

Abstract geometric lines in black on a white background, forming various overlapping polygons and shapes, primarily concentrated on the left side of the slide.

VISUALIZING PREFERENCES: HISTORY, METHOD, AND IMPORTANCE

Danika Wagner

WHY PREFERENCES

Preferences are foundational to understanding human behaviour, societal trends, and decision-making (Tversky & Kahneman, 1974)

KAHNEMAN AND TVERSKY (1979) – PROSPECT THEORY

DEPEND ON CONTEXT

Individuals make choices (i.e., exert preferences) between uncertain outcomes

COGNITIVE BIASES

What comes to mind quickly, what you see first

EMOTIONS, COMPARISONS, AND FRAMING

Positive or negative affect, reference points, framing of options

PERSONAL CHOICES

Preferences guide our everyday decisions; can help us make more or less fulfilling choices

POLICY AND GOVERNANCE

Preferences for laws, regulations, social programs; voting and political preferences

ECONOMICS

Consumer preferences shape markets

CULTURAL COHESION

Shared preferences can strengthen social bonds, reinforce cultural identity

IMPORTANCE OF PREFERENCES

VISUALIZING PREFERENCES

PRE-MODERN ERA

Petroglyphs and pictographs communicate
preferences related to survival



VISUALIZING PREFERENCES

PRE-MODERN ERA

Symbols and cave paintings communicate
preferences related to survival

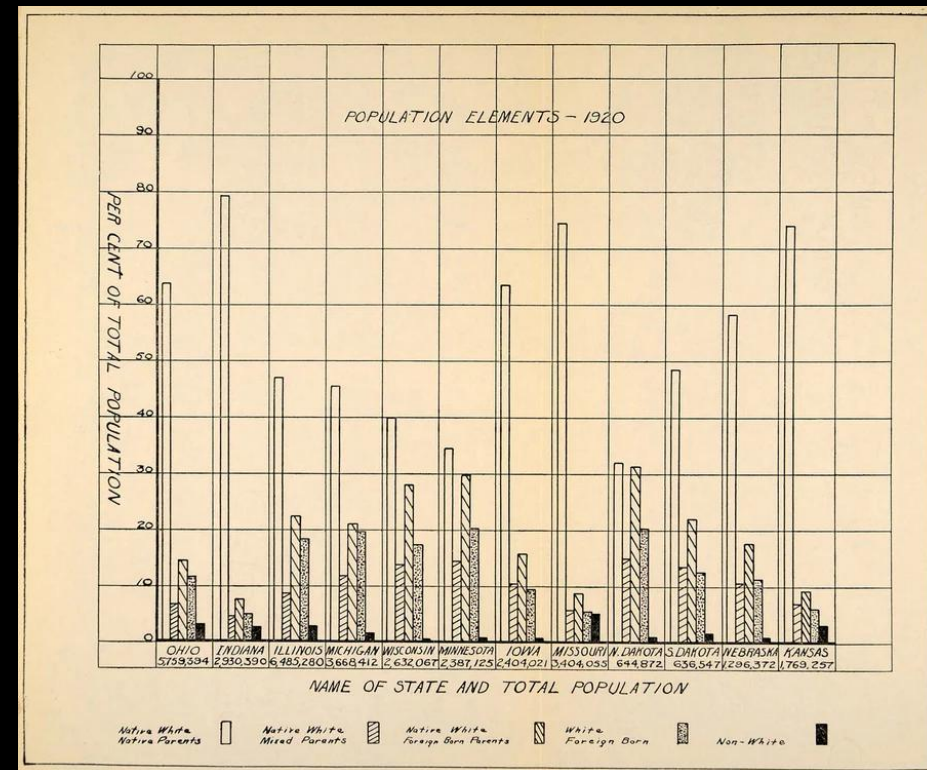
18TH CENTURY

William Playfair's introduction of the bar chart,
line chart, and pie chart to represent economic
and trade preferences

VISUALIZING PREFERENCES

20th CENTURY

Maturity of social sciences associated with maturity in visualizations of consumer behaviour, voting patterns, social attitudes



VISUALIZING PREFERENCES

20th CENTURY

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~~Common Report~~
Adding it would give such legislation full support, the Council said indications were that public opinion was undergoing a marked change and the Volstead Act would be amended to permit beer "at the forthcoming session or at some future session."

VISUALIZING PREFERENCES

20th CENTURY

Maturity of social sciences associated with maturity in visualizations of consumer behaviour, voting patterns, social attitudes

ROBERT THOMPSON, sometime leader of the Social Credit party and Canada's answer to Mrs. Malaprop, once said, "The Americans are our best friends, whether we like it or not." Canadians obviously agree. The *Week-end Poll* finds that seven out of 10 adults, asked which country is Canada's best friend, name the United States. Britain is a distant second with 13 percent. When people are asked to name two other friends, the next most-mentioned countries are, in order, France, Japan, Germany, China and Australia.

When it comes to enemies we are not so sure. Whereas only 10 percent of Canadians have no *opinion* as to this nation's best friend, 43 percent cannot name an enemy or claim we have none. However, where an *opinion* is expressed, Russia is almost as clearcut a foe as the United States is a friend. Thirty-three percent of those who believe we do indeed have enemies regard the Soviet Union as the major menace, followed by China (5 percent), France (3 percent), Germany (3 percent), Japan (2 percent) and the United States (2 percent).

With the exception of Britain and Australia, all the names that appear on our friendly list also appear on the hate list, but perhaps that is not so strange, since among nations, as among individuals, love-hate relationships are not uncommon. (Mark Twain wrote, "It takes your enemy and your friend, working together, to

70% OF CANADIANS SAY THE UNITED STATES IS CANADA'S BEST FRIEND

hurt you to the heart; the one to slander you and the other to get the news to you.")

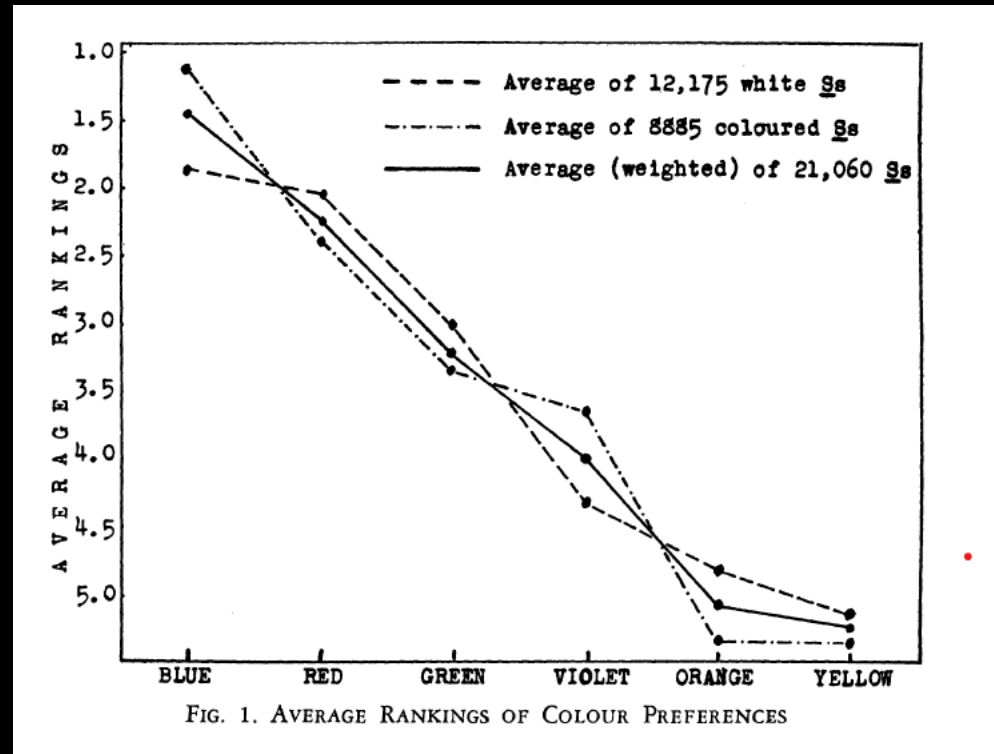
Heredity, geography and trade are the obvious ties that determine our friendships; history has little to do with them. We have been at war twice each with the United States, Germany and Japan, but today they are major trading partners. Just as the Americans have 70 percent of our nominations for best friend, they also have 70 percent of our trade.

There are some missing links in our circle of friends. There are only two Commonwealth countries in this list, Britain and Australia. Italy is named as best friend by 4 percent—the same percentage as name Russia—although it is consistently among our top 10 trading partners and has provided Canada with our fourth strongest ethnic strain (behind Britain, France and Germany). The Italians, as usual, have a phrase to cover this sort of treatment—several, in fact. There is the one that says, "One's table receives more friends than one's heart does," and another that contends, "A man that has friends must show himself friendly," and finally, and cuttingly, *Amico d'ognuno, amico di nessuno*—"Everybody's friend is nobody's friend."

VISUALIZING PREFERENCES

20th CENTURY

Eysenck (1941) – Color Preferences



VISUALIZING PREFERENCES

20th CENTURY

- 1960s-1980s computers allowed for new graphics and statistical analyses
- Factor analysis became more common - understand latent associations behind choices

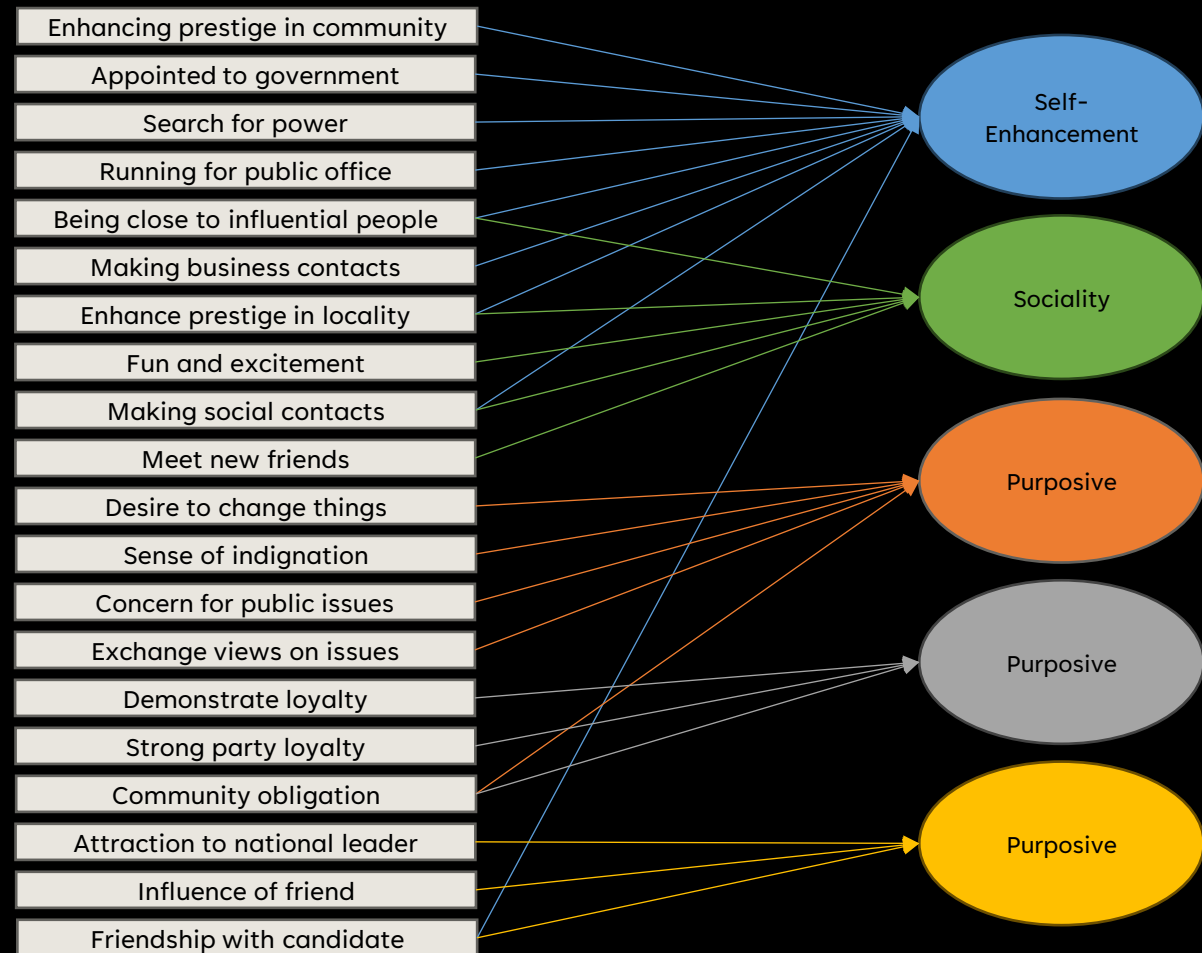
TABLE 1. Political Motives of Party Activists: Varimax Rotated Factor Matrix¹

Motive	Self-Enhancement	Sociality	Purposive	Allegiance	Personalist
An interest in enhancing my prestige in my community ²	.72				
An interest in being appointed to a government office ³	.71				
The search for power and influence ²	.70				
An interest in running for public office ³	.67				
Being close to influential people ²	.60	.47			
Making business or professional contacts ²	.57				
To enhance my prestige in my locality and among my acquaintances ²	.45	.39			
Fun and excitement ²		.75			
Making social contacts and friends ²	.35	.67			
To meet new friends, renew old acquaintances and generally enjoy a great American social occasion ²		.66			
A desire to change things in society ²			.79		
A sense of indignation over the current state of affairs ¹			.76		
Concern for public issues ²			.66		
To exchange views on the issues of the day and to help define the program of the party ³			.47		
To demonstrate my loyalty to state and party leadership ³				.76	
Strong party loyalty ²				.72	
Sense of community obligation ²			.31	.53	
The attraction of a particular national or state political leaders ²					.66
The influence of a friend or friends ²					.63
Friendship with a particular candidate ²	.37				.57
Eigenvalue	4.5	2.1	1.6	1.4	1.2
Percent of Total Variance	22.5	10.3	7.9	6.8	6.0

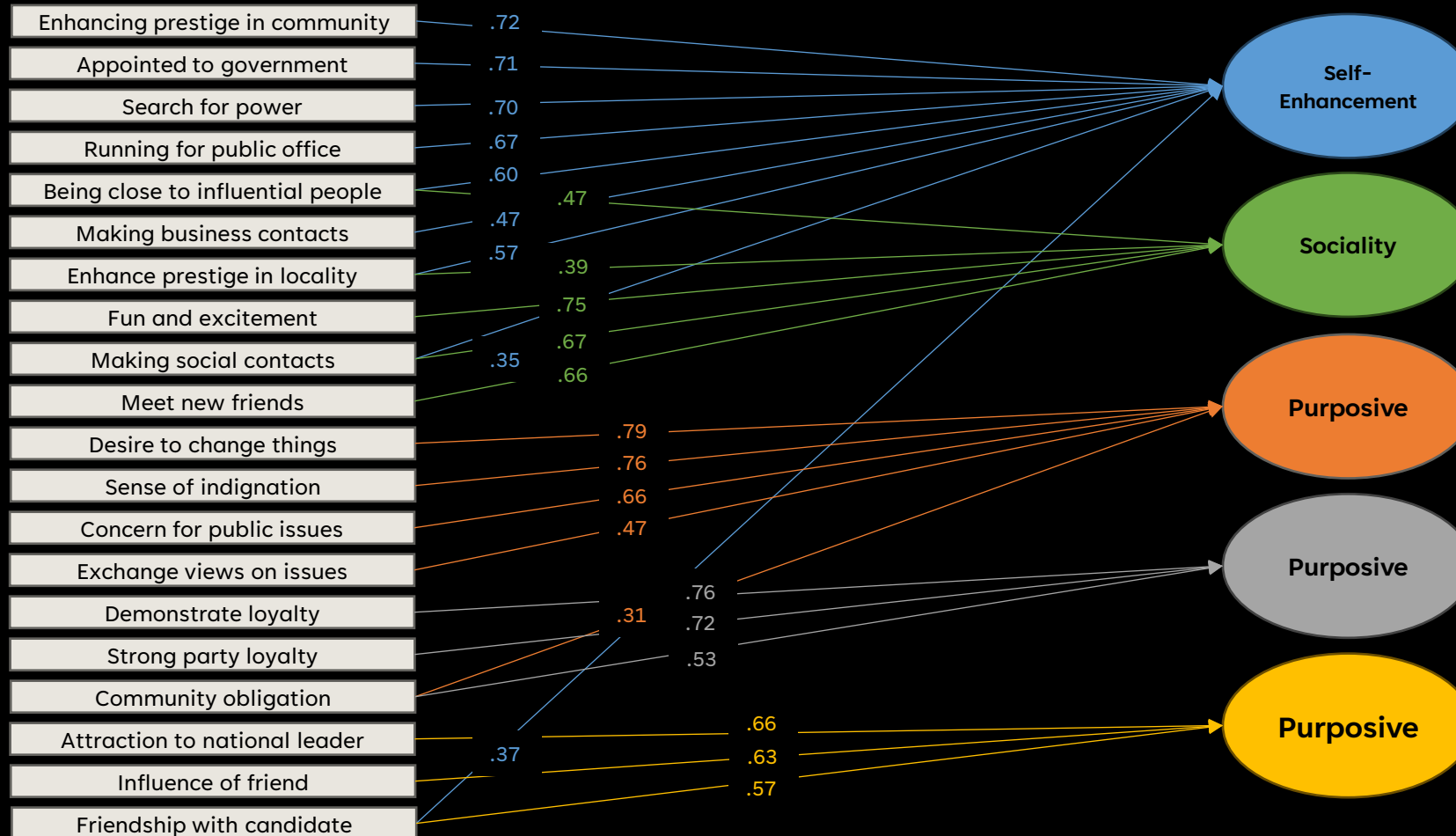
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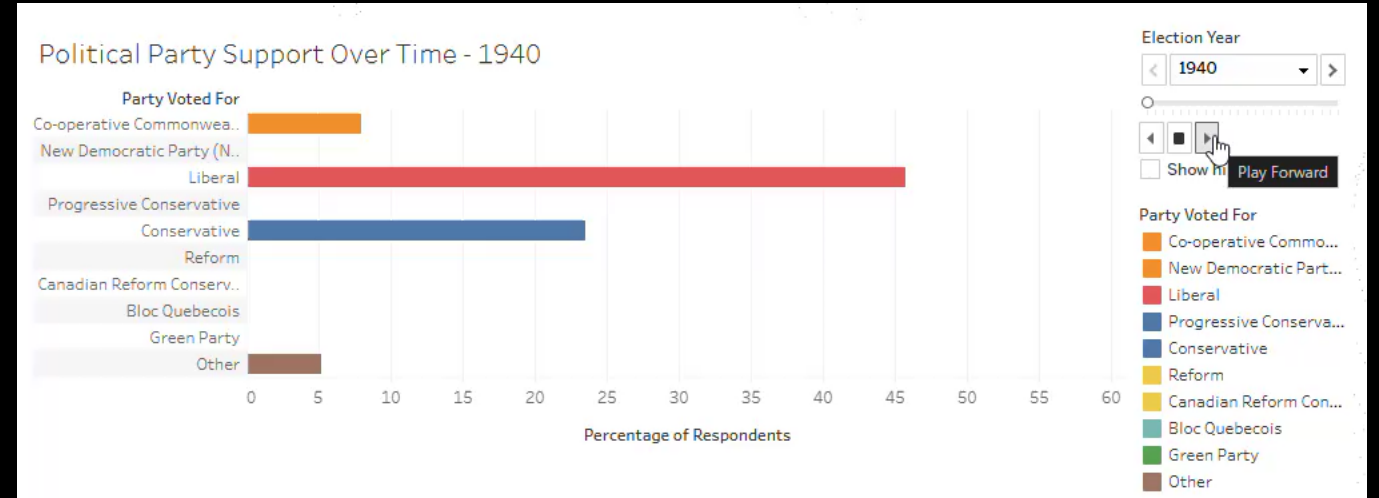
VISUALIZING PREFERENCES



VISUALIZING PREFERENCES

21st CENTURY

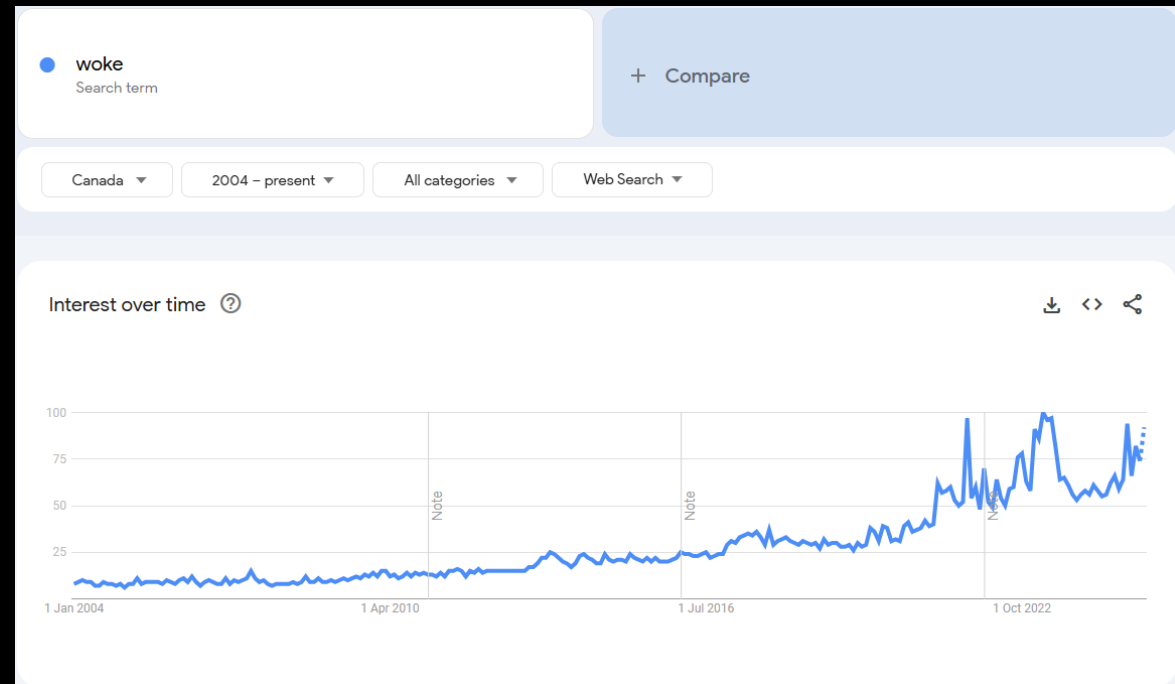
Interactive tools



VISUALIZING PREFERENCES

21st CENTURY

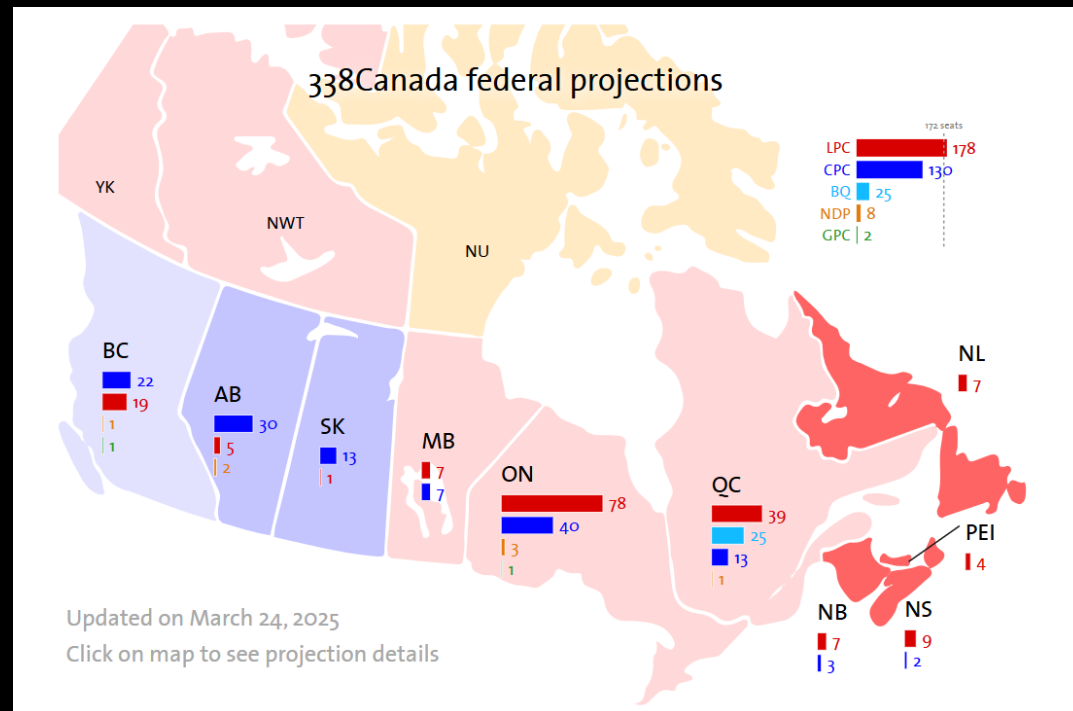
Democratization of Data



VISUALIZING PREFERENCES

21st CENTURY

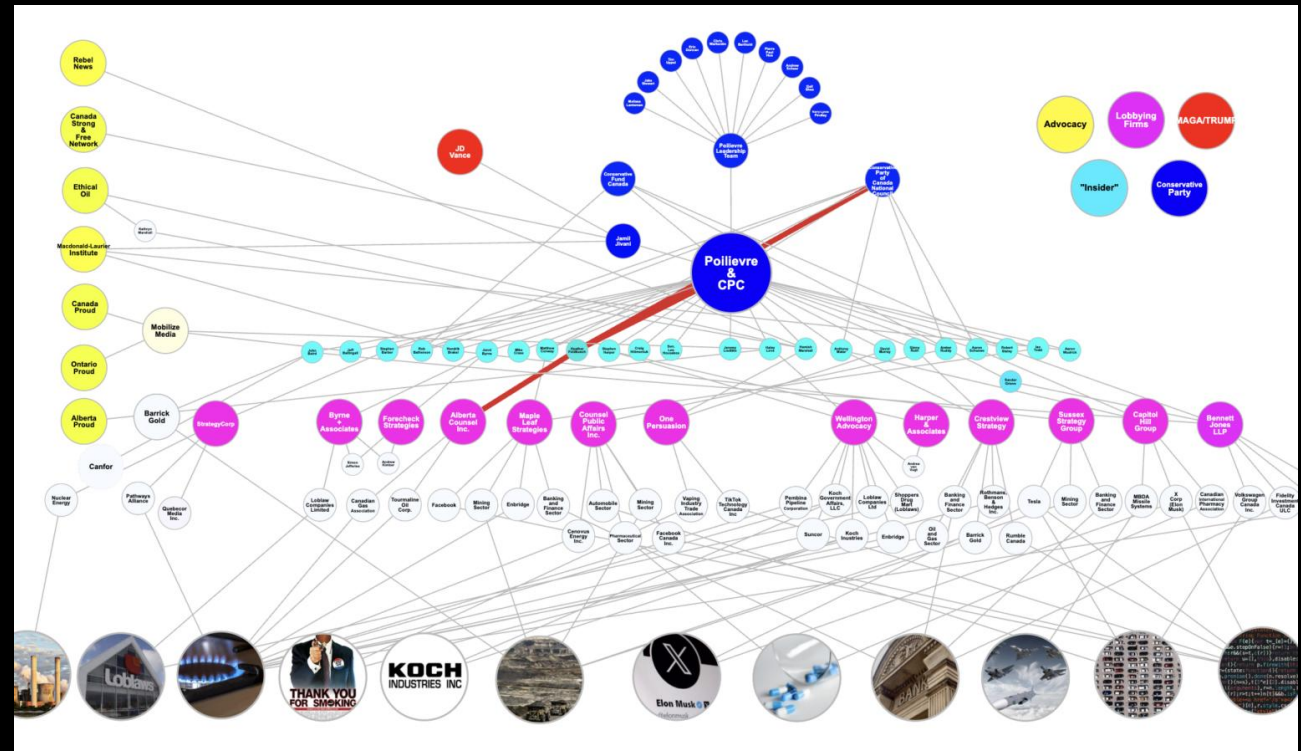
- Heat maps
- Network analysis
- Sentiment analysis



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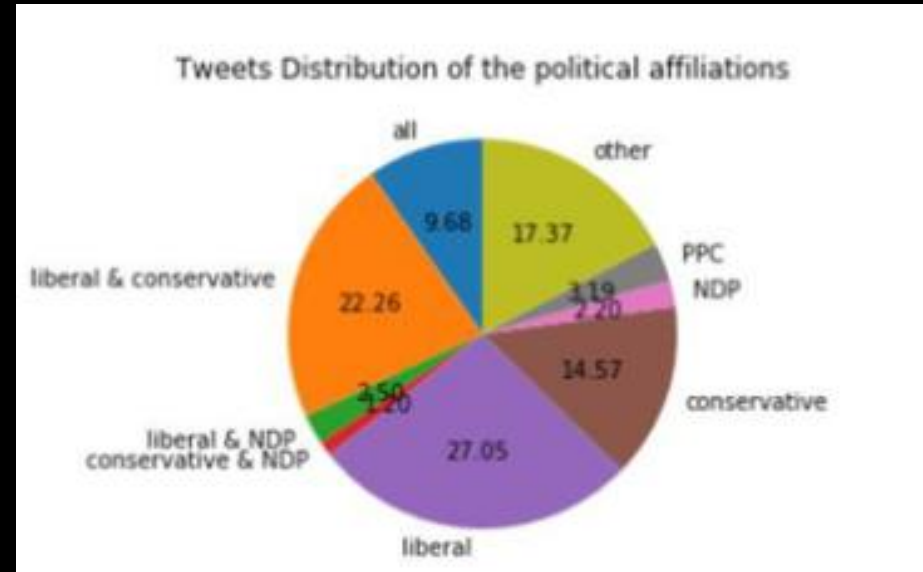
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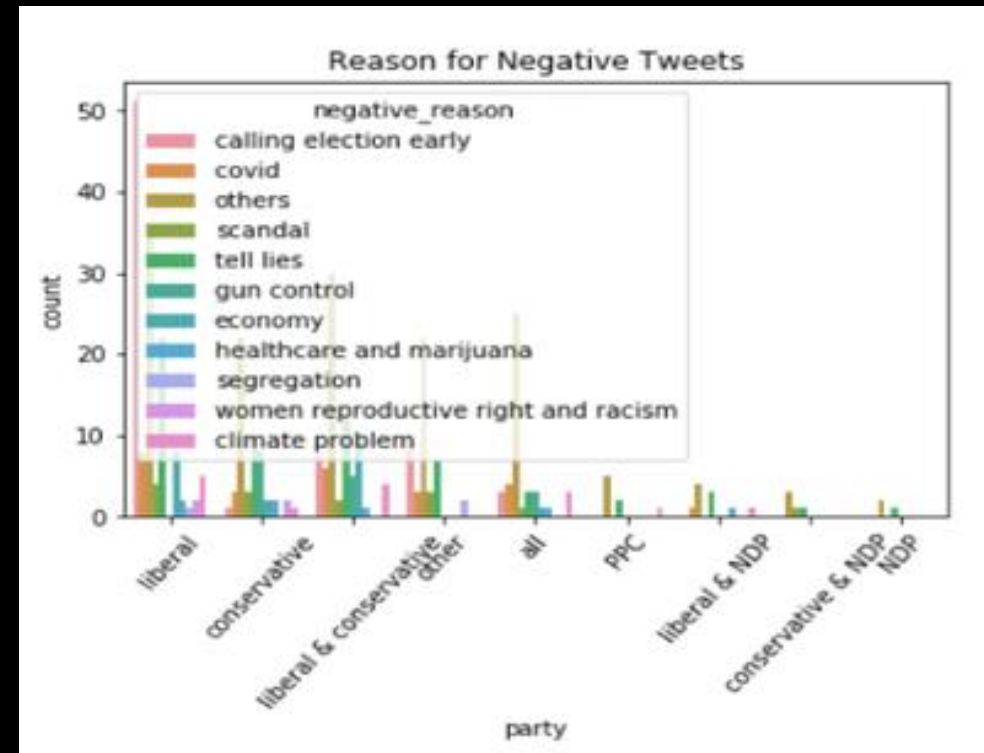
- Sentiment analysis
- Example: Sentiment Analysis of 2021 Canadian Election Tweets (Zhu, 2023)



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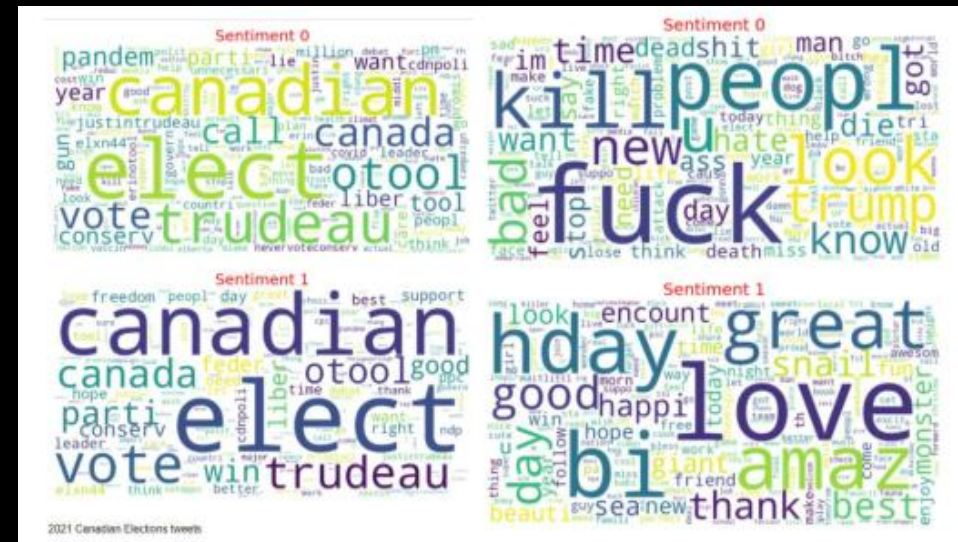
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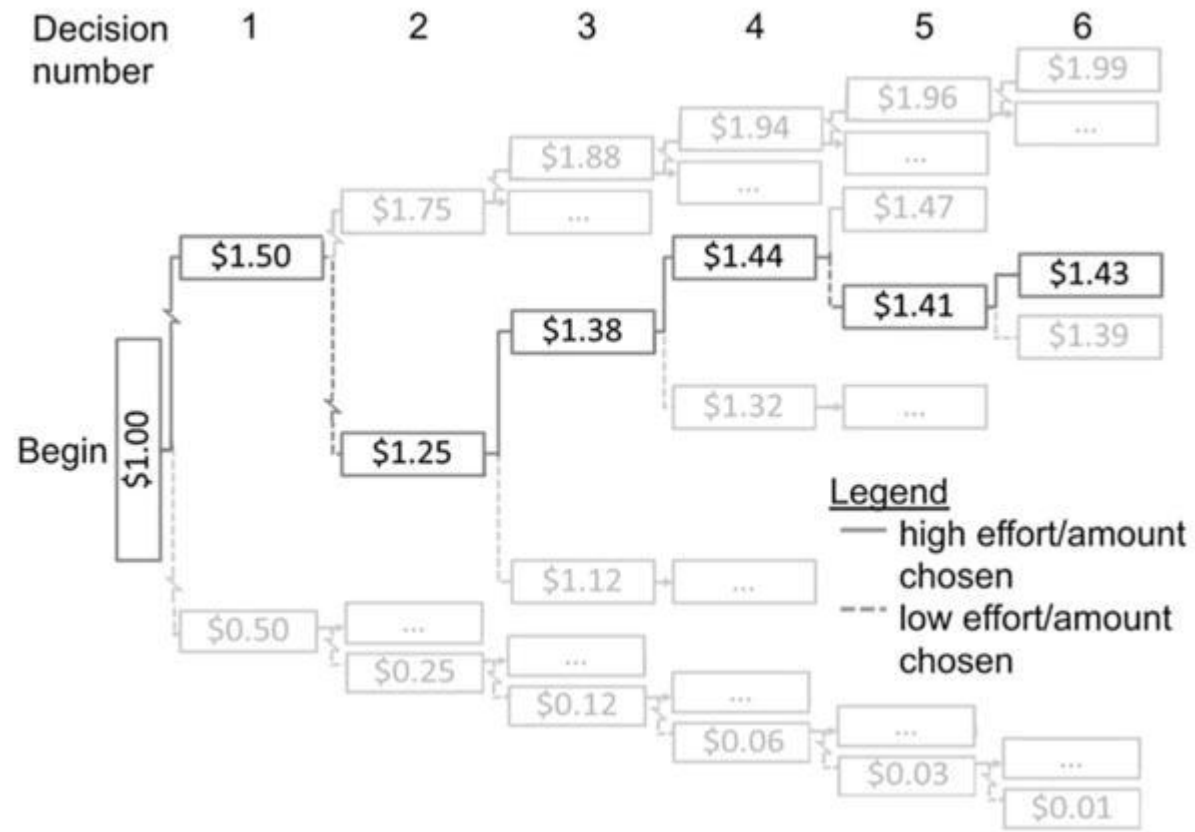
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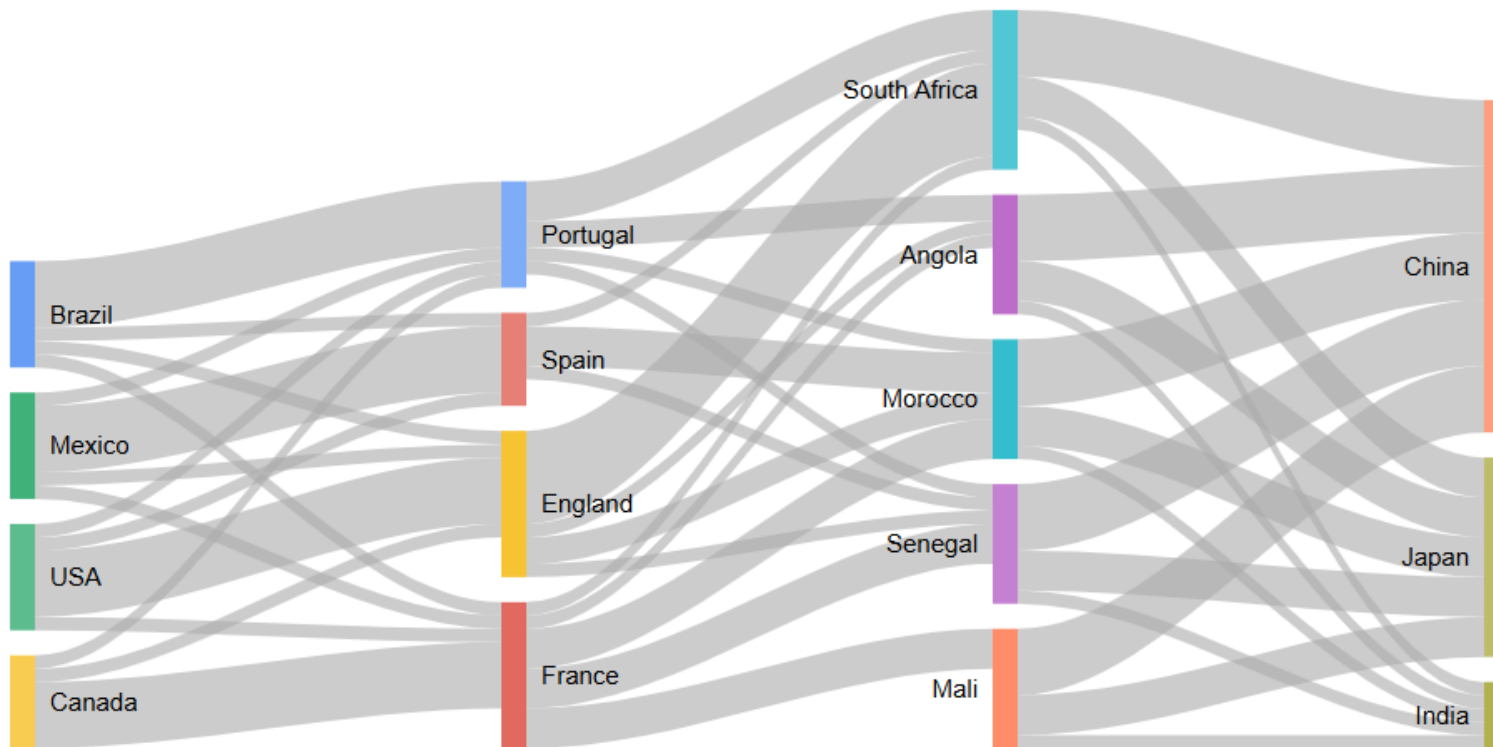
- Sentiment analysis
- Example: West Coast Environmental Law (2021)



VISUALIZING CHOICES



MULTI-LEVEL SANKEY DIAGRAM



Honest numbers lose face value

There are ways to make innocent numbers do dirty work

BY MALCOLM W. BROWNE

© New York Times Service

NEW YORK — A lot of people are afraid of numbers, so numbers make wonderful cudgels for winning arguments. Even meaningless numbers can be made to ring like fine crystal, shattering intellectual resistance with pure, unassailable truth.

This is why salesmen and propagandists love numbers.

There's a television commercial in which the huckster unabashedly tells viewers his product is better because it contains 450 milligrams of "pain reliever," while the competitor's products have only 650 milligrams. Some may ask, is the "pain reliever" in all these products the same? If not, does a comparison of the weights of different substances tell us anything about their abilities to relieve pain? In any case, is more "pain reliever" necessarily a good thing? (What if the "pain reliever" is morphine?)

But the "pain reliever" commercial drones on, evidently enriching its sponsors if not the cause of public enlightenment.

Numbers are also useful in factual reports and headlines, but they are easy to misuse, even with the best intentions. Typical of the genre is this sample: "Cosmic radiation from space threatens billions with genetic mutation." While

sions from honest numbers. In a group of competing breakfast cereals (or political candidates, or weapons systems, or whatever), any one of the contenders can usually be found to have some attribute by which it can be made to sound better than the others. But since all the competitors may possess the same attribute in nearly equal measure, it may be necessary to magnify

Tricky bar graphs create illusions from honest numbers

the statement is true and the number realistic, a disaster that does not exist is implied.

More dangerous than the merely sloppy handling of numerical information are the disingenuous graphic illusions sometimes created by juggling numbers on graphs.

Tricky bar graphs, for instance, can fabricate illu-

fy the minuscule advantage of the product being touted.

One way to do this is with bar graphs showing how the selected attribute varies among the competitors. Even if all the bars are nearly the same height, small differences can be accentuated by enlarging the entire graph, lopping off the bottoms of all the bars and setting their severed

tops on a new base line.

Chances are the average viewer, allergic to numbers, will overlook the fact that the base line is no longer zero, and will only see that the advertised product appears to stand head and shoulders above the rest of the field.

Such tricks are usually transparent to scientifically trained people, but even scientists are sometimes susceptible to the false conclusions and distortions that can arise from numbers. One of the most dangerous potential snares in science is also one of its most useful tools: statistical correlation.

Broadly speaking, there

are two paths to scientific discovery. One is detailed examination of the chain of cause and effect that leads from one event to another. The other is comparison of the frequency of occurrence of two events, using mathe-

Even the sophisticated are sometimes fooled

matics to form an opinion as to whether the events are statistically related.

Some scientific questions have proved very difficult to unravel in terms of the mechanisms of cause and

effect. Such questions include how atomic particles transform themselves, how the mind works and what causes cancer. Research in such fields must therefore lean heavily on the other tool, correlational analysis.

The trouble is that even a perfect statistical correlation between two kinds of event does not prove that one caused the other. Most patients found in obstetrical clinics are pregnant, but it

does not necessarily follow that pregnancy is caused by exposure to obstetricians.

And yet, even sophisticated investigators are sometimes fooled by spurious statistical relationships caused by unnoticed extraneous effects. In a recent semi-serious experiment one researcher implanted bits of plastic credit card under the skin of rats many of which later developed skin cancer. But, the administration's insistence on high interest rates notwithstanding, does credit really cause cancer?

The point is that numbers are not soothsayers. They are useful, but they are merely numbers.

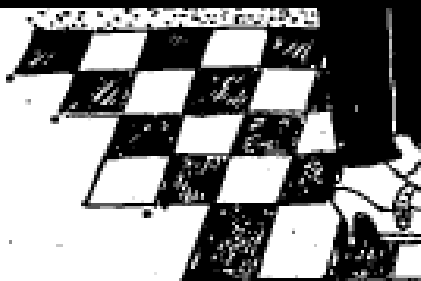


CAN VISUALS INFLUENCE PREFERENCES?

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DATA VISUALIZATION INFLUENCING PREFERENCES

EBERHARD (2023)

Visualizations may impair decision-making by misguiding attention

LIN ET AL (2024)

Misinformation, including in graphics, influence consumers food preferences and policy attitudes

TORNBERG (2018)

Viral misinformation, especially visuals, thrive in echo chambers

Online echo chambers influence social and political preferences, political mobilization

Honest numbers lose face value

There are ways to make innocent numbers do dirty work

BY MALCOLM W. BROWNE

© New York Times Service

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CAN VISUALS INFLUENCE PREFERENCES?

YES.



PREFERENCES AND CULTURE

ACERBI & DE COURSON (2025)

- Weak *individual* preferences stabilize culture
 - When conformity and individual preferences act together, can trigger sudden cultural shifts



PREFERENCES, CULTURE, AND POLITICS

PREFERENCES INFLUENCE POLICY

Guide lawmakers and political leaders to design policies that reflect the desires, needs, and values of the population

PREFERENCE INFLUENCE CULTURE

Shape societal norms, consumption patterns, and identity formation.



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