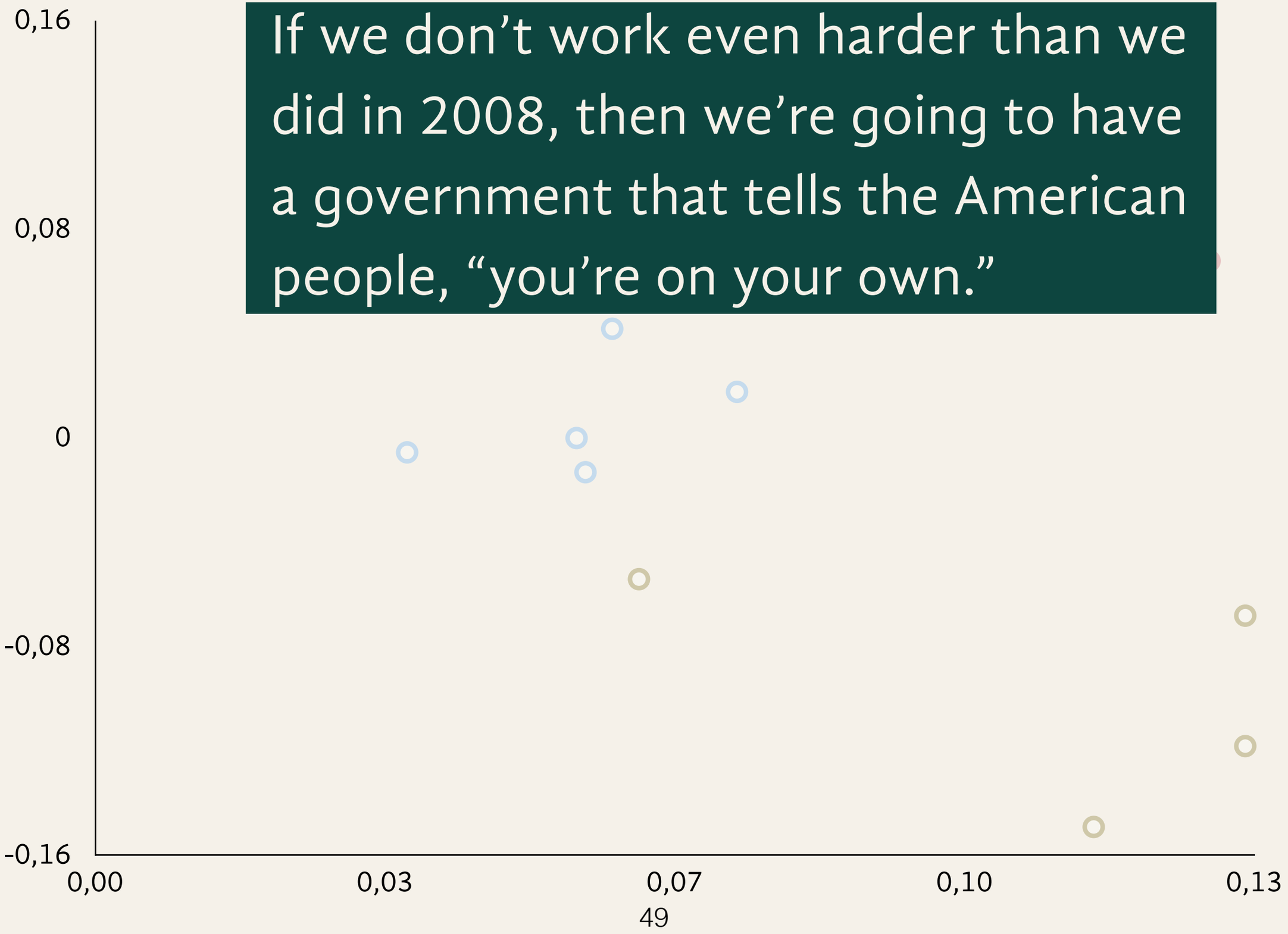
(The same axes!)



Can *language* characterize the bias?

$$\hat{X} = U \cdot (\quad \text{quote space} \quad)$$

If we don't work even harder than we did in 2008, then we're going to have a government that tells the American people, "you're on your own."



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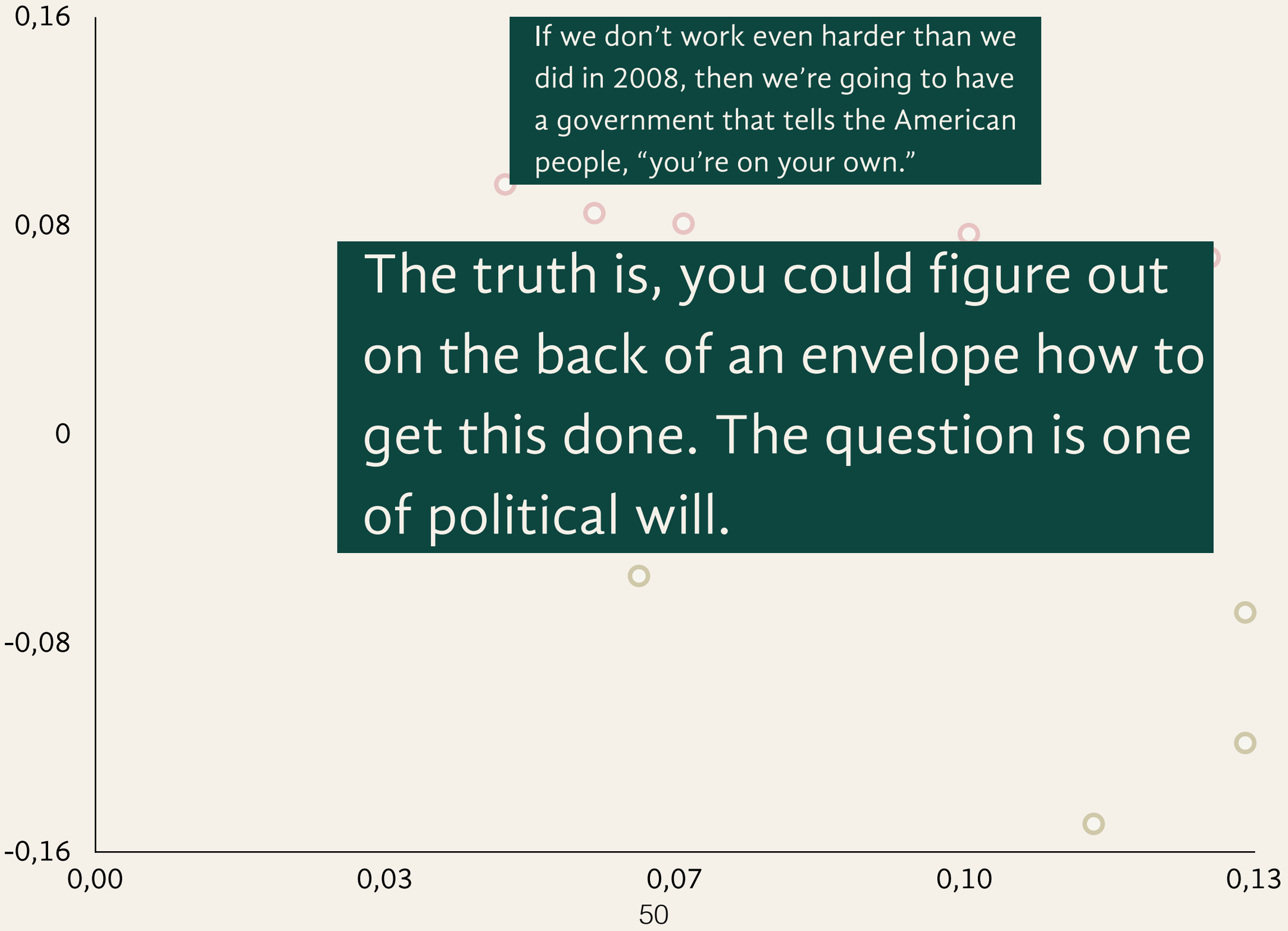
$$\hat{X} = U \cdot (\quad \text{quote space} \quad)$$

If we don't work even harder than we did in 2008, then we're going to have a government that tells the American people, "you're on your own."

The truth is, you could figure out on the back of an envelope how to get this done. The question is one of political will.



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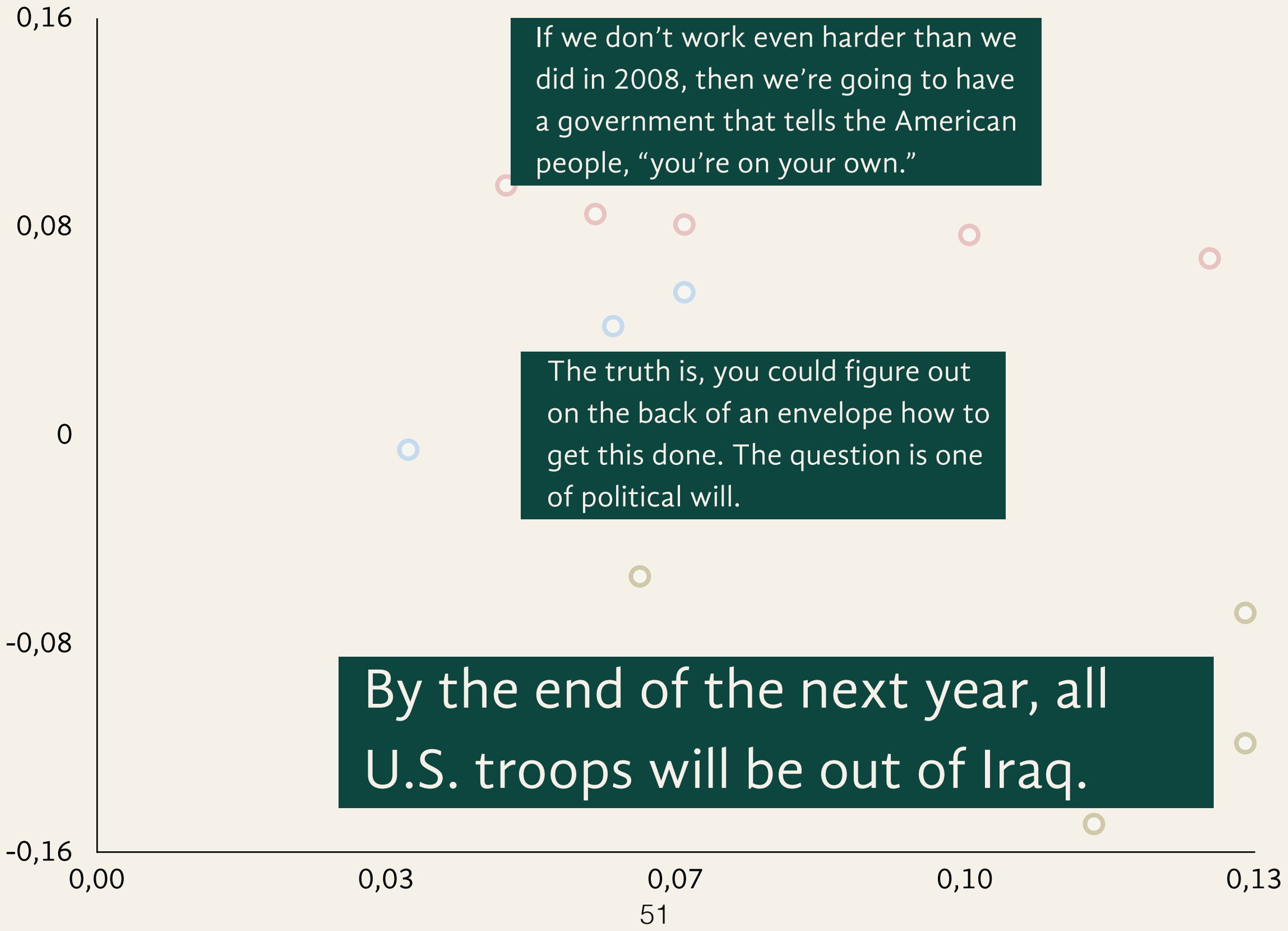
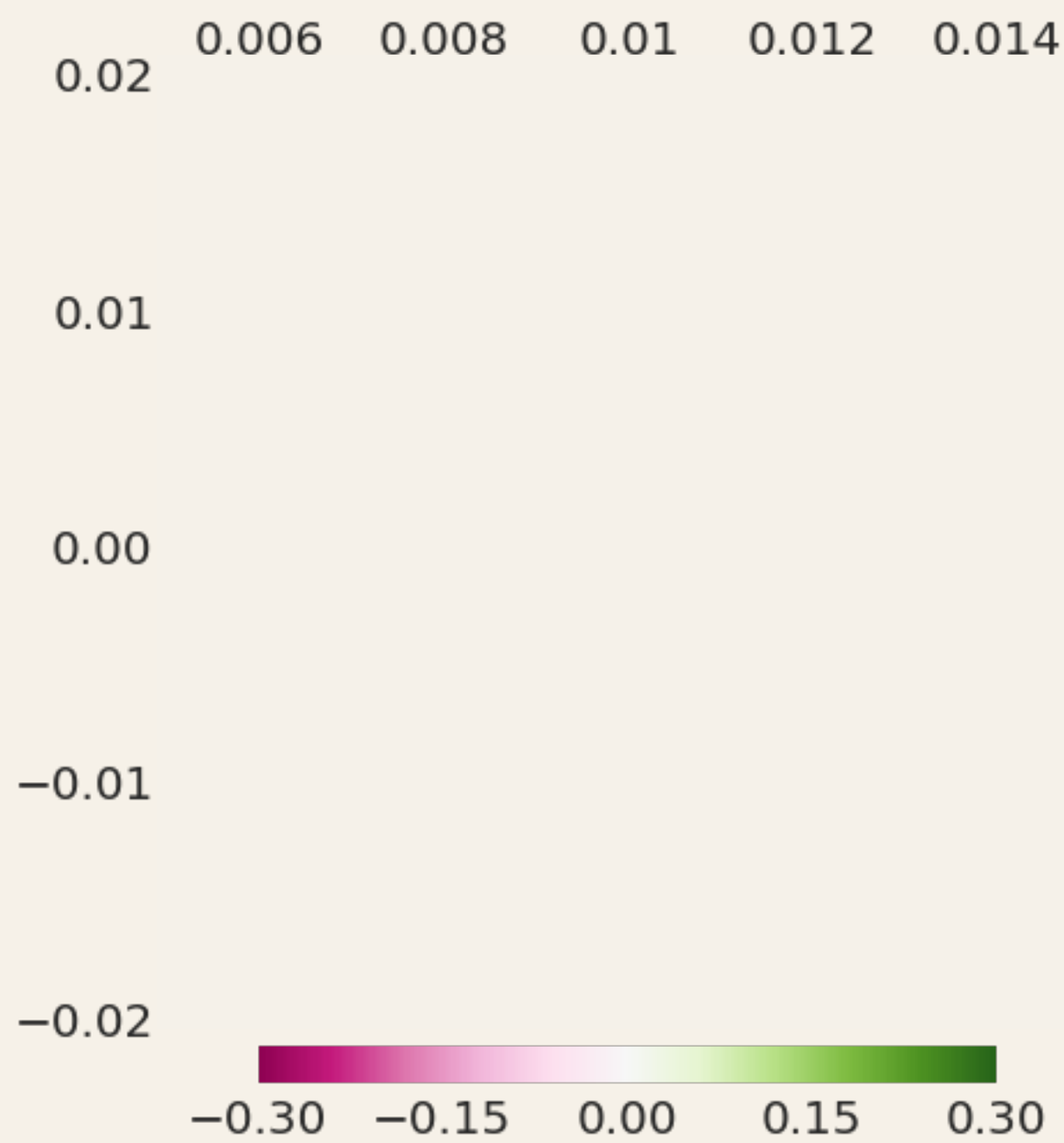


Can *language* characterize the bias?

Average sentiment of quotes:



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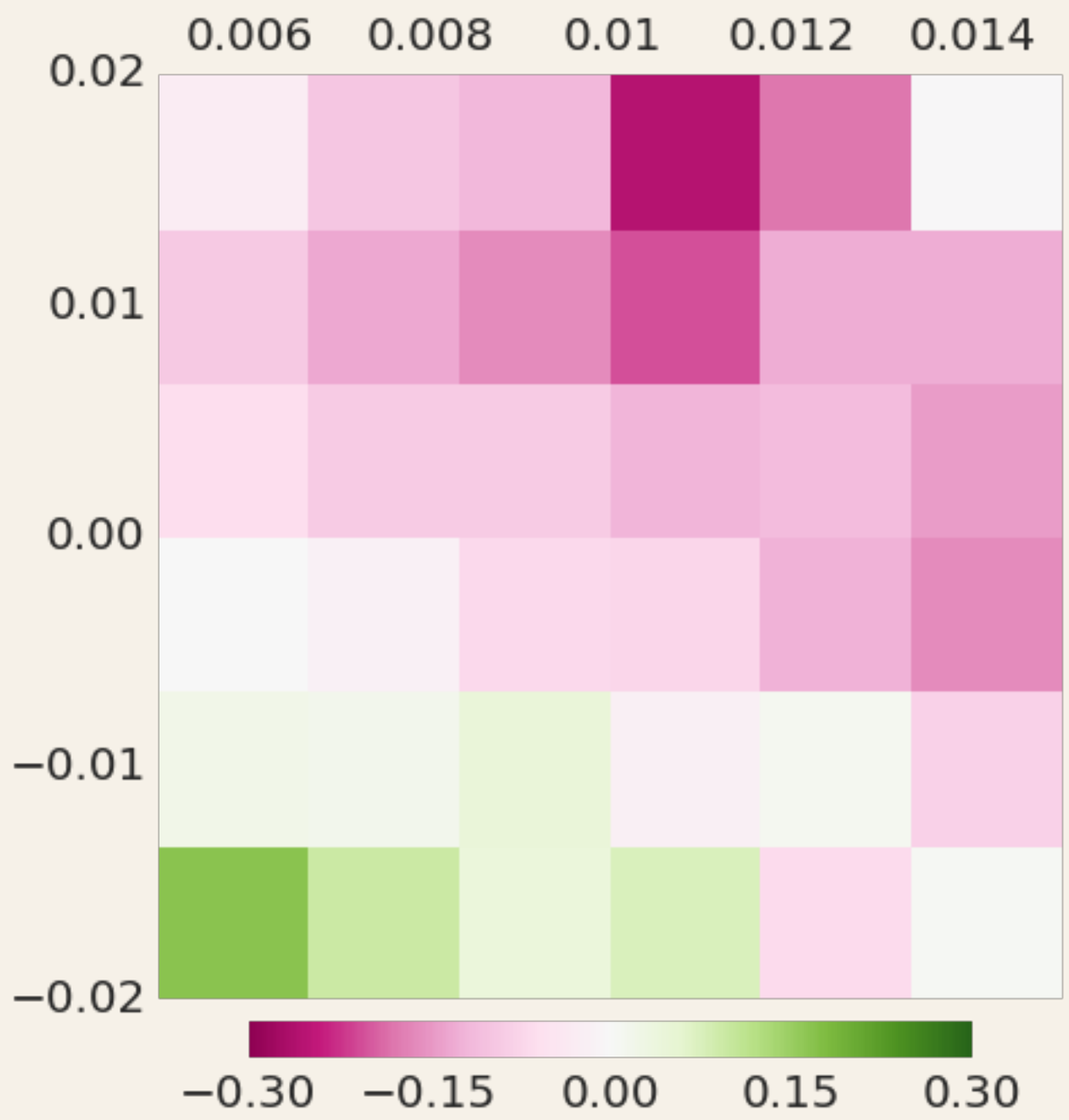
Can *language* characterize the bias?

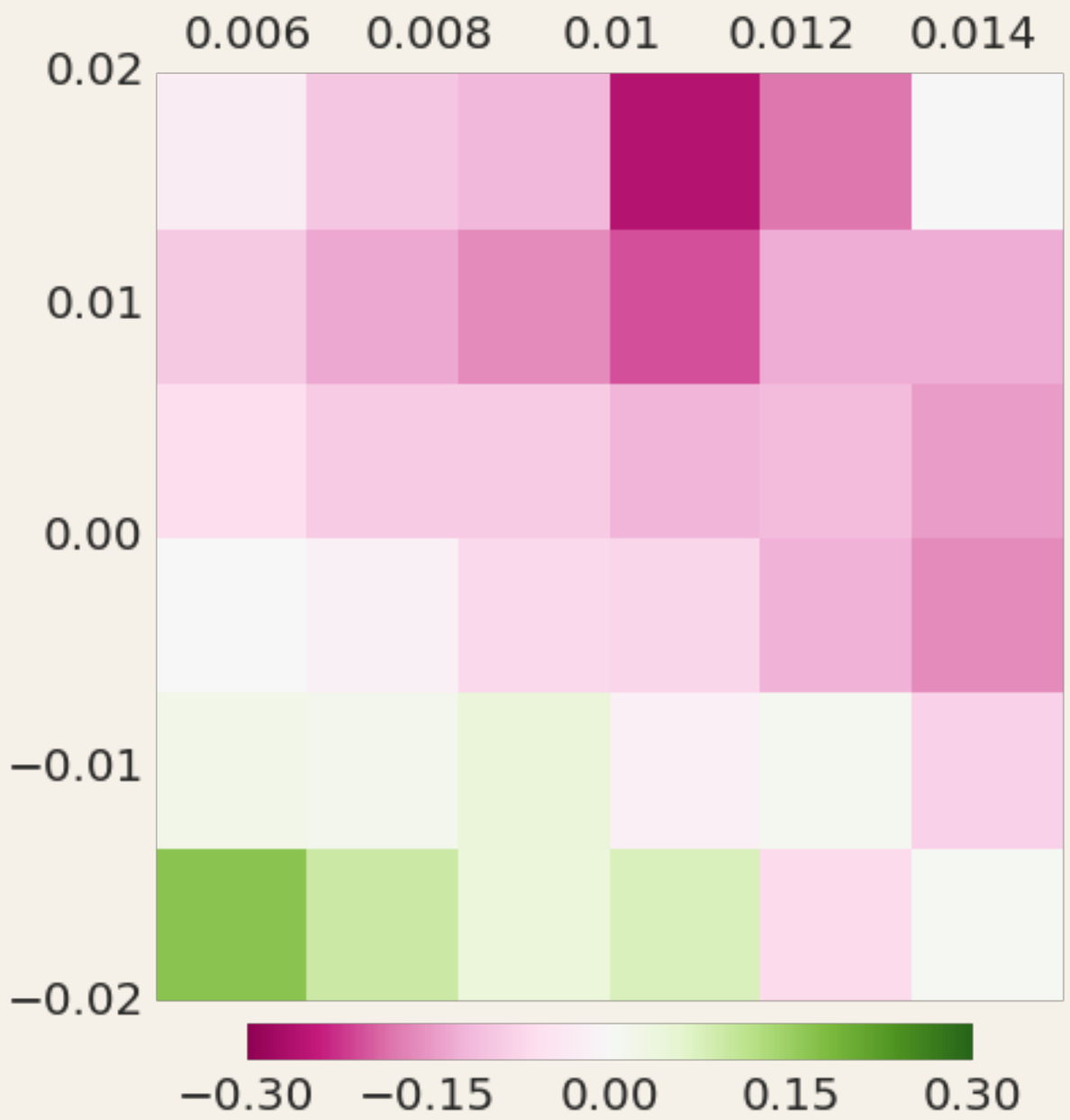
Average sentiment of quotes:



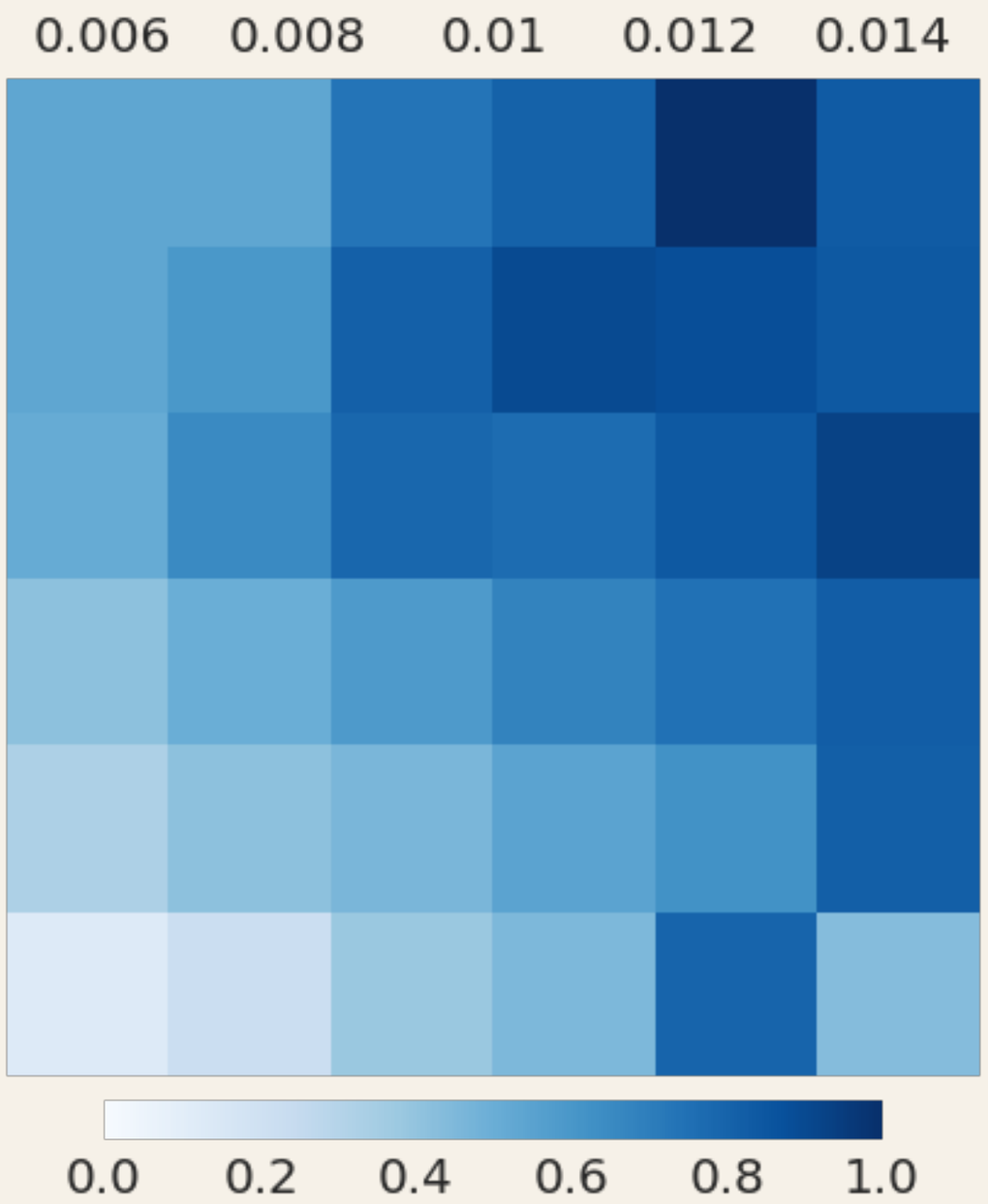
(The same axes!)

Can *language* characterize the bias?

Average sentiment of quotes:



Amount of negation in quotes:



(The same axes!)

Conclusion

Quoting patterns are systematic:
We can predict them.

Online visualization & data:
http://snap.stanford.edu/quotus/

Conclusion

Quoting patterns are systematic:
We can predict them.

Selection bias is multidimensional.

Language plays a part:
Sentiment and negation show alignment.

Online visualization & data:
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