

Eelco Herder

Quantifying the Fine Balance Between Pluralism and Polarization



My research in a nutshell

My core research field is User Modeling and Personalization.

The application areas of my research have been extended to various related fields, including social media, technology-enhanced learning and mobile, ubiquitous computing.

In particular, I am interested in how users interact with programs, how they search for information, and how the return to places where they have been before.



The ideal recommender (1/2)

Your partner, your best friend or your mother probably knows a lot about you:

- the food you like, the books you read, the movies you watch
- things that interest you or that upset you
- your current needs, aspirations and goals
- dates of your birthday, your kids' birthdays, and holidays
- secret desires and phantasies



The ideal recommender (2/2)

Still, this does not guarantee that your mother will buy you a present that you like.



It can be something that

- you already have
- you hate for some reason only known to you
- she bought to surprise you (sometimes this works out perfectly fine, though)

Do Google, Facebook and YouTube personalize because they like you?

Arguably not.

- These companies earn their money by selling advertisements and showing them to you.
- For YouTube, it is more profitable if you spend a whole evening watching cat videos instead of just one educational video.



Pluralism in the media

A functioning media landscape should both

- provide different perspectives that represent different societal, political and religious views
- provide some common ground, a shared understanding of facts and definitions



Pluralism versus polarization

The fine border between pluralism and polarization seems to be crossed more often, among others due to¹:

- An increasingly polarizing landscape
- The spread of twisted facts, partisan views and fake news
- The growing influence of personal blogs, non-professional news outlets and social media



¹ Ash, T. G. (2017). *Free Speech: Ten Principles for a Connected World*. Atlantic Books. ISBN-13: 978-1848870949.

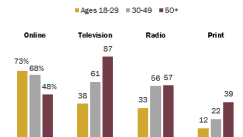
Is the media landscape really that polarized?

A recent study by the Pew Research Center² showed that, for regular news consumption

- the older generations still relied on public broadcasters (BBC, ARD, NPO, ...)
- the younger generations relied more on reliable news media (The Guardian, Sueddeutsche, Volkskrant, ...)

Younger Europeans more likely to get news online than from TV

Across eight Western European countries, median percent of adults in each age group who get news at least daily from ...



Note: Percentages are medians based on eight Western European countries.
Source: Survey of eight Western European countries conducted Oct. 30-Dec. 20, 2017.
"Western Europeans Under 30 View News Media Less Positively, Rely More on Digital Platforms Than Older Adults"

PEW RESEARCH CENTER

² http://www.journalism.org/2018/10/30/western-europeans-under-30/?fbclid=IwAR0nL_KYBiGbK_kvhaTPq3XIqucAvnIzgf9wDBxwfcGy91Gso2q_DQYZI

On the nature of real and perceived bias in the mainstream media

Erick Elejalde, Leo Ferres and Eelco Herder (March 2018). PLOS ONE.

- News consumers expect news outlets to be objective and balanced in their reports of events and opinions.
- However, there is a growing body of evidence of bias in the media caused by underlying political and socio-economic viewpoints.
- In this work, we quantify these impressions and describe the nature of this bias, focusing on the Chilean media.

Our dataset contains 1,916,709 tweets, spanning a period of 8 months, from 399 active Chilean news sources.



The World's Smallest Political Quiz

Developed in 1985 for the American public. It uses ten questions to position a person in a Cartesian plane: left-liberal, libertarian, centrist, right-conservative, or statist.

Personal issue questions:

- Government should not censor speech, press, media or Internet.
- Military service should be voluntary. There should be no draft.
- There should be no laws regarding sex between consenting adults.
- Repeal laws prohibiting adult possession and use of drugs.
- There should be no National ID card.

Economic issue questions:

- End corporate welfare. No government handouts to business.
- End government barriers to international free trade.
- Let people control their own retirement: privatize Social Security.
- Replace government welfare with private charity.
- Cut taxes and government spending by 50% or more.



Operationalizing the quiz

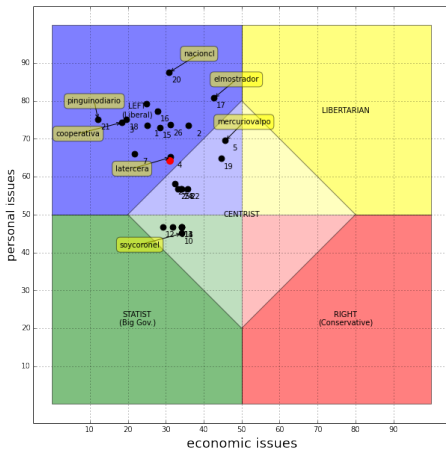
Basic principle of the quiz: for each *Agree*, the score of the quiz-taker in the corresponding dimension is increased.

We selected the tweets relevant to the questions by means of a set of preselected keywords (an expanded seed set).

We randomly selected and labeled a training set of about 190 tweets per question. We evaluated the dataset using 10 iterations with 20% for validation in each fold, using the Randomized Tree Model.



Results: absolute position of the news outlets



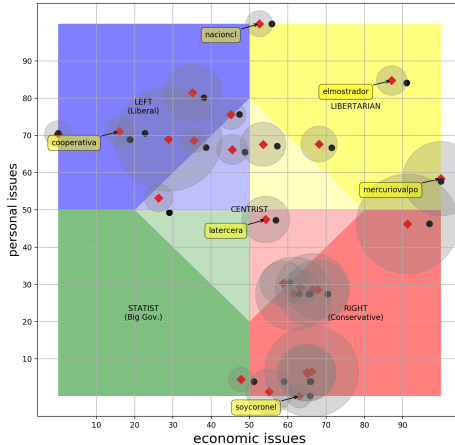
Absolute positions: some observations

- In June 2017, the government mainly consisted of center-left to left-wing parties, with the president affiliated with the socialist party.
- The labeled dots represent the outlets of the 26 media outlets that answered at least four questions on each dimension.
- El Mercurio is popularly received as right-wing conservative.

In order to get a better impression of the relative position of the media, we normalized the scores in the range $[0,100]$.

We also investigated the stability of the results, by leaving out a random 5% of the tweets in each round.

Results: relative positions



Blue dots are the relative positions, red diamonds the score after 20 repetitions, the grey circles are the 95% confidence area.

Influence of government orientation on the media landscape

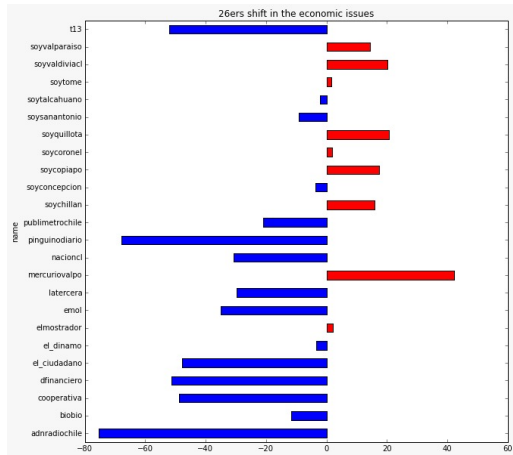
The Propaganda Model and the Media Capture Model describe the political elite, and the government in particular, as a very influential actor.

Our data was from 2017, with the socialist president Michelle Bachelet , and a government of center-left to left-wing parties.

For comparison, we crawled another 822,223 from 2010 and 2011, during which Chile had a right-conservative government led by Sebastian Piñera.

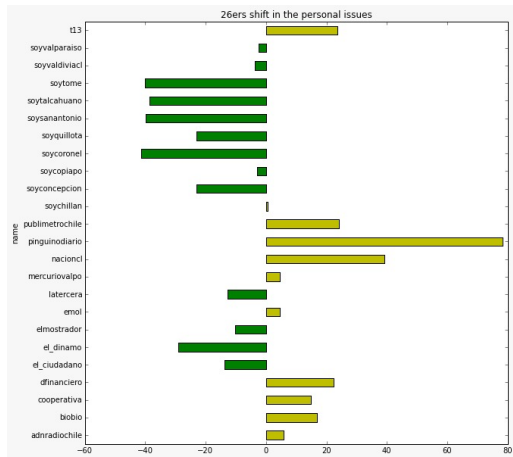


Shift in the economic dimension



A clear shift to the left can be noticed.

Shift in the personal dimension



Left is more conservative, right is more liberal.

Socio-political leaning and the impact on topic coverage

To investigate the impact of the socio-politic position of the media on coverage of political discourse, we:

- Created a list of politicians who voted against an abortion bill, and those who voted in favor.
- Scored each outlet based on the relative frequency (compared with the other outlets) they mentioned politicians from either side.

The results show that outlets tagged as independent, libertarian mentioned those in favor of the bill more often.

Survey results (details not presented here) confirm that the bias as we quantitatively detected, is also perceived by the Chilean population, based on selected keywords of each outlet on the topic of abortion.

Conclusions

The political orientation of the media in Chile is in line with and follows the political orientation of the government.

Our own perception of bias in the media landscape as a whole seems to be adjusted by the political space defined by the news that we receive, which is largely defined by governmental politics.

We believe it is important to be aware of shift, alignments and discrepancies in bias and political orientation within the government, the population and the media.

- Misconceptions may have unexpected or negative effects.

Quantifying the ecological diversity and health of online news

Erick Elejalde, Leo Ferres, Eelco Herder, Johan Bollen. Journal of Computational Science, 2018.

We used several diversity measures to quantify diversity of reporting in Chilean media. Results indicate:

- Many outlets seem to rely on similar content (like press releases) and have similar editorial policies.
- When we look at the *owners* of the news outlets (one owner may have several outlets), the diversity is far lower.
- A few mega-conglomerates controlling a large number of outlets presents a clear risk to news diversity, coverage, and representativeness.



Pluralism and diversity in personal news feeds

In earlier days, people subscribed to their local newspaper and/or the national newspaper that is in line with their socio-political orientation (e.g. in the UK, the Guardian is considered quite left-wing).

Nowadays, particularly younger people predominantly read news online, and often seem to rely on newsfeeds provided by the social media (Twitter, Facebook, Instagram). Which news articles they receive, depends on:

- The news outlets that they actively subscribed to (which is self-selected)
- Automatic filtering and selection based on user profiles and user data, among others activities of their friends/neighbors.



The filter bubble

Personalization in the background, such as Google search results or a Facebook newsfeed, may be harmful.

If search results or news articles are always personalized, this means that no two persons will see the same results.

Users will only get results that match their own viewpoints, isolating them in their own *filter bubbles*.

(To make things worse, the personalization process still needs improvement)



The filter bubble and bias on the Web

Apart from algorithmic bias, the so-called 'Filter Bubble', the popularity of items (such as recipes) is determined by a lot of factors, including your friends, date of publication and editorial decisions³

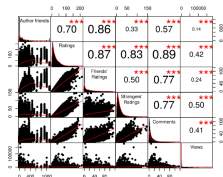


Figure 5: Spearman's rank correlations for recipe popularity in terms of number of ratings, number of comments, number of views and author popularity in terms of number of friends (* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$).

³ Markus Rokicki, Eelco Herder and Christoph Trattner. How Editorial, Temporal and Social Biases Affect Online Food Popularity and Appreciation. Proc. ICWSM 2017

The Facebook algorithm

- Facebook was not designed to give us the news, but to connect users and help them share content.
- As a news source, it takes gatekeeping and agenda-setting functions; algorithms instead of human editors.
- The exact algorithm is heavily protected and complex, a black box.
- Based on an analysis of Facebook patents and blogs⁴, nine values seem to play a significant role: friend relationships, user interests, prior engagement, user preferences, post age, *platform priorities*(?), page relationships, negative preferences and *content quality*(?)
- Even though there are popular beliefs about the way Facebook filters news, it is close to impossible to reverse-engineer it⁵

⁴ DeVito, M. A. (2017). From editors to algorithms: A values-based approach to understanding story selection in the Facebook news feed. *Digital Journalism*, 5(6), 753-773.

⁵ Rader, E., Gray, R. (2015). Understanding user beliefs about algorithmic curation in the Facebook news feed. *Proc. ACM CHI* (pp. 173-182)



Do users really have such different news feeds and search results?

Results from a study by the German initiative AlgorithmWatch⁶ suggests that queries on politicians' names largely resulted in more or less the same results, with established news media in the top results.

However, this study focused only on a very specific set of queries.

- The results may be quite different for polarizing themes such as migration, Trump and Brexit.
- There are plenty of other studies confirming the existence of filter bubbles.
- The effects and consequences of confirmation bias in news feeds are not well studied.

⁶ <http://www.spiegel.de/netzwelt/netzpolitik/google-projekt-von-algorithmwatch-filterblase-welche-filterblase-a-1219981.html>



Quantifying trust in the media

- Is the media landscape really that polarized? Or only for certain topics? How to recognize this (before it is obvious)?
- Are our individual news feeds really that different? And if so, what are the causes and what are the effects?



Discussion

- Where do the responsibilities of tech companies regarding gatekeeping start and end?
- Which specific (assumed) effects require further investigation (and regulation)?



**Privacy Engineering, User Modeling, Personalization,
Recommendation, Web Usage Mining,
Data Analysis and Visualization,
Usability, Evaluation**