# PopBERT –
# Detecting left and right-wing populism in the German Bundestag.

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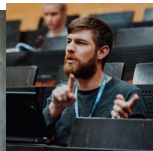
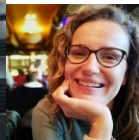SICSS Munich 2023

# Outline

# Teamwork



Lukas
Erhard

Sara
Hanke

Uwe
Remer

Agnieszka
Faleńska

# Motivation

# Goal

- Develop a *fine-grained classifier* to **detect populism in German language**
- Enabling researchers to develop more granular measurements regarding populist dynamics and contexts in comparison, for instance, to classic survey items

# Why populism?

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Well, those guys...

# Why populism?

But also those...

# The rise of populism

- One of the main threats to *democratic values* (Rummens 2017) and driver of increased *ideological polarization* (Roberts 2022)

- Understanding *populists' rhetorics and content* is key to explaining their electoral success (de Vreese et al. 2018)

- Studying **populist language** represents a particularly important case of contemporary political analysis (e.g., Mudde & Kaltwasser 2019, Hunger & Paxton 2022)

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# Current efforts

- Even recent (quantitative) approaches apply static *dictionaries* to identify populist statements (Gründl 2022)
  - Many shortcomings, e.g., no embeddings or abstract meanings (e.g., idioms)
- (Few) others use *supervised machine learning* (Dai and Kustov 2022; Bonikowski, Luo, and Stuhler 2022)
  - Focused on the U.S. context
  - Limited understanding of language

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# Transformers

- Many shortcomings in modeling language have been overcome by **transformers** (Vaswani et al. 2017)

- Deep learning representations of language are able to capture words' **contextual information** and **long-distance dependencies**

- Transformers achieve this by employing *self-attention*, a mechanism that enables the model to attend to different parts of the input and to determine their relative importance.

- The key innovation of the architecture was the ability to represent words together with their contexts, i.e., different occurrences of the same word were represented by different vectors

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# Transformers in social science

- ...though transformers have not yet been embraced by social scientists (Macanovic 2022)
- Closest to our study is a recent paper that focuses on entities extraction (e.g., elite persons or elite organizations) (Klamm, Rehbein, and Ponzetto 2023)

# **B**idirectional **E**ncoder **R**epresentations from **T**ransformers

- BERT provides a pre-trained language representation

- Devlin et al. (2019) incorporated context from both directions using a "masked language model" inspired by the Cloze task for measuring readability (Taylor 1953)
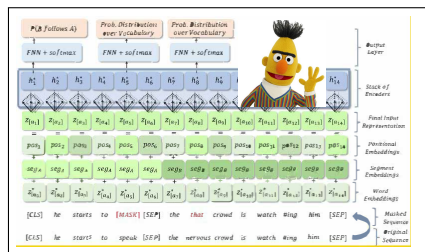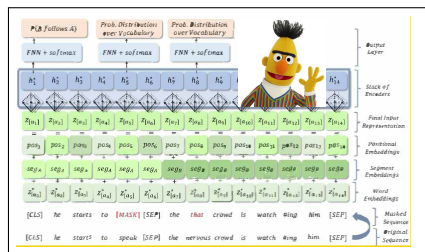


→ While the essence of BERT is relatively simple—predict each of the masked words by its context— pre-training the model on large-scale corpora provides enough contextualized information to capture a deep understanding of language

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# Conceptualizing Populism

# The ideational approach to defining populism

- Populism as "thin-centered" ideology, assuming an antagonistic relationship between **the elite** and **the people** (Mudde 2004)
- A Manichean relationship representing a **moral dichotomy** between *"the virtuous people"* and *a "corrupt" elite*

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# Left-wing and right-wing populism

Populism may be "thickened" by attaching it to a **host ideology**:

- **Right-wing** populism focuses on *nativism*: exclusionary worldview that primarily defines the people over who and what does not belong to it

- **Left-wing** populism focuses on *class*: understanding the people mainly as "the deprived" in socio-economic terms and elites as part of profiteers of the capitalist system

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# Scheme

| | | people-centrism/anti-elitism + morality framing | |
|---|---|---|---|
| | | yes | no |
| **host ideology** | yes | left-wing populism or right-wing populism | radical left (class) or radical right (nativism) |
| | no | populism | neither |

# PopBERT

# Corpus

- We use parliamentary speeches from the 18th and 19th German Bundestag (2013–2021) (N = 53,202 speeches)
- One of the practical challenges is determining the appropriate length of text snippets (Klamm et al. 2023, Barbera et al. 2021)
- The duration of contributions in the German Bundestag varies significantly
- We therefore use grammatical sentences (1.26mill), which allows researchers to aggregate scores on the desired level (e.g., speeches, speakers, or parties).

# Annotation Process: *Challenges*

- The NLP literature does not provide universally valid recommendations on how to annotate
- Fuzzy and ambiguous concepts like populism that elude a strict definition are particularly challenging (Planck 2022, Uma et al. 2021)

# Annotation Process: *Our choices*

- Five specialized annotators instead of crowd-workers
- Multi-label annotation at sentence level
- Initially selected stratified random sample across parties and selected according to keywords
- Furthermore, annotators also coded *left* or *right wing* host-ideology, yet, only if it *co-occurred* with one of the core dimensions

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## Annotation Process: *Consequences*

- 7 rounds of active learning to improve model on edge cases
- In total, this iterative process yielded 8,795 annotated sentences
- Fleiss' $\kappa$ represents moderate values comparable to other subjective tasks like detecting emotions (e.g., Kobbe et al. 2020)

Table: Description of the dataset.

| Label | N | Fleiss' $\kappa$ | Agreement |
|---|---|---|---|
| Anti-Elite | 3236 | 0.410 | 65.8 % |
| People-Centric | 1608 | 0.244 | 81.8 % |
| Left | 1393 | 0.355 | 84.5 % |
| Right | 773 | 0.364 | 91.6 % |
| **Total / Mean** | **8795** | **0.343** | **80.93 %** |

# Model architecture: *labels*

- Due to **the absence of a strict external ground** truth regarding populism (comparable to defining, e.g., hate speech (Sap et al. 2022), many labels allow different opinions that may be considered correct.

- This stands in contrast to most annotations in CL, which are designed for rather objective tasks with the underlying assumption that each item *can* be defined to be true (e.g., part-of-speech tagging)

- Instead, we embrace *the 'perspectivism'' movement* brought forward only recently in NLP research (Planck 2022)

- We argue that **each labeled instance** of our well-trained coders might reflect an aspect of populism

$\rightarrow$ Hence, if **at least one coder** identifies a dimension of populism in a sentence, we assume that there exists something worth learning

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# Model choice: Multilabels

- **Multilabel model**, i.e., each sentence may contain multiple dimensions simultaneously
- In a *multiclass model*, we would divide all combinations of populism dimensions and host ideology into distinct categories (e.g., left-wing anti-elite, neutral anti-elite, and right-wing anti-elite)
- We resolve this division and learn the categories independently
- Enables us to augment our data on the populist dimensions by learning the host ideology separately

# Model choice: *Parameters*

- We use **GBERT-large** (Chan et al. 2020), with default parameters
- We use a train-validation-test split of *60%-20%-20%* to optimize the hyperparameters and find the *optimal thresholds for each dimension*
- We stopped training after *13 epochs* as the validation loss reached a plateau.
- For evaluating the results, we employed *5-fold cross-validation*
- After cross-validation of the model, the final model was trained on *all the data* using the aforementioned configuration

# Model performance

| measure | precision | recall | f1-score |
|---|---|---|---|
| Anti-Elite | 0.812 (0.013) | 0.885 (0.006) | 0.847 (0.007) |
| People-Centric | 0.670 (0.011) | 0.725 (0.040) | 0.696 (0.019) |
| Left | 0.664 (0.023) | 0.771 (0.024) | 0.713 (0.010) |
| Right | 0.654 (0.029) | 0.698 (0.050) | 0.674 (0.031) |
| | | | |
| micro avg | 0.732 (0.009) | 0.805 (0.006) | 0.767 (0.007) |
| macro avg | 0.700 (0.011) | 0.770 (0.010) | **0.733 (0.010)** |

# Face-validity (Anti-elite & People-centrism)

| Dimension | Text | elite | centr | left | right |
|---|---|---|---|---|---|
| **Anti-Elitism** | The opposition is already on an intellectual summer break. *Die Opposition befindet sich intellektuell bereits in der Sommerpause.* | **.99** | .00 | .00 | .01 |
| | The deregulation of financial markets is what initially sparked dollar signs in the eyes of speculators. *Die Deregulierung der Finanzmärkte hat doch erst die Dollarzeichen in die Augen der Spekulanten gezaubert.* | **.96** | .00 | **.71** | .00 |
| | In great haste, you stumble through the country with your policies, hastily passing one asylum package after another. *In großer Hektik taumeln Sie mit Ihrer Politik durch das Land und beschließen Sie ein Asylpaket nach dem anderen.* | **.99** | .02 | .03 | **.99** |
| **People-Centrism** | We make concrete policy for the very concrete problems of the people. *Wir machen konkrete Politik für die ganz konkreten Probleme der Menschen.* | .00 | **.99** | .02 | .02 |
| | We do not demand any social policy measures for these people, but we demand: Stop the permanent social exclusion! *Wir fordern für diese Menschen nicht irgendwelche sozialpolitischen Maßnahmen, sondern wir fordern: Schluss mit der dauerhaften gesellschaftlichen Ausgrenzung!* | .00 | **.98** | **.96** | .00 |
| | A Syrian with 4 wives and 23 children already costs the German taxpayer 400,000 euros per year in support, without ever having contributed a single cent. *Ein Syrer mit 4 Frauen und 23 Kindern kostet den deutschen Steuerzahler schon jetzt im Jahr 400.000 Euro Alimentierung, ohne je einen einzigen Cent eingezahlt zu haben.* | .16 | **.87** | .05 | **.98** |

# Face-validity (Populism)

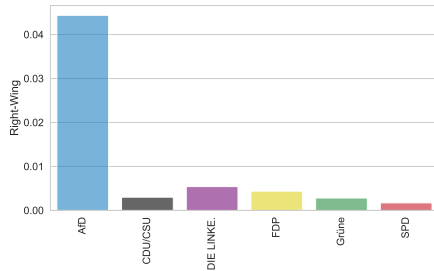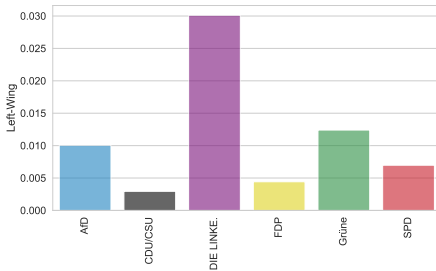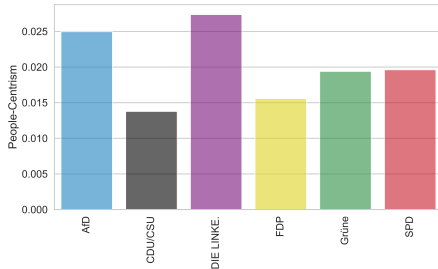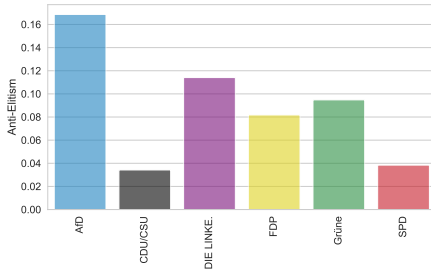| Populism | | | | | |
|---|---|---|---|---|---|
| | For tenants, this government inaction is really costing them dearly. *Für Mieterinnen und Mieter kommt diese Tatenlosigkeit der Regierung wirklich teuer.* | .99 | .79 | .02 | .03 |
| | This is class warfare from above; this is class warfare in the interests of the wealthy and the propertied against the majority of taxpayers on this earth. *Das ist Klassenkampf von oben, das ist Klassenkampf im Interesse von Vermögenden und Besitzenden gegen die Mehrheit der Steuerzahlerinnen und Steuerzahler auf dieser Erde.* | .88 | .99 | .98 | .21 |
| | You are the ones who are widening the gender pay gap by trampling upon poor German female retirees, while lavishly giving money to asylum seekers, who are predominantly young and male. *Sie sind jene, die den Gender Pay Gap vergrößern, indem Sie die armen deutschen Rentnerinnen mit Füßen treten, während Sie den Asylbewerbern, die hauptsächlich jung und männlich sind, das Geld in den Rachen werfen.* | .99 | .95 | .16 | .99 |

# Validity: out-of-sample

- We use "populist sentences" as out-of-sample tests
- Taken from the literature that scholars used to illustrate populist statements (Schurmann et al. 2022, Bonikowski et al. 2022, Dai et al. 2022, Gründl et al. 2022, Ernst et al. 2017)
- We use these "anchors" to establish *construct validity*
- For **16 out of 17** sample sentences, the classifier predicts at least one of our two main dimensions
- The one exception stems from a sentence representing a different dimension, "restoring souvereignity" (Ernst et al. 2017)
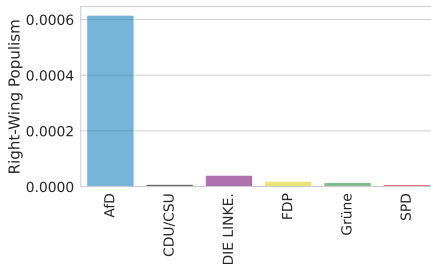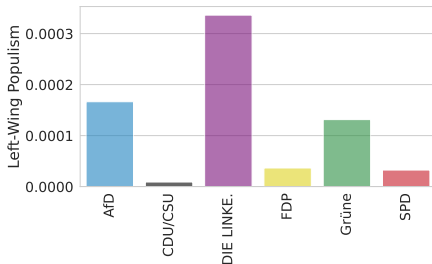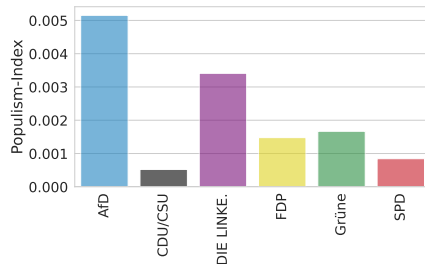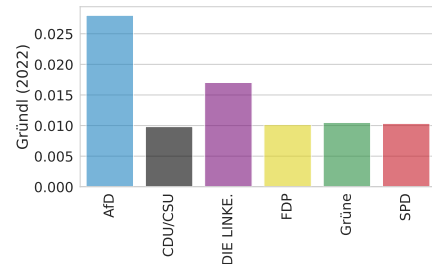
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# Validity: Party ranking (each dimension)

# Validity: Party ranking (populism)

# Preliminary conclusion

- We present **PopBERT**, a model to detect populist utterances (along with the underlying codebook and annotator-level labels)

- A battery of validity checks emphasizes the validity of our measurements

- However, a lot more can be done, e.g.,
  - cross-domain applications
  - fine-tune additional models by decreasing/increasing thresholds for certain dimensions or train other transformer-based models
  - analyze systematic variations in the coding behavior exhibited by our coders
  - combine with complementary classifiers like, for example, Klamm, Rehbein, and Ponzetto (2023)

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# Empirical analyses

# Preliminary empirical results

1. Development over time
2. Associated persons' (characteristics)
3. Spreading?

# Populism in Germany, 2013 – 2021
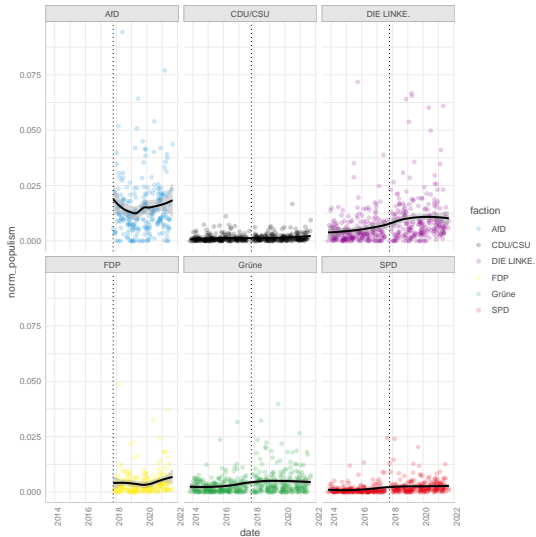
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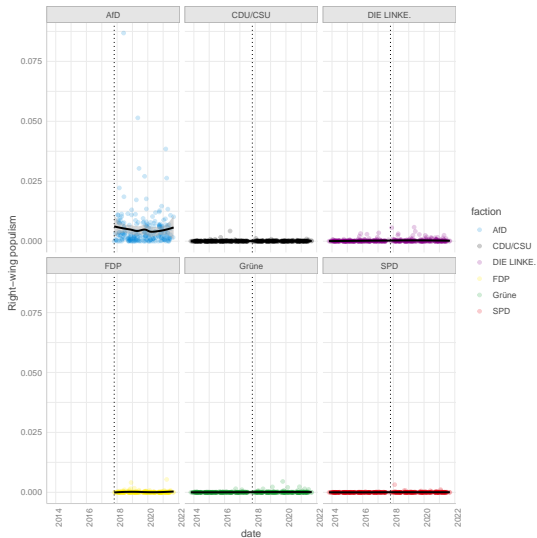
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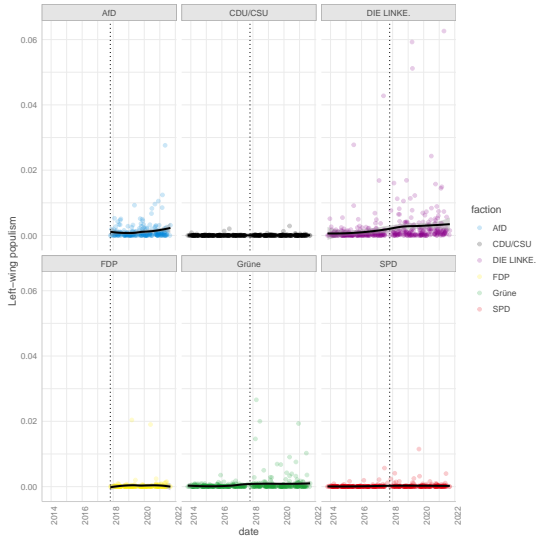
# Most populist speakers in the *18th* Bundestag

1. Sahra Wagenknecht, DIE LINKE
2. Katja Kipping, DIE LINKE.
3. Jörg Diether Dehm-Desoi, DIE LINKE.
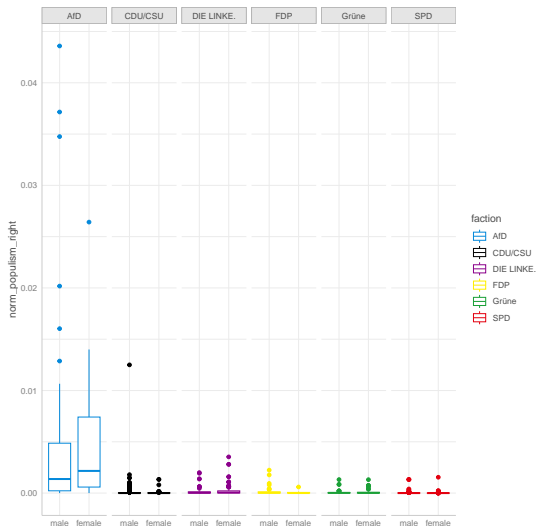4. Sabine Zimmermann, DIE LINKE.
5. Michael Kretschmer, CDU/CSU

# Most populist speakers in the *19th* Bundestag

1. Martin Sichert, AfD
2. Alice Weidel, AfD
3. Martin Reichardt, AfD
4. Mariana Iris Harder-Kühnel, AfD
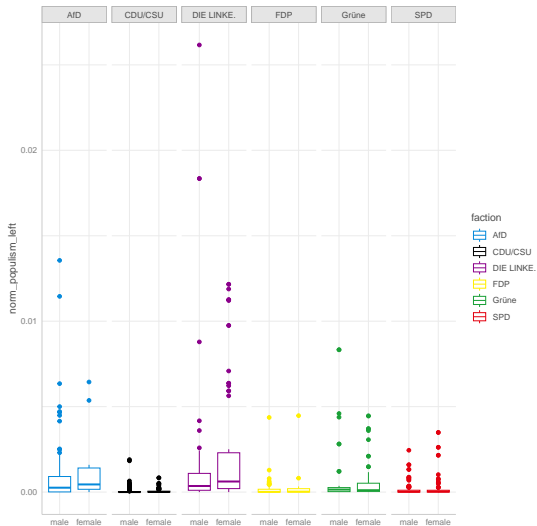5. Bernd Riexinger, DIE LINKE.

# Gender differences – populism?
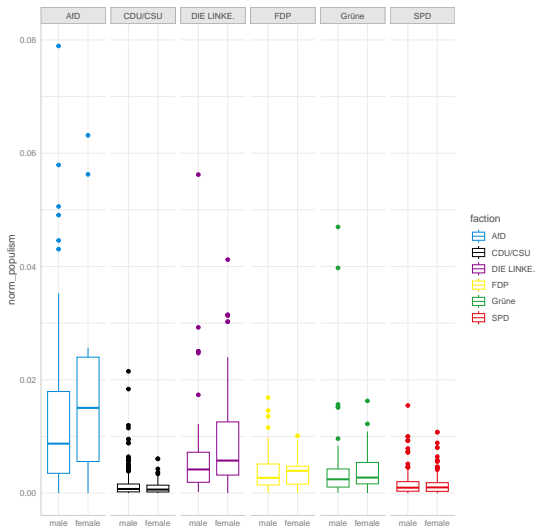
# Gender differences – right-wing populism?

# Gender differences – left-wing populism?

# Contagious effects?

- Considering *when* somebody speaks
- Plenary **debates** follow a chronological order
- Though large parts of a speech might be scripted, people could react to prior speakers

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# Measuring prior populist speakers

1. Create a speaker index for each session
2. Consider who used populist language (first)
3. Measure distance of each "populist speaker" to its predecessor

# Who starts the fire?

- Logistic regression with speakers' attributes

- Interestingly, female politicians have a higher probability to be the first populists in a session
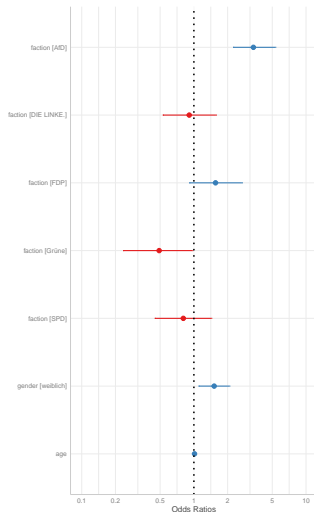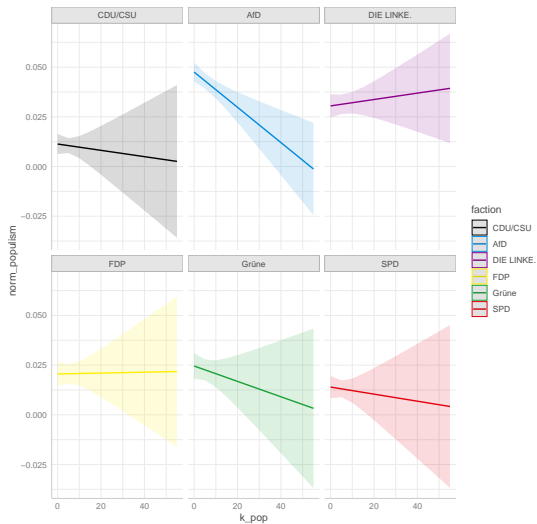
# Contagious populism?



- DV: (Normalized) degree of populism in a speech

- Key variable: *"K-Pop"*, i.e., distance of $K$-speakers to prior populist speaker

- Level-1: *speeches*; level-2: *speakers*

- Mixed regression
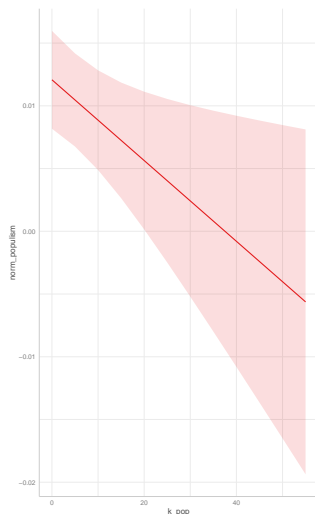
# Mechanism of contagious populism?

# Outlook

- Results are only preliminary, yet, we see some tendencies
- *PopBERT* classifier opens the way to investigate, e.g., longer timeframes, contexts, or communicative interactions
- In the end: **one step to further our understanding of populist rhetorics and its effects**

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