

# Cognitive attraction and online misinformation

Alberto Acerbi



Click and elect: how fake news helped Donald Trump win a real election

The Guardian

**Fake news a democratic crisis for UK, MPs warn**

BBC

**Instagram blocks vaccine hoax hashtags**

BBC

Facebook chiude 23 pagine: “Fake news a favore del governo”

LA STAMPA POLITICA

« Les “fake news” sont le bras armé du RN et de ses alliés »

Le Monde

# "Fake News" and disinformation

- As "fake news" proliferate, disinformation threatens democracy and efficient governance.
- There is [empirical evidence](#) that false news are spreading significantly "faster, deeper, and more broadly" than the true ones. An [MIT study](#) found that the top 1% of false news cascades diffused to 1,000 - 100,000 people, whereas the true ones rarely reached more than 1,000 people.



# Can cultural evolution research say something about online misinformation?

- A mini review of the empirical research on the reach of online misinformation
- A quick “experiment”
- Cognitive attraction and online misinformation

# The reach of online misinformation

- “False news reached more people than the truth; the top 1% of false news cascades diffused to between 1000 and 100,000 people, whereas the truth rarely diffused to more than 1000 people”
- “Falsehoods are 70 percent more likely to be retweeted on Twitter than the truth”
- “Falsehood also diffused faster than the truth” (~6 times faster)

# The reach of online misinformation



Did Queen Elizabeth Wear a Brooch Gifted by President Obama While Meeting President Trump?



**False**

*About this rating* ↗



Did Amnesty International ‘Officially Declare’ Donald Trump a ‘Human Rights Violator’?



**True**

*About this rating* ↗



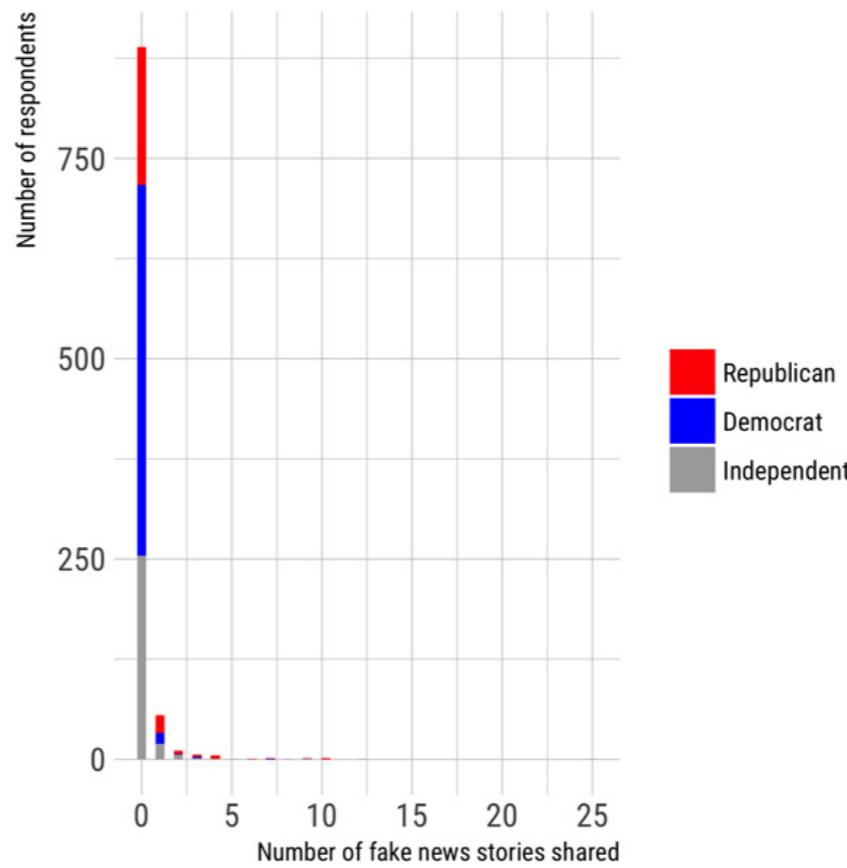
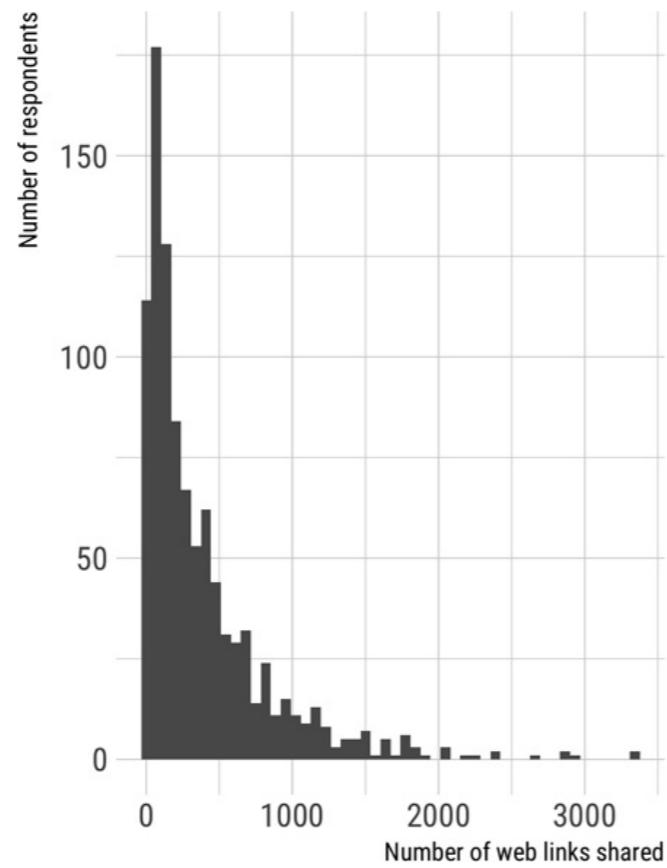
**US election 2016 result: Trump beats Clinton to take White House**

# The reach of online misinformation

- “**Debunked rumours** reached more people than **confirmed rumours**; the top 1% of **debunked rumours** cascades diffused to between 1000 and 100,000 people, whereas **confirmed rumours** rarely diffused to more than 1000 people”
- “~~Falsehoods~~ are 70 percent more likely to be retweeted on Twitter than the ~~truth~~”
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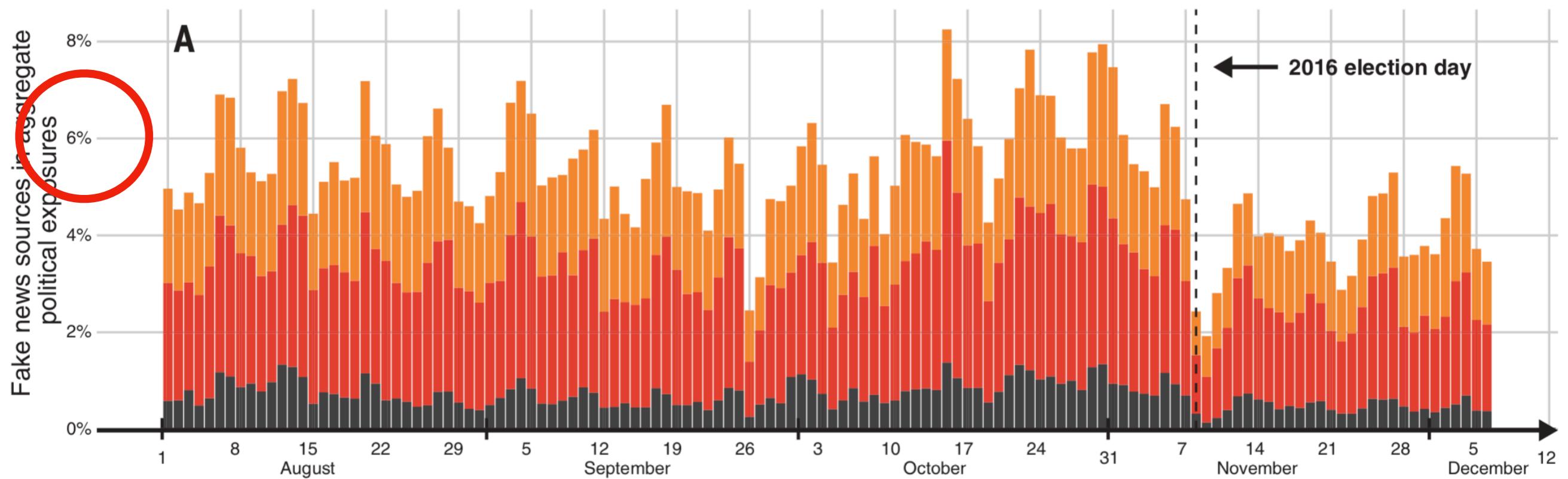
# The reach of online misinformation

- “The vast majority of Facebook users in our data did not share any articles from fake news domains in 2016 at all” (N=3,500)



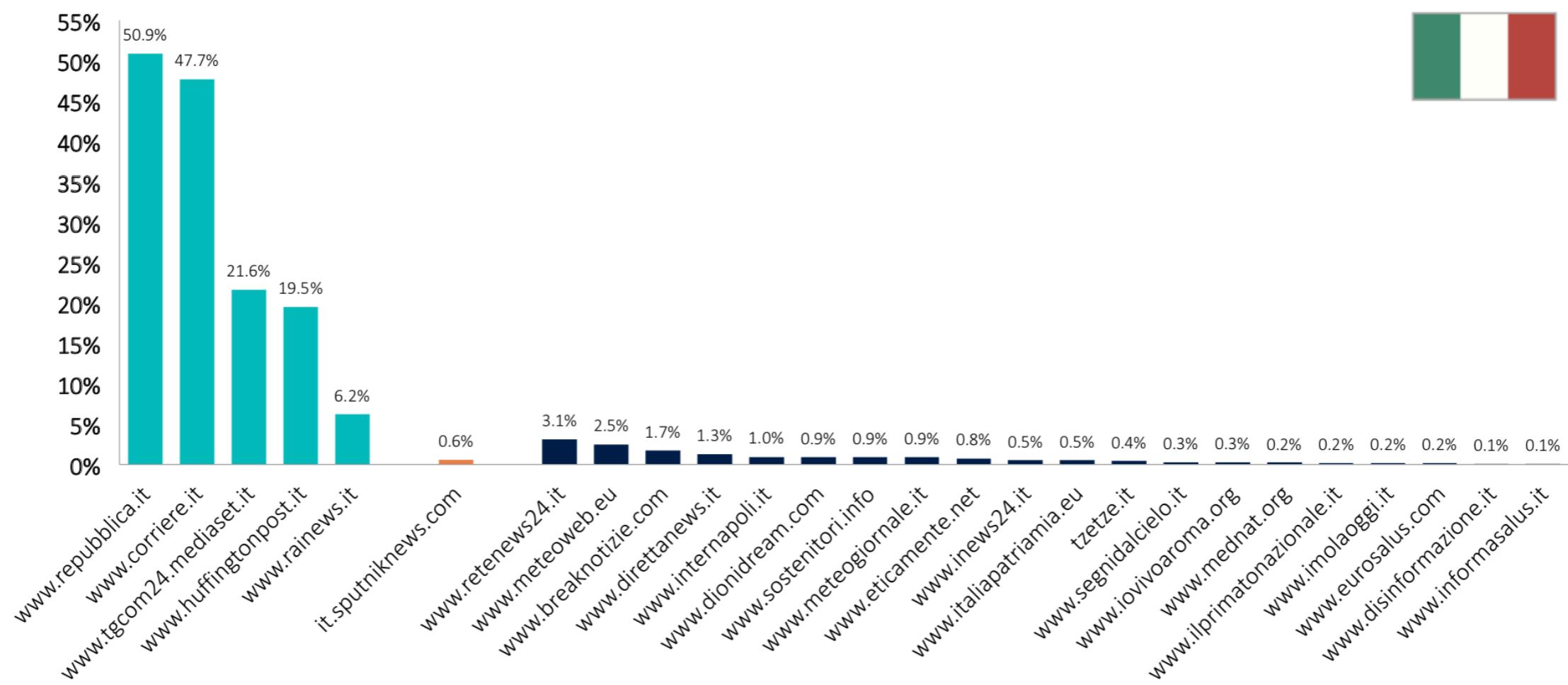
# The reach of online misinformation

- “Only 1% of individuals accounted for 80% of fake news source exposures, and 0.1% accounted for nearly 80% of fake news sources shared” (N=16,442)



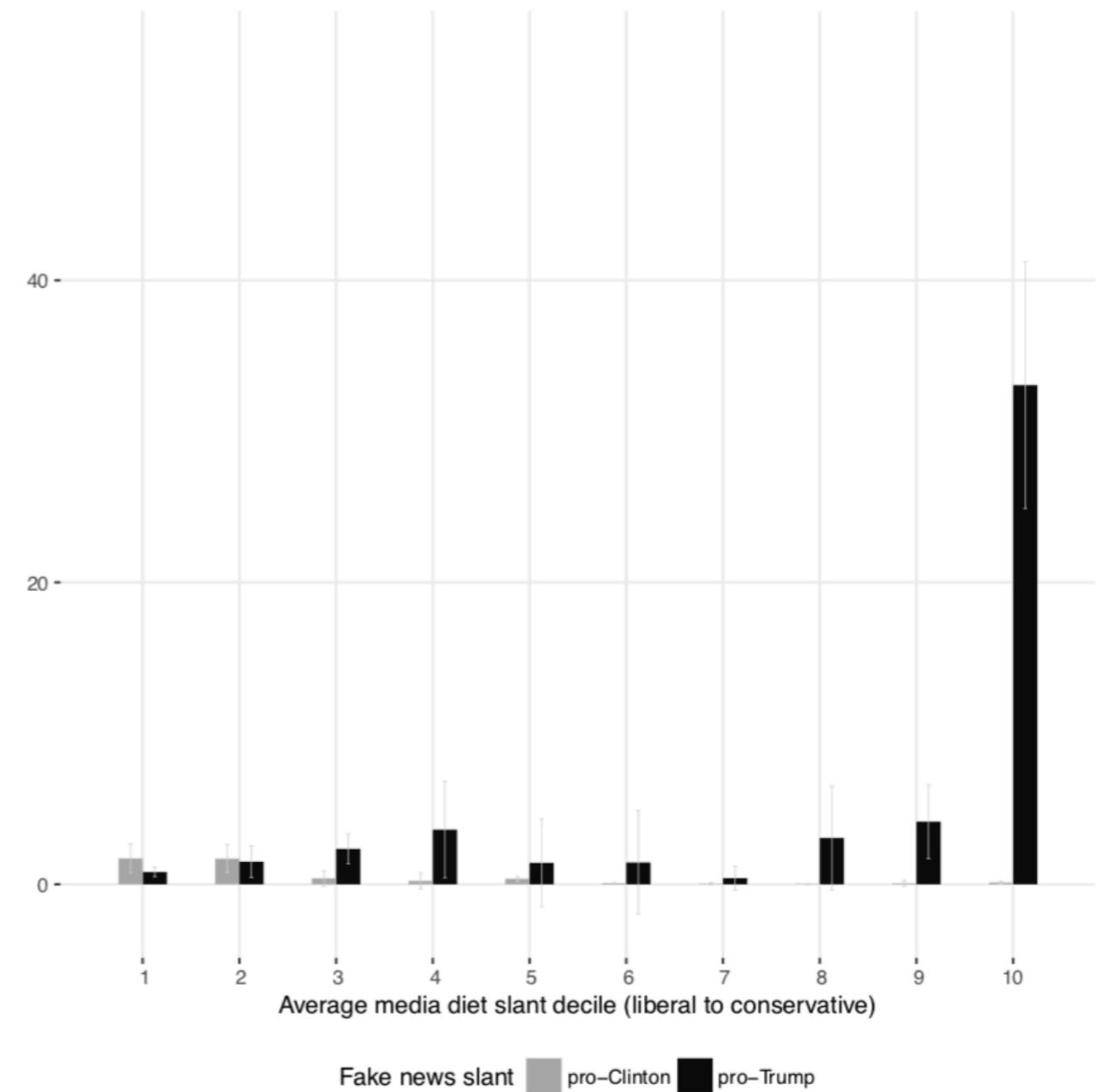
# The reach of online misinformation

**Figure 4. Average monthly reach of prominent Italian news sites, and some of the most popular false news sites (2017)**



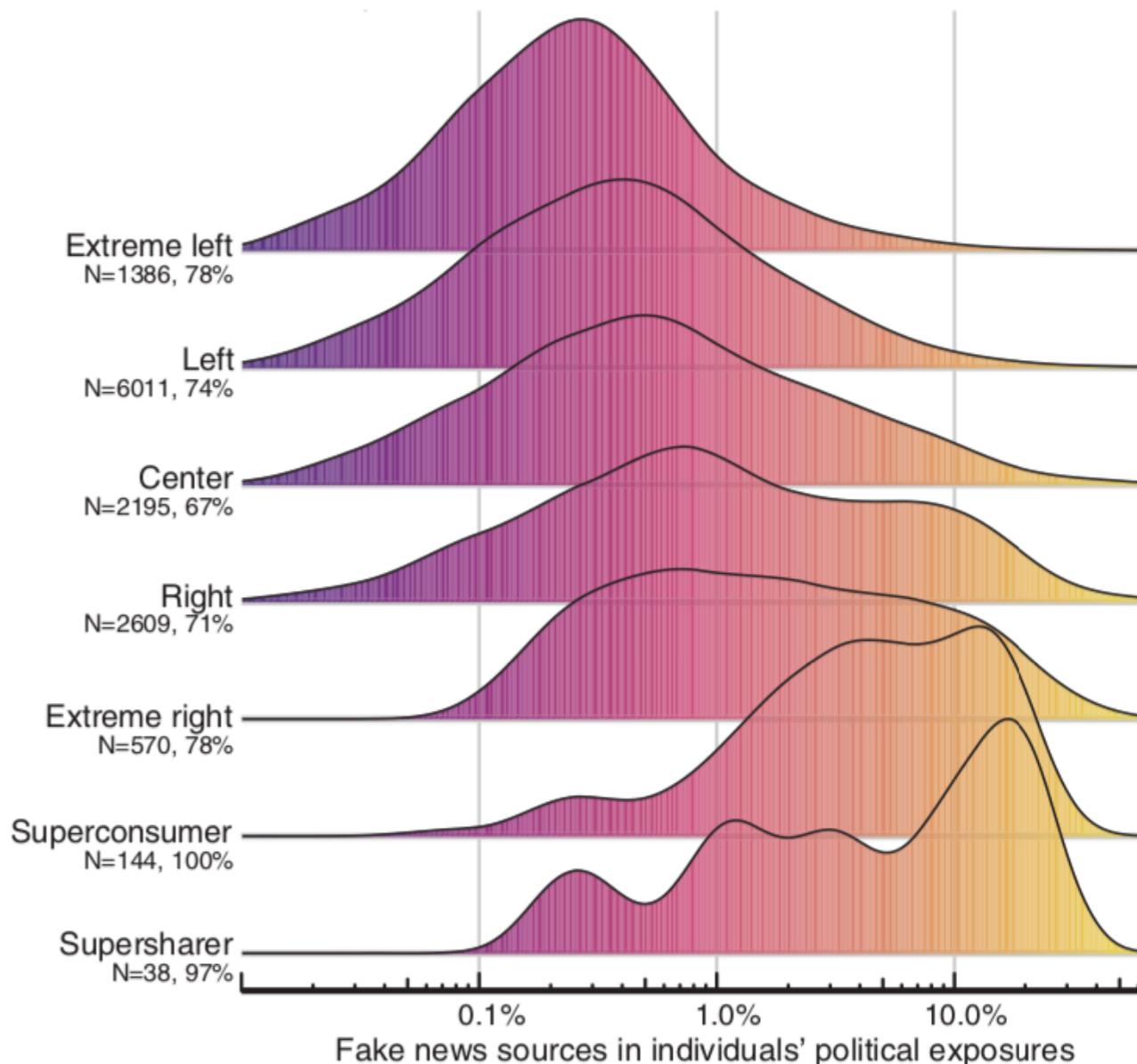
# The reach of online misinformation

- Do fake news have *real* effects?
- In general fake news are more conservative-oriented, and they are viewed more by conservatives
- In general, individuals that view more news overall, also view more fake news



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# The reach of online misinformation

- Empirical evidence of reach and effects of online misinformation is at best mixed.
- This is consistent with evolutionary approaches to culture: for the characteristics allowing communication, social interactions, and learning from others to be evolved in the first place, we should not be too gullible - e.g. social learning strategies (Laland, 2004), epistemic vigilance (Sperber et al., 2010)
- still online misinformation exists...

# Top 10 Fake News Articles by Facebook Engagements

1

BABYSITTER TRANSPORTED TO HOSPITAL AFTER INSERTING A BABY IN HER VAGINA



**1,204,400**

Babysitter transported to hospital after inserting a baby in her vagina

2

FBI SEIZES OVER 3,000 PENISES DURING RAID AT MORGUE EMPLOYEE'S HOME



**1,145,470**

FBI seizes over 3,000 penises during raid at morgue employee's home

3

Charles Manson to be released on parole, to Johnson County, TX



**1,125,031**

Charles Manson to be released on parole, to Johnson County, TX

4

Police: Chester Bennington Was Murdered



**1,042,032**

Police: Chester Bennington Was Murdered

5

MORGUE EMPLOYEE CREMATED BY MISTAKE WHILE TAKING A NAP

**993,205**

Morgue employee cremated by mistake while taking a nap

6



Angry Woman Cuts Off Man's Penis for Not Making Eye Contact During Sex

**981,423**

Angry Woman Cuts Off Man's Penis for Not Making Eye Contact During Sex - TRENDING

7



Female Legislators Unveil 'Male Ejaculation Bill' Forbidding The Disposal Of Unused Semen

**966,498**

Female Legislators Unveil 'Male Ejaculation Bill' Forbidding The Disposal Of Unused Semen

8

President Trump Orders the Execution of Five Turkeys Pardon by Obama

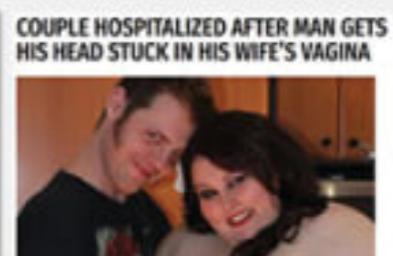
ELDERLY WOMAN ACCUSED OF TRAINING HER 65 CATS TO STEAL FROM NEIGHBORS



**914,429**

President Trump Orders the Execution of Five Turkeys Pardon by Obama

9



COUPLE HOSPITALIZED AFTER MAN GETS HIS HEAD STUCK IN HIS WIFE'S VAGINA

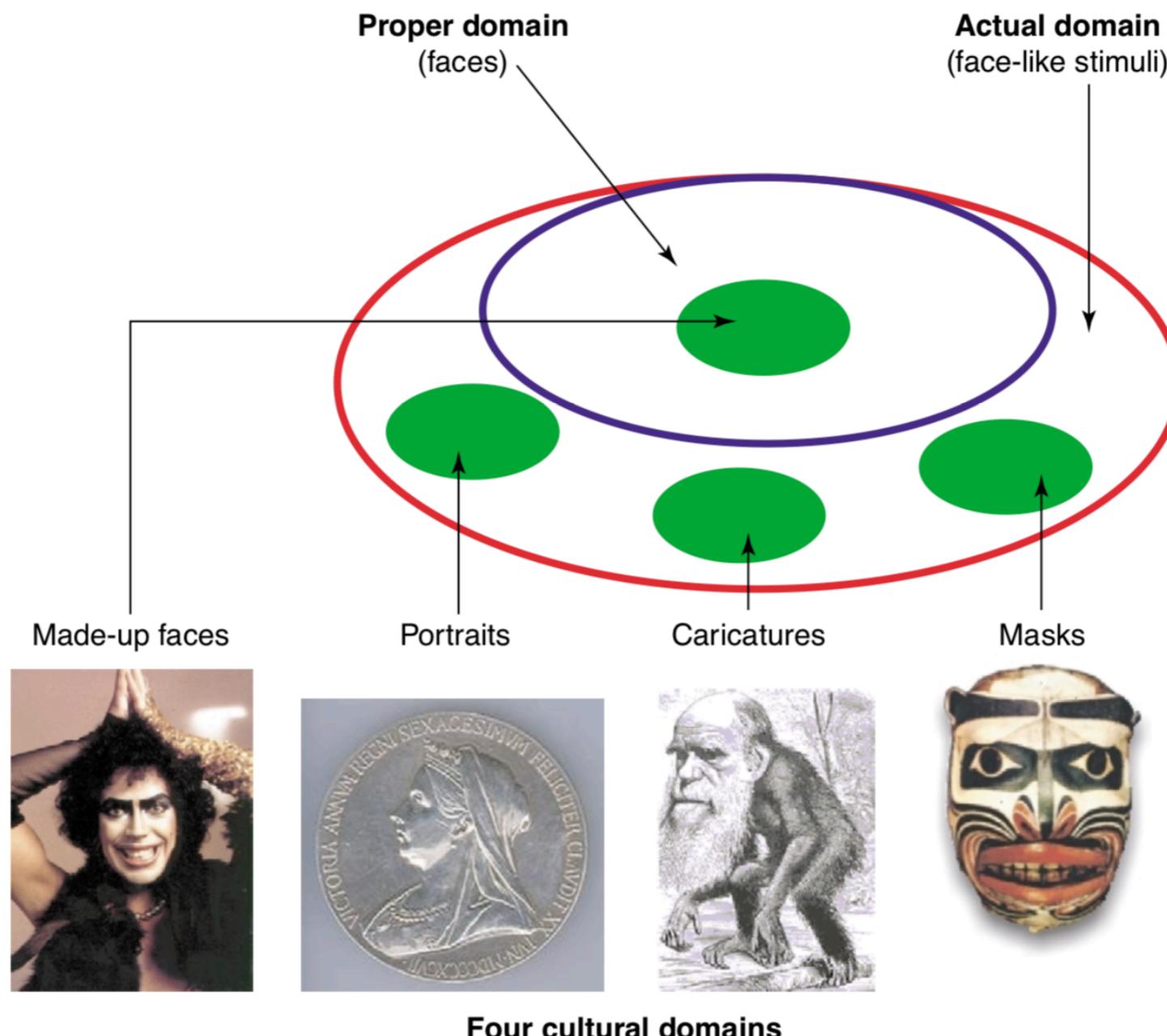
**672,093**

Couple hospitalized after man gets his head stuck in his wife's vagina

# Cognitive attraction and online misinformation

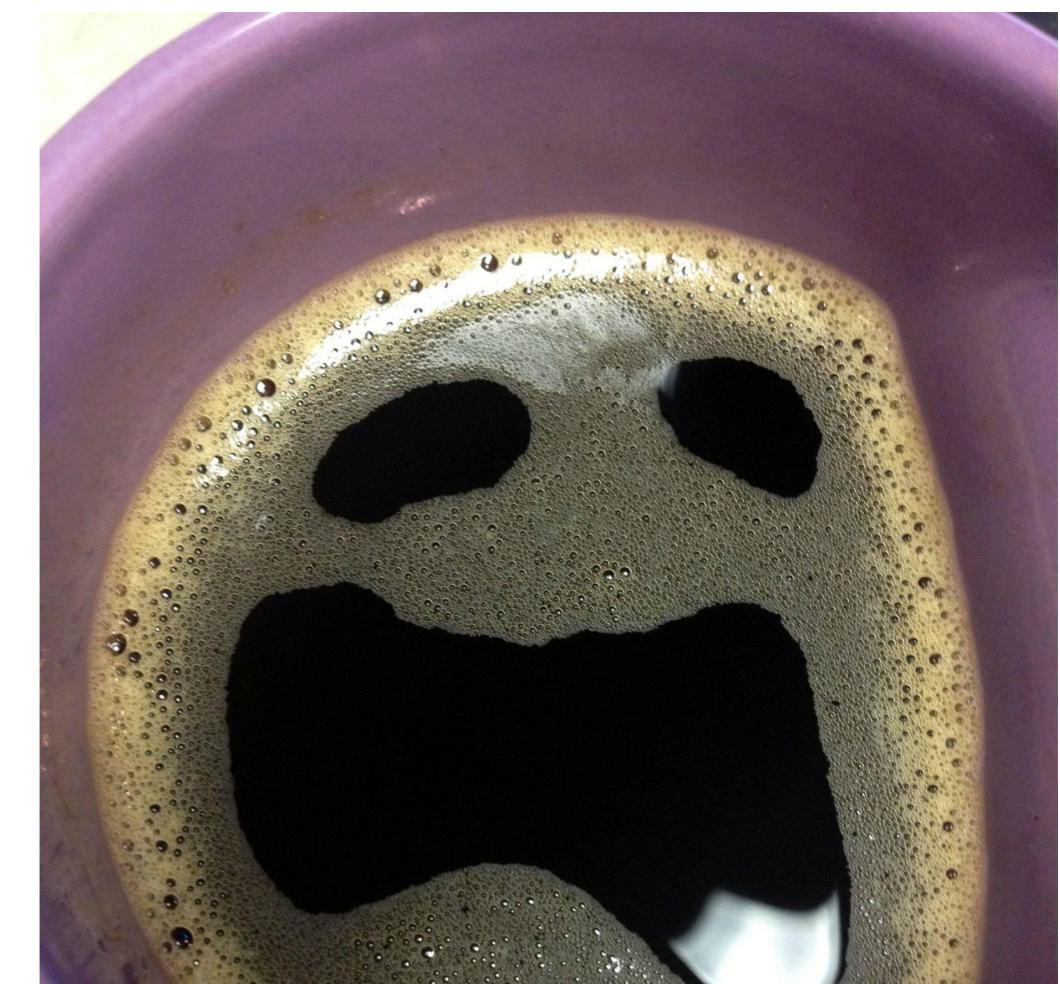
- what makes a cultural trait successful?
- general cognitive preferences make some cultural traits more likely to succeed with respect to others, making them more appealing, attention-grabbing and memorable

# Cognitive attraction and online misinformation

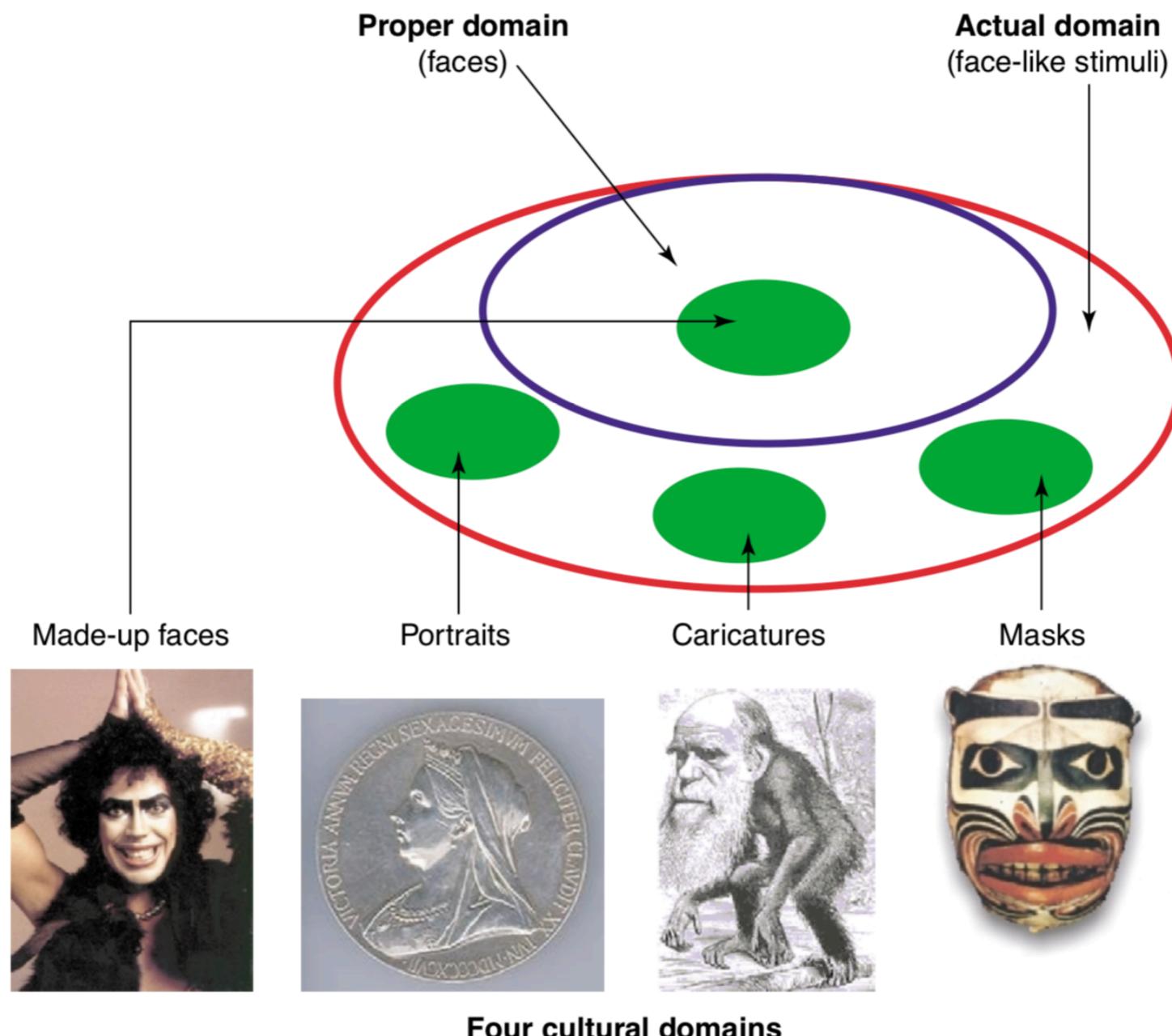


TRENDS in Cognitive Sciences

Sperber & Hirschfeld, 2004



# Cognitive attraction and online misinformation



TRENDS in Cognitive Sciences

Sperber & Hirschfeld, 2004

- misinformation (online or offline) is not constrained by reality.
- We can shape misinformation to be appealing, attention-grabbing and memorable more than what we can do with real information.
- (does not need to be a conscious process)



data, links and articles  
full texts on OSF

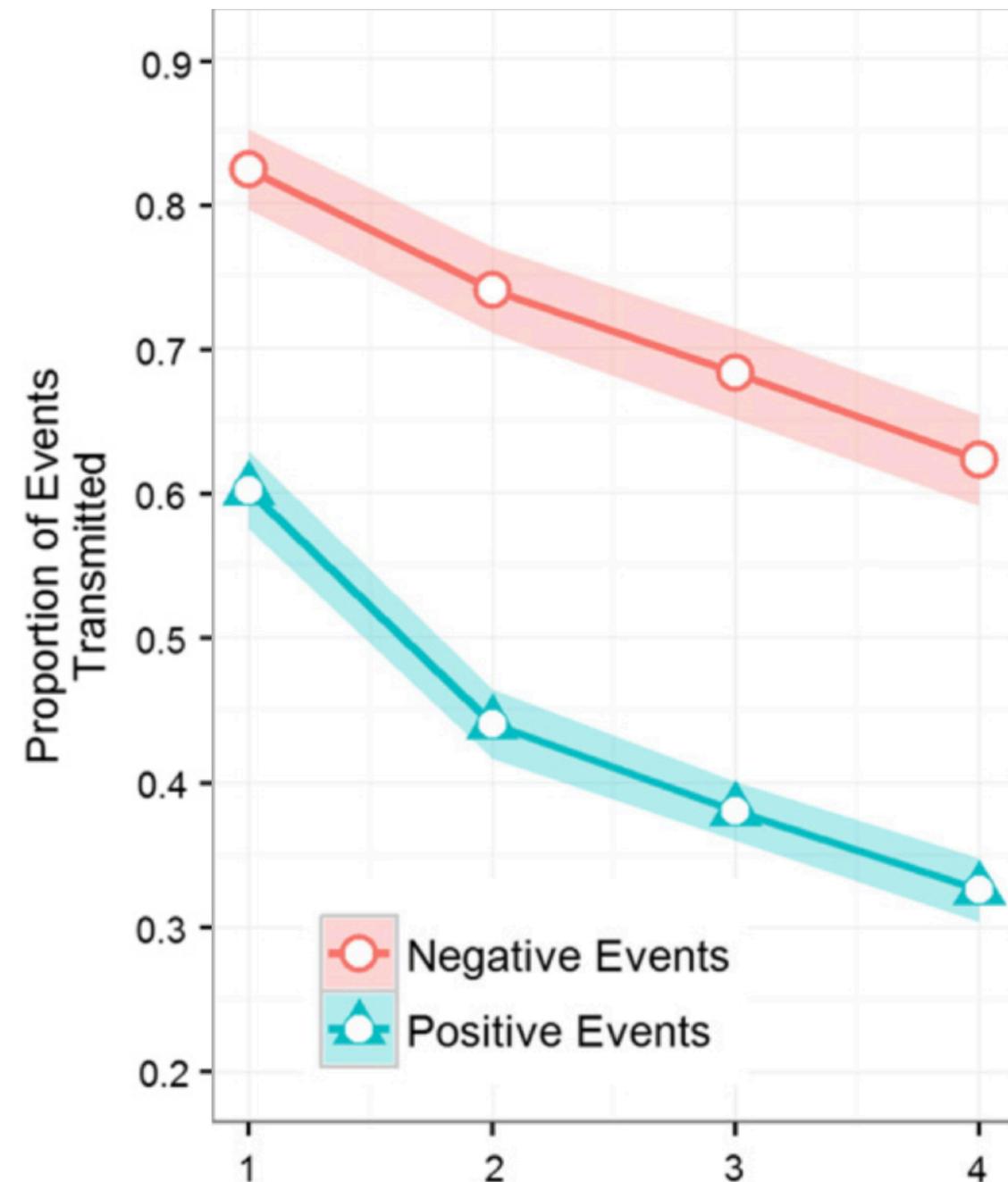


- an illustrative/exploratory investigation:
- content analysis of 260 articles from “suspect” websites (lists provided by [snopes.com](#) and [buzzfeed.com](#))
- articles coded for the presence/absence of specific features (cognitive attractors)
- relatively small sample, but we wanted to *read* the articles

- Negative content
- Threat-Related information
- Disgust
- Sex
- Minimally counterintuitive concepts (and anti-essentialist violations)
- Social information
- Celebrities

## Negative content

- negative information is better remembered and transmitted than positive information
- information framed negatively is considered more truthful than the same information framed positively
- documented in news, but also e.g. literature



## Negative content

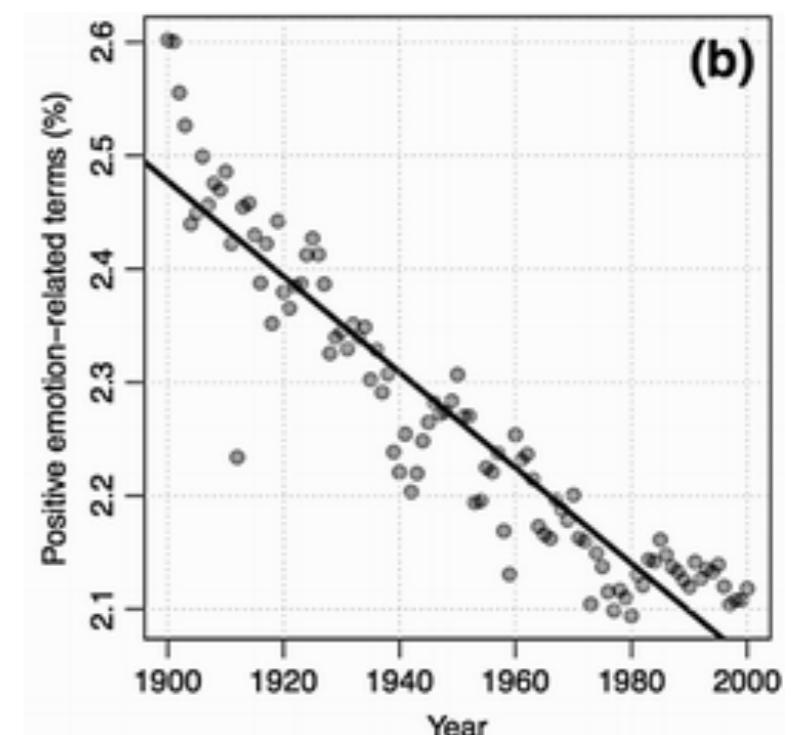
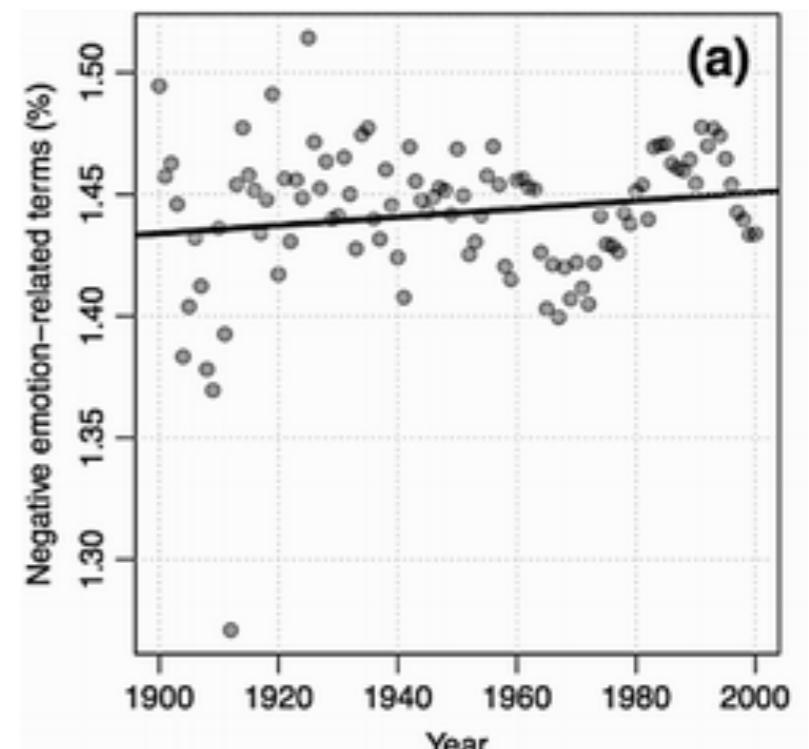
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When civil litigation cases go to trial, 60% of plaintiffs lose, winning no money

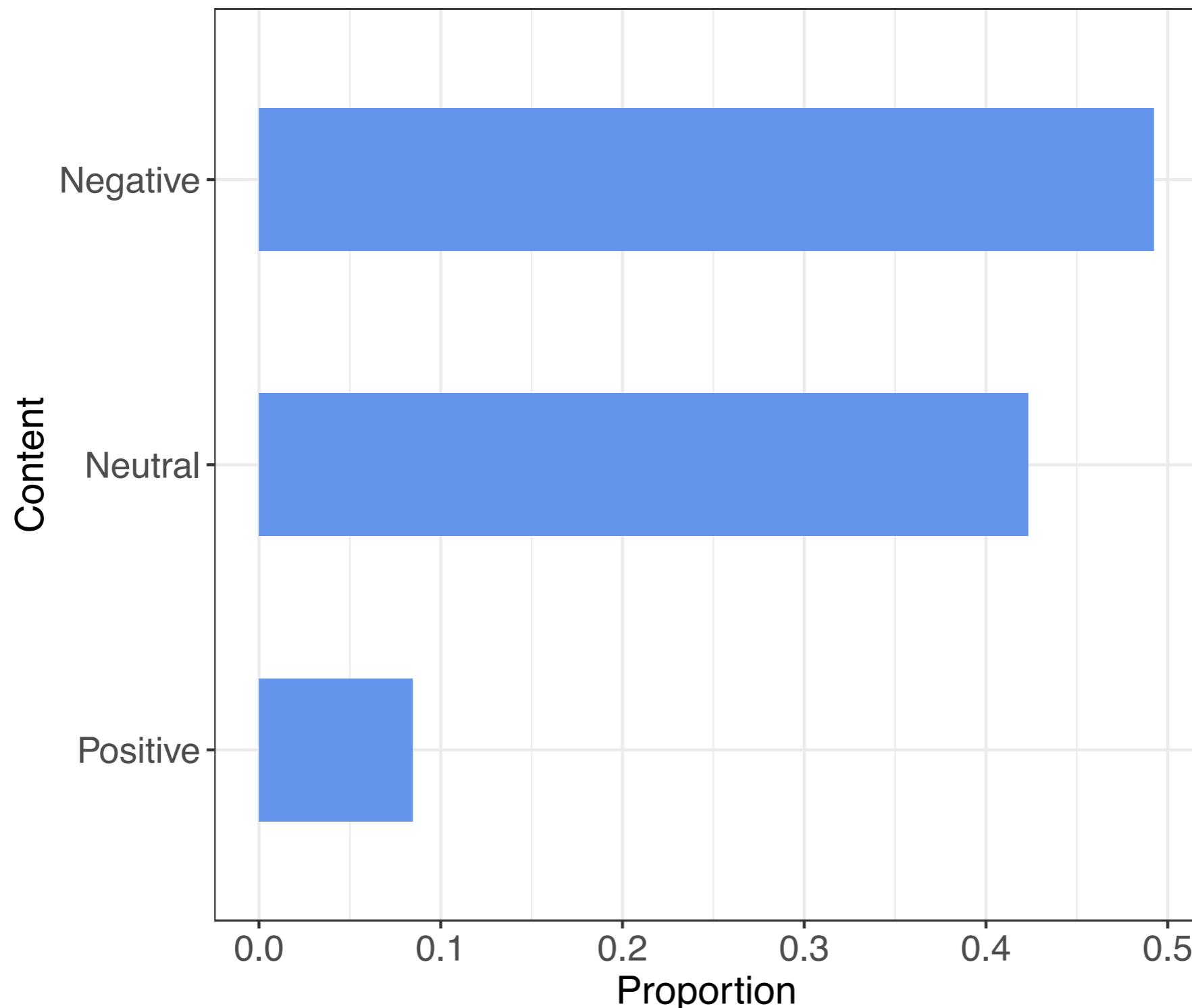
When civil litigation cases go to trial, 40% of plaintiffs succeed and win money

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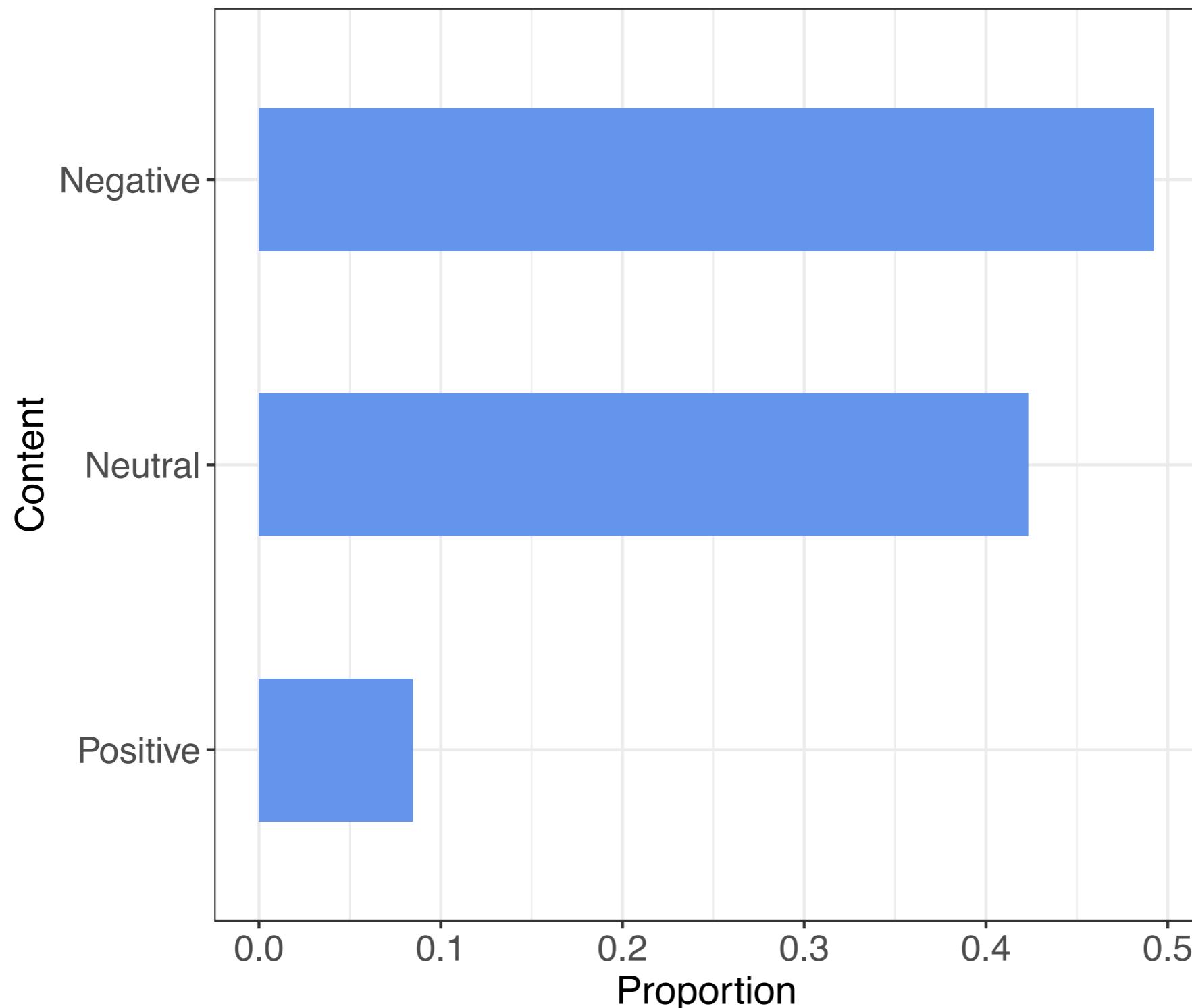


## Negative content



- negative articles were between five and six times more frequent than articles with a positive content

## Negative content



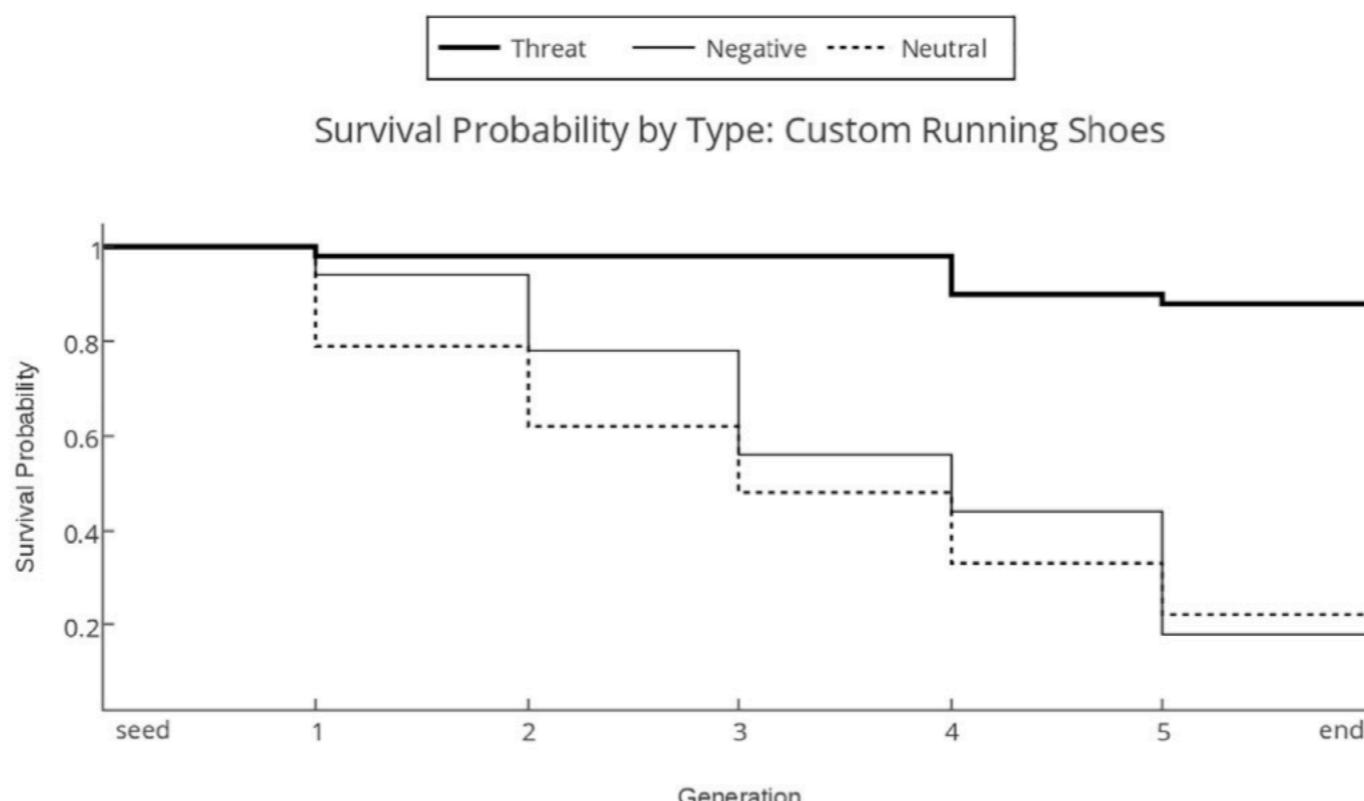
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## Threat-related information

- evolutionary explanation for negative information.
- The threat does not need to be relevant

'Lancer™ special fabric may smell if not cleaned properly'

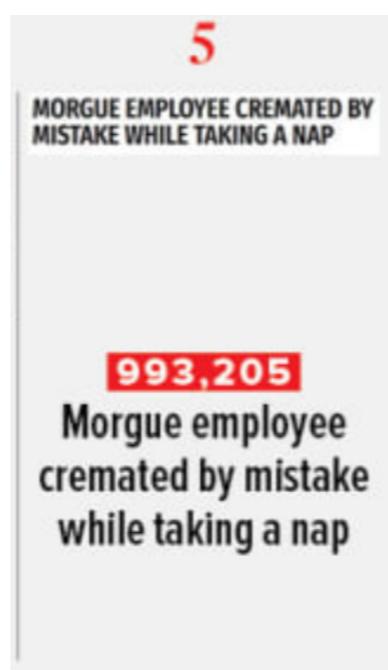
'Lancer™'s strap design can cause sprained ankles when used for activities other than running'



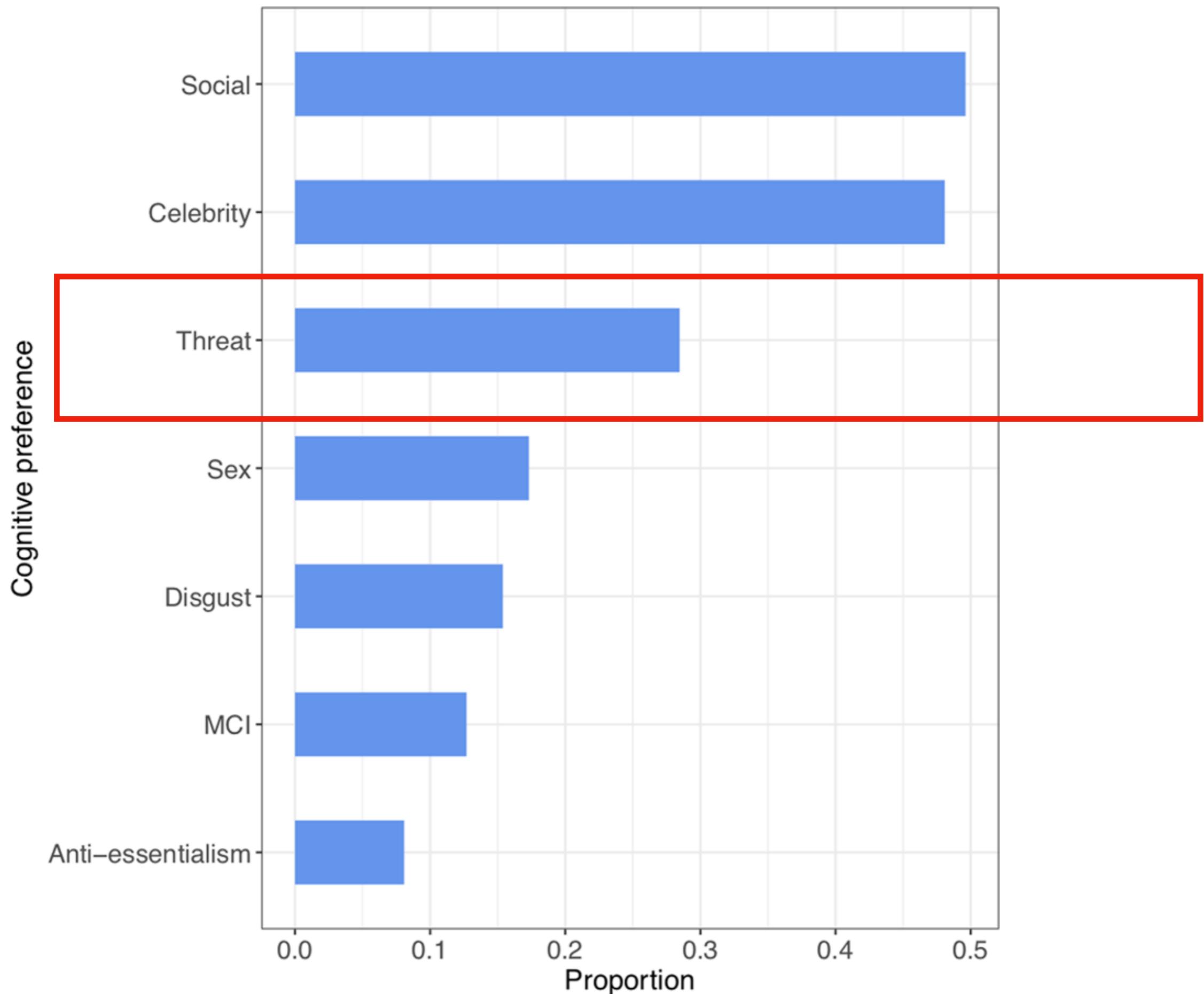
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In 2% of users 'Lancer™'s strap design can cause sprained ankles when used for activities other than running'



## Threat-related information



## Sex

- no cultural evolution study investigating whether sex-related information enhances the success of narratives

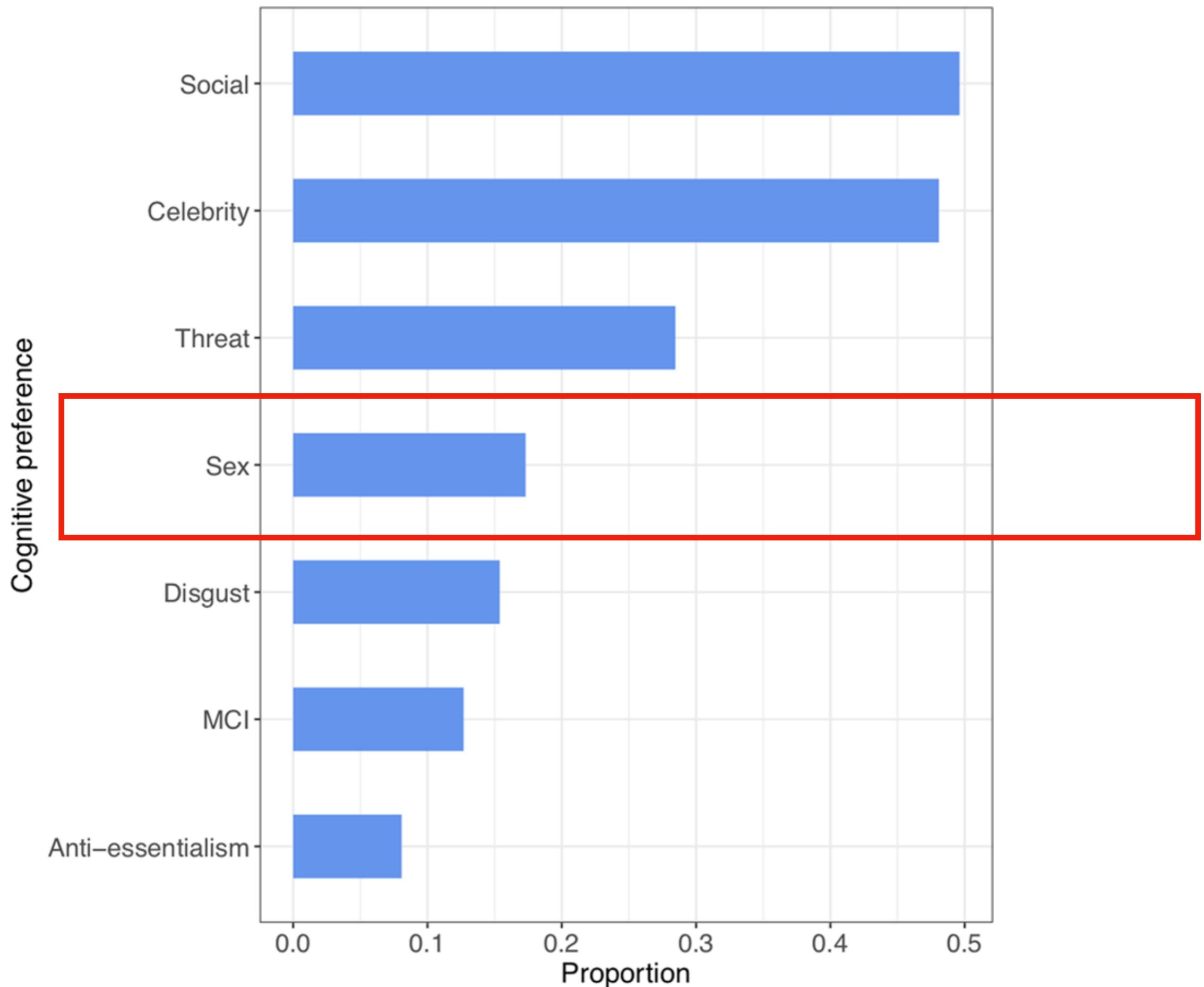
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<b>6</b> Angry Woman Cuts Off Man's Penis for Not Making Eye Contact During Sex  <b>981,423</b> Angry Woman Cuts Off Man's Penis for Not Making Eye Contact During Sex · TRENDING	<b>7</b> Female Legislators Unveil 'Male Ejaculation Bill' Forbidding The Disposal Of Unused Semen  <b>966,498</b> Female Legislators Unveil 'Male Ejaculation Bill' Forbidding The Disposal Of Unused Semen	<b>8</b> President Trump Orders the Execution of Five Turkeys Pardon by Obama  <b>914,429</b> President Trump Orders the Execution of Five Turkeys Pardon by Obama	<b>9</b> ELDERLY WOMAN ACCUSED OF TRAINING HER 65 CATS TO STEAL FROM NEIGHBORS  <b>690,437</b> Elderly woman accused of training her 65 cats to steal from neighbors	<b>10</b> COUPLE HOSPITALIZED AFTER MAN GETS HIS HEAD STUCK IN HIS WIFE'S VAGINA  <b>672,093</b> Couple hospitalized after man gets his head stuck in his wife's vagina

## Sex



## **Disgust**

- many cultural evolution studies showing that disgust favours the success of stories
- transmission chains experiments suggest stories with disgust motifs are better transmitted
- Disgust motives studied in urban legends

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Jasmine was involved in a privately organised charity cake sale. Jasmine didn't have enough time to buy ingredients for the cake so she used what she could find in the kitchen cupboard.

When returning to clean up the kitchen Jasmine found that the flour she had used was infested with maggots. She hurried to buy the cake but it had already been sold.

Next day in the local newspaper she saw a picture of a cake being sliced up for visiting dignitaries – Jasmine's maggot cake!

## Disgust

- many cultural evolution studies showing that disgust favours the success of stories
- transmission chains experiments suggest stories with disgust motifs are better transmitted
- **Disgust motives studied in urban legends**



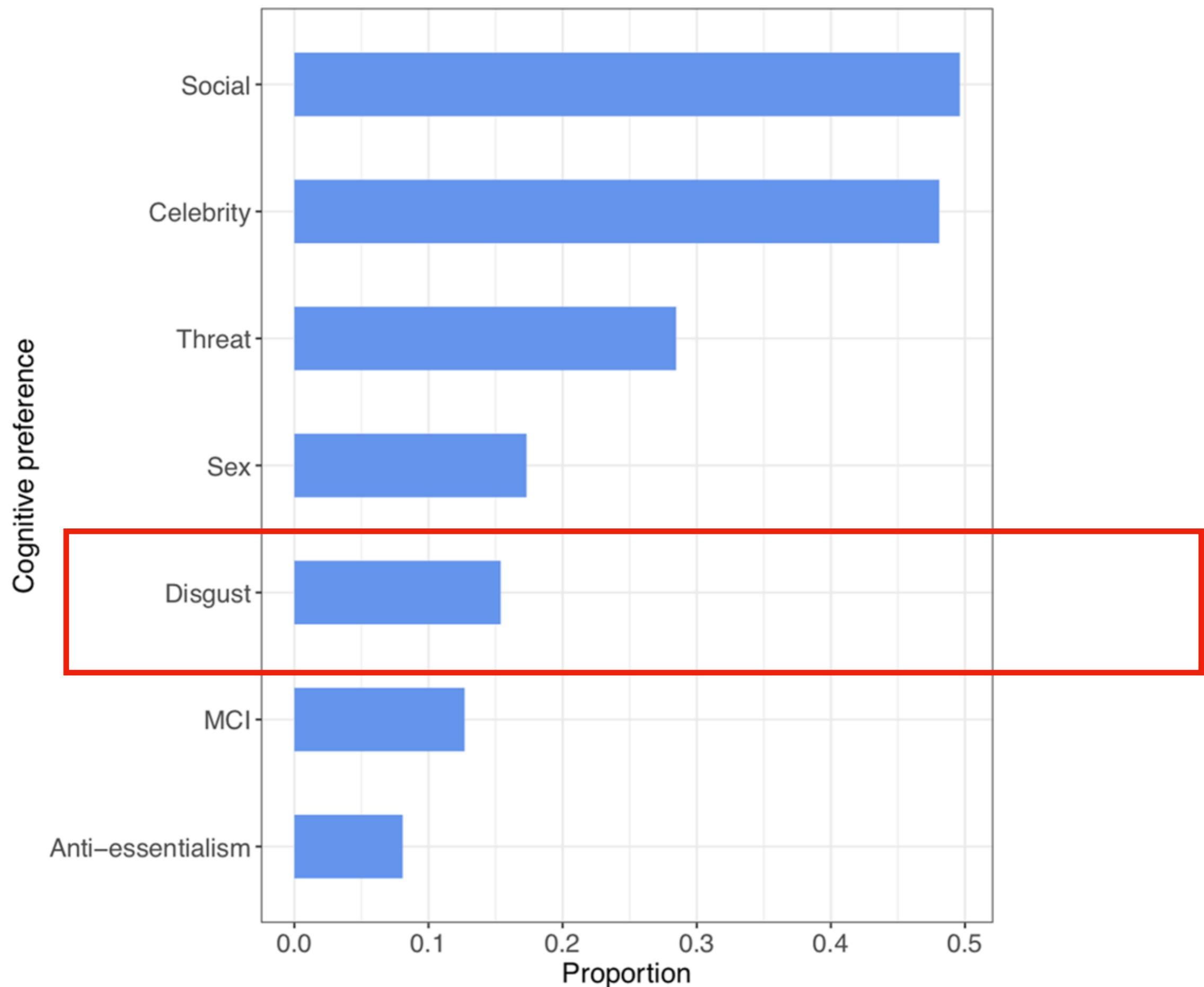
McDonald's Uses Worm Meat Fillers But Can Legally Call It 100% Beef

McDonald's Uses Worm Meat Fillers But Can Legally Call It 100% Beef. Large companies have been the subject of rumors that they substitute unusual

DAILYBUZZLIVE.COM



## Disgust



## **Minimally counterintuitive information**

- MCI represent a ‘cognitive optimum’. They are both memorable (counterintuitive elements) and easy to use (intuitive ones)
- Religions, transmission chain experiments, even Grimm’s folktales

THE INVISIBLE BANANA  
(BANERJEE ET AL. 2013)

That had a bright yellow skin and smelled very fruity and delicious

0

That was very fresh and ripe and turned invisible every few minutes

1

That felt angry when it rained and turned invisible every few minutes

2

That felt angry when it rained, turned invisible every few minutes, and could live in outer space without needing any oxygen

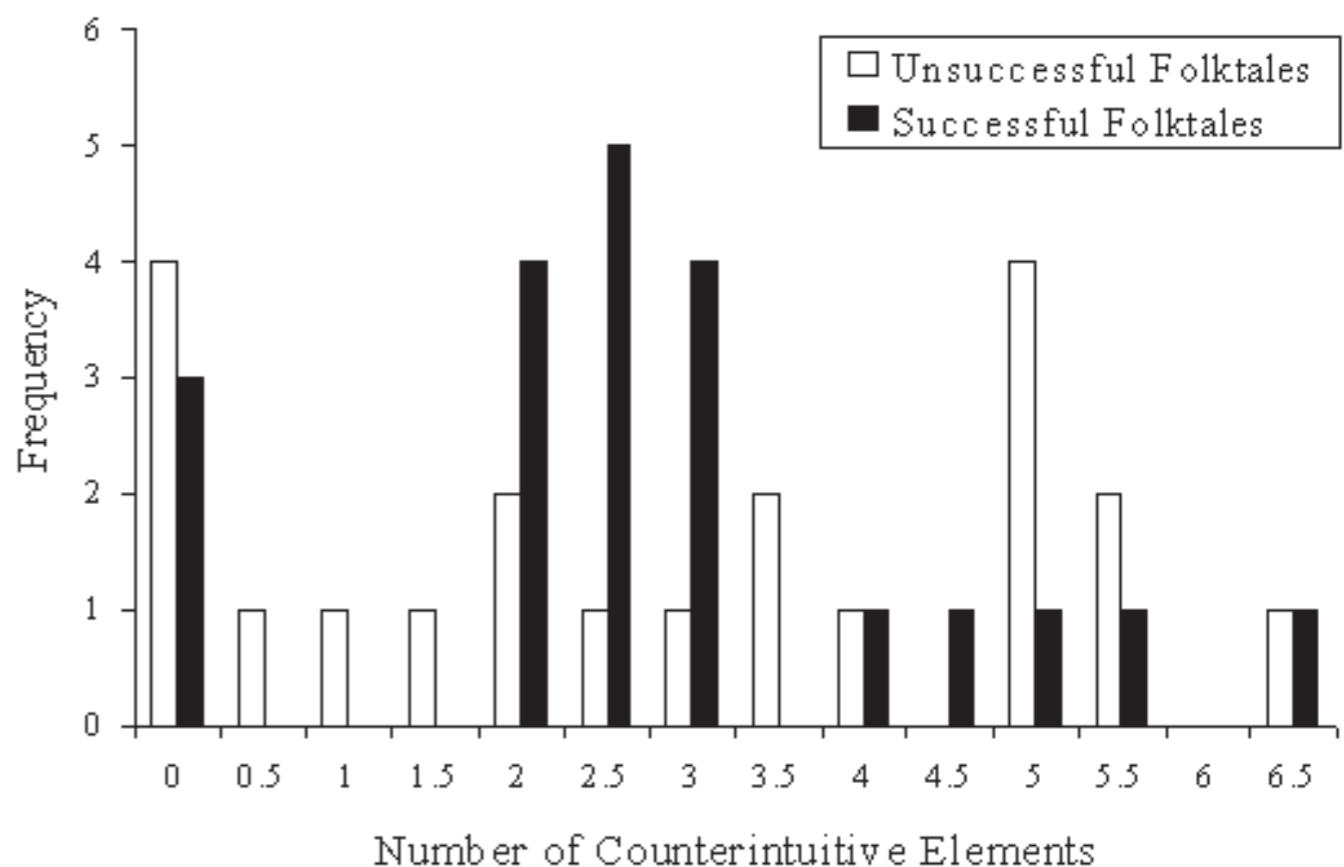
3

## Minimally counterintuitive information

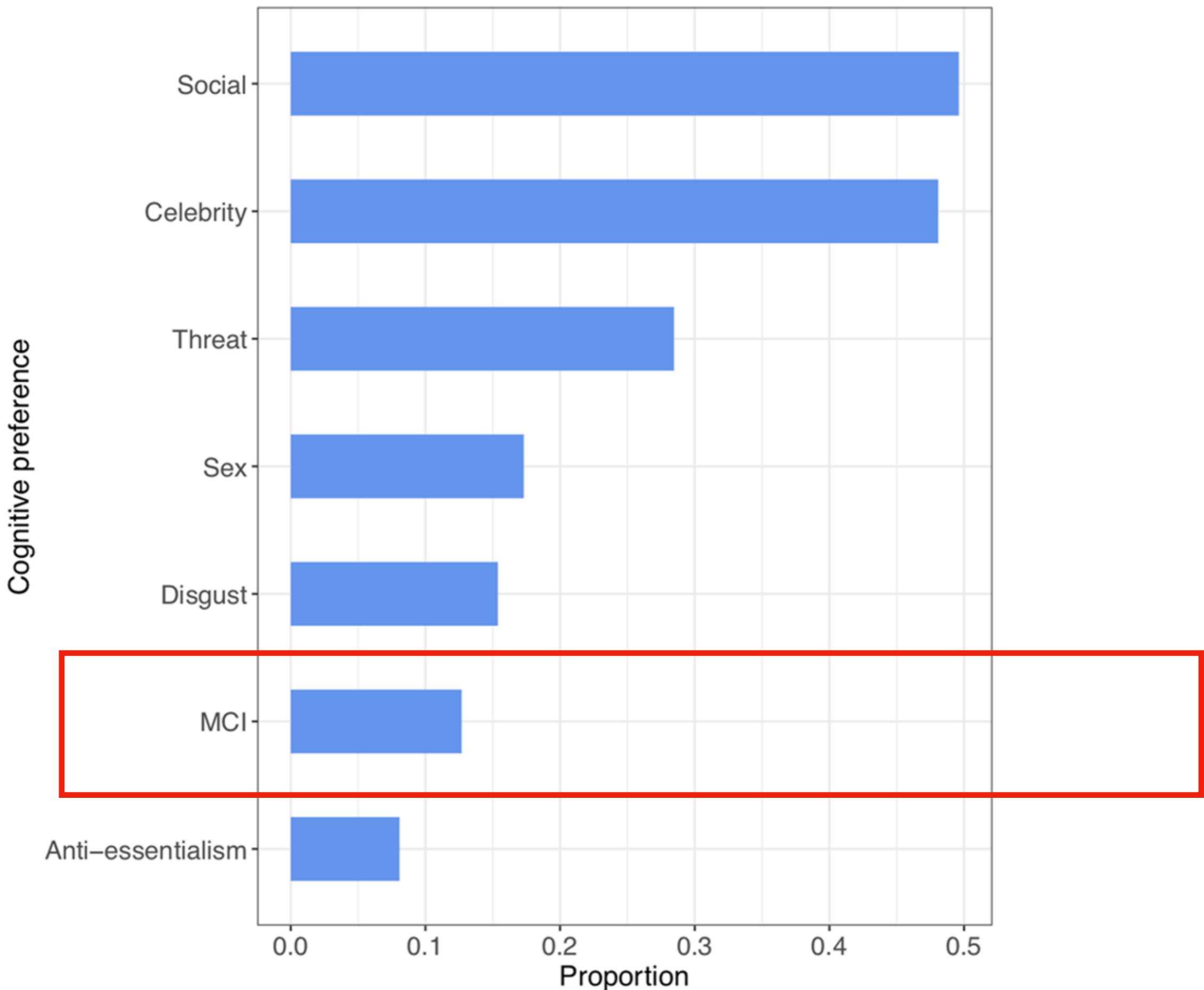
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## Minimally counterintuitive information



## Anti-essentialism

- Essentialist thinking refers broadly to the intuition that living beings have a hidden essence that does not change, and that is responsible for their physical appearance and for their behaviour
- Suggested link with GMO opposition

If one takes a white horse and paint black stripes on it, it is not a zebra.

On the contrary, by taking out handles from a mug and putting flowers inside, the mug becomes a flowerpot.

## Anti-essentialism

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- Suggested link with GMO opposition

DNA = ‘essence’

85% of respondents of a survey said that it is possible that a GM tomato (with a catfish gene) will taste “fishy”

Anti-essentialism

## FIRST GENETICALLY MODIFIED HUMAN BEING IS RAISING CONCERNS FOR RESEARCHERS

ACTIONNEWS3 NEWS 0

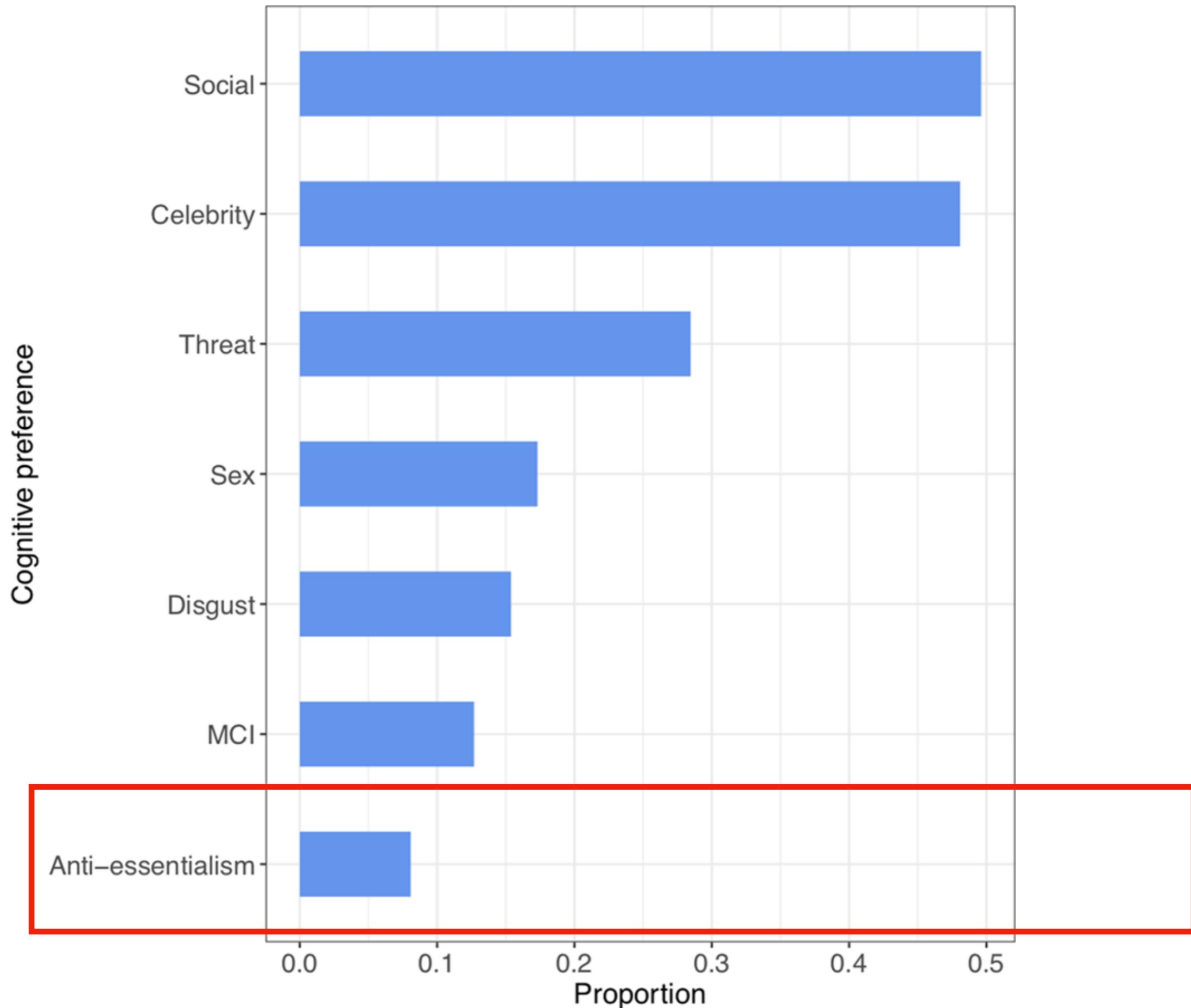


## TAIWANESE MILLIONAIRE SUCCESSFULLY GETS TRANSPLANTED 12-INCH-LONG BLACK MAN'S PENIS

ACTIONNEWS3 NEWS 0

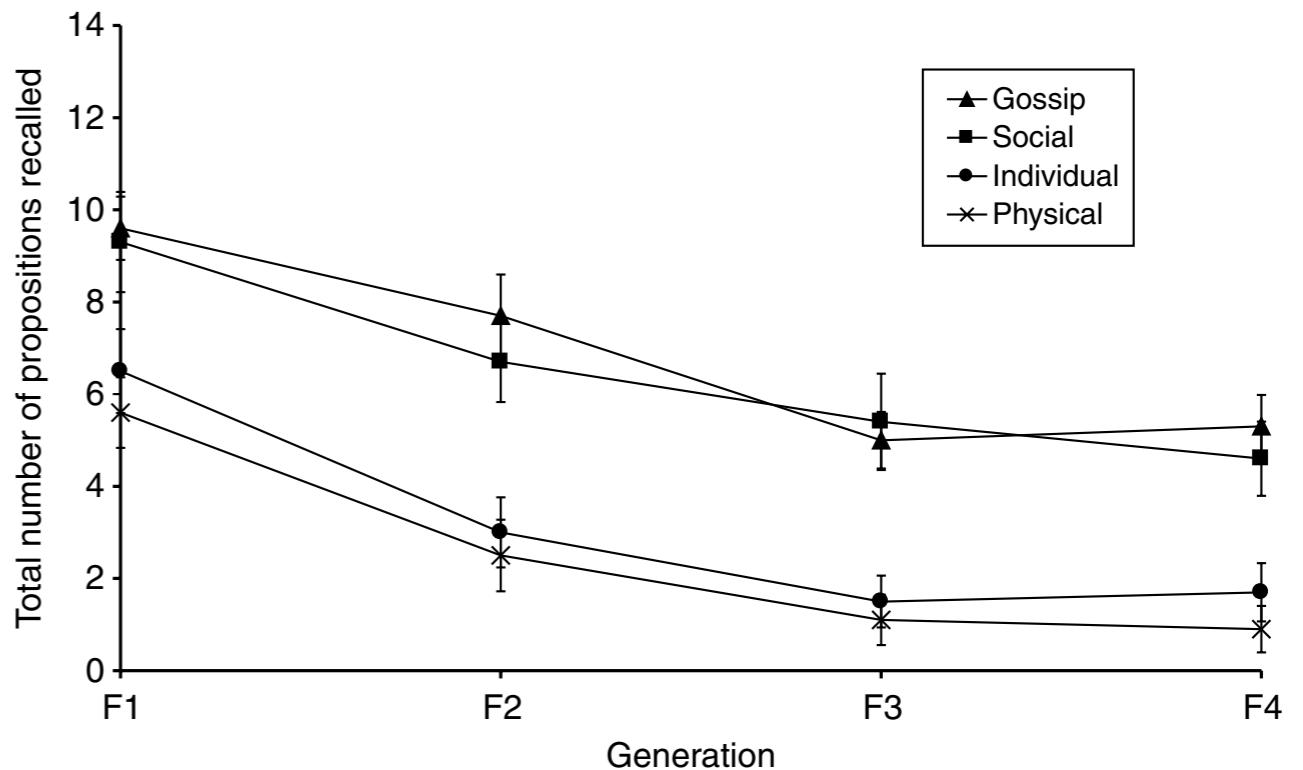


## Anti-essentialism



## Social information/Celebrities

- ‘particularly intense and salient social interactions and relationships’ = gossip, cheating, group alliances, controversies among individuals, etc.
- Presence of celebrities



## Social information/Celebrities

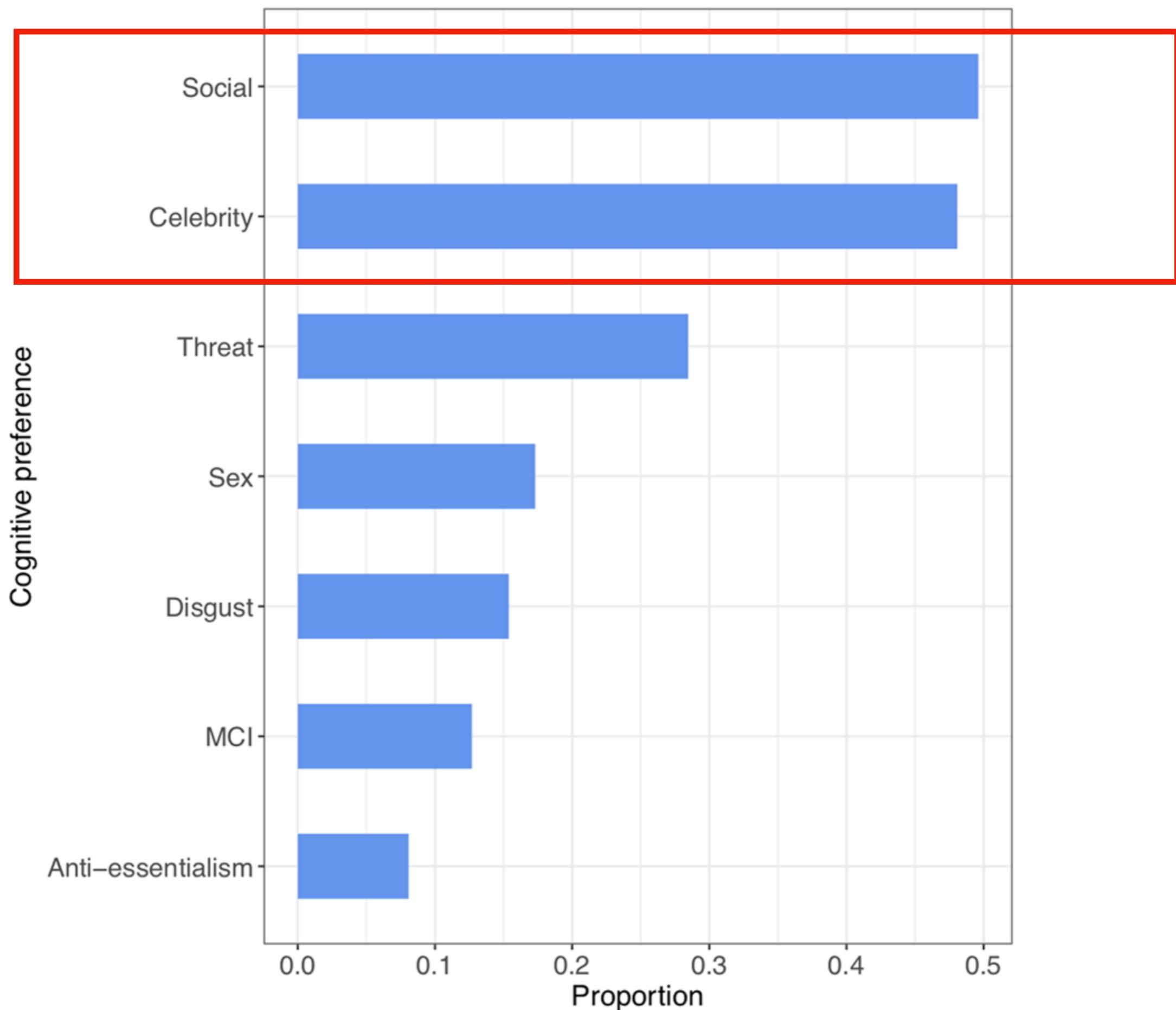
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**Bieber Accused Of Being Responsible For Teen Girl’s Suicide After “Beached Whale” Insult**

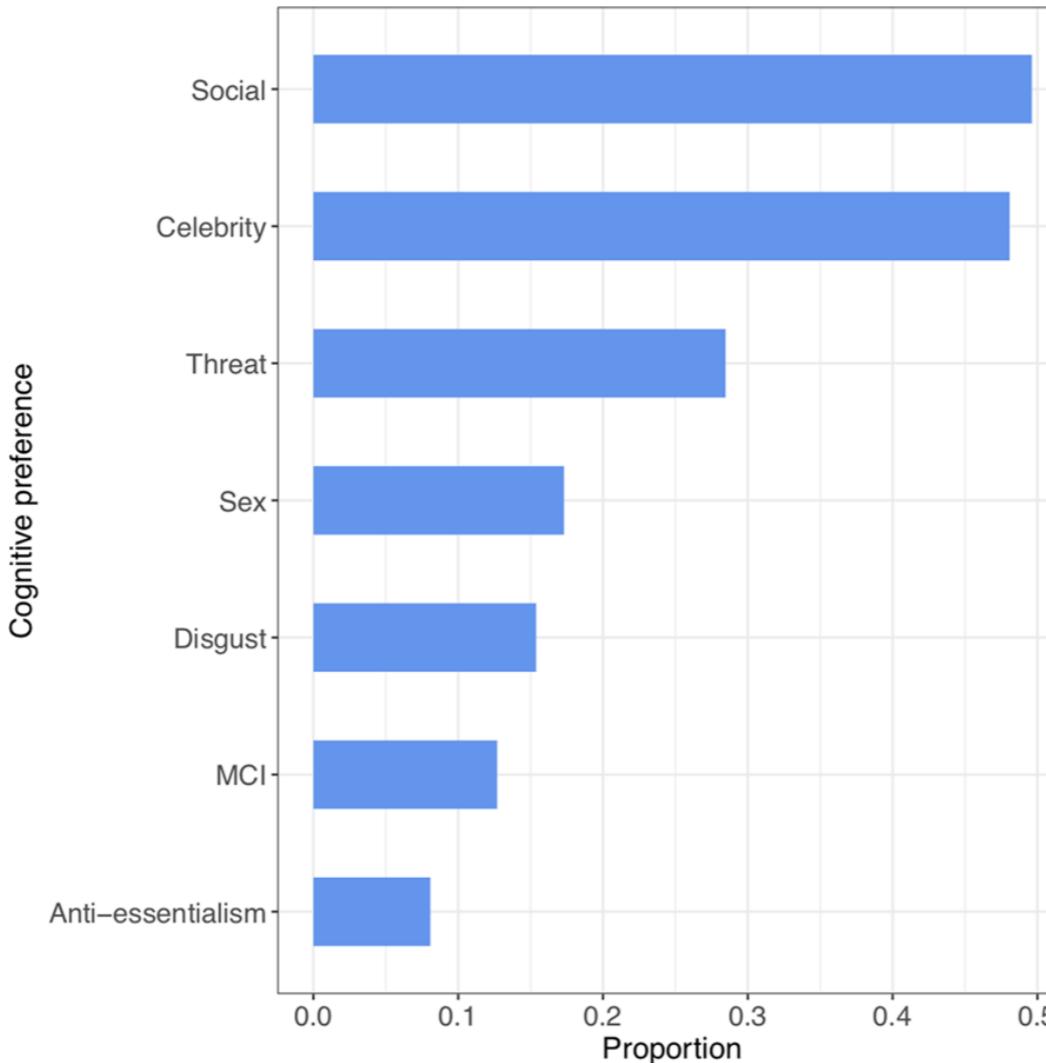
🕒 March 1, 2017 🚩 Chudasi Delhi 📄 Celebrity 💬 9



## Social information/Celebrities

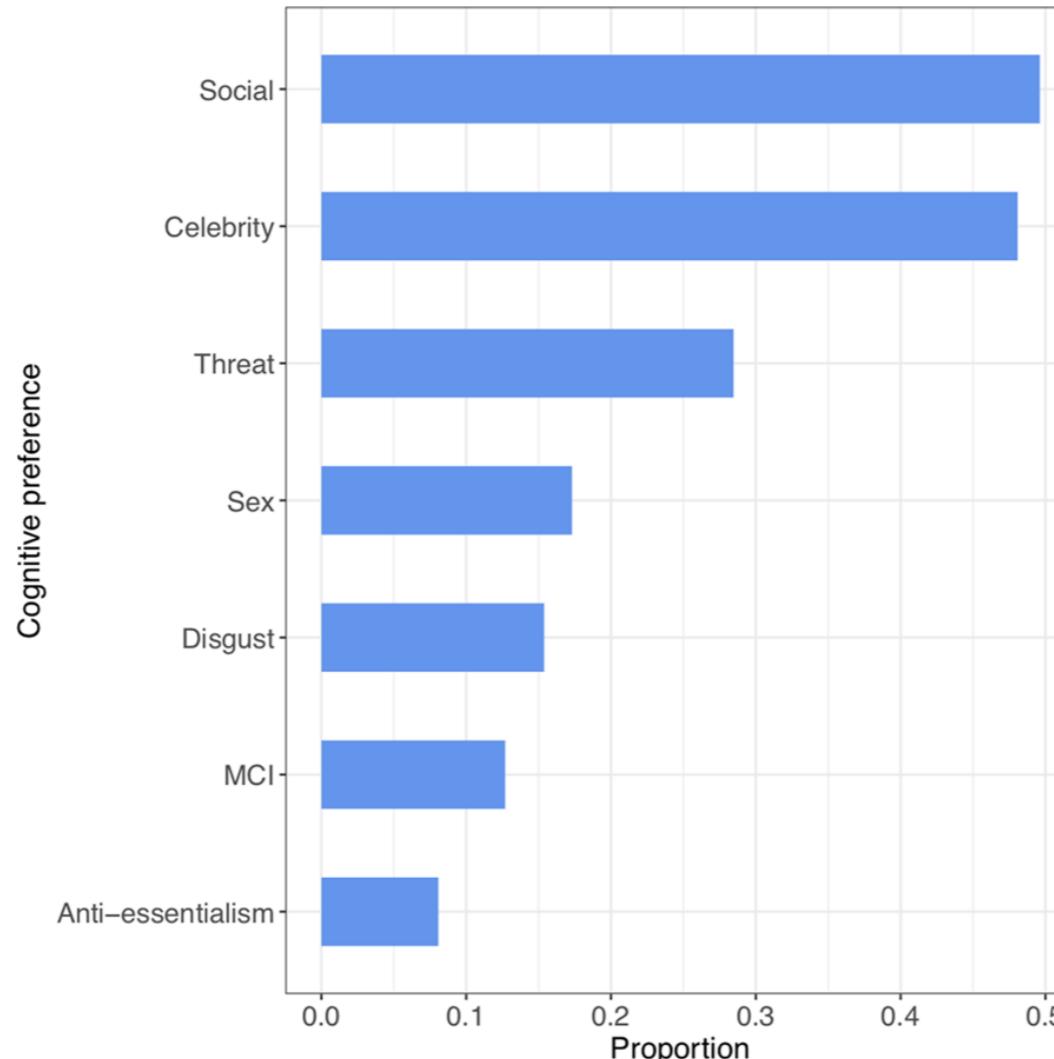


## Social information/Celebrities



- Almost 50% of articles were coded as containing “celebrities”. However, the majority of them were articles about politics. Excluding these, articles about celebrities were the 16% of the sample.

## Social information/Celebrities



"Political" fake news were around 40%. Abundant but still a minority. Misinformation is not necessarily political.

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# Conclusion

- Exploratory analysis
- hypothesis testing: compare suspect and real news
- hypothesis testing: role of different cognitive attractors in the differential success of news
- topic modelling: (i) larger samples, (ii) automatic tagging of text with respect to their “attractiveness”

# Conclusion

- Misinformation is **low-quality** information that spreads because of **inefficiency** of digital communication
- quality = **truthfulness**
- Misinformation is **hi-quality** information that spreads because of **efficiency** of digital communication
- quality = **cognitive appeal**

# Thank you!

- A. Acerbi, Cognitive attraction and online misinformation, *Palgrave Communications*, 5, 15 (special issue on “Cultural Evolution”), 2019
- A. Acerbi, *Cultural Evolution in the Digital Age*, Oxford University Press, in press, expected December 2019