



Lecture 5: Dogwhistles and NLP in Political Communication

**Linguistics, NLP, and Political
Communication, ESSLLI 2025, Bochum
Asad Sayeed and Ellen Breitholtz**



Different dimensions of social meaning

Game-theoretic

$$\begin{array}{lll}
 L_1 & \text{pragmatic listener} & P_{L_1}(s|u) \propto P_{S_1}(u|s) \cdot P(s) \\
 \downarrow & & \\
 S_1 & \text{pragmatic speaker} & P_{S_1}(u|s) \propto \exp(\alpha U_{S_1}(u;s)) \\
 \downarrow & & \\
 L_0 & \text{literal listener} & P_{L_0}(s|u) \propto \llbracket u \rrbracket(s) \cdot P(s)
 \end{array}$$

(Micro)diachronic

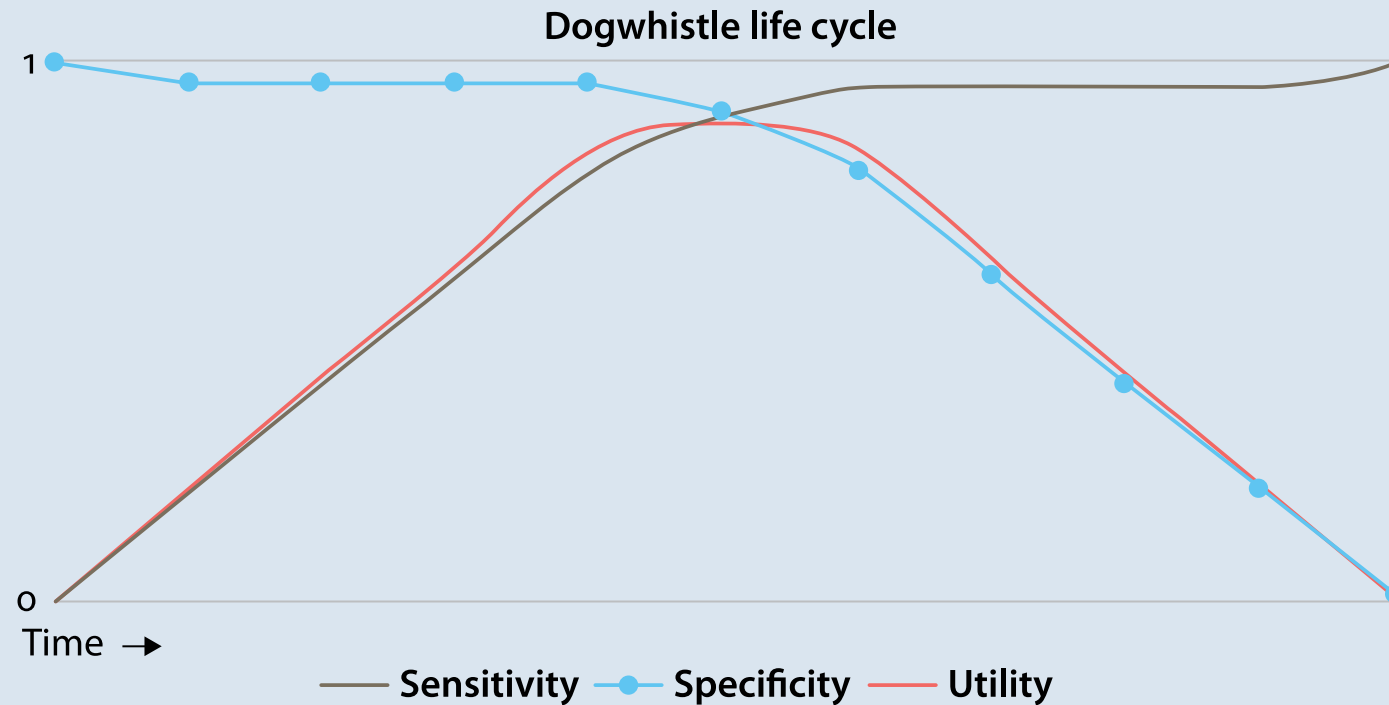
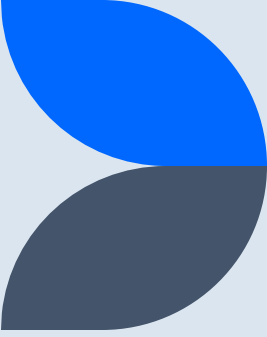
- Initial probabilities: the virtue ethicist: 0.3, the humanist: 0.4, the cold rationalist: 0.3

$$\left[\begin{array}{l} \text{pr:} \left[\begin{array}{l} A: \left[\begin{array}{l} x=\text{shared.participants.A:Ind} \\ \text{pd}=\left\{ \begin{array}{l} p=\{\tau_1,\tau_2\} \\ \text{prob}=0.3 \end{array} \right\}, \begin{array}{l} p=\{\tau_1,\tau_3\} \\ \text{prob}=0.4 \end{array} \right\}, \begin{array}{l} p=\{\tau_2,\tau_3\} \\ \text{prob}=0.3 \end{array} \right\} : \text{PersDistr} \end{array} \right] \end{array} \right] \\ \text{sh:} \left[\begin{array}{l} \text{topoi:} \left[\begin{array}{l} \text{prev:RecType} \\ \text{curr:} \left[\begin{array}{l} \text{topos:Topos} \\ \text{speaker:Ind} \end{array} \right] \end{array} \right] \\ \text{participants:} \left[\begin{array}{l} A:\text{Ind} \\ B:\text{Ind} \end{array} \right] \end{array} \right] \end{array} \right]$$

The problem of grounding

- Game-theoretic dimension:
 - How to compute the utility function outside of "toy" world?
- Micro-diachronic dimension:
 - Where does the knowledge originate from?
- These questions are not independent of each other.

Dogwhistle lifecycle: an operationalization of utility and knowledge over time?



Per phenomenon

- There isn't a single category of things called "social meaning".
- Different ways of grounding social meaning depending on the phenomenon.



**Since knowledge is historically
contingent and there's no
"momentary" grounded utility...**



... we maybe infer both utility and knowledge through observing change.

Meaning negotiation as explicit social trigger to observe knowledge state in the wild.

Noble, B., Vilorio, K., Larsson, S., & Sayeed, A. (2021, September). What do you mean by negotiation? Annotating social media discussions about word meaning. In *Proceedings of the Workshop on the Semantics and Pragmatics of Dialogue (SemDial 2021)*.

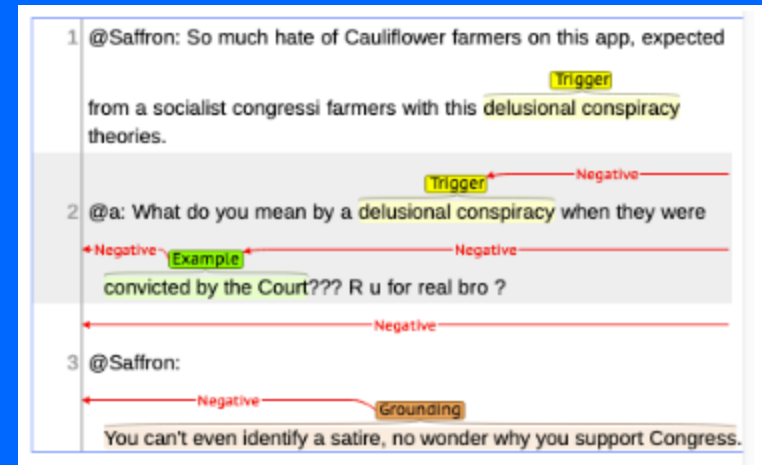
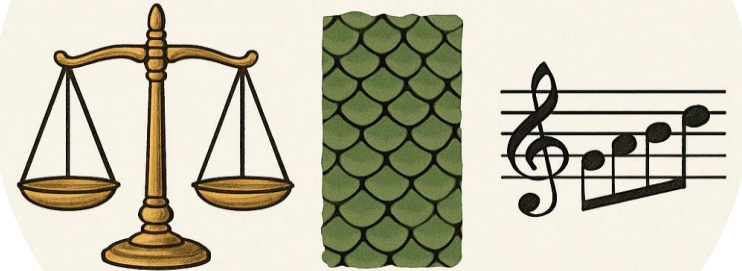


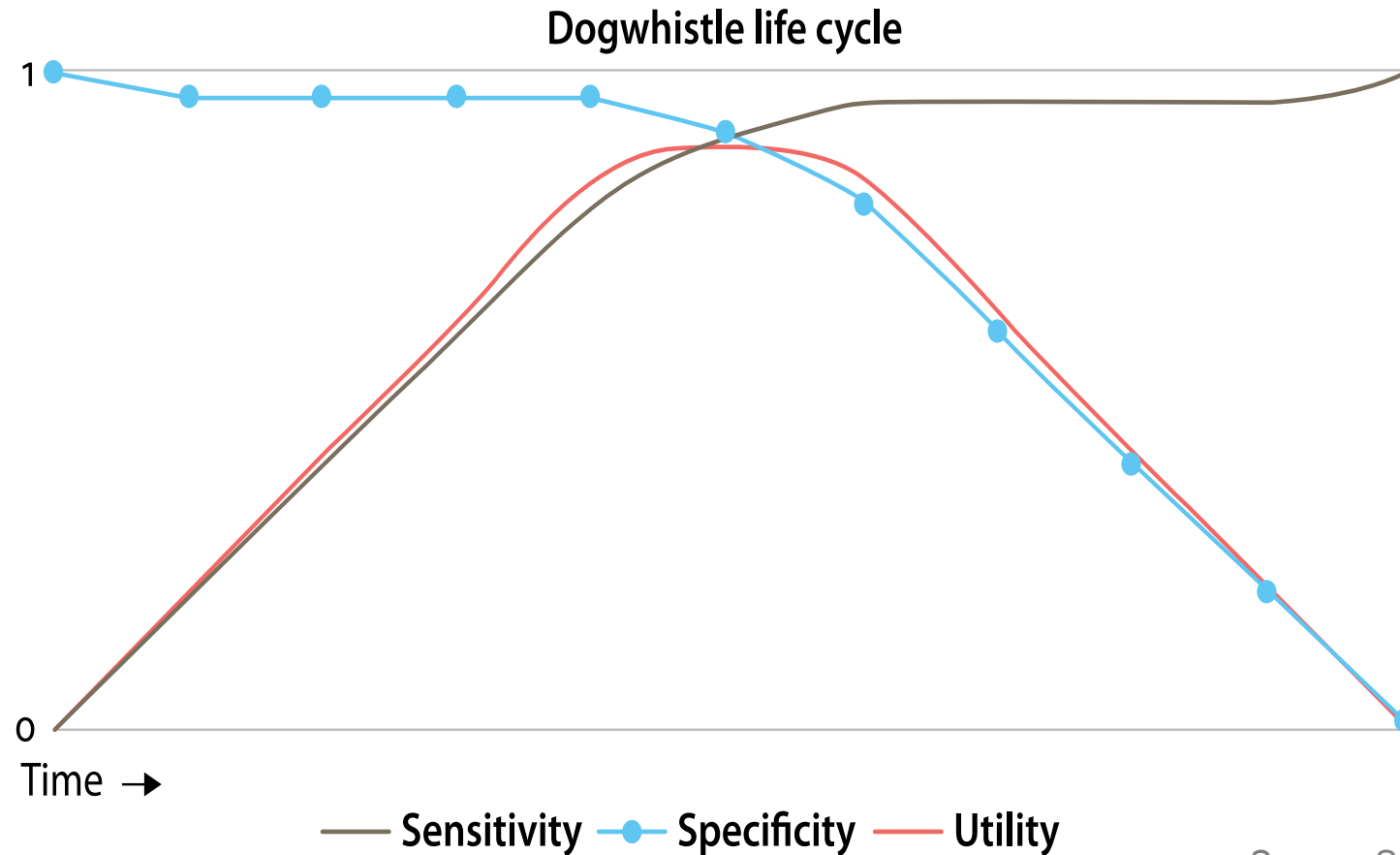
Figure 2: Post-hoc annotation provided by an annotator familiar with Indian social media political discourse. The original annotators of this example, lacking the background knowledge, had different interpretations.

**Problem is, it
still doesn't
scale.**

SCALES



Also hard to operationalize: time travel?



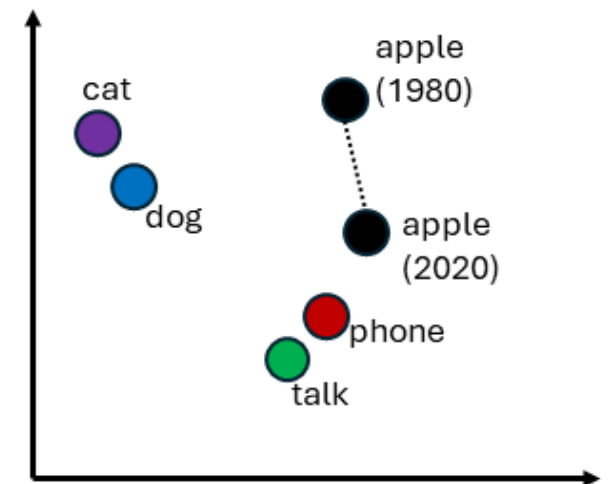
Source: Sayeed, A., et al. (2024) "The utility of (political) dogwhistles—a life cycle perspective". *Journal of Language and Politics*. <https://doi.org/10.1075/jlp.23047.say>

Distributional semantics to the rescue?

- **Distributional hypothesis:** *words that occur in similar contexts have similar meanings*
- Word meaning can be represented by probability distributions over contexts
 - Vector representations: “**embeddings**”
 - Geometrical measures
 - Several methods exist for vectorization
- Analysis of lexical **semantic change**: comparing word embeddings over time

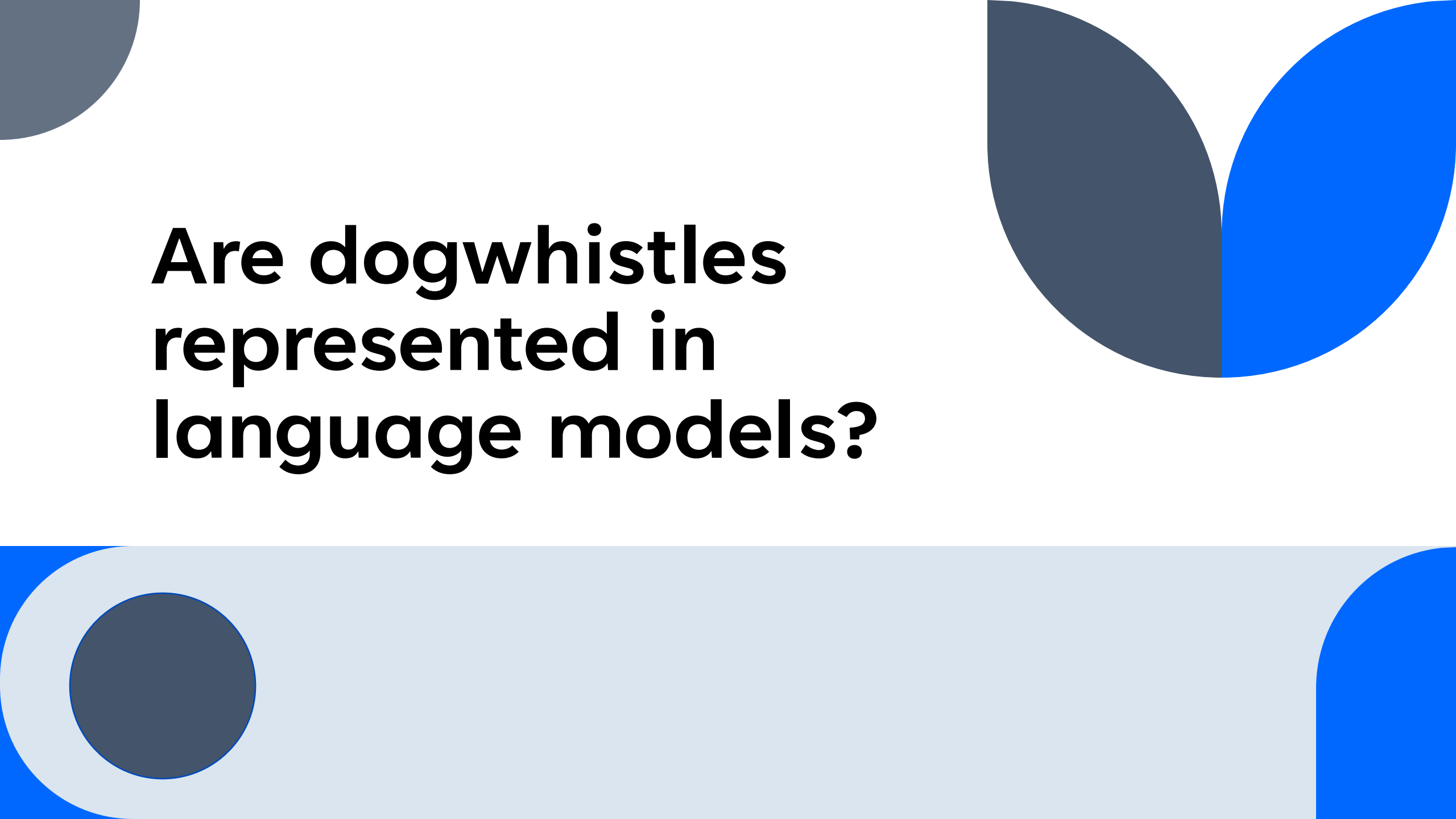
cat	0.6	0.9	0.1	0.4	-0.6
dog	0.5	0.8	0.2	0.6	-0.3
talk	0.4	0.1	0.9	0.3	0.8
phone	0.5	0.2	0.5	0.8	0.5
apple	-0.1	0.5	-0.5	-0.1	0.1

(5 dimensional word embeddings)



(2D-visualization after dimensionality reduction)

**Are dogwhistles
represented in
language models?**



Word replacement study

Technique from psycholinguistics.

Applied through Swedish Citizens' Panel (*Medborgarpanelen*) with the efforts of GRIPES members Björn Rönnerstrand, Elina Lindgren.

Lets people reveal who "gets" the dogwhistle.

Responses associated with political affiliation

Survey of Citizens' Panel respondents

Läs meningen nedan och byt ut det markerade ordet till ett eller flera ord så att meningens budskap förblir ungefär detsamma. (read the sentence below and exchange the bolded word to one or more words so that the sentence's message stays approximately the same)

*"**Återvandring** lyfts fram som ett sätt att motverka de problem som migrationen skapar." (Remigration is highlighted as a way of resolving the problems that migration causes.)*



**Medborgar-
panelen**

Answers are coded manually by members of
GRIPES:

0= explicit meaning

1= implicit meaning

Answers in SBERT

Swedish BERT sentence transformer trained on decades of newspaper text, books, etc (from Språkbanken).

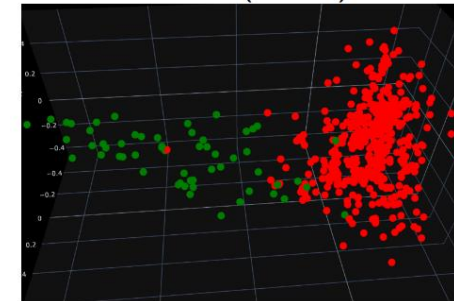
vs.

Response texts from word replacement study as sentence vectors.

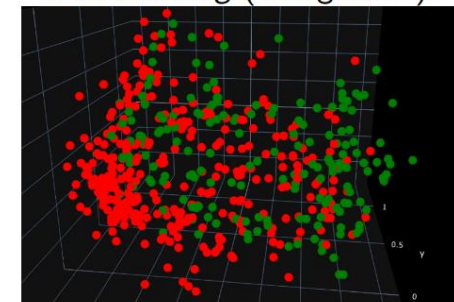
3D PCA projection

Niclas Hertzberg, Robin Cooper, Elina Lindgren, Björn Rönnerstrand, Gregor Rettenegger, Ellen Breitholtz, and Asad Sayeed. 2022. [Distributional properties of political dogwhistle representations in Swedish BERT](#). In *Proceedings of the Sixth Workshop on Online Abuse and Harms (WOAH)*, pages 170–175, Seattle, Washington (Hybrid). Association for Computational Linguistics.

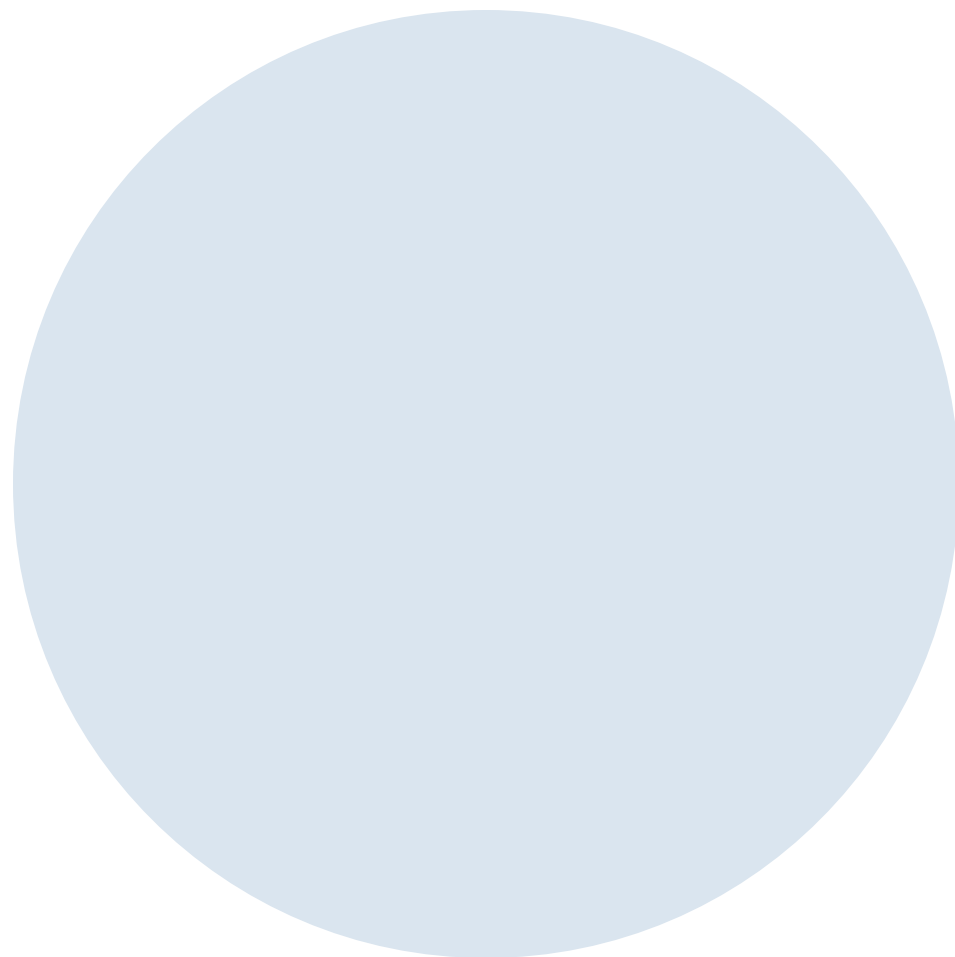
Berikar (enrich):



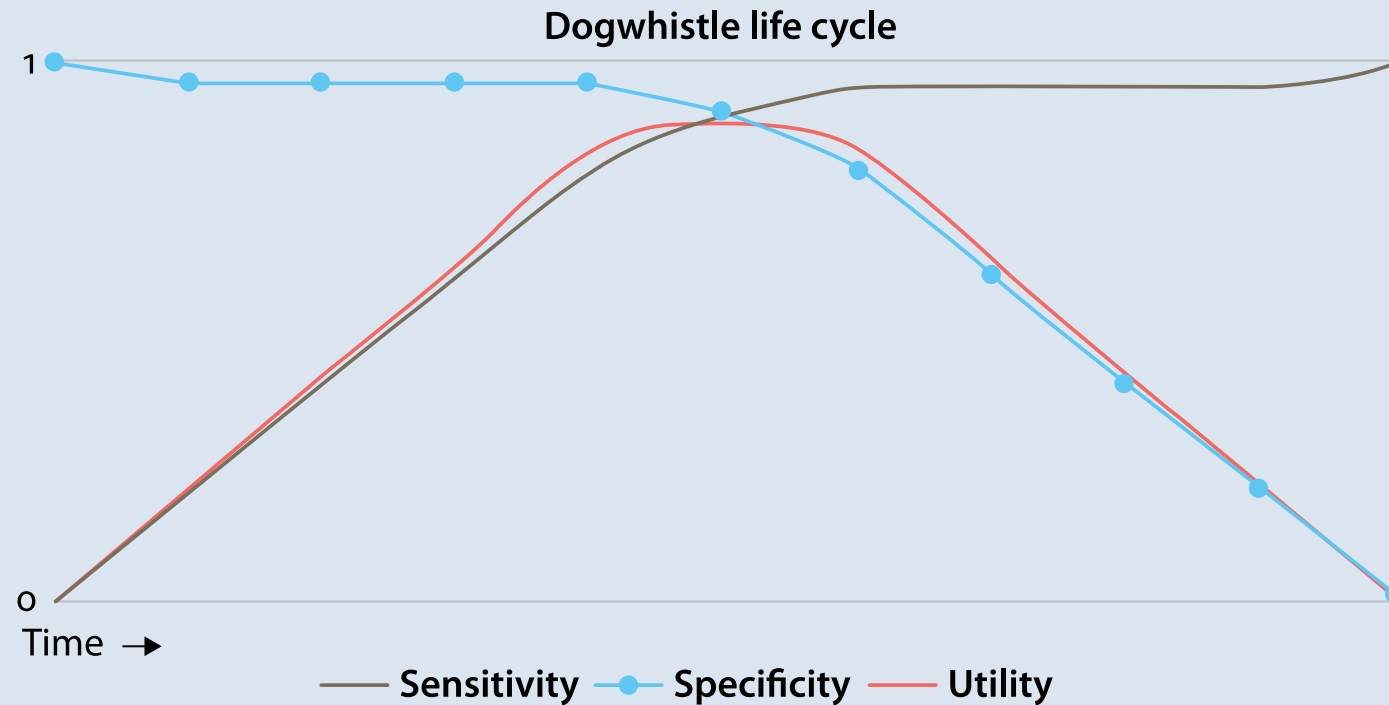
Återvandring (remigration):



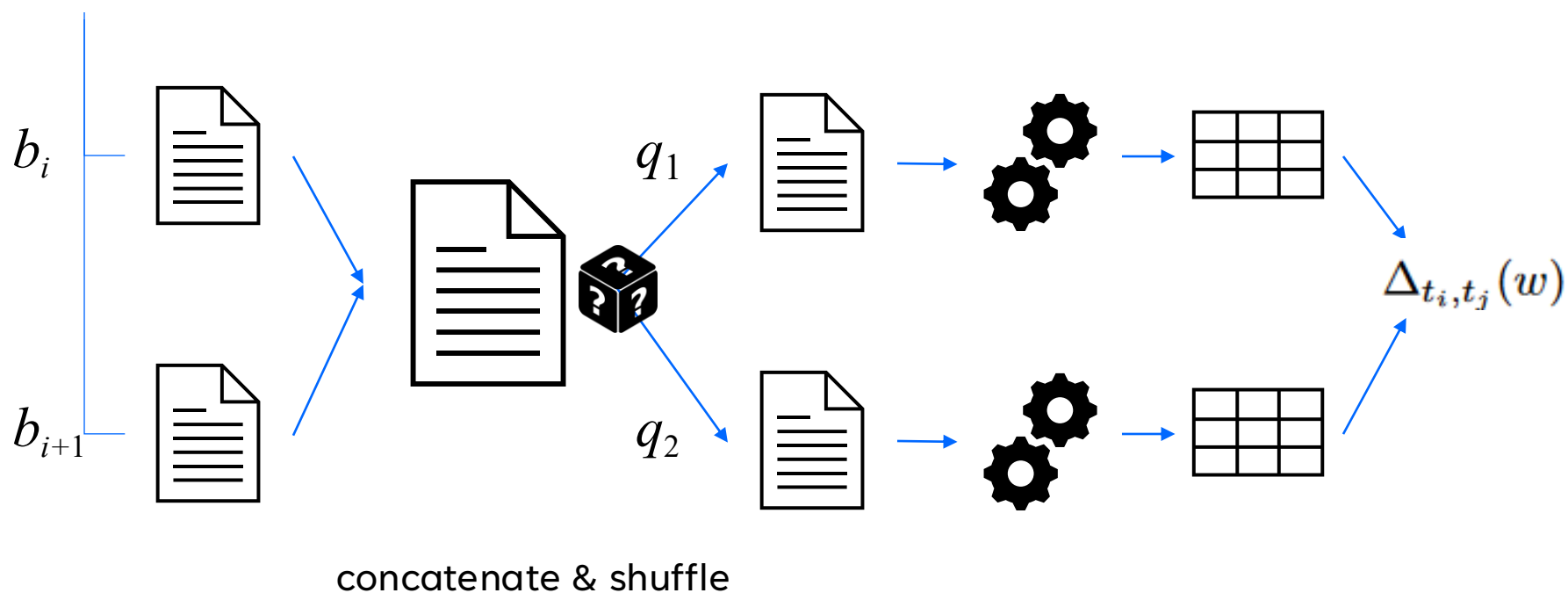
**If dogwhistle
responses
cluster well in a
distributional
space...**



... then maybe we can also represent change in the time dimension.



Rectified change: (Noble et al., 2021)



**Applied to SGNS and SBERT-PRT
approaches.**



33 500 besökare online 1 573 996 medlemmar 80 926 075 inlägg

BLI MEDLEM LOGGA IN

Stöd Flashback Swish: 123 536 99 96

- AVDELNINGAR
- AKTUELLA ÄMNEN
- POPULÄRA ÄMNEN
- NYA ÄMNEN
- NYA INLÄGG
- TAGGAR
- REGLER
- SÖK

Annonsblockering skadar oss.

Annonserna är forumets enda intäkt och är nödvändiga för att vi ska kunna finnas kvar. Om möjligt ber vi er därför att stänga av annonsblockeringen när ni besöker Flashback. Tack!

Flashback bygger pepparkakshus!

Politik / Integration och invandring

Moderatorer (5): manamanah, Poiken med guldröyarna, Ancistrus, Brutus01, yz44

Nytt ämne

Sidan 1 av 765 1 2 11 51 101 501 > »

Regler och riktlinjer för Inter
Allmänt meddelande (2020-08)

Ämne • Senast startade trådar

Senaste inlägg

Viktigt: Källor, statistik och referenser 2.1 (10) NSO	110 svar 115 095 visningar	2023-03-11 13:07 av Modd-dumskalle →
Borde Nordkorea öppna upp för mer invandring? Hallonsommar	7 svar 171 visningar	Idag 19:07 av Mad monk →
Jimmie Åkesson: Riv moskéer (113) Shaitan666	1 348 svar 85 016 visningar	Idag 18:56 av Ajabaja555 →
Hur är det att leva i Danmark, ni invandrare, urres	4 svar 213 visningar	Idag 17:25 av PatricHbg →
Hur farligt är det för svenska unga kvinnor att vara tillsammans med invandrare? (9) ApNegern	96 svar 5 026 visningar	Idag 16:18 av Statistenidittiv →
DN: Ensamkommande avgörande för att svensk omsorg i dag över huvud taget ska fungera. (11) Stasiministern	127 svar 7 662 visningar	Idag 14:46 av Mad monk →

Dogwhistle in-group

Familjeliv

Sök

FORUM ARTIKLAR ÖVRIGT

Mina länkar

- Skapa en ny tråd
- Regler

Forum

- Senaste
- Nya trådar
- Omröstningar
- Quiz
- Obesvarade
- Hetaste

Kategorier

- Adoption ▶
- Ekonomi & juridik ▶
- Familjeliv.se ▶
- Fritid & hobby ▶
- Fråga experten ▶
- Förälder ▶
- Gravid ▶

Samhälle: Politik forum

FORUM ▶ SAMHÄLLE ▶ POLITIK

RUBRIK

- Ni som tror att Hamas och islamister inte vill se fler döda civila, läs detta av Maja2003
- Antisemitismen inom vänstern, varför? av RebeckaZ70
- Regeringens el-fiasko av Ju mer ju bättre
- Gaza eller Israel? av RahRah
- Riksdagsvalet 2026 av KillBill
- Har du förtroende för regeringen (efter 18 oktober 2022) av KillBill
- Besviken på regeringen av Hedda04
- Hur mycket kan Socialdemokraterna minska? av Gert
- Nämnden för... ? av Kvinna 1980
- Va sjukaste misinformation/porpoganda ni har set från Isreal och pro-Isreal? av Suheyb
- Ryssland har anfallit Ukraina - krig i Europa av Xenia

- Total frequency and mean frequency per million per year
- 2003-2022

DWE	<i>Flashback</i>			<i>Familjeliv</i>		
	Total	<i>M</i>	<i>SD</i>	Total	<i>M</i>	<i>SD</i>
<i>berika</i>	20 936	27.92	12.18	2 047	8.02	2.94
<i>globalist</i>	31 156	32.07	39.62	122	1.77	3.15
<i>hjälpa på plats</i>	1 150	1.14	1.50	453	1.99	2.88
<i>kulturberika</i>	2 445	2.88	2.75	101	0.21	0.38
<i>kulturberikare</i>	6 133	9.88	8.41	202	0.42	0.58
<i>återvändra</i>	1 449	1.51	1.84	66	0.12	0.25
<i>återvandring</i>	12 999	13.19	22.20	384	3.27	5.73



Does change differ between communities?

Kolmogorov-Smirnov test
(KS-test)

Applied between
communities for each
approach.

Hypothesis is supported if the
per-year change pattern
significantly differs.

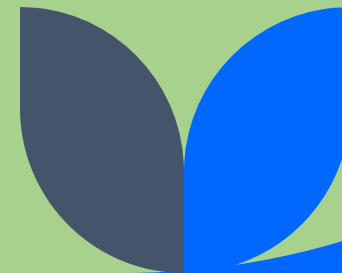


APPROACH	MEASURE	D^{KS}	p
SGNS	naive	0.568	<0.001
SGNS	rectified	0.500	<0.001
SBERT-PRT	naive	0.750	<0.001
SBERT-PRT	rectified	0.318	<0.05
SBERT-CLT	JSD	0.636	<0.001

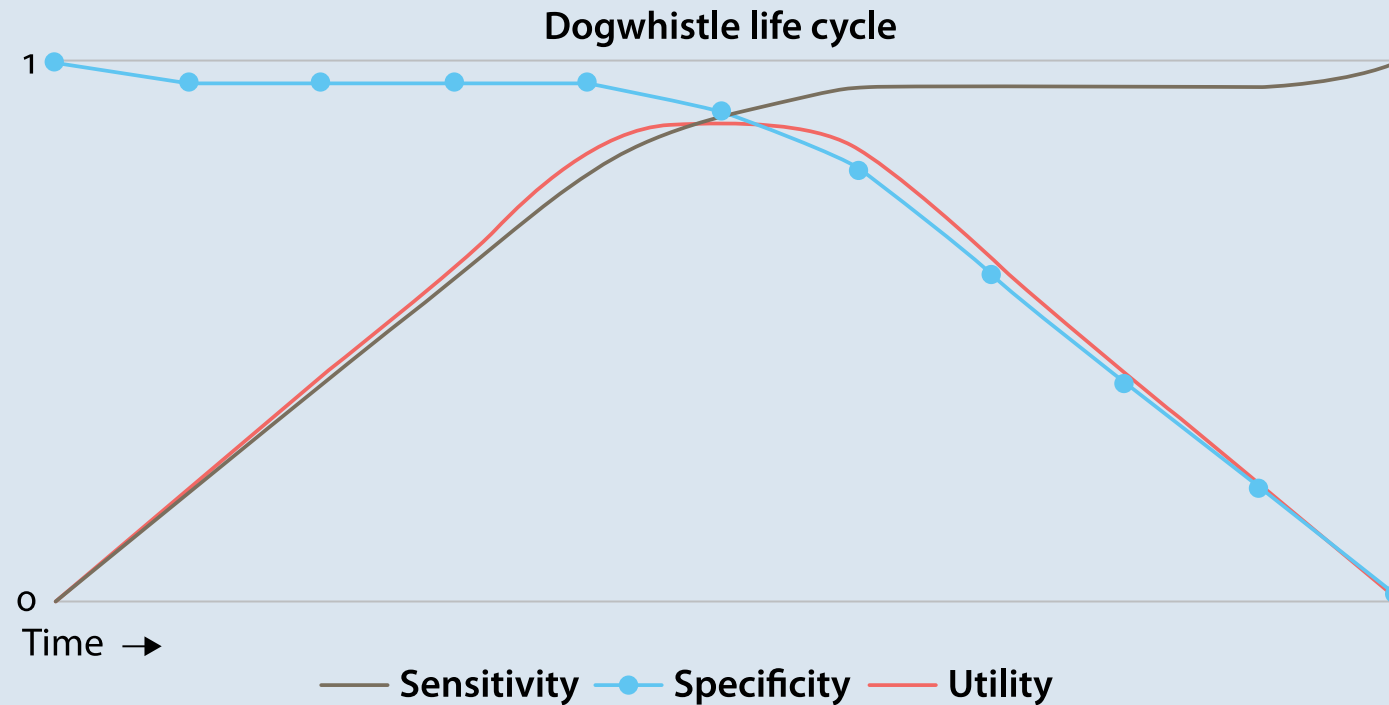
Results of KS-tests (N = 44)

It does for all approaches.

Boholm, M., & Sayeed, A. (2023, December). Political dogwhistles and community divergence in semantic change. In *Proceedings of the 4th Workshop on Computational Approaches to Historical Language Change* (pp. 53-65).



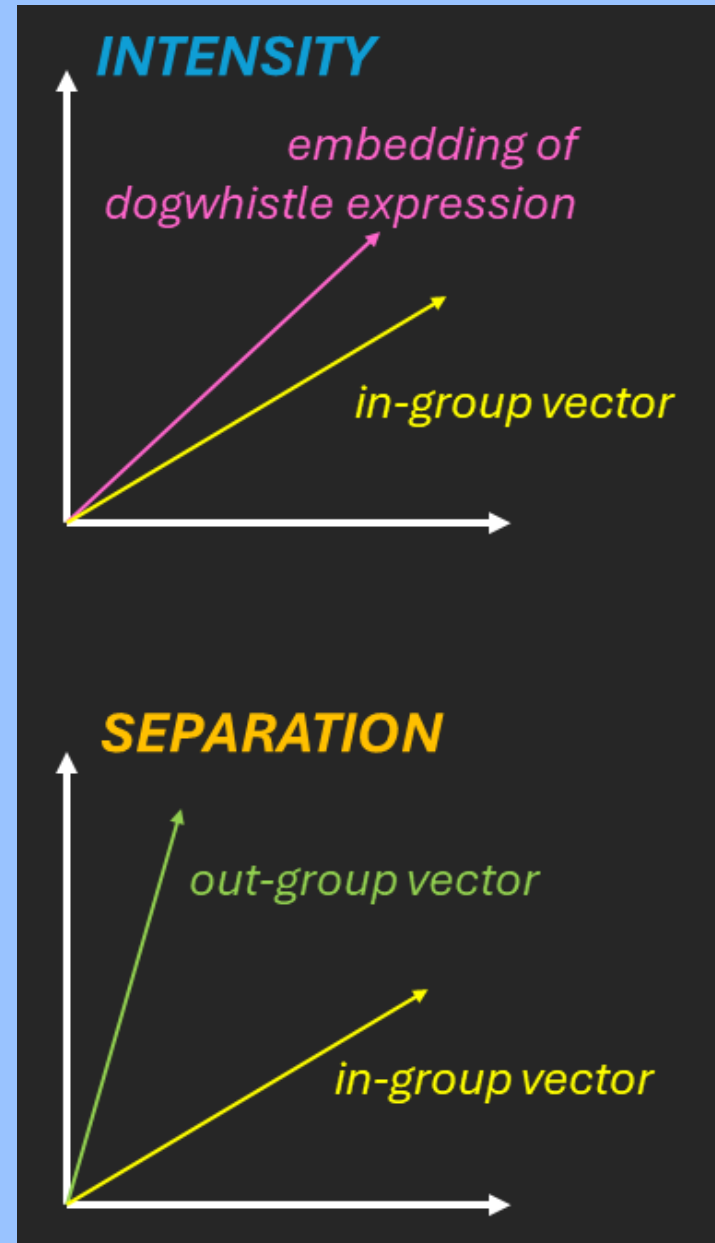
But how do we know the change matters for utility?



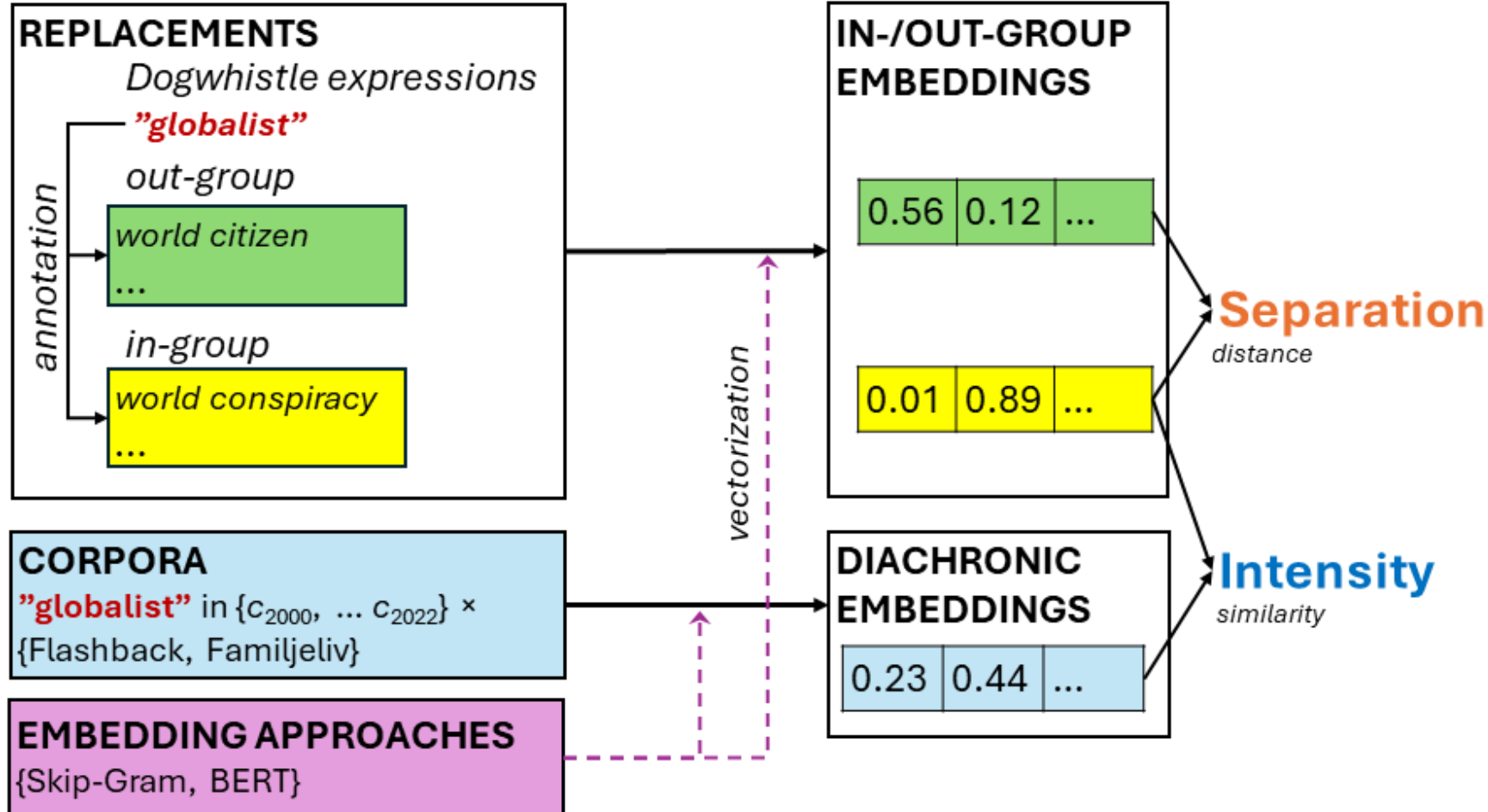
Intensity and separation

- **Intensity** (related to sensitivity)
the (average) degree of association of a dogwhistle expression w to its in-group meaning I
$$intensity = similarity(\vec{w}_t, \vec{I}_w)$$
- **Separation** (related to specificity)
the distance between the in-group meaning I and the out-group meaning O of a dogwhistle expression w

$$separation = distance(\vec{I}_w, \vec{O}_w)$$



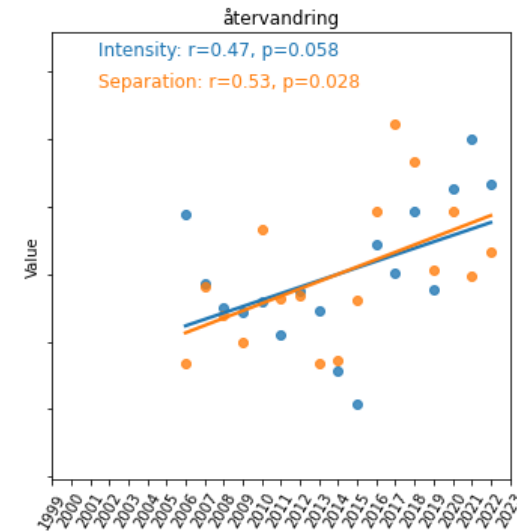
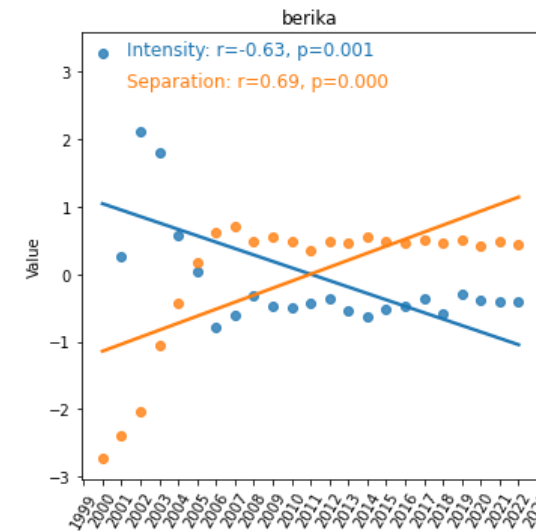
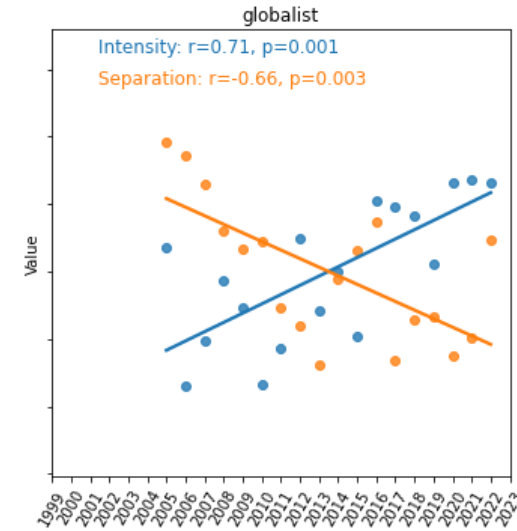
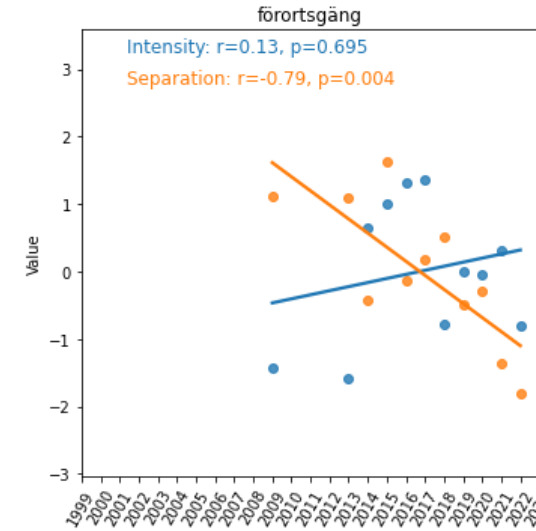
Pipeline



Results (pt. 1)

- Intensification
 - The emergence of dogwhistles
 - Exception: enrich
- Mixed patterns of separation
- Implications for utility?
 - Emergence of dogwhistle imply intensification
 - Intensity comes with a risk of out-group detection, especially when separation is low
- Not stable
(Boholm et al. In prep.)

Flashback



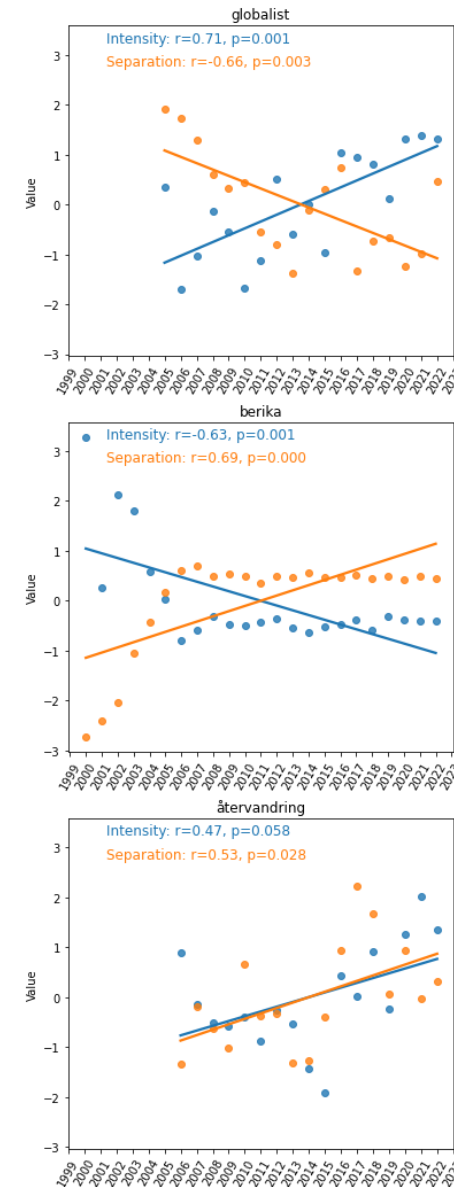
intensity = blue; separation = orange

Results (pt. 2)

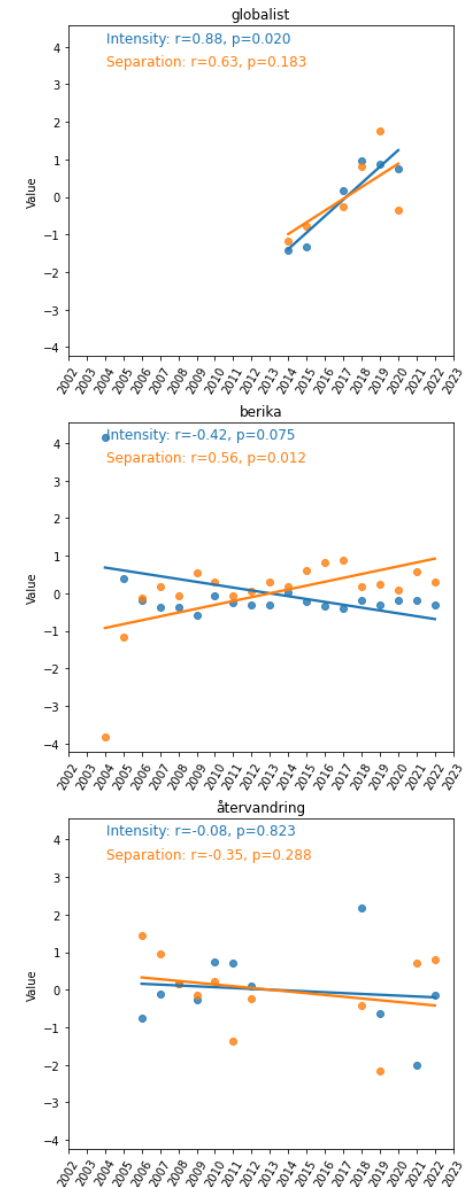
- Dogwhistle utility is less preserved in Flashback than in Familjeliv
 - Stronger intensity
 - Less separation
- Flashback memebbers tend to be too "eager" too convey their anit-immigrant attitudes
- "Slurification"

intensity = blue; separation = orange

Flashback



Familjeliv



Discussion

The dogwhistle we study (enrich etc.) have different pattern of meaning change

Dogwhistles are not stable – but vary with time and community

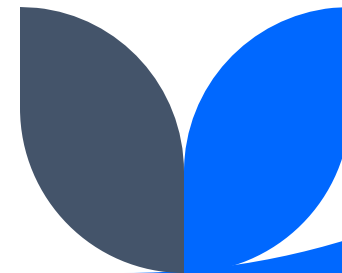
Methodological contribution: first steps towards modeling dogwhistle life-cycles in corpus data

Limitations and suggestions for future work

- Production vs. reception of dogwhistles

- How to scale up?

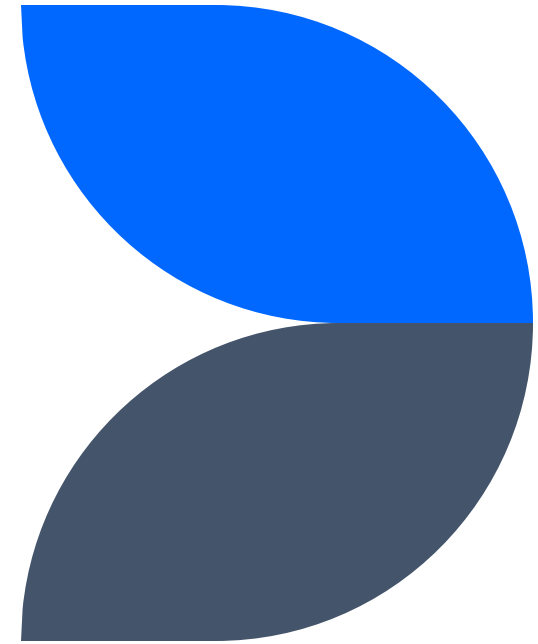
- Better understanding of different embedding approaches



The matter of directionality?

Dogwhistle meaning change in Flashback (in-group) and Familjliv (out-group) track each other.

But who precedes whom?



Vector autoregression (VAR)

Regression model for how well previous time periods predict current time periods.

SBERT model based on intensity of contextual embedding in Flashback and Familjeliv (taken quarterly) relative to average embedding of replacement survey responses.

Eq.	Var.	<i>berika</i>	<i>globalist</i>	<i>återvändring</i>
FB_t	FB_{t-1}	-0.676*** (0.141)	-0.521*** (0.129)	-0.614*** (0.14)
	FB_{t-2}	-0.431** (0.166)	-0.33* (0.13)	-0.334* (0.158)
	FB_{t-3}	-0.286† (0.147)		-0.225 (0.147)
	FL_{t-1}	-0.007 (0.025)	-0.029 (0.023)	-0.02 (0.04)
	FL_{t-2}	-0.012 (0.026)	0.003 (0.023)	-0.041 (0.04)
	FL_{t-3}	-0.0 (0.027)		-0.013 (0.041)
FL_t	FB_{t-1}	1.206 (0.783)	-1.505* (0.707)	0.251 (0.476)
	FB_{t-2}	1.218 (0.921)	-0.59 (0.714)	1.785*** (0.537)
	FB_{t-3}	2.218** (0.816)		1.355** (0.498)
	FL_{t-1}	-0.541*** (0.138)	-0.672*** (0.127)	-0.73*** (0.137)
	FL_{t-2}	-0.575*** (0.144)	-0.495*** (0.126)	-0.574*** (0.136)
	FL_{t-3}	-0.288* (0.147)		-0.233† (0.138)

Table 2: Coefficients of VAR models (mean imputation of data). FB = Flashback, FL = Familjeliv. † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

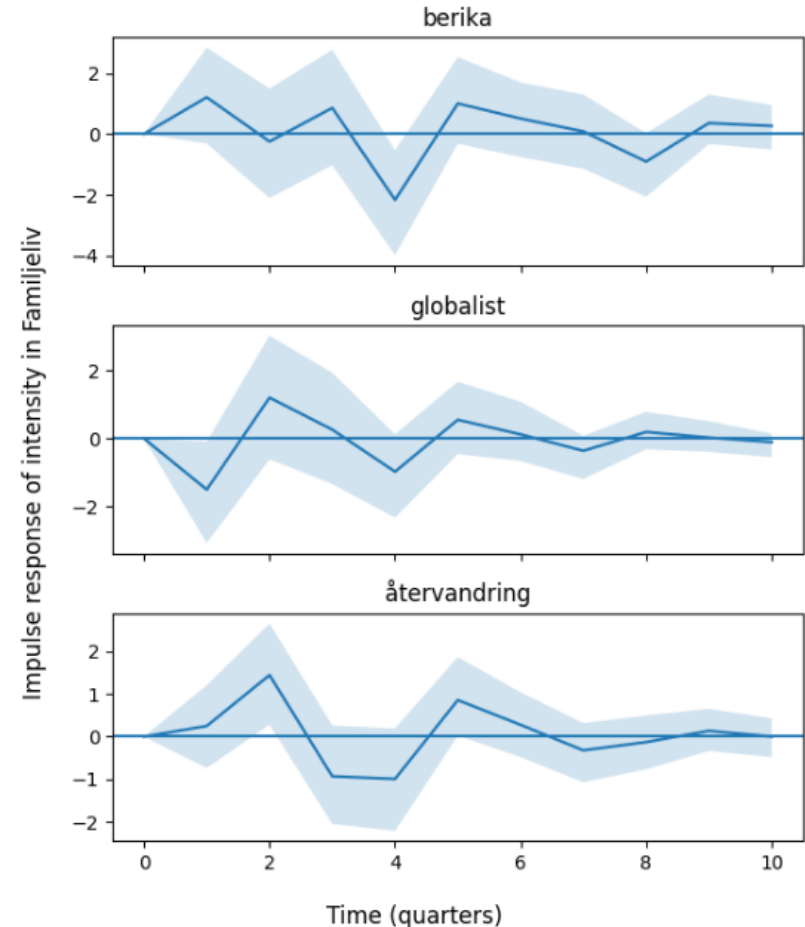
Granger causality and impulse response function

Granger causality test:

- X "Granger-causes" Y if X provides significant information in forecasting Y
- Appearance of dogwhistle meaning in Flashback significantly Granger-causes appearance in Familjeliv for "enrich" and "re-migration".
- No reverse effect.

What about "globalist"?

Boholm, M., Rettenegger, G., Breitholtz, E., Cooper, R., Lindgren, E., Rönnerstrand, B., & Sayeed, A. (2025, August). Who leads? Who follows? Temporal dynamics of political dogwhistles in Swedish online communities. In *Proceedings of the The 9th Workshop on Online Abuse and Harms (WOAH)* (pp. 383-395).



Distributional semantics and social meaning



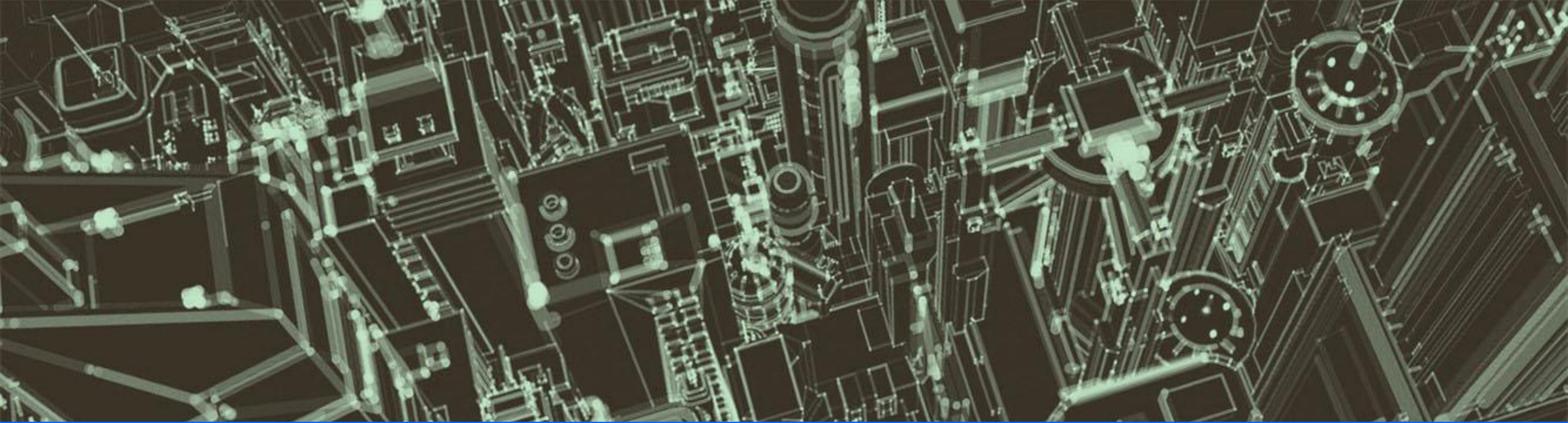
For dogwhistles: intensity and separation help operationalize a utility curve in textual resources and LLMs.



Existing statistical analysis tools allow us to approximate causality judgements.



Speculative: similarity measures allow us to represent/extract "knowledge content" for representing social meaning?



Fighting arson with arson

An epilogue.



Dogwhistles as misinformation



Obscuring democratic choice: what does the speaker/politician really believe?



Connected to conspiracy theories.



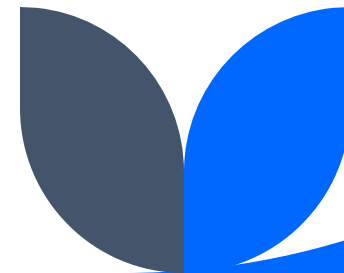
Weaponizing in-group/out-group dynamic: identity performance and derogation.

Discursive arson

Misinformation vs. Disinformation? Flashback participants don't necessarily know they're participating in disinformation, but they would probably wouldn't mind if they did...

Ideological and material motivations drive misinformation spread at a grassroots level.

(This is on the side of "we can use AI to detect this"--but this means we can use AI to do this...)



Dogwhistling "dogwhistle"

- > Hi Asad,
- > [REDACTED] and I are working on a project to construct digital
- > [REDACTED] and there is potential overlap with your
- > research interests. As I am sure that you are aware, an explicit
- > reference to "dog whistles" or similar terms, while accurate, also can
- > cause concerns, even from colleagues and administrators who are
- > sympathetic to the research idea. I suggest that you send a request to
- > us that uses more general language. I am happy to forward it to [REDACTED]
- > [REDACTED] and to coordinate with [REDACTED] to forward to the [REDACTED]
- > [REDACTED], to get a letter of [REDACTED] support. Please
- > provide some possible start dates [REDACTED]



Dogwhistling "dogwhistle"

Possible project title: "Don't mention the thing we're definitely not talking about - mapping communicative intents in research discourse pertaining to complex audience segmentation in widespread information-sharing."

Yours,
--Asad.



J. TRUMP

The WHITE HOUSE

RESTORING FREEDOM OF SPEECH AND ENDING FEDERAL CENSORSHIP

The White House | January 20, 2025

By the authority vested in me as President by the Constitution and the laws of the United States of America, and section 301 of title 3, United States Code, it is hereby ordered as follows:

Section 1. Purpose. The First Amendment to the United States Constitution, an amendment essential to the success of our Republic, enshrines the right of the American people to speak freely in the public square without Government interference. Over the last 4 years, the previous administration trampled free speech rights by censoring Americans' speech on online platforms, often by exerting substantial coercive pressure on third parties, such as social media companies, to moderate, deplatform, or otherwise suppress speech that the Federal Government did not approve. Under the guise of combatting "misinformation," "disinformation," and "malinformation," the Federal Government infringed on the constitutionally protected speech rights of American citizens across the United States in a manner that advanced the Government's preferred narrative about significant matters of public debate. Government censorship of speech is intolerable in a free society.

Double negatives.

But if dogwhistles are misinformation...



**...and we have to dogwhistles about
dogwhistles...**



...then we have to misinform to fight misinformation...



**...and we end up
subject to the same
ideological and
material calculus as
the "original"
dogwhistlers.**



McCready-Hendersonian dogwhistle maximalism

- Maybe we can't actually stop dogwhistling.
- Maybe it's just part of the human condition to dogwhistle.
- Maybe we just need to embrace the battle.
- Maybe the threat to democratic discourse is just a matter of degree...

