Title: Regression model selection, specification, and full results appendix for "Toxic politics and TikTok engagement in the 2024 U.S. election"
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Note: The material contained herein is supplementary to the article named in the title and published in the Harvard Kennedy School (HKS) Misinformation Review.

Appendix F: Regression model selection, specification, and full results

We estimated the observed effects (after controlling for views) on interaction for RQ2–4 using linear mixed effects models. We first selected the best-performing baseline model using ANOVA-based model selection to determine the most relevant features influencing user interactions. To capture content-specific idiosyncrasies, we incorporated random effects for post author, featured music, and posting time, which enhances methodological rigor by disentangling algorithmic amplification from organic engagement patterns, offering a more precise analysis of how partisanship, toxicity, and political topics shape audience interactions. We experimented with several variations of models for RQ2–4, the best models in terms of high R^2 and low complexity (using Akaike Information Criterion or AIC) were selected. The baseline model features included partisan alignment, red hue, duration, hedging, anger, and age, after controlling for views. We use the following model for RQ2:

$$y_{ui} \sim \alpha_0 + \alpha_t t_i + \alpha_e t_i p_i + \alpha_p p_i + \overrightarrow{\alpha_K} K_i + m_i + \alpha_v views_i + s_u + w_i$$

Where:

- y_{ui} is the interaction on author u's post i.
- t denotes toxicity score.
- α_t is the effect of toxicity on interaction.
- p denotes partisan leaning of a post.
- α_e captures the joint effect of party and toxicity on interactions.
- K is the vector of other post features (red hue, duration, hedging, anger, and age) from the baseline model.
- s , w , and m denote random effects on the user, post timing, and featured music, respectively.

Model fit and sample:

- *N* = 37,929 observations
- Marginal R^2 = .894 (variance explained by fixed effects)
- Conditional R^2 = .930 (variance explained by fixed and random effects)

Table F1. *Regression estimates, standard errors, 95% CI, and p-values for RQ2.*

Predictor	**Estimate**	***SE***	**95% CI (LL, UL)**	***p***
Intercept	0.000	0.006	[-0.011, 0.012]	.943
Toxicity	0.023	0.003	[0.017, 0.028]	< .001 ***
Party: Neither	-0.040	0.004	[-0.049, -0.031]	< .001 ***
Party: R-leaning	-0.007	0.004	[-0.014, 0.000]	.042 *
Red Hue	0.007	0.002	[0.004, 0.010]	< .001 ***
Duration	0.010	0.002	[0.005, 0.014]	< .001 ***
Hedges	-0.016	0.004	[-0.025, -0.008]	< .001 ***
Anger	0.003	0.004	[-0.004, 0.011]	.356
Views	0.917	0.002	[0.913, 0.920]	< .001 ***

Predictor	Estimate	*SE*	95% CI (LL, UL)	*p*
Age	0.005	0.002	[0.003, 0.008]	< .001 ***
Toxicity*Party: Neither	-0.014	0.004	[-0.022, -0.007]	< .001 ***
Toxicity*Party: R-leaning	-0.006	0.003	[-0.013, 0.001]	.078 †

Note: p values: † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$. CI = Confidence Interval; *SE* = Standard Error.

For RQ3, individual topics are grouped into broader topic categories to enhance statistical power and interpretability, and nonpartisan content is excluded due to insufficient topical posts (see Figure C1, Appendix C). We use the following model:

$$y_{ui} \sim \alpha_0 + \overrightarrow{\alpha_G} G_i + \overrightarrow{\alpha_L} t_i G_i + \overrightarrow{\alpha_N} p_i G_i + \overrightarrow{\alpha_H} t_i p_i G_i + \alpha_t t_i + \alpha_e t_i p_i + \alpha_p p_i + \overrightarrow{\alpha_K} K_i + m_i + \alpha_v views_i + s_u + w_i$$

Where:

- G is the vector of topic groups.
- α_G gives the effect of topic groups on interaction.
- α_L and α_N capture the interaction effects of toxicity and party with topic groups.
- $\alpha_H$captures the three-way interaction effect between topic group, party and toxicity.

Model fit and sample:

- *N* = 29,425 observations
- Marginal R^2 = .896 (fixed effects)
- Conditional R^2 = .931 (fixed + random effects)

Table F2. *Regression estimates, standard errors, 95% CI and p-values for RQ3.*

Predictor	Estimate	*SE*	95% CI (LL, UL)	*p*
Intercept	-0.010	0.007	[-0.023, 0.003]	.118
Toxicity	0.020	0.003	[0.013, 0.026]	< .001 ***
Party: R-leaning	-0.004	0.004	[-0.012, 0.004]	.335
Elections	0.002	0.006	[-0.009, 0.014]	.717
Economy	-0.001	0.008	[-0.017, 0.015]	.880
Socio-cultural Issues	0.034	0.007	[0.020, 0.047]	< .001 ***
Political Figures & Events	0.012	0.007	[-0.001, 0.025]	.080 †
Geopolitical Conflict	-0.003	0.012	[-0.027, 0.020]	.771
Immigration	-0.029	0.015	[-0.058, ~0.000]	.049 *
Labor	0.032	0.015	[0.002, 0.062]	.039 *
Red Hue	0.011	0.002	[0.008, 0.015]	< .001 ***
Duration	0.007	0.003	[0.002, 0.012]	.011 *
Hedges	-0.007	0.005	[-0.017, 0.003]	.177
Anger	0.003	0.004	[-0.005, 0.011]	.502
Views	0.910	0.002	[0.906, 0.914]	< .001 ***
Age	0.007	0.002	[0.004, 0.011]	< .001 ***
Toxicity*Party: R-leaning	-0.005	0.004	[-0.013, 0.003]	.207
Toxicity*Elections	0.013	0.007	[0.000, 0.026]	.044 *
Toxicity*Immigration	0.035	0.020	[-0.004, 0.074]	.076 †

Predictor	Estimate	*SE*	95% CI (LL, UL)	*p*
Party: R-leaning*Immigration	0.047	0.018	[0.012, 0.083]	.009 **
Party: R-leaning*Labor	-0.085	0.025	[-0.134, -0.036]	< .001 ***
Toxicity*Party: R-leaning* Geopolitical Conflict	0.050	0.023	[0.005, 0.095]	.028 *

Note: p values: † *p* < .10, * *p* < .05, ** *p* < .01, *** *p* < .001. CI = Confidence Interval; *SE* = Standard Error.

For RQ4, we use the following model:

$$y_{ui} \sim \alpha_0 + \alpha_z z + \alpha_l z x_i + \alpha_x x_i + \alpha_p p_i + \overrightarrow{\alpha_K} K_i + m_i + \alpha_v views_i + s_u + w_i$$

Where:

- z is a binary indicator denoting the event (i.e., $z = 1$).
- α_z shows the effect of the event on interaction.
- α_l effect of toxicity subtype x on interaction following the event.

Severe toxicity model fit and sample:

- *N* = 3,008 observations
- Marginal R^2 = .910 (fixed effects)
- Conditional R^2 = .961 (fixed + random effects)

Table F3. *Regression estimates, standard errors, 95% CI and p-values for RQ4 (severe toxicity).*

Predictor	Estimate	SE	95% CI (LL, UL)	*p*
Intercept	-0.037	0.014	[-0.065, -0.010]	.007 **
Severe Toxicity	0.007	0.006	[-0.004, 0.019]	.196
Post-Event	0.018	0.009	[0.001, 0.035]	.035 *
Party: D-leaning	0.027	0.012	[0.004, 0.050]	.020 *
Party: R-leaning	0.028	0.011	[0.006, 0.050]	.013 *
Red Hue	0.005	0.004	[-0.004, 0.013]	.258
Duration	0.006	0.006	[-0.006, 0.017]	.333
Hedges	-0.041	0.011	[-0.063, -0.019]	< .001 ***
Anger	0.009	0.010	[-0.011, 0.029]	.357
Views	0.952	0.006	[0.941, 0.963]	< .001 ***
Age	0.005	0.004	[-0.003, 0.013]	.182
Severe Toxicity*Post-Event	0.016	0.008	[0.001, 0.032]	.040 *

Note: p values: † *p* < .10, * *p* < .05, ** *p* < .01, *** *p* < .001. CI = Confidence Interval; *SE* = Standard Error.

Sexually explicit toxicity model fit and sample:

- N = 3,008 observations
- Marginal R^2 = .910 (variance explained by fixed effects)
- Conditional R^2 = .961 (variance explained by fixed and random effects)

Table F4. *Regression estimates, standard errors, 95% CI and p-values for RQ4 (sexually explicit toxicity).*

Predictor	**Estimate**	**SE**	**95% CI (LL, UL)**	***p***
Intercept	-0.042	0.014	[-0.069, -0.015]	.002 **
Sexually Explicit	0.001	0.006	[-0.011, 0.011]	.929
Post-Event	0.019	0.009	[0.002, 0.036]	.027 *
Party: D-leaning	0.029	0.012	[0.006, 0.053]	.013 *
Party: R-leaning	0.031	0.011	[0.009, 0.053]	.007 **
Red Hue	0.005	0.004	[-0.003, 0.013]	.233
Duration	0.005	0.006	[-0.006, 0.016]	.398
Hedges	-0.041	0.011	[-0.063, -0.020]	< .001 ***
Anger	0.016	0.010	[-0.004, 0.035]	.113
Views	0.952	0.006	[0.940, 0.963]	< .001 ***
Age	0.005	0.004	[-0.002, 0.013]	.180
Sexually Explicit*Post-Event	0.020	0.008	[0.004, 0.035]	.013 *

Note: p values: † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$. CI = Confidence Interval; *SE* = Standard Error.