ARTICLE

Online Appendix to: PopBERT. Detecting populism and its host ideologies in the German Bundestag

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Appendix 1.   Dataset description
Appendix 1.1   Full Dataset

Table 1. Number of sentences and speeches in the data set by electoral term and party. *Avg. sentences* depict the mean number of sentences per speech, party, and term. *Std. Sentences* shows the corresponding standard deviations.

Term	Party	Speeches	Sentences	Avg. sentences	Std. sentences
18	CDU/CSU	4,437	251,109	56.594	23.651
	SPD	3,397	177,056	52.121	21.806
	Grüne	2,831	116,538	41.165	27.980
	DIE LINKE	2,444	108,251	44.293	29.499
	Fraktionslos	2	52	26.000	2.828
19	CDU/CSU	5,104	225,145	44.111	16.806
	SPD	3,604	150,928	41.878	17.134
	AfD	3,020	109,504	36.260	17.293
	FDP	2,622	93,045	35.486	18.412
	Grüne	2,495	88,244	35.368	18.337
	DIE LINKE	2,321	84,132	36.248	20.005
	Fraktionslos	71	2,022	28.479	7.107
sum		32,348	1,406,026		

Appendix 1.2   Distribution of annotated dimensions

Table 2. Number of labels in the data set by electoral term, party, and whether a coder was unsure. These numbers represent sums over all coders, so each labeled sample is present multiple times (once per coder).

Term	Party	antielite	pplcentr	eliteless	pplmore	left	right
18	CDU/CSU	339	245	13	7	92	78
	DIE LINKE	976	256	13	59	617	34
	Fraktionslos	12	0	0	0	0	0
	Grüne	588	178	7	35	275	16
	SPD	199	244	1	19	151	14
19	AfD	2,510	521	38	69	294	1,097
	CDU/CSU	452	243	4	25	69	84
	DIE LINKE	1,044	348	6	33	721	15
	FDP	408	154	6	10	44	48
	Fraktionslos	101	18	8	10	3	35
	Grüne	676	220	3	29	279	14
	SPD	405	288	1	23	205	17
sum		7,710	2,715	100	319	2,750	1,452

Appendix 2.   Translated Codebook

The following paragraphs describe the final codebook (translated from German) that was given to the annotators after several rounds of improvements to the described text. Annotations were carried out in German and the original language of the codebook is also German. The original, untranslated codebook can be obtained from the authors upon request. It contains descriptions of the used concept of (left-wing and right-wing) populism as well as examples following the definition

outlined in our conceptualization of populism and is inspired in wide parts by the operationalization by Wirth et al. (2016) and Ernst, Engesser, and Esser (2017).

Definition of Populism

We define populism according to Mudde (2004). Populism is a concept that has three central components: *anti-elitism*, *populism* and a focus on popular sovereignty. A conflicting relationship between the corrupt elites (anti-elitism) and the virtuous people (people-centrism) is assumed. For populists, politics should be an expression of the will of the people, which is understood to be homogeneous.

Populism can be understood as a "thin-centered ideology". This means that it is a series of ideas that do not represent an ideology of their own from which a substantive direction in the political spectrum can be derived. Instead, they can be combined with a so-called "host (or thick) ideology" such as nativism (right-wing populism), communism/socialism (left-wing populism), etc.

It is not enough for the people or the elites to be mentioned in a text. The mentions of the people and the elites must be linked to evaluative statements, e.g. normative statements (this is how it should be) or moral statements (this is right or wrong). Only then can the statement be seen and coded as populist.

This means that the elite is described negatively (Ernst, Engesser, and Esser 2017). The elite are accused of being evil, criminal, lazy, stupid, extremist, racist, undemocratic, etc. The elite is insulted and denied morality, charisma, credibility, intelligence, competence, consistency, etc. The people are described as positive. The people are endowed with morality, charisma, credibility, intelligence, competence, consistency, etc. The people are not malicious, criminal, lazy, stupid, extremist, racist, undemocratic.

A populist statement is not, for example

"The government has made a mistake." *„Die Regierung hat einen Fehler begangen.“*

A populist statement is, for example

"The Merkel dictatorship has made a mistake." *„Die Merkel-Diktatur hat einen Fehler begangen.“*

These two differ primarily in the moralizing undertone that resonates in the word "Merkel dictatorship".

Only code statements that are meant to be populist. If it is clear that the speaker is accusing someone of populism or quoting someone, this is not coded. This is not coded because it is not the opinion of the speaker, but that of a third person:

"Bernd Höcke claims that the Merkel dictatorship makes many mistakes." *„Bernd Höcke behauptet, die Merkel-Diktatur mache viele Fehler.“*

However, the following example is still coded because no conclusion about the speaker's opinion is possible:

"The movie documents the greed of speculators and the failure of politics." *„Der Film dokumentiert die Gier der Spekulanten und das Versagen der Politik.“*

Appendix 2.1   Anti-Elitism

Anti-elitism includes all statements where the *characteristics* of the elite are criticized (1), they are blamed for a *bad development/situation* (2), and it is criticized that the elites *do not represent the people* (3).

(1) The characteristics of the elite are described as negative. The elites are accused of being malicious, criminal, lazy, stupid, extremist, racist, undemocratic, etc. The elite is insulted and denied morality, charisma, credibility, intelligence, competence, consistency, etc.

(2) The elite are blamed for a situation, either because they are responsible for causing the bad situation or because they have no answers for solving the bad situation. Elites are described as a threat/burden, as responsible for negative developments/situations or as those who have committed

mistakes or crimes. Elites are not described as a source of enrichment or as responsible for positive developments/situations.

(3) The description of the elite often implies that they do not belong to the people, are not close to the people, do not know the people, do not speak for the people, do not care about the people or do not perform everyday tasks.

Appendix 2.1.1   Examples

- "The German government is partly to blame for this atrocity."
  „Die deutsche Bundesregierung trägt eine Mitschuld an dieser Gräueltat.“
- "Never before has a committee chairman tried so self-importantly and arbitrarily to silence the opposition in a committee of inquiry."
  „Noch nie hat ein Ausschussvorsitzender so selbstherrlich und willkürlich versucht, die Opposition in einem Untersuchungsausschuss zum Schweigen zu bringen.“
- "Dear SPD and Greens, you are particularly hypocritical representatives here, because you should actually meekly admit that you prevented a democratic prime minister in Thuringia in the run-up to the election."
  „Liebe SPD und Grüne, Sie sind hier besonders scheinheilige Vertreter; denn Sie müssten eigentlich klein-laut zugeben, dass Sie im Vorfeld in Thüringen einen bürgerlichen Ministerpräsidenten verhindert haben.“
- "You say you want everyone in this country to abide by law and order – we all want that – but you yourself employ a whole series of convicted criminals in your ranks, in your parliamentary group, in your offices, using taxpayers' money."
  „Sie sagen, Sie wollen, dass sich jeder in diesem Land an Recht und Ordnung hält – das wollen wir doch alle – , aber selber beschäftigen Sie eine ganze Reihe verurteilter Straftäter vom Geld der Steuerzahlerinnen und Steuerzahler in Ihren Reihen, in Ihrer Fraktion, in Ihren Büros.“
- "So you admit that you have led German citizens and taxpayers on an odyssey costing over 500 billion euros, the future of which is – I repeat myself here – an open construction site."
  „Sie geben also zu, dass Sie die deutschen Bürger und Steuerzahler auf eine über 500 Milliarden Euro teure Irrfahrt geführt haben, deren Zukunft eine – ich wiederhole mich hier – offene Baustelle ist.“
- "If you look at the pictures from the Greek-Turkish border, where human rights are being trampled underfoot, where tear gas and stun grenades are being used and refugees are being shot at, then you feel ashamed that the European Union is treating people in need so shamefully."
  „Wenn man sich die Bilder von der griechisch-türkischen Grenze anschaut, wo Menschenrechte mit Füßen getreten werden, wo mit Tränengas und Blendgranaten und auch scharf auf Flüchtlinge geschossen wird, dann schämt man sich, dass die Europäische Union so schändlich mit Menschen in Not umgeht.“
- "This is not for backrooms, not for games, not for unsavory horse-trading."
  „Das ist nichts für Hinterzimmer, nichts für Spielchen, nichts für unappetitliche Kuhhandel.“
- "In the reality of the established parties, on the other hand, there were no regulations at all for decades that at least prevented members of the government and parliamentary state secretaries from selling their officially acquired knowledge, but above all their officially established contacts, more or less seamlessly to the highest bidder after leaving office."
  „In der Realität der Altparteien gab es dagegen jahrzehntelang überhaupt keine Regelungen, die wenig-stens verhinderten, dass Regierungsmitglieder und Parlamentarische Staatssekretäre ihr amtlich erworbenes Wissen, vor allem aber ihre amtlich geknüpften Kontakte mehr oder weniger nahtlos nach dem Ausschei-den aus dem Amt gewinnbringend an den Meistbietenden verhökerten.“

Anti-elitism can also occur together with a "host ideology" if the elite is described as non-native or economic. You can find more information on this under point 1.4.1. Then assign the code anti-elitism + ideological orientation. Here are some examples:

Left

- "It is particularly about the financial market, because a very relevant part of the financial market is unfortunately based on lies and fraud."
  „Es geht darin insbesondere um den Finanzmarkt, weil ein ganz relevanter Teil des Finanzmarktes leider auf Lug und Betrug basiert .“
- "Your policy should suit many large corporations and the super-rich."
  „Ihre Politik dürfte vielen Großkonzernen und Superreichen ganz recht sein.“
- "It is the tenth anniversary of the financial crisis, and the costs of the crisis were not paid by the 1 percent super-rich or the criminal bankers, but by the people who earn their money honestly."
  „Es ist der zehnte Jahrestag der Finanzkrise, und die Krisenkosten haben eben nicht die 1 Prozent Super-reichen und auch nicht die kriminellen Banker bezahlt, sondern die Menschen, die ihr Geld auf ehrliche Weise verdienen.“
- "This is political horse-trading in the interests of the construction industry, without any significant benefit for tenants and at the expense of local authorities."
  „Das ist ein politischer Kuhhandel im Interesse der Bauwirtschaft, ohne nennenswerten Nutzen für die Mieterinnen und Mieter und zulasten der Kommunen.“

Right

- "Our over-indebted households support corrupt governments with billions in transfers and generate new migration."
  „Unsere überschuldeten Haushalte stützen mit Milliardentransfers korrupte Regierungen und erzeugen neue Migration.“

Specific example

- "The German government is celebrating a hyper-Keynesian party - you've already hinted at it, I'll add 'hyper' - and consuming the fruits of the artificial boom via misguided programs, more immigration, more euro bailouts, more aid to Turkey, more supranationalism and thus against Germany."
  „Die Bundesregierung feiert eine hyperkeynesianische Party – Sie haben es schon angedeutet, ich füge ,hyper' hinzu– und verkonsumiert die Früchte des künstlichen Booms über fehlgeleitete Programme, mehr Zuwanderung, mehr Euro-Rettung, mehr Türkei-Hilfen, mehr Supranationalismus und damit gegen Deutschland.“

As you have noticed, you can clearly find left and right host ideology here, if something like this occurs, then and only then code both host ideologies (left & right). If you are not sure, then do not code "host ideology".

People-Centrism

All statements where the *characteristics* of the people are praised (1), they are made responsible for a *positive development/situation* (2), the people are described as *uniform and homogeneous* (3) or the speaker describes themself as belonging to the people (4) fall under people-centrism.

(1) The characteristics of the people are described as positive. The people are endowed with morality, charisma, credibility, intelligence, competence, constancy, etc. The people are not malicious, criminal, lazy, stupid, extremist, racist, undemocratic.

(2) The people are ascribed responsibility for a positive situation. The people are described as an asset or responsible for a positive development/situation. The people are described as not a threat/burden, not responsible for negative developments/situations and not as having committed mistakes or crimes.

(3) The description of the people is characterized by common, homogeneous feelings, wishes or opinions.

(4) The speaker describes him/herself as belonging to the people, being close to the people, knowing the people, speaking for the people, caring for the people, agreeing with the people or performing everyday tasks. The speaker claims to represent or embody the people.

Examples

- "That means you still have half an hour to grow a backbone and stand up for the common cause of our citizens and the rule of law."
  „Das heißt, Sie haben noch eine halbe Stunde Zeit, sich ein Rückgrat wachsen zu lassen und sich für die gemeinsame Sache unserer Bürger und den Rechtsstaat einzusetzen.“
- "In any case, it is not in the public interest, as you write, to pass the costs of a minority on to the majority of the population."
  „Es ist jedenfalls nicht gemeinwirtschaftlich, wie Sie schreiben, die Kosten einer Minderheit auf die Mehrheit der Bevölkerung abzuwälzen.“

People-centrism can also occur together with a "host ideology" when the people are described as native or socio-economically marginalized. You can find more information on this under point 1.5.2. Then assign the code people-centrism + ideological orientation. Here are some examples:

Left

- "If immigrants are only seen as workers and not as people, if families are not taken into account, if no long-term prospects are offered and if migrants are treated as second-class workers, Germany will never make it from an immigration country to an inclusive and equal-opportunity immigration society."
  „Wenn Einwanderungswillige lediglich als Arbeitskräfte betrachtet werden und nicht als Menschen, wenn die Familien nicht mitgedacht werden, wenn keine langfristigen Perspektiven geboten werden und wenn die Migrantinnen und Migranten als Arbeitskräfte zweiter Klasse behandelt werden, wird es Deutschland nie vom Einwanderungsland zu einer inklusiven und chancengerechten Einwanderungsgesellschaft schaffen.“
- "They are restructuring the budget on the backs of the poorest, and that is unacceptable in our view."
  „Sie sanieren den Haushalt auf dem Rücken der Ärmsten, und das ist aus unserer Sicht nicht hinnehmbar.“

Right

- "Put an end to the division of the German people and the rule of injustice - for unity and justice and freedom for the German fatherland."
  „Schluss mit der Spaltung des deutschen Volkes und der Herrschaft des Unrechts – für Einigkeit und Recht und Freiheit für das deutsche Vaterland.“

No people-centrism would be e.g.

- "Immigration massively exacerbates this problem."
  „Durch Zuwanderung wird dieses Problem massiv verschärft.“
- "Migration is the cause of all problems."
  „Migration ist die Ursache aller Probleme.“
- "Our goal is to get more people with disabilities into training and work."
  „Unser Ziel ist, mehr Menschen mit Behinderungen in Ausbildung und Arbeit zu bringen.“

In the first two sentences this would not be people-centrism because no reference is made to "the people", "the citizens" etc.. There is no moral statement in the last sentence and is therefore not to be considered as populist.

Appendix 2.2   Left-Right

As described, populism can be combined with a "host ideology". This can relate to class (left) or nativism (right). Populism may or may not be associated with these ideologies. This is why these types are coded separately.

Therefore, you should

1. first code the populism dimension
2. if you can then determine whether the statement is a left-wing or right-wing statement, you also assign the corresponding code. If you cannot determine whether it is a left-wing or right-wing statement, do not assign a code.

Who is the elite in left and right host ideology?

Left   The economic elites are seen as supporting the political elites; or the political elites as being infiltrated/corrupted by economic elites. Both economic elites per se (international economic organizations e.g., WTO, IMF, World Bank, corporations, etc) and politicians guided by economic interests, as well as capitalism or neoliberalism are criticized.

Right   Non-Natives are seen as supporting the political elites; or the political elites as being infiltrated/corrupted/influenced by non-Natives (elites). Political and other elites (e.g. media, courts) are criticized as a "leftist/woke establishment" that is in cahoots with or represents non-Natives. Non-Natives can be immigrants, asylum seekers and (indigenous) ethnic minorities, religious minorities, LGBTQI+, feminists, "social parasites", leftists/progressives and foreign states and international organizations.

Who is the people in left and right host ideology?

Left   Addressing in particular excluded/ socio-economically "marginalized" groups such as immigrants, LGBTQI, women, disabled, unemployed.... Emphasis is on the need for social, economic and political inclusion.

The people are described as belonging to the "working class" or the (socio-economically) disadvantaged majority.

Right   The state belongs to the "native" group. The "native" group is often defined by distinguishing it from out-groups, such as

- immigrants, asylum seekers, and (indigenous) ethnic minorities
- religious minorities
- LGBTQI+
- feminists
- welfare recipients
- left-wingers/progressives
- foreign states and international organizations

This means that the native "(German) people" are mentioned in distinction to migrants, but also to the other groups mentioned above. For example, differentiation from welfare recipients ("social parasites") or homosexuals is also categorized as right-wing.

Appendix 3.   Extended List of Examples

In this appendix, we present additional examples from our corpus. These examples are based on a stratified random sample. We used each sentence's predicted probability to be assigned to one of the four dimensions. Then, we selected for each dimension three groups consisting of five sentences. The anchor value was each dimension's threshold, from which we derived the "edge cases group" with boundaries of [threshold − .15, threshold + .15]. The other two groups need to be above (or below) those boundaries, representing sentences that are highly likely (or highly unlikely, respectively) to belong to a certain dimension. Values above each threshold are highlighted in bold. The examples have been translated into English, the original text is shown in italics below each sentence.

Dim	Sentence	Anti-Elite	People-Centric	Host-Left	Host-Right
Anti-Elite	The result of this process were maximum protection for those affected and low-threshold access for all . *Höchster Schutz für die Betroffenen und niedrigschwelliger Zugang für alle waren das Ergebnis dieses Prozesses.*	0.0	0.03	0.01	0.0
	This is because many people work on construction sites where the work cannot be carried out at night with the same quality as during the day. *Denn viele arbeiten auf den Baustellen, auf denen sich die Arbeiten nachts gar nicht mit der gleichen Qualität wie tagsüber durchführen lassen.*	0.01	0.02	0.01	0.0
	Almost a million people would already be entitled to basic old-age pension today, but for many reasons they do not take advantage of it. *Schon heute hätte eine knappe Million Menschen einen Anspruch auf Grundsicherung im Alter, aber sie nehmen ihn aus vielen Gründen nicht wahr.*	0.01	0.04	0.01	0.0
	We need clear and uniform guidelines for schools that do not change ad hoc. *Wir brauchen klare und einheitliche Vorgaben für Schulen, die sich nicht ad hoc ändern.*	0.01	0.01	0.0	0.0
	I cannot understand this objection. *Diesen Einwand kann ich nicht nachvollziehen.*	0.01	0.01	0.0	0.0
	But you are presenting a package that does not actually reform. *Aber Sie legen ein Paket vor, das gerade nicht reformiert.*	0.28	0.0	0.01	0.0
	If you are going to make this claim, which I find outrageous, then you need to name the horse and rider and say where someone has done this. *Wenn Sie diese für mich ungeheure Behauptung aufstellen, dann müssen Sie schon auch Ross und Reiter nennen und sagen, wo jemand das so getan hat.*	0.37	0.0	0.01	0.0
	Since 2007, Deutsche Umwelthilfe (German Environmental Aid) has been talking publicly and also to the ministry very decidedly about the fact that the levels of exhaust gases blown into the air by cars deviate from the limit values. *Seit 2007 redet die Deutsche Umwelthilfe öffentlich und auch gegenüber dem Ministerium sehr dezidiert davon, dass die Werte bei den Abgasen, die die Automobile in die Luft blasen, von den Grenzwerten abweichen.*	0.38	0.0	0.0	0.01
	The law itself was bad enough, but the fact that it also applied retroactively is the real scandal. *Das Gesetz an sich war schon schlimm genug, aber dass das auch noch rückwirkend galt, das ist der eigentliche Skandal.*	**0.47**	0.0	0.01	0.0

Dim	Sentence	Anti-Elite	People-Centric	Host-Left	Host-Right
	Please finally admit that the abolition of military service and alternative service was a huge mistake! *Geben Sie doch bitte endlich zu, dass die Abschaffung des Wehr- und Ersatzdienstes ein Riesenfehler war!*	**0.51**	0.01	0.01	0.0
	A well-established team is being torn apart without need - because of a rigid age limit in the law. *Ein eingespieltes Team wird ohne Not zerrupft – wegen einer starren Altersgrenze im Gesetz.*	**0.64**	0.01	0.01	0.0
	So then, Mr. Gabriel, you guarantee that it won't even go to arbitration or that the US company won't prevail against the employees. *Dann garantieren Sie also, Herr Gabriel, dass es erst gar nicht vor ein Schiedsgericht kommt bzw. der US-Konzern sich nicht gegen die Arbeitnehmer durchsetzt.*	**0.85**	0.0	**0.72**	0.0
	Although this is a socially difficult issue, the Ministry's supervision of the BAMF and the proper application of the law in asylum procedures has not been important to this government for years. *Obwohl dies ein gesellschaftlich schwieriger Themenkomplex ist, war die Fachaufsicht durch das Ministerium zur Kontrolle des BAMF und zur Kontrolle einer ordnungsgemäßen Rechtsanwendung in Asylverfahren dieser Regierung über Jahre nicht wichtig.*	**0.95**	0.0	0.02	0.02
	The inhuman face of left-wing ideology, which kills children and wants to ramble about humanity everywhere, was revealed at the national congress of the Jusos. *Auf dem Bundeskongress der Jusos hat sich die unmenschliche Fratze linker Ideologie gezeigt, die Kinder tötet und überall von Humanität faseln will.*	**0.98**	0.02	0.06	**0.95**
	What I can't understand is that by playing this game, the Greens are making themselves allies of the enemies of the EEG in Brussels, the enemies of the energy transition. *Was ich nicht verstehen kann, ist, dass Grüne sich hier mit diesem Klamauk zu Verbündeten von Feinden des EEG in Brüssel machen, von Feinden der Energiewende.*	**0.99**	0.0	0.15	**0.72**
People-Centric	The approximately 30,000 jobs that are directly or indirectly dependent on lignite in Saxony alone are seen as collateral damage. *Die circa 30 000 Arbeitsplätze, die allein in Sachsen direkt oder indirekt von der Braunkohle abhängig sind, werden als Kollateralschäden verbucht.*	0.02	0.0	0.01	0.0
	But elections at any price are not elections that bring peace. *Aber Wahlen um jeden Preis sind keine Wahlen, die Frieden bringen.*	0.02	0.01	0.01	0.0
	Let me conclude by saying what we, as Social Democrats in government, are doing: Firstly. *Lassen Sie mich zum Schluss sagen, was wir als Sozialdemokraten in Regierungsverantwortung machen: Erstens.*	0.01	0.01	0.0	0.0
	He should receive this within four weeks. *Diesen sollte er innerhalb von vier Wochen bekommen.*	0.01	0.01	0.0	0.0
	Our economic strength must be flanked by social and ecological progress. *Unsere ökonomische Stärke muss von sozialem und ökologischem Fortschritt flankiert werden.*	0.0	0.02	0.01	0.01
	I would like to take this opportunity to express my thanks and respect to those who have taken on this responsibility. *Ich möchte hier an dieser Stelle meinen Dank und meinen Respekt an diejenigen richten, die diese Verantwortung übernommen haben.*	0.01	0.17	0.0	0.0

Dim	Sentence	Anti-Elite	People-Centric	Host-Left	Host-Right
	Consumers have the right to information and transparency, and we have a duty to create legally secure regulations. *Denn Verbraucherinnen und Verbraucher haben das Recht auf Information und Transparenz, und wir haben die Pflicht, rechtssichere Regelungen zu schaffen.*	0.0	0.22	0.01	0.0
	They must also realize that the ideal of the honorable businessman is still valid for most entrepreneurs in our country in the 21st century. *Sie müssen auch einsehen, dass das Ideal des ehrbaren Kaufmannes für die meisten Unternehmer in unserem Land auch im 21. Jahrhundert noch Bestand hat.*	0.0	0.27	0.01	0.0
	But the soldiers of fortune, the people obliged to leave the country, the IS fighters and the welfare tourists, there is a solution for them, and that is: deport, deport, deport. *Aber die Glücksritter, die Ausreisepflichtigen, die IS-Kämpfer und die Sozialhilfetouristen, für die gibt es eine Lösung, und das ist: abschieben, abschieben, abschieben.*	0.34	**0.36**	0.26	**0.51**
	I think that single parents in Germany, most of whom are in employment, should be able to rely on actually receiving an advance on child maintenance every month until the child reaches the age of majority.. *Ich finde, dass sich Alleinerziehende in Deutschland, von denen übrigens die meisten erwerbstätig sind, darauf verlassen können müssen, dass sie jeden Monat bis zur Volljährigkeit tatsächlich einen Unterhaltsvorschuss bekommen.*	0.0	**0.41**	0.18	0.0
	However, it is crucial that we signal that we reward what families achieve, what parents have achieved, especially the achievements of those who have fewer financial resources. *Entscheidend ist aber, dass wir signalisieren, dass wir das, was Familien leisten, was Eltern geleistet haben, honorieren, insbesondere die Leistungen derjenigen, die geringere finanzielle Mittel haben.*	0.0	**0.56**	0.14	0.0
	This naturally makes everything more expensive and increasingly unaffordable for the average citizen. *Dadurch wird natürlich alles teurer und immer unfinanzierbarer für den normalen Bürger.*	0.01	**0.61**	0.02	0.01
	Large companies take advantage of loopholes and structuring options to make substantial tax savings, while the many honest taxpayers, such as the insurance employee or the baker next door, wonder where the sometimes huge corporate profits actually end up. *Große Unternehmen nutzen Schlupflöcher und Gestaltungsmöglichkeiten, um kräftig Steuern zu sparen, während die vielen ehrlichen Steuerzahlerinnen und Steuerzahler, wie die Versicherungsangestellte oder der Bäckermeister von nebenan, sich fragen, in welche Taschen die teils riesigen Gewinne der Unternehmen eigentlich wandern.*	**0.89**	**0.82**	**0.99**	0.03
	Social Democratic voters in Berlin and elsewhere - especially in my Tempelhof-Schöneberg constituency - want 100 percent equality. *Sozialdemokratische Wähler und Wählerinnen in Berlin und anderswo - insbesondere in meinem Wahlkreis Tempelhof-Schöneberg wollen 100 Prozent Gleichstellung.*	0.0	**0.86**	0.06	0.01
	You have rightly said that you stand up for and defend the interests of the people. *Sie haben zu Recht gesagt, dass Sie für die Interessen der Menschen antreten und eintreten.*	0.01	**0.92**	0.03	0.01

Dim	Sentence	Anti-Elite	People-Centric	Host-Left	Host-Right
Host-Left	This is of course not okay. *Dies ist natürlich nicht in Ordnung.*	0.01	0.01	0.0	0.0
	Let's remember our citizens' consultation hours. *Denken wir an unsere Bürgersprechstunden.*	0.01	0.01	0.0	0.0
	We have determined the exact amount of fertilizer for each individual plant species. *Wir haben die Düngemenge für jede einzelne Pflanzenart exakt festgelegt.*	0.01	0.01	0.01	0.0
	The arms race is already in full swing. *Der Rüstungswettlauf dabei ist schon in vollem Gange.*	0.04	0.0	0.01	0.0
	These are all projects that will cement and perpetuate Europe's dependence on fossil fuels for years to come. *All dies sind Projekte, die die fossile Abhängigkeit Europas über Jahre hinaus zementieren und fortschreiben.*	0.02	0.0	0.01	0.0
	German citizens, who are already working longer, paying higher taxes and have lower pensions and private assets than the citizens of the countries receiving these transfers, will have to adjust to even higher burdens. *Die deutschen Bürger, die jetzt schon länger arbeiten, höhere Steuern zahlen und geringere Renten und Privatvermögen haben als die Bürger der Empfängerländer dieser Transfers, müssen sich dagegen auf noch höhere Belastungen einstellen.*	0.01	**0.88**	0.29	0.14
	It really is the biggest scandal in the history of the SPD that it distributes money to 1.2 million people in this Federal Republic of Germany who don't need it at all. *Es ist wirklich der größte Skandal in der Geschichte der SPD, dass ihr Geld an 1,2 Millionen Menschen in dieser Bundesrepublik Deutschland verteilt, die das überhaupt nicht brauchen können.*	**0.99**	0.24	0.3	0.08
	We will no longer allow anyone with a criminal record to open a brothel and earn a fortune from women's bodies. *Wir lassen es nicht mehr zu, dass jeder, der einschlägig vorbestraft ist, ein Bordell eröffnen und sich mit den Körpern von Frauen eine goldene Nase verdienen kann.*	0.11	0.12	0.36	0.01
	They don't need advice from the Federal Minister of Finance or the Federal Chancellor, but are experienced enough themselves - on the one hand with Postbank, on the other with Dresdner Bank - to decide whether they want to enter into a marriage or not. *Die brauchen keinen Rat vom Bundesfinanzminister oder von der Bundeskanzlerin, sondern sind selbst erfahren genug – zum einen mit der Postbank, zum anderen mit der Dresdner Bank –, zu entscheiden, ob sie eine Hochzeit eingehen wollen oder nicht.*	**0.48**	0.01	0.37	0.0
	And you know as well as I do that the lowering of standards was caused by sham trade unions and bargaining agreements - and not by the trade unions, which are now trying to achieve an improvement for employees. *Und Sie wissen genauso wie ich, dass die Absenkung des Standards durch Scheingewerkschaften und Gefälligkeitstarifverträge verursacht wurde - und nicht durch die Gewerkschaften, die jetzt versuchen, da eine Besserung für die Arbeitnehmer zu erreichen.*	**0.88**	0.01	0.42	0.0

Dim	Sentence	Anti-Elite	People-Centric	Host-Left	Host-Right
	Hardly a day goes by in this House without parcel carriers, care workers and cashiers in retail stores being praised for their efforts during the coronavirus crisis, and quite rightly so. *Es vergeht kaum ein Tag, an dem nicht auch hier in diesem Hohen Haus Paketboten, Pflegekräfte und die Kassiererinnen im Einzelhandel für ihren Einsatz in der Coronakrise sehr gelobt werden, und das völlig zu Recht.*	0.0	**0.96**	**0.63**	0.02
	The serious mistakes made by the German government in dismantling the welfare state cannot be remedied by restricting the basic rights of migrants and refugees. *Die schweren Fehler, die die Bundesregierung mit dem Abbau des Sozialstaats begangen hat, heilt man nicht, indem man jetzt die Grundrechte von Migranten und Flüchtlingen einschränkt.*	**0.85**	**0.75**	**0.68**	0.19
	Oligarchs are said to be pulling the strings in Bulgaria. *In Bulgarien sollen Oligarchen die Fäden in der Hand halten.*	**0.86**	0.01	**0.82**	0.01
	Many companies have simply used the money they have saved, so to speak, for share buyback programs, and the mountain of debt in the USA has grown. *Viele Unternehmen haben einfach die Kohle, die sie sozusagen gespart haben, für Aktienrückkaufprogramme genutzt, und der Schuldenberg der USA ist gewachsen.*	**0.93**	0.01	**0.94**	0.01
	Their national corporate risks were simply socialized in this European financial system of cheating and exploiting German taxpayers and savers. *Deren nationale Unternehmensrisiken wurden einfach sozialisiert in diesem Finanzeuropa der Übervorteilung und Ausbeutung des deutschen Steuer- und Sparersäckels.*	**0.99**	0.05	**0.99**	0.18
Host-Right	These injustices, ladies and gentlemen, also have an impact on the interpersonal climate. *Diese Ungerechtigkeiten, meine Damen und Herren, die schlagen auch auf das zwischenmenschliche Klima durch.*	0.01	0.01	0.01	0.0
	The black zero has been achieved and will remain so - clear proof that we as the governing coalition were able to set clear priorities. *Die schwarze Null steht, und so wird es auch bleiben - ein klarer Beweis, dass wir als Regierungskoalition in der Lage waren, deutliche Prioritäten zu setzen.*	0.01	0.02	0.0	0.0
	With a friendly glance at the unfortunately orphaned Länderbank, may I once again appeal to the Länder to vote in favor of this bill in the Bundesrat. *Ich darf mit einem freundlichen Blick auf die leider verwaiste Länderbank noch einmal an die Länder appellieren, im Bundesrat diesem Gesetzentwurf zuzustimmen.*	0.01	0.01	0.0	0.0
	We need to think about all of this together as part of the technology leadership that we have and should develop, and see it as a locational advantage for us. *All das müssen wir im Rahmen der Technologieführerschaft, die wir haben und ausbauen sollten, zusammendenken und als Standortvorteile für uns begreifen.*	0.01	0.01	0.0	0.01

Dim	Sentence	Anti-Elite	People-Centric	Host-Left	Host-Right
	But if we believe that this is good mobility, that it helps and is environmentally friendly - of course a rental bike is more environmentally friendly than a cab or other vehicles - then we have to be honest at this point and say: we also have to promote this. *Wenn wir aber glauben, dass das gute Mobilität ist, dass sie hilft und umweltfreundlich ist – natürlich ist ein Leihfahrrad umweltfreundlicher als ein Taxi oder andere Fahrzeuge –, dann müssen wir uns an der Stelle auch mal ehrlich machen und sagen: Auch das müssen wir fördern.*	0.0	0.02	0.01	0.01
	On the contrary, this Islamic peculiarity falls under a kind of protection of a false, liberal interpretation of our Basic Law. *Ganz im Gegenteil dazu fällt diese islamische Besonderheit bei Ihnen unter eine Art Bestandsschutz einer falschen, liberalen Auslegung unseres Grundgesetzes.*	**0.95**	0.01	0.01	0.16
	Against the backdrop of German developments, these EU bankruptcy declarations really have a special flavor. *Vor dem Hintergrund der deutschen Entwicklung bekommen diese EU-Bankrotterklärungen wirklich ein besonderes Geschmäckle.*	**0.99**	0.01	0.04	0.17
	The left is not going along with this mindless technological euphoria. *Die Linke macht diese besinnungslose Technikeuphorie nicht mit.*	**0.95**	0.01	0.01	0.2
	This is another reason why we refuse to spend even a single cent, which has been hard-earned by the population, on so-called climate protection measures based on an absurd theory, which also cause massive environmental damage. *Auch deshalb lehnen wir ab, auch nur einen einzigen Cent, der von der Bevölkerung hart erarbeitet wurde, für die auf der Grundlage einer absurden Theorie veranlassten sogenannten Klimaschutzmaßnahmen auszugeben, die zudem auch noch massive Umweltschäden verursachen.*	**0.99**	0.03	0.03	0.27
	Unfortunately, a large part of this is being misused to ideologically control people in Germany and to educate them in tolerance, diversity and cosmopolitanism, the cardinal globalist virtues. *Ein nicht geringer Teil davon wird leider dazu missbraucht, die Menschen in Deutschland ideologisch zu gängeln und zu Toleranz, Vielfalt und Weltoffenheit, den globalistischen Kardinaltugenden, zu erziehen.*	**0.95**	0.01	0.02	**0.45**
	You are trying to make a very cheap point here, and you are showing your ugly, nationalist and also - as we have just heard - socialist face. *Sie versuchen hier, einen ganz billigen Punkt zu machen, und Sie zeigen Ihre hässliche, nationale und auch – wir haben es eben gehört – sozialistische Fratze.*	**0.98**	0.01	0.04	**0.5**
	It started to have an effect until left-wing and right-wing radicals took over the government in Athens and the few who were still paying taxes also deferred payment, ladies and gentlemen. *Es hat angefangen, zu wirken, bis Links- und Rechtsradikale in Athen die Regierung übernommen haben und die wenigen, die da noch Steuern bezahlt haben, die Zahlung auch noch zurückgestellt haben, meine sehr verehrten Damen und Herren.*	**0.96**	0.03	0.04	**0.58**
	And, dear Mr. Scholz, it is precisely these drones that you and your left-wing SPD are currently blocking the procurement of. *Und, lieber Herr Scholz, es sind genau diese Drohnen, deren Beschaffung Sie im Moment mit Ihrer linken SPD blockieren.*	**0.99**	0.01	0.04	**0.8**

Dim	Sentence	Anti-Elite	People-Centric	Host-Left	Host-Right
	Right-wing extremism cannot be fought with left-wing militancy. *Rechtsextremismus bekämpft man nicht mit linker Militanz.*	**0.87**	0.02	0.01	**0.8**
	When immigrants from archaic cultures rape young women and commit bestial murders, this is not hatred either, but rather relationship crimes for the back pages of the local papers, because they are supposedly not of national relevance. *Wenn Zugewanderte aus archaischen Kulturen junge Frauen vergewaltigen und bestialisch morden, dann ist auch das kein Hass, sondern dann sind das Beziehungstaten für die hinteren Seiten der Lokalblätter, da angeblich nicht von nationaler Relevanz.*	**0.44**	**0.49**	0.1	**0.84**

Appendix 4.   Figures with Unstandardized Axes

The axes in the figures within the main text were normalized to their respective maximum values. For the sake of transparency, we present here the figures with the unstandardized axes once again for interested readers.
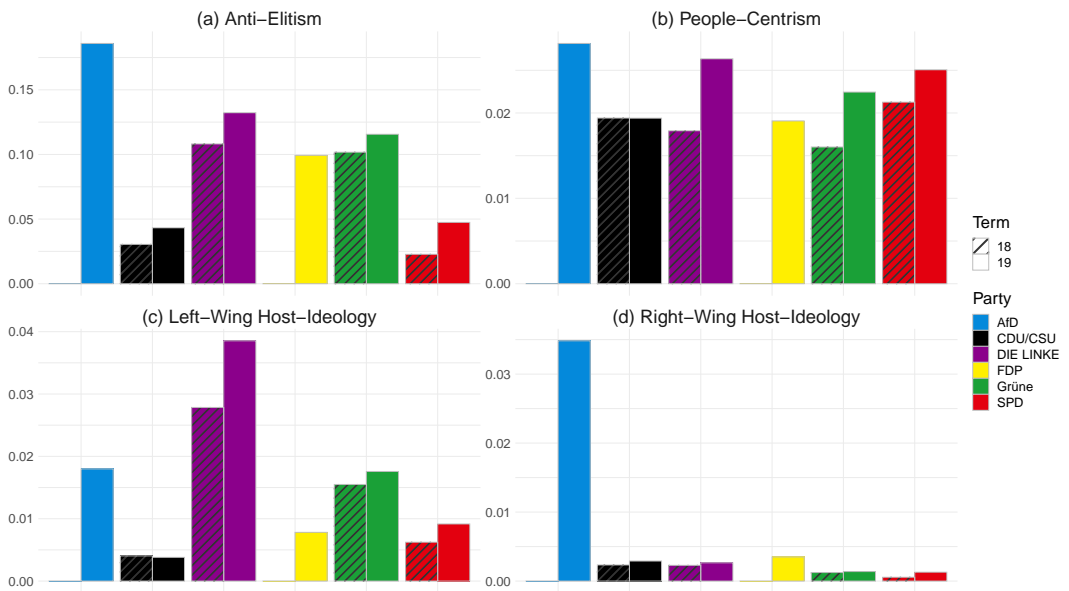

Figure 1. Populist dimensions in speeches of the 18th and 19th legislative period of the Bundestag, by party. This figure shows the same values as Figure ?? in the original paper, but with unstandardized axes; hence, the different scales.
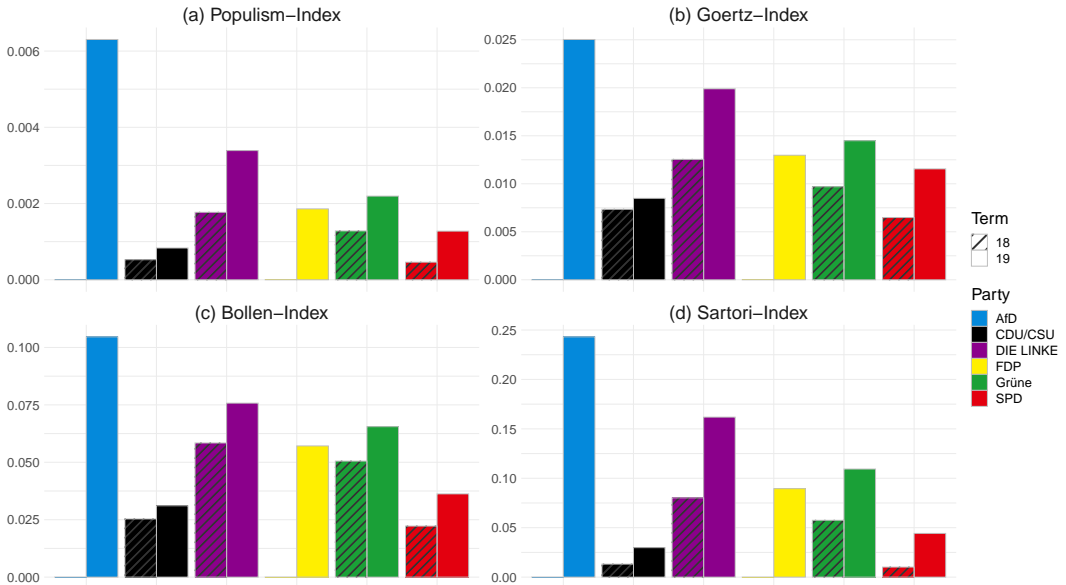
Figure 2. Populism in speeches of the 18th and 19th legislative period of the Bundestag, by party. This figure shows the same values as Figure ?? in the original paper but with unstandardized axes; hence, the different scales.

Appendix 5.   Details on External Validation

This appendix presents the 17 prototypical populist statements extracted from other articles that we used as out–of–sample test.[1] We relied on the following studies to extract sentences:

The analysis in Schürmann and Gründl (2022) was conducted as a manual content analysis of 3500 Facebook posts from prominent German politicians and parties. While the article differentiates between various dimensions of populism throughout, this distinction is not evident in the supplementary material for the examples. Therefore, in this study, a post is considered a positive match if it exhibits at least one of the two key dimensions of populism. All posts from Schürmann and Gründl (2022) resonate with at least one of our identified dimensions.

In a semi–automated content analysis, Ernst et al. (2017) examined 1400 Facebook posts from six Western European countries to study populist communication strategies. The examples provided in their supplementary materials comprise six posts that align with our categorization into dimensions. Among these six posts, we identified an exact match for the specified dimensions in five of them. Our analysis did not recognize one post from the dimension of people-centrism.

Bonikowski, Luo, and Stuhler (2022) conducted a study on election speeches in the USA and provided two examples during the explanation of their theoretical concept in the article to illustrate populism. We identified at least one of our two dimensions for both examples.

Dai and Kustov (2022) also investigated election speeches in the USA and presented two examples. In both cases, our two dimensions of populism were also applicable and evident.

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1. Idioms have been translated with their German equivalents (e.g. "Washington" to "Berlin", "SNCF" to "Bahn", "the American people" to "Bürger").

Table 4. Predictions on populist sentences from other studies. Predicted values above the threshold are highlighted in bold. The predicted values are rounded to two decimal points, hence the occasional prediction of 1.0.

Source	Label	Text	Anti-Elite	People-Centric	Host-Left	Host-Right
Schürmann and Gründl 2022	**populism**	"Die da oben" bestimmen über "uns hier unten"? Dieses Gefühl der Ohnmacht vieler Bürger will die AfD aufheben. Einer der mir wichtigsten Punkte in unserem Wahlprogramm ist deshalb dieser: Wir wollen dem Volk das Recht geben, den Abgeordneten auf die Finger zu schauen und vom Parlament beschlossene Gesetze zu ändern oder abzulehnen. Das Volk soll auch die Möglichkeit erhalten, eigene Gesetzesinitiativen einzubringen und per Volksabstimmung zu beschließen. *The one up there" controls "us down here"? This feeling of disempowerment for many citizens is what the AfD wants to overcome. One of the most important points in our election program is therefore this: "We want to give the people the right to watch the MPs and to change or reject laws passed by parliament. The people should also have the opportunity to introduce their own legislative initiatives and pass them by referendum.*	0.01	**1.0**	0.02	0.01
		Ich denke, für Familien und Menschen mit kleinen und mittleren Einkommen müsste noch mehr getan werden: Angesichts der Rücklagen die Sozialabgaben senken, den Soli schrittweise abschaffen, die kalte Progression zurückführen, Kindergeld erhöhen, Baukindergeld umsetzen und vieles mehr. Wir müssen die Normalbürger in der Mitte entlasten. *I think more should be done for families and people with small and medium salaries: In light of our reserves, [we must] lower social welfare contributions, gradually abolish the Soli [solidarity tax for former DDR states], reduce the cold progression, increase child benefits, implement Baukindergeld [state subsidy for families buying a house] and much more. We need to unburden the ordinary people in the middle class."*	0.0	**0.94**	0.05	0.0
		Integration kann nicht bedeuten, dass sich die einheimische Bevölkerung und die Zuwanderer auf halbem Weg treffen und daraus eine neue Kultur entsteht. Wir brauchen bei der Integration in Deutschland einen klaren Kompass: unsere Leitkultur. Eine Mehrheit der Deutschen sieht das genauso! *Integration does not mean that the natives and immigrants meet halfway and a new culture emerges from this. We need a clear direction for integration in Germany: our Leitkultur. A majority of Germans thinks like us!*	0.0	**0.98**	0.03	**0.43**
		Die CSU hat zweieinhalb Jahre lang nichts getan und tritt jetzt, vor der bayerischen Landtagswahl, hart auf. Die Bürgerinnen und Bürger in Bayern sollten es sich nicht bieten lassen, für einen Landtagswahlkampf so instrumentalisiert zu werden. *The CSU has done nothing for two and a half years, an now ahead of the Bavarian state election, they are getting tough. The citizens of Bavaria should not tolerate to get instrumentalized for a state election campaign like this.*	**0.99**	**0.58**	0.0	0.01

Source	Label	Text	Anti-Elite	People-Centric	Host-Left	Host-Right
		CDU/CSU und SPD stellen kurzfristige Konzerninteressen über den Gesundheitsschutz der Menschen. Mit dieser Kumpanei muss endlich Schluss sein! *The CDU/CSU and SPD are putting short-term interests of big companies over the protection of people's health. This cronyism must come to an end!*	**1.0**	0.45	**1.0**	0.01
		Warum Konzerne an Parteien spenden, lässt sich gerade beobachten. Die Politiker der Großen Koalition verhalten sich wie Lobbyisten der Autoindustrie. Beschwichtigung und Aussitzen, statt Aufklärung und Verbraucherschutz. DIE LINKE hingegen ist nicht käuflich! Bei den anderen Parteien zahlen Unternehmen und Wirtschaftsverbände – bei uns zählst Du! *Why large concerns donate to political parties can be observed right now. The politicians of the grand coalition act like lobbyists for the car industry. Appeasement and waiting, instead of information and consumer protection. Instead, DIE LINKE is not for sale! With the other parties, companies and trade associations pay - with us, you matter!*	**1.0**	0.2	**1.0**	0.04
		Ich bin überzeugt, dass die Verunsicherung in der Bevölkerung ganz viel mit dem Wandel in der Arbeitswelt zu tun hat. Wir werden diesen Wandel gestalten und zwar gemeinsam mit den Menschen. Die SPD braucht bei der der Zukunft der Arbeit eine klarere Profilierung. *I am convinced that the uncertainty among the population has a lot to do with the transformation of work. We will shape this transformation, and we will do so together with the people. The SPD needs a clearer profile when it comes to the future of labour.*	0.0	**0.59**	0.0	0.0
Bonikowski et al. 2022	**populism**	Schließlich müssen die Bürger darauf vertrauen können, dass ihre Regierung sich um uns alle kümmert - und nicht um die Sonderinteressen, die seit acht Jahren die Agenda in Berlin bestimmen, und um die Lobbyisten, die die Kampagne leiten. Ich habe meine Karriere damit verbracht, es mit Lobbyisten und deren Geld aufzunehmen, und ich habe gewonnen. *Finally, the American people must be able to trust that their government is looking out for all of us—not the special interests that have set the agenda in Washington for eight years, and the lobbyists who run John McCain's campaign. I've spent my career taking on lobbyists and their money, and I've won*	**1.0**	0.73	**1.0**	0.01
		Es wird ein Sieg für das Volk sein. Ein Sieg für den einfachen Bürger, dessen Stimme bisher nicht gehört wurde. Es wird ein Sieg für die Wähler sein, nicht für die Experten, nicht für die Journalisten, nicht für die Lobbyisten, nicht für die globalen Sonderinteressen, die die Kampagne meines Gegners finanzieren. *It's going to be a victory for the people. A victory for the everyday citizen whose voice hasn't been heard. It will be a win for the voters, not the pundits, not the journalists, not the lobbyists, not the global special interests funding my opponent's campaign.*	0.34	**1.0**	0.29	0.04

Source	Label	Text	Anti-Elite	People-Centric	Host-Left	Host-Right
Dai and Kustov 2022	**populism**	Der Wandel wird kommen. All die Leute, die das System zu ihrem persönlichen Vorteil manipuliert haben, versuchen, unsere Veränderungskampagne zu stoppen, weil sie wissen, dass ihr Geldsegen am letzten Halt angekommen ist. Jetzt bist du dran. Dies ist Ihre Zeit ... Wir kämpfen für alle Bürger, ... die von diesem korrupten System im Stich gelassen wurden. Wir kämpfen für alle, die keine Stimme haben. Hillary Clinton ist die Kandidatin der Vergangenheit. Unsere ist die Kampagne der Zukunft. In dieser Zukunft werden wir eine neue Handelspolitik verfolgen, bei der die Arbeitnehmer an erster Stelle stehen - und bei der die Arbeitsplätze in unserem Land erhalten bleiben ... Die Zeit der wirtschaftlichen Kapitulation ist vorbei. *Change is coming. All the people who've rigged the system for their own personal benefit are trying to stop our change campaign because they know that their gravy train has reached its last stop. It's your turn now. This is your time ... We are fighting for all Americans ... who've been failed by this corrupt system. We're fighting for everyone who doesn't have a voice. Hillary Clinton is the candidate of the past. Ours is the campaign of the future. In this future, we are going to pursue new trade policies that put American workers first – and that keep jobs in our country ... The era of economic surrender is over.*	**1.0**	**0.89**	**0.94**	0.0
		Drittens habe ich gesagt, dass wir die Finanzindustrie nicht einfach retten können und werden, ohne den Millionen von unschuldigen Hausbesitzern zu helfen, die darum kämpfen, in ihren Häusern zu bleiben. ... Ich habe gesagt, dass ich nicht zulassen werde Ich habe gesagt, dass ich nicht zulassen werde, dass dieser Plan zu einem Wohlfahrtsprogramm für die Führungskräfte der Finnazindustrie wird, deren Gier und Verantwortungslosigkeit uns in diesen Schlamassel gebracht haben. ... Wir brauchen nicht nur einen Plan für Banker und Investoren, wir brauchen einen Plan für Autoarbeiter, Lehrer und Kleinunternehmer. ... Das bedeutet, dass wir es mit den Lobbyisten und Sonderinteressen in Berlin aufnehmen müssen. Das bedeutet, gegen die Gier und Korruption in der Finanzindustrie vorzugehen ... Es ist an der Zeit, Berlin zu reformieren. *Third, I said that we cannot and will not simply bailout Wall Street without helping the millions of innocent homeowners who are struggling to stay in their homes. ... I said that I would not allow this plan to become a welfare program for the Wall Street executives whose greed and irresponsibility got us into this mess. ... We don't just need a plan for bankers and investors, we need a plan for autoworkers and teachers and small business owners. ... That means taking on the lobbyists and special interests in Washington. That means taking on the greed and corruption on Wall Street ... It is time to reform Washington.*	**0.99**	**0.76**	**1.0**	0.03
Ernst et al. 2017	**populism**	Erst die anderen, dann wir: Für illegale Einwanderer ist die Zugfahrt kostenlos! Danke, Bahn! *The others before us: Trains for the illegal are for free! Thank you SNCF!*	**0.99**	0.32	0.04	**0.99**

Source	Label	Text	Anti-Elite	People-Centric	Host-Left	Host-Right
		Volle Unterstützung für unsere Bauern, die heute erneut von der EU und der Regierung gedemütigt wurden. Es ist Zeit für eine deutsche Agrarpolitik! *Unlimited support for our peasant once more humiliated by the EU and our government today. Long live the French agrarian politic.*	**0.99**	**0.94**	0.1	0.01
anti-elitism		Die Regierung weiß längst nicht mehr, wo sie diskriminiert und wenn ja warum. *The Government no longer knows, where it discriminates and even if, not why*	**1.0**	0.0	0.01	0.01
		Der unverantwortliche Umgang der EU mit der Migrantenkrise verursacht Chaos und ist ein weiteres Beispiel dafür, warum wir austreten müssen. *The EU's irresponsible approach to the migrant crisis is causing chaos and is another example of why we must leave.*	**1.0**	0.04	0.01	**0.95**
people-centrism		Schriftsteller Peter Stamm unterstützt mich, weil ich "ein Volksvertreter und kein Wirtschaftsvertreter" bin. *Author Peter Stamm supports me because I am "a representative of the people and not an economic representative".*	0.0	0.0	0.0	0.0
		Da ich meine Kampagne selbst finanziere, werde ich nicht von meinen Spendern, besonderen Interessen oder Lobbyisten kontrolliert. Ich arbeite nur für die Menschen in Deutschland! *By self-funding my campaign, I am not controlled by my donors, special interests or lobbyists. I am only working for the people of the U.S.!*	0.01	**1.0**	0.03	0.02

Appendix 6.   Alternative Models

When choosing a suitable transformer-based model, there is a wide range of options. We therefore compare our initial choice (GBERT-large; use each annotation; multilabel) to other sensible choices: a model fine-tuned to political discourse, majority vote label aggregation, multiclass and multilingual models. All models are uploaded to the associated Harvard Dataverse repository (see the data availability statement in the paper for a URL).

Appendix 6.1   aehrm/gepabert

The first question to be answered is whether MLM (Masked Language Modeling) fine-tuning would improve the predictive power of the model. A common argument is that learning the domain-specific language can help to improve model performance. However, we do not expect any major differences since, on the one hand, domain-specific language is already included in the training data of gbert-large and, on the other hand, we expect that an improvement of the model could be achieved primarily through better (or more) training data.

Since MLM fine-tuning is a very time-consuming and computationally intensive task, we are using a model that has already been fine-tuned. The aehrm/gepabert[2] model is a gbert-large based model that has been fine-tuned on the Open Discourse dataset. To ensure comparability with the main model, the same hyperparameters and thresholds were used. The results are very similar to those we achieved without MLM fine-tuning.

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2. https://huggingface.co/aehrm/gepabert

Table 5. Performance of the aehrm/gepabert based model.

Dimension	Precision	Recall	F1
Anti-Elitism	0.83	0.89	0.86
People-Centrism	0.63	0.83	0.72
Left-Wing Ideology	0.70	0.75	0.72
Right-Wing Ideology	0.67	0.61	0.64
micro avg	0.74	0.82	0.77
macro avg	0.71	0.77	0.74

Appendix 6.2   Majority Vote

Table 6 shows the results using a majority voting algorithm to aggregate annotated labels. Hence, a label is only used when it has been assigned by the majority of annotators (3 in our case). The grid search for hyperparameters yielded a batch size of 8, a learning rate of 1e-5, and a weight decay of 0.05 for 6 epochs (as for all models with a cosine annealing learning rate scheduler). This resulted in the following thresholds: $0 : 0.184230, 1 : 0.341543, 2 : 0.674651, 3 : 0.604527$. The model performance is clearly worse compared to the variant used in the main part of this paper. We attribute this primarily to two points: 1) majority voting produces a smaller number of positive labels due to the greater requirements and thus fewer learnable data points for the model; 2) the understanding of populist content is severely limited if three coders have to agree due to ambiguous nature of the concept. As described in the article, we assume that personal experiences, socio–demographic background, and personal beliefs influence the annotators' actions. Majority voting would therefore nullify these differences and thus lead to a marginalization of less popular views (Cabitza, Campagner, and Basile 2023).

Table 6. Performance of the majority vote model.

Dimension	Precision	Recall	F1
Anti-Elitism	0.56	0.71	0.62
People-Centrism	0.41	0.35	0.38
Left-Wing Ideology	0.45	0.29	0.35
Right-Wing Ideology	0.48	0.34	0.40
micro avg	0.53	0.56	0.54
macro avg	0.47	0.42	0.44

Appendix 6.3   Multiclass Model

As an additional test, we also calculated a multiclass version of our model. It is also based on the majority vote approach and not all label combinations were allowed due to data sparsity. The grid search for hyperparameters resulted in a batch size of 16, a learning rate von 1e-5, and a weight decay of 0.01 As many combinations only occur rarely, this model emphasizes the advantages of a multilabel approach. In particular, right-wing people-centrism is difficult to detect and does not occur often. The performance of the model is thus expectedly low here. In contrast, a multi–label model can learn and estimate the two concepts separately for corresponding data points. However, some use cases for this model do not require distinguishing ideological orientation and can rely on a binary version of populism detection. For this purpose, formulating the problem as a multi–

label problem provides a better approach, as the remaining unnecessary dimensions can simply be ignored.

Table 7. Performance of the multiclass model.

Dimension	Precision	Recall	F1
None	0.92	0.91	0.91
Anti-Elitism	0.53	0.42	0.47
Left-Wing Anti-Elitism	0.46	0.50	0.48
Right-Wing Anti-Elitism	0.50	0.68	0.58
People-Centrism	0.25	0.07	0.11
Left-Wing People-Centrism	0.17	0.59	0.26
Right-Wing People-Centrism	0.17	0.25	0.20
Accuracy			0.83
macro avg	0.43	0.49	0.43
weighted avg	0.84	0.83	0.84

Appendix 6.4   Multilingual Models

Appendix 6.4.1   bert-base-multilingual-cased

To get a grasp of the transferability to multilingual models, we started out with the bert–base–multilingual–cased model[3], since this model is much smaller than the "large" version. A grid search CV gave us the best parameters: A learning rate of 1e–5, a batch size of 8 over 6 epochs, and a weight decay of 0.01. The averaged best thresholds during the cross–validation were: $0 : 0.112633, 1 : 0.575459, 2 : 0.388344, 3 : 0.152591$. The performance is reported in Table 8.

Table 8. Performance of the bert-base-multilingual-cased model.

Dimension	Precision	Recall	F1
Anti-Elitism	0.69	0.79	0.74
People-Centrism	0.65	0.52	0.58
Left-Wing Ideology	0.64	0.48	0.55
Right-Wing Ideology	0.61	0.48	0.54
micro avg	0.67	0.63	0.65
macro avg	0.65	0.57	0.60

Appendix 6.4.2   XLM-Roberta

To further investigate the applicability of our model to a multilingual scenario, we also used the XLM-Roberta model (Conneau et al. 2019). A grid search CV gave us the best parameters: A learning rate of 9e–6, a batch size of 8 over 7 epochs, and a weight decay of 0.05. The averaged best thresholds during the cross–validation were: $0 : 0.413472, 1 : 0.265016, 2 : 0.657122, 3 : 0.384051$. This allows us to achieve comparable performance to our main model. The only drawback here is the increased number of parameters of XLM-Roberta compared to gbert-large, which is why we stick to using gbert-large for our case.

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3. https://huggingface.co/bert–base–multilingual–cased

It should also be mentioned that although we achieve comparable performance with our data material in the multilingual case, we would not recommend applying the model to non-German cases directly. We assume that many country-, policy- and culture-specific factors play a role that make it questionable whether a model trained on German data can be transferred to other countries. However, the XLM-Roberta version of PopBERT should facilitate the development of non-German populist classifiers considerably.

Table 9. Performance of the XLM-Roberta model.

Dimension	Precision	Recall	F1
Anti-Elitism	0.77	0.91	0.83
People-Centrism	0.54	0.89	0.67
Left-Wing Ideology	0.67	0.72	0.69
Right-Wing Ideology	0.58	0.72	0.65
micro avg	0.66	0.84	0.74
macro avg	0.64	0.81	0.71

Appendix 7.   Alternative Computation of Populist Speakers

In the same way that the populism ranking of parties can be aggregated by different strategies, we show alternative approaches to rank politicians by their use of populist language (Wuttke, Schimpf, and Schoen 2020). The multiplicative index correlates with the Bollen-Index with $\rho = .87$ and with the Goertz-Index with $\rho = .84$. As the Sartori Index is a binary measure and therefore does not allow for ranking, it is not used here.

Appendix 7.1   Goertz-Index

Term	Rank	First Name	Last Name	Party
18	1	Andreas	Scheuer	CDU/CSU
	2	Katja	Kipping	DIE LINKE
	3	Sabine	Zimmermann	DIE LINKE
	4	Corinna	Rüffer	Grüne
	5	Karl Heinz	Brunner	SPD
19	1	Martin	Sichert	AfD
	2	Pia	Zimmermann	DIE LINKE
	3	Katja	Kipping	DIE LINKE
	4	Lars	Klingbeil	SPD
	5	Martin	Reichardt	AfD

Appendix 7.2   Bollen-Index

Term	Rank	First Name	Last Name	Party
18	1	Peter	Bleser	CDU/CSU
	2	Sahra	Wagenknecht	DIE LINKE
	3	Jörg Diether	Dehm-Desoi	DIE LINKE
	4	Sevim	Dağdelen	DIE LINKE
	5	Alexander	Ulrich	DIE LINKE
19	1	Alice	Weidel	AfD
	2	Martin	Sichert	AfD
	3	Martin Erwin	Renner	AfD
	4	Janosch	Dahmen	Grüne
	5	Martin	Hess	AfD

Appendix 7.3   Populist politicians by term and party

Figure 3 takes a closer look at populist politicians per party and electoral term. The anti-elitism dimension is plotted on the x-axis, and popular centrism on the y-axis. Each point shows a politician of the respective party. Based on a sum index of z-transformed values of the two dimensions, the 10 most populist politicians per party and electoral term are shown with their names.
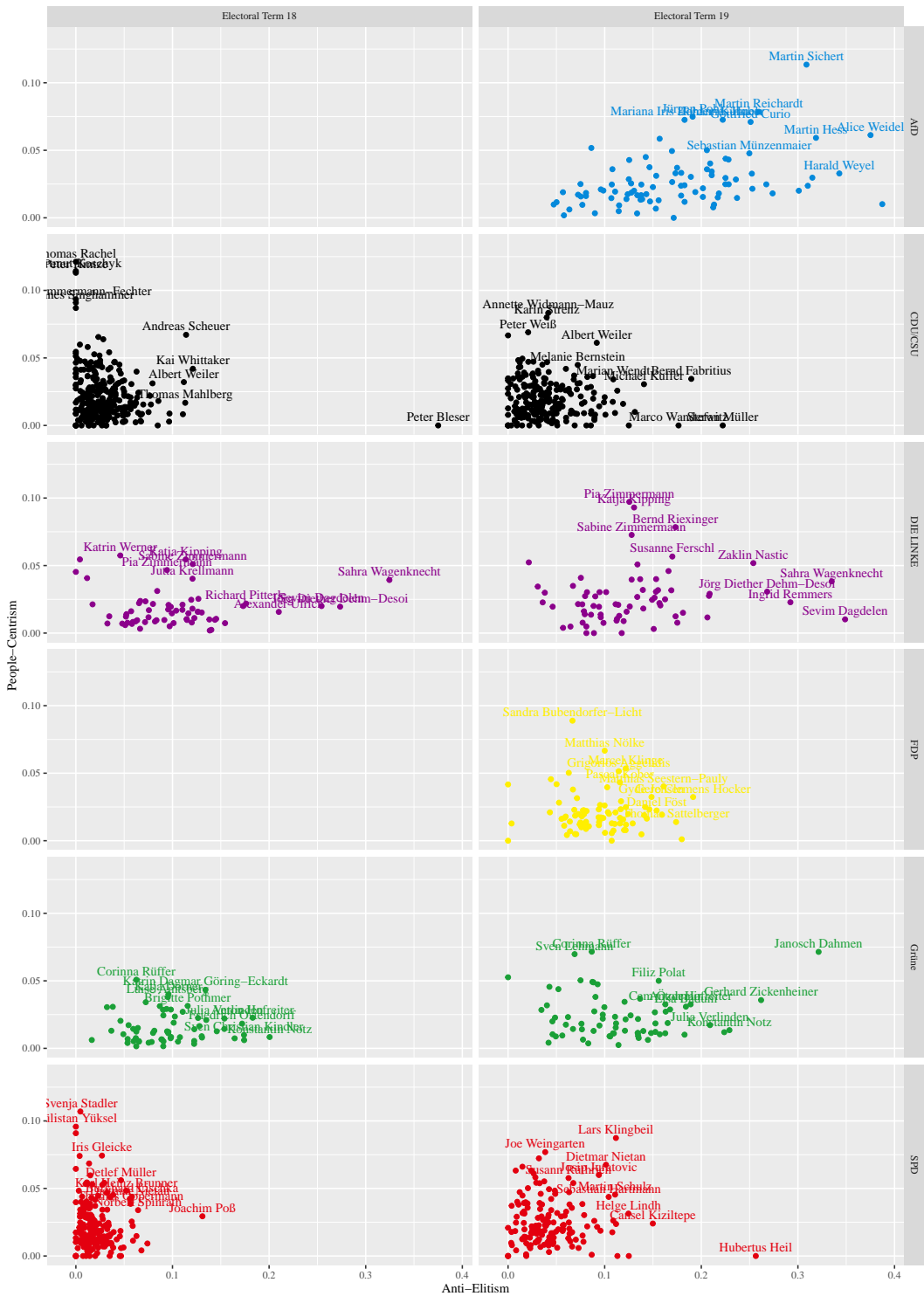
Figure 3. Figure shows politicians per party.

Appendix 8.   Comparison to Wordfish regarding Host Ideologies

In this appendix we compare the host-ideology dimensions of the PopBERT model with the Word-fish approach (Slapin and Proksch 2008). It should be mentioned that such a comparison is only possible to a limited extent, as Wordfish ranks all documents on a one-dimensional scale, whereas we use a two-dimensional method to measure (left-wing and right-wing) ideology. For that purpose, we use all speeches from the 19th German Bundestag. To calculate the Wordfish model, we remove stop words and words that occur less than 4 times in the entire corpus.

   In Table 10, we show the results of the comparison on the level of parties. The first column shows the order of the six parties present in the 19th Bundestag according to the Wordfish model. Low ranks indicate a scaling to the left, higher ranks to the right. On an identical aggregation level, columns 2 (*Left*) and 3 (*Right*) show the rankings for speeches that have been attached by PopBERT to a left-wing or right-wing host ideology, respectively. To project PopBERT's two-dimensional measurement on one dimension as provided by Wordfish, column 4 (*Diff*) shows the ranking according to the difference (*right – left*) of columns 2 and 3. We can see here that ranks 4-6 in columns 1 and 4 are identical (i.e., of more right-wing parties). However, ranks 1-3 differ somewhat. It can also be seen that the AfD achieves a high score in the left *and* right dimensions according to PopBERT. While the comparison provides some insights of similarities and differences to the unsupervised Wordfish approach, the analysis relates a two-dimensional concept (left/right) to a one-dimensional metric and is therefore limited in its scope. This is where the difference in the two approaches becomes apparent. According to our view of host ideologies, a party can make many left- and right-wing populist statements. However, these are not accurately represented in a one-dimensional model, which is why we have opted for the two-dimensional approach. Nevertheless, it can be seen that the general order of the parties in our approach differs from the Wordfish model only in small parts and that there is a tendency towards agreement.

Table 10. Comparison between a Wordfish approach and PopBERT on the 19th Bundestag.

Rank	Wordfish	Right	Left	Diff
1	SPD	Grüne	CDU/CSU	DIE LINKE
2	Grüne	SPD	FDP	Grüne
3	DIE LINKE	DIE LINKE	SPD	SPD
4	FDP	FDP	Grüne	FDP
5	CDU/CSU	CDU/CSU	AfD	CDU/CSU
6	AfD	AfD	DIE LINKE	AfD

Appendix 9.   Comparison to Gründl

This chart allows a comparison of Figure 1 of the main text with the results according to Gründl (2022). Please note, however, that Gründl's dictionary was not created for this genre but for social media data. Due to the lack of other benchmarks, we still decided to include a comparison on the party level. The main reason is that future research may use, for instance, all sentences as available in the Online Supplementary Material and compare differences between dictionary and transformer-based models in greater detail. Moreover, Figure 4 shows that while Gründl also recognizes the AfD and DIE LINKE as the most populist parties, differences between all other parties are not identified.

Appendix 10.   Comparison to Klamm et al.

Next to Gründl's approach, the only other study suited for a direct comparison stems from Klamm, Rehbein, and Ponzetto (2023). They focus on the detection of entities (e.g., organizations or persons)
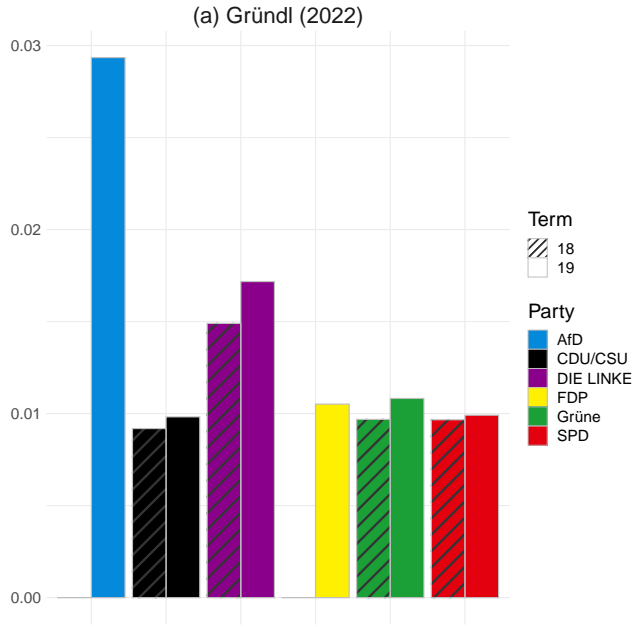
Figure 4. Complements Figure 1 of the main text. The procedure is identical but uses the scores of Gründl (2022).

that refer to the people or the elite (e.g., "the federal government"), which provides a complementary classification scheme to our approach. Therefore, we applied PopBERT on their manually annotated data to derive the entities associated with the populist dimensions as defined in this paper. Figure 5 shows that about 89% of people-centric utterances contain an organization related to the people. At the same time, anti-elitist sentences contain much more mentions of "elite organizations" and "elite persons" than their counterparts not classified as anti-elitism.
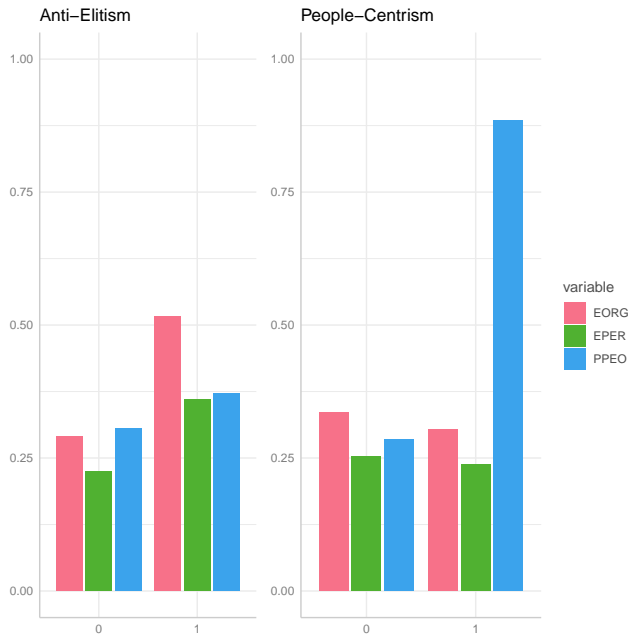
Figure 5. Comparison of annotation from Klamm, Rehbein, and Ponzetto (2023) to PopBERT's classifications of our main model. EORG stands for "elite organization", EPER for "elite person", and PPEO for "people". 0 and 1 denote the prediction of our model for the corresponding dimension.

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