



Virtual Congress  
July 29 - August 1, 2020

# Cognitive fluency and the spread of news on social media

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## Key Questions

1. What drives someone to share news online?
2. Does cognitive fluency of a news headline relate to this sharing?

## Cognitive Fluency

**Cognitive Fluency** is often measured through **Lexical Decision Tasks (LDT)** and reaction-time.

The **English Lexicon Project (ELP)** quantifies the time on average taken to identify a word as real for 40,000 English words.

## 3 News Selection Factors<sup>1</sup>

**News Consumer** such as demographics

**News Stories** such as subject matter

**Consumption Environment** such as device

## Approach - Data

	Source	N
1	ABC News	717
2	Atlantic	469
3	BBC	871
4	Business Insider	1,848
5	Bloomberg	1,073
6	CBC	735
7	CNN	1,405
8	Daily Kos	744
9	Daily Beast	634
10	Economist	44
11	Independent UK	1,732
12	LA Times	2,097
13	Mashable	1,418
14	MSNBC	684
15	Newsweek	1,310
16	NY Post	1,126
17	New York Times	948
18	Reason	385
19	The Nation	194
20	Variety	938
21	Weekly Standard	288
22	WSJ	335

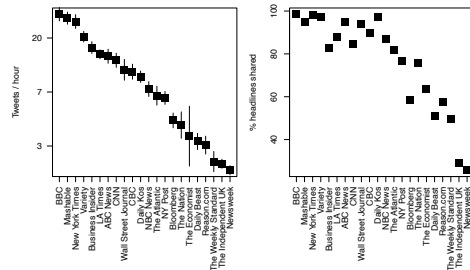
We collected over **100,000 news article headlines** in the CogMedia<sup>2</sup> database from major news organizations and analyzed a **random subset of 20,000 stories.**

## Approach - Metrics

Each headline was measured in two ways:

- A **rate measure for social sharing** taken from **Twitter**, based on how quickly a story's title garnered tweets
- English Lexicon Project (ELP) used to measure **upper bound processing time** on each headline<sup>3</sup>

## Approach - Corpus Analysis



- Over 25% of analyzed articles went unshared.
- The average social score of articles was 2.5

## Approach - Results

Logistic regression model predicting how much shared (0's omitted)

	Dependent variable:	
	log_social	
MeanSyllables	-0.016 (0.011)	
MeanMorphemes	0.001 (0.008)	
Frequency	-0.003 (0.007)	
WordLength	-0.003 (0.013)	
SumLDT	0.011 (0.006)	
PercentContent	0.009 (0.007)	
Constant	0.447*** (0.006)	
Observations	15,152	
R <sup>2</sup>	0.001	
Adjusted R <sup>2</sup>	0.0005	
Residual Std. Error	0.722 (df = 15145)	
F Statistic	2.260* (df = 6; 15145)	

Note: \*p<0.05; \*\*p<0.01; \*\*\*p<0.001

Logistic regression model predicting whether shared

	Dependent variable:	
	log_social > 0	
MeanSyllables	-0.012 (0.028)	
MeanMorphemes	0.058** (0.021)	
Frequency	0.043* (0.018)	
WordLength	-0.070* (0.033)	
SumLDT	-0.118*** (0.015)	
PercentContent	0.038* (0.018)	
Constant	0.198*** (0.014)	
Observations	19,989	
Log Likelihood	-13,718.030	
Akaike Inf. Crit.	27,450.050	

Note: \*p<0.05; \*\*p<0.01; \*\*\*p<0.001

Generally, model does not predict how much sharing will occur.

Surprisingly, more morphemes per word predicts more likely shared

Upper bound processing time (RT) from ELP - more processing predicts less likely to share

The more content words, the more likely to share

Note: all variables normalized prior to entry in model

## Conclusion

- We have yet to determine a causal link between cognitive fluency and rate of share, though there is a **suggestive relationship**.
- Several subsets of 20,000 articles from the main data set ( $N > 100,000$ ) produced results consistent with those reported.
- ***Statistically subtle but likely impactful at scale.***

## The Social Media News Landscape



## Discussion

- Future analysis may include more sophisticated statistical models to control for news source, collinearity, and other covariates of interest (e.g. concept concreteness).
- Cognitive processing measures may also contribute to algorithmic discovery of “click-bait” or “fake-news”.

## References

1. Kumpel, A. S., Karnowski, V., & Keyling, T. (2015). Newssharing in social media: A review of current research on news sharing users, content, and networks. *Social media+society*, 1(2), 2056305115610141
2. Dale, R. (in preparation). The CogMedia project: Open data and tools for investigating linkages between mind and mass media
3. Balota, D. A., Yap, M. J., Hutchison, K. A., Cortese, M. J., Kessler, B., Loftis, B., ... & Treiman, R. (2007). The English lexicon project. *Behavior Research Methods*, 39(3), 445-459.