

Regulatory Compliance with Limited Enforceability: Evidence from Privacy Policies

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GDPR: An Update of EU Data Regulation

- In 2018, the GDPR (General Data Protection Regulation) fundamentally transformed the legal requirements of privacy policies
- One of the (many) goals (going back to earlier consumer protection agenda):
 - Enhance **transparency** and accountability
- **The goal:** give users accessible information on a firm's use of their data

1. **Art. 13–14 GDPR:** Disclose what data is collected, how, by whom
2. **Art. 12(1) GDPR:** *“concise, transparent, intelligible and easily accessible form, using clear and plain language”*

This Paper Asks:

How do firms respond to the GDPR's transparency principle?

How does the stringency of enforcement of the rules affect their compliance decisions?

Here's How We Tackle This

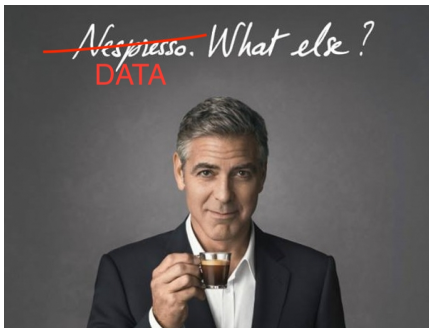
1. Theoretical framework

- A simple two-dimensional audit model provides predictions
- ... where asymmetric enforceability (and enforcement) results in better disclosure compliance than readability compliance
- ... but the gap narrows when regulators are *more stringent* or *better funded*

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- Firm and industry-level information

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3. Natural language processing of privacy policies to

- measure **disclosure** (Art. 13/14) and **readability** (Art. 12(1))
- → our measures for compliance!

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We ask and answer three questions

Preview of the Results

1. How did firms respond to the transparency principle in the GDPR?
2. How do more attention and scrutiny by regulators affect compliance?
3. How do a regulator's resources affect compliance?

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 - *Same rules, different enforcers*: In Germany, 16 (+2) state data protection authorities regulate firms in their respective states
 - Firms regulated by better funded DPAs show better readability compliance; but no (or negative) effect on disclosure compliance

Data: Privacy Policy Panel

Privacy Policy Panel

- Construction of panel
 - >1m privacy policies by more than 500,000 German firms between 2014 and 2021.
 - Data source: Internet Archive's Wayback Machine
- Subsample of firms with at least one observation in the following time periods:
 - **Pre-GDPR:** 2014–Q2 2018 (*before* GDPR's enforcement date)
 - **Post-GDPR:** Q2 2018–Q2 2021 (*after* GDPR's enforcement)
- Unbalanced quarterly panel:
 - **585,329 privacy policies** posted by **75,683 firms**



Add: Other Data Sources

- **Firm-level** information: Mannheim Enterprise Panel (MUP)
 - Firm size information (employment and revenue/sales)
 - Industry classifiers (NACE codes)
 - NACE 4-digit Herfindahl-Hirschman Index (national markets)
 - Firm HQ address (→ state)
- **Enforcement data**
 - UK Information Commissioner's Office (Koutroumpis, Ravasan & Tarannum 2022)
 - 3-digit industry level for 2012 through Q2 2018
 - Scaled by industry-level firm numbers → enforcement index
- **State** government websites
 - Budget and staffing information for state data protection authorities
 - Scaled by state-level number of firms (from MUP)

How do we measure regulatory compliance?

How do we measure *disclosure* and *readability*?

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How do we measure *disclosure* and *readability*?

for **disclosure**: the standard NLP approach →
counting words and topic models

for **readability**: digging into the linguists' toolbox →
readability indices

Disclosure (Art. 13–14 GDPR)

- Simple: Volume of information (length and breadth of policies)
 - Number of words (total and unique)
 - Number of sentences
 - Number of distinct topics from *LDA topic models*
- **Disclosure:** How much GDPR-relevant information does the policy contain?
 1. Identify paragraphs with terms expected in Art. 13–14 related parts of policies
 2. Which **LDA topics** are more likely related to these disclosing paragraphs?
 3. Attach higher topic weight to disclosing paragraphs
 4. Calculate number of words of thus topic-weighted paragraphs

Topic weights

Note: Not an assessment of GDPR-compliance of the policies!

Readability (Art. 12(1) GDPR): Use Two Readability Indices

1. German version (Amstad, 1978) of the **Flesch Reading Ease Score (German FRE)** (Flesch, 1948)

$$180 - ASL - 58.5 \times AWL$$

... because of its **regulatory history**

2. **Läsbarhetsindex (LIW)** (Björnsson, 1968)

$$ASL + \frac{100 \times n_{sy \geq 7}}{n_w}$$

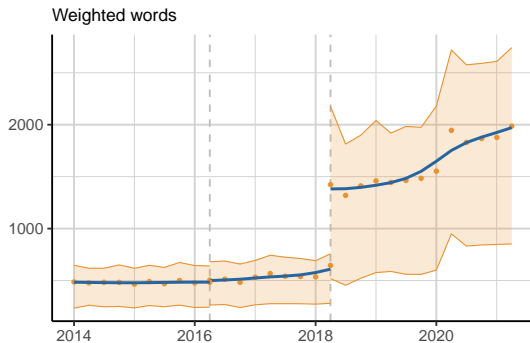
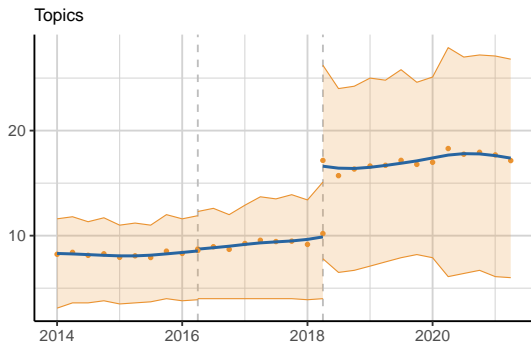
... because it **best predicts** 4,000 pairwise comparisons of text snippets (assessed by “users”) (following [Benoit et al., 2019](#))

Before-and-After Results

Prediction:

GDPR → more disclosure, maybe more
readability

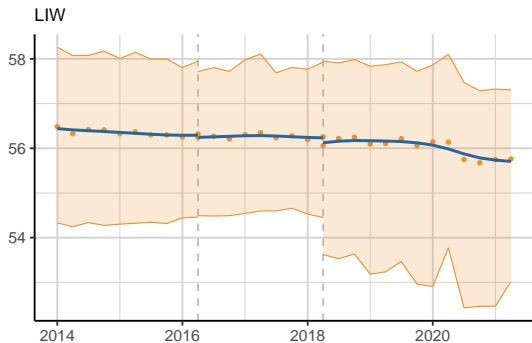
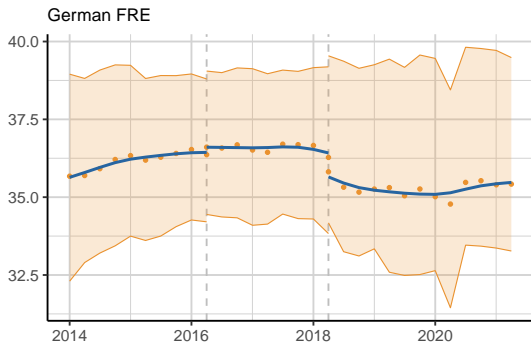
Disclosure



Disclosure (Weighted words) triples/quadruples!

Year FE, Firm FE, additional controls: 80% increase

Readability



*Mixed results: FRE with **lower** readability and LIW with **higher** readability (and: not just large firms; small firms, too, respond!)*

Year FE, Firm FE, additional controls: 4% decrease, 0.4% increase

Is it Asymmetric Enforceability? What Else?

- Do regulators **really care** about readability?
 - *“Firms do not comply because they know regulators do not care.”*
- Is disclosure compliance **much cheaper** than readability compliance?
 - *“This is not about a response to enforcement but a response to compliance costs.”*
- Do either firms or data protection authorities know **what readability means**?
 - *“Nobody knows anything. Of course we see little to no readability compliance.”*

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 - *“Nobody knows anything. Of course we see little to no readability compliance.”*

We address these concerns ⇒ **Take-away:**

- yes, firms believe regulators care
- no, it is not (only) about costs
- the readability requirement is effective

Results

- Regulatory **Exposure**
- Regulatory **Scrutiny**
- Regulatory **Capacity**

Regulatory Exposure

Prediction:

Higher treatment intensity, better compliance

GDPR Exposure (“Treatment Intensity”)

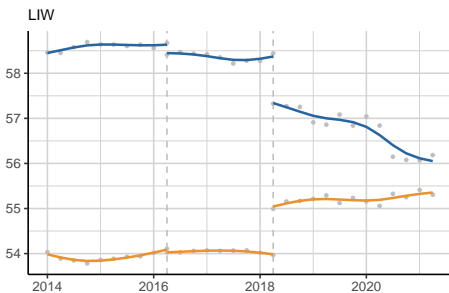
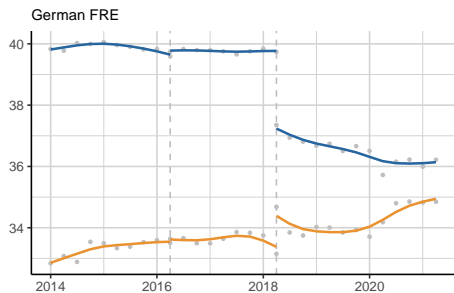
- Treatment intensity:
 - Firms with *lower pre-GDPR disclosure* are *more exposed* to GDPR
 - Firms with *lower pre-GDPR readability* are *more exposed* to GDPR
- → think: treatment-intensity DiD
- **We expect firms with lower pre-GDPR disclosure/readability to exhibit better compliance with the transparency principle (both disclosure and readability)**
- interact the post-GDPR coefficient with above/below median dummy variables (disclosure and readability)

GDPR Exposure: Readability Requirement Bites!

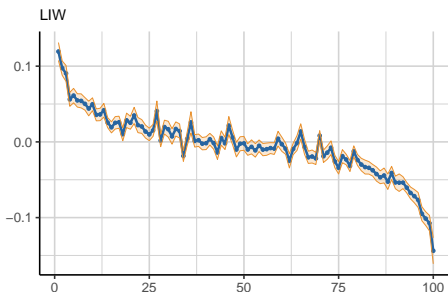
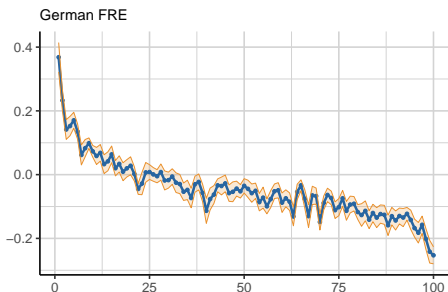
Dependent variable (in log):	Disclosure		Readability	
	Topics	Weighted words	German FRE	LIW
High disclosure (Topics)	0.0771*** (0.0084)			
Low disclosure (Topics)	0.9292*** (0.0101)			
High disclosure (Weighted words)		0.4507*** (0.0075)		
Low disclosure (Weighted words)		1.144*** (0.0092)		
High readability (German FRE)			-0.1095*** (0.0021)	
Low readability (German FRE)			0.0196*** (0.0021)	
High readability (LIW)				0.0244*** (0.0007)
Low readability (LIW)				-0.0320*** (0.0007)
# Firm FE	64,583	64,609	64,606	64,609
R ²	0.722	0.805	0.645	0.679
Observations	409,320	409,527	409,433	409,527

- Ambivalence, compliance-cost differences, or $\bar{\pi}(\tau)/\bar{\pi}$ do not explain this!

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- No convergence to new levels



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- No convergence to new levels
- Monotonicity



Regulatory Scrutiny

Prediction:

More scrutiny, better compliance

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Industry-level variation in attention by the regulator

1. Enforcement actions by UK regulator (prior to GDPR)
2. Concentrated industries (biggest bang for the buck; higher concentration of complaints)

Better Readability Compliance in High-Enforcement Industries

Dependent variable (in log):	Disclosure		Readability	
	Topics	Weighted words	German FRE	LIW
UK ICO: No enforcement	0.4110*** (0.0239)	0.7918*** (0.0189)	-0.0450*** (0.0047)	-0.0030* (0.0016)
UK ICO: Low enforcement	0.5499*** (0.0107)	0.7964*** (0.0096)	-0.0428*** (0.0025)	-0.0044*** (0.0008)
UK ICO: Medium enforcement	0.4395*** (0.0125)	0.7504*** (0.0105)	-0.0481*** (0.0027)	-0.0026*** (0.0009)
UK ICO: High enforcement	0.4715*** (0.0141)	0.7767*** (0.0117)	-0.0321*** (0.0028)	-0.0051*** (0.0010)
# Firm FE	63,740	63,749	63,746	63,749
R ²	0.697	0.782	0.624	0.648
Observations	403,302	403,452	403,358	403,452

Better readability compliance in industries with enforcement history

Better Readability Compliance in Concentrated Industries

Dependent variable (in log):	Disclosure		Readability	
	Topics	Weighted words	German FRE	LIW
Post GDPR (=1)	0.4924*** (0.0075)	0.7783*** (0.0074)	-0.0424*** (0.0018)	-0.0041*** (0.0006)
Concentration (HHI in '00)	0.0006** (0.0003)	0.0004* (0.0002)	-0.00004 (0.00006)	-0.00002 (0.00002)
× Concentration	-0.0008** (0.0004)	-0.0002 (0.0003)	0.0001* (0.00007)	0.000010 (0.00003)
# Firm FE	64,600	64,609	64,606	64,609
R ²	0.696	0.782	0.624	0.648
Observations	409,377	409,527	409,433	409,527

Better readability compliance in concentrated industries (German FRE!)

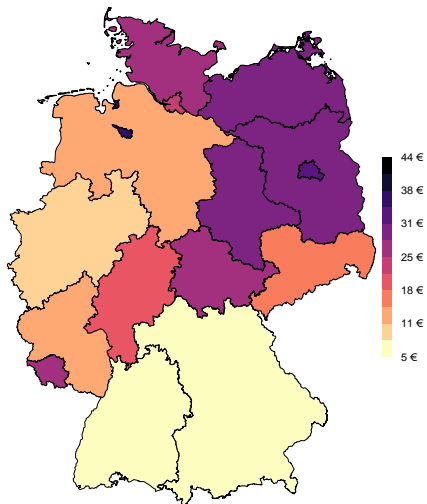
Regulatory Capacity

Prediction:

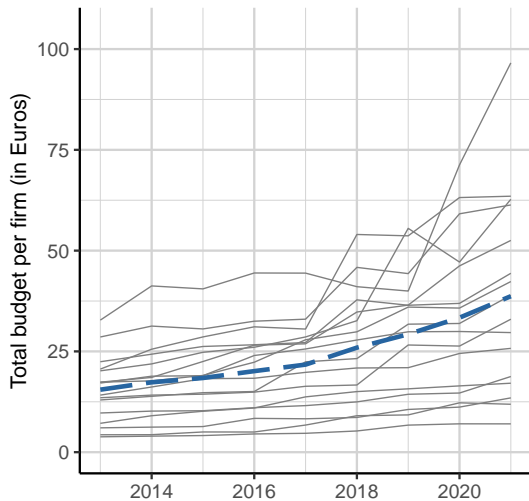
Better funded DPAs induce better readability compliance but not disclosure compliance

We exploit budget variation
(across states and time)
to proxy for enforcement intensity

Variation Across States and Over Time



Total DPA Budget Per Firm



Total DPA Budget Per Firm

Compliance by Budget

Dependent variable (in log):	Disclosure		Readability	
	Topics	Weighted words	German FRE	LIW
Panel (a): DPA Budget – Total Budget Per Firm				
× Total budget (per firm, lagged)	0.0006 (0.0006)	-0.0006 (0.0005)	0.0002* (0.0001)	0.00002 (0.00004)
Panel (b): DPA Staff – Number of Employees Per Firm				
× Staff (per firm, lagged)	0.0090 (0.0579)	-0.0575 (0.0428)	0.0219* (0.0112)	-0.0005 (0.0038)

Better readability compliance in states with better funded DPAs

Let's Wrap Up!

Summary

- Firms write a lot more and also disclose more of the things they are supposed to
- Privacy policies are (on average) just as incomprehensive as before

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 - those behind caught up!
 - firms did respond to more stringent regulation!

Summary

- Firms write a lot more and also disclose more of the things they are supposed to
- Privacy policies are (on average) just as incomprehensive as before
- **BUT**: the rules are **effective**
 - those behind caught up!
 - firms did respond to more stringent regulation!
- We study what firms communicate to users. Whether they apply to other dimensions of compliance (e.g., prevention of data breaches) is an open question.

... the readability requirement is here to stay!

- GDPR (2018)
 - “concise, transparent, intelligible and easily accessible form, using clear and plain language”
- Platform-to-Business Regulation (2019)
 - “plain and intelligible language”
- Digital Services Act (2022)
 - “clear, plain, intelligible, user-friendly and unambiguous language”
- Platform Workers Directive (proposal version) (2023)
 - “concise, transparent, intelligible and easily accessible form, using clear and plain language”

Thank you!

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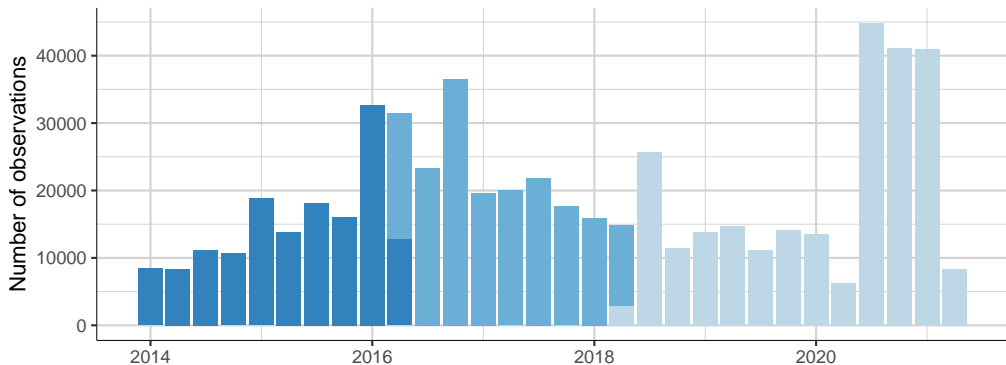
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Shades of blue highlight three phases (before passage; between; after enforcement) [Back](#)

Estimation Sample

	Obs.	Mean	Std.	Min	Max
Number of observations per firm	75683	7.734	4.67	2	30
... in pre-GDPR enforcement phase	75683	4.446	3.69	1	18
... in post-GDPR enforcement phase	75683	3.288	2.17	1	13
Employees (firm-level means)	65863	36.446	408.48	1	48300
... Micro	40578	3.72	2.54	1	10
... Small and medium-sized (SME)	23920	39.222	42.13	10	249.6
... Large	1365	960.678	2671.81	250	48300
Sales (in million; firm-level means)	55656	14.942	351.78	0	62379.6
Herfindahl-Hirschman Index (HHI; in 2017)	44883	551.131	1178.23	1.5	10000
Agriculture/Mining	688	1.03%	1.96%		
Manufacturing	6387	9.56%	6.72%		
Utilities	1028	1.54%	0.92%		
Construction	4679	7.01%	10.69%		
Trade	14907	22.32%	23.89%		
Services	39105	58.55%	55.82%		
	66794	(Sample)	(MUP)		

Topic-Weighted Paragraphs: An Illustration

	Words	Example 1			Example 2		
		Topic	Factor ϕ_k	$\phi_k w_{c k}$	Topic	Factor ϕ_k	$\phi_k w_{c k}$
Paragraph 1	10	A	2.0	20	A	2.0	20
Paragraph 2	20	B	1.0	20	B	1.0	20
Paragraph 3	30	C	0.5	15	C	0.5	15
Paragraph 4	40	C	0.5	20	A	2.0	80
Total word count	100	Disclosure (Ex. 1)		75	Disclosure (Ex. 2)		135

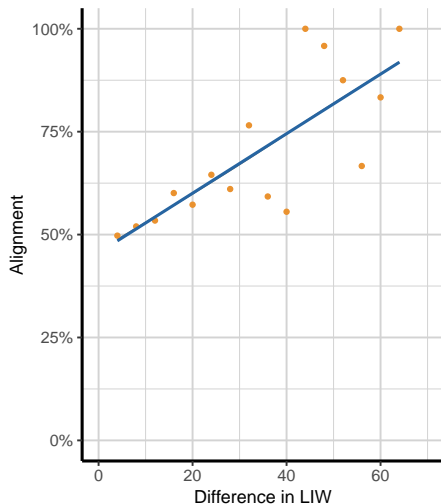
- For the overall topic distribution, assume $(0.25, 0.25, 0.50)$.
- Topic A is the most disclosing! Topics B and C are less relevant.
→ For the topic distribution of disclosing paragraphs, assume $(0.50, 0.25, 0.25)$.
- The topic factors are therefore $(\phi_A, \phi_B, \phi_C) = (2, 1, 0.5)$.

Are They Useful? Let the Data Speak! (→ Benoit et al., 2019)

1. Collect human assessments that serve as a “gold-standard” for determining text readability
 - 700 text pairs; 14 respondents; 4,000 comparisons (data points)
 - pairs of similar length and similar content (topic: justification of data processing)
2. Fit unstructured Bradley-Terry model for pairwise comparisons (Bradley and Terry, 1952) to the data
 - originally developed for sports competition to rank the best contestant
 - estimates odds that a contestant will outperform another in a competition
3. Select best predictors (i.e., indices/scores) of readable texts by using a random forest algorithm

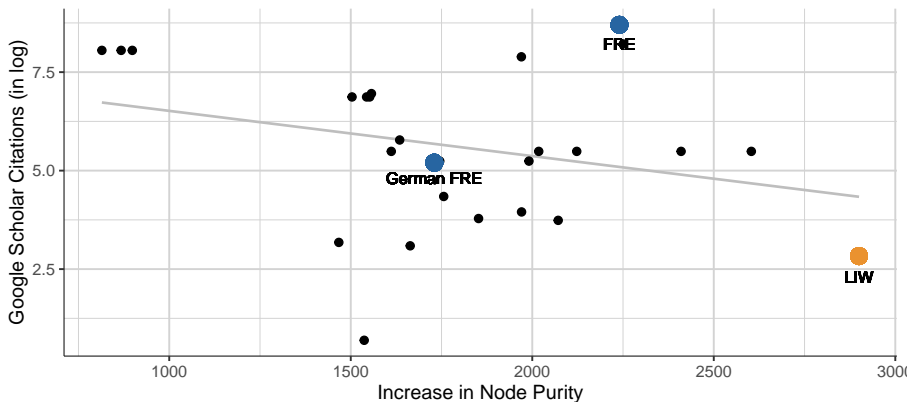
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 - Result: Läsbarhetsindex (LIW) by Björnsson (1968)



*Around 4,000 pairs of paragraphs / alignment: human ranking = text-based ranking
10 point increase of LIW (about 20% in our sample) increases alignment by 7 p.p.*

Best Does Not Mean Most Popular

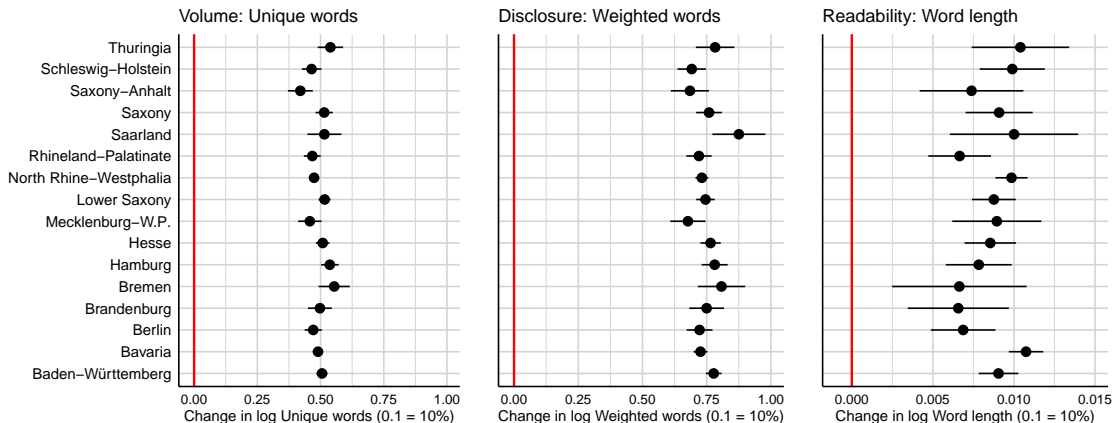


Performance of readability indices in predicting pairwise comparisons and their popularity

Do They Make Sense? Putting Readability in Perspective

	Obs.	Word length	Sentence length	Big words	German FRE	LIW
Privacy policy panel	585329	2.16 (0.07)	17.84 (3.26)	0.21 (0.04)	35.98 (5.64)	56.13 (3.94)
Simple-language news (nachrichtenleicht.de)	1594	1.74 (0.12)	10.74 (1.8)	0.04 (0.03)	67.5 (7.28)	39.11 (5.42)
Speeches and statements: Angela Merkel	1128	1.83 (0.07)	18.16 (2.3)	0.3 (0.03)	54.84 (4.47)	48.05 (3.1)
Decisions by German Consti- tutional Court (BVerfG)	9358	1.96 (0.09)	16.35 (2.91)	0.15 (0.03)	49.27 (6.75)	50.17 (4.91)
Wikipedia (German)	10000	1.9 (0.2)	20.63 (14.48)	0.12 (0.04)	48.48 (18.23)	53.51 (15.48)
Wikipedia (English)	10000	1.71 (0.16)	19.78 (6.57)	0.05 (0.03)	60.33 (11.58)	47.8 (9.31)
GDPR/DS-GVO (Wikipedia)	1	2.1	18.63	0.12	38.35	57.1
GDPR/DS-GVO (official)	1	2.24	40.39	0.18	8.83	81.39

Compliance by State



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