

Affective Polarization and Dynamics of Information in Online Networks

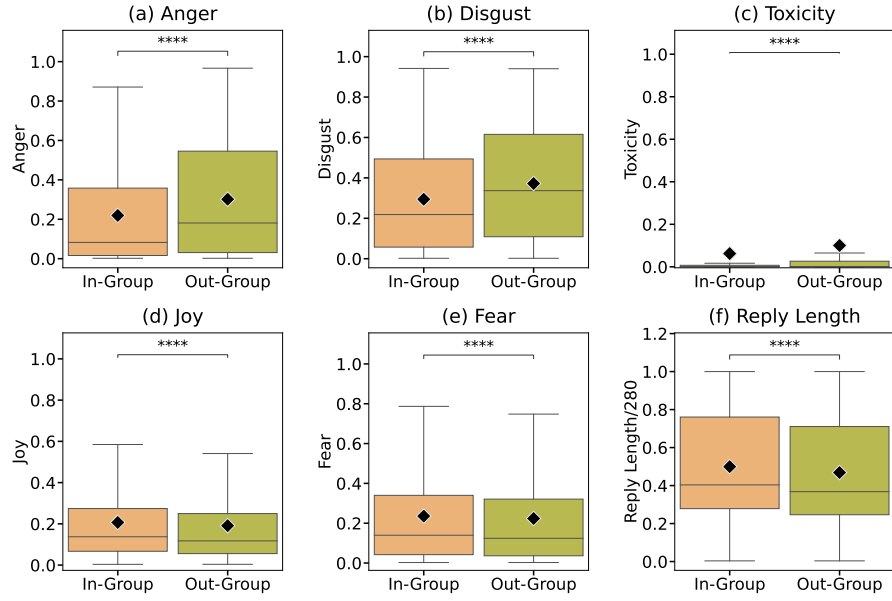
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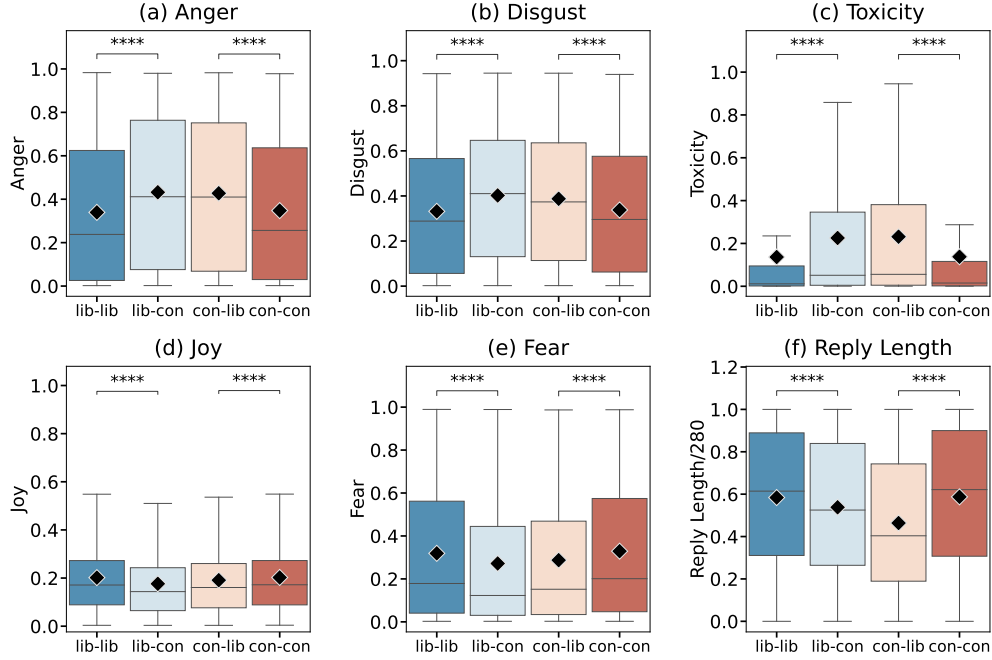
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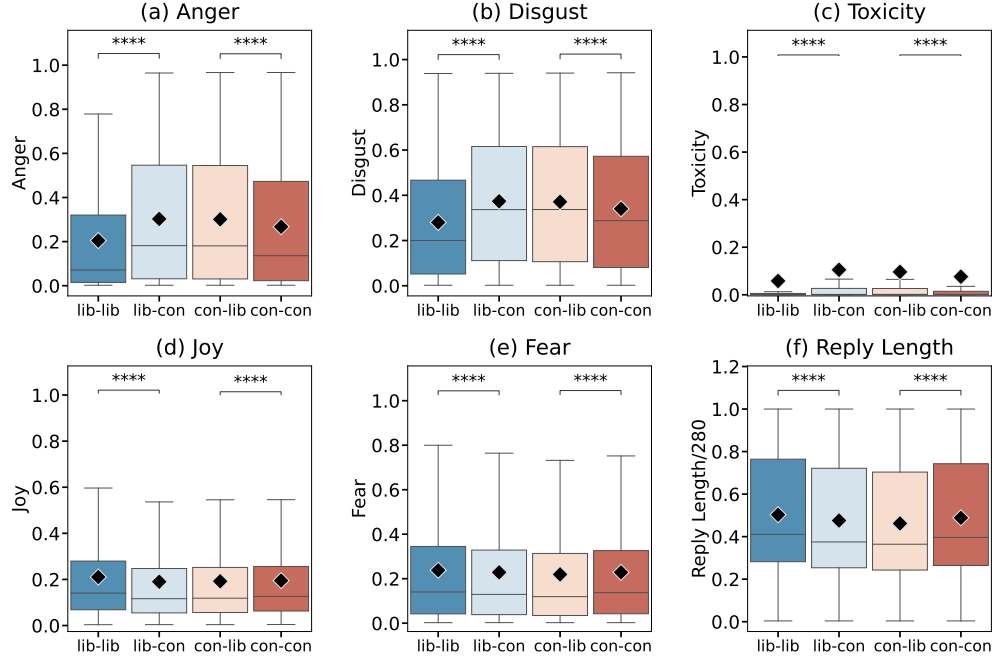
Supplementary Figures



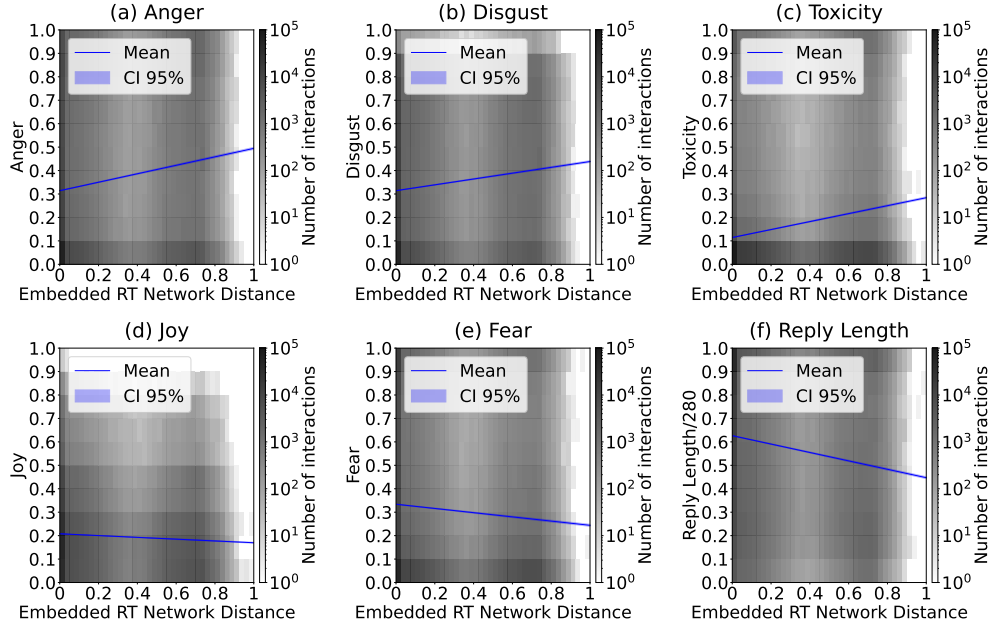
Supplementary Figure 1 Affective polarization in COVID-19 discussions: in-group vs out-group affect. Boxplots show confidence scores of emotions expressed in replies between two users with the same ideology (in-group) and users with different ideology (out-group). Out-group interactions show more (a) anger, (b) disgust, and use more (c) toxic language, but also less (d) joy and (e) fear, and tend to be shorter (f). The boxes span the first to third quartiles, with whiskers extending 1.5 times the interquartile range. The horizontal line inside the box represents the median, and diamond symbol marks the mean. Differences in means were tested for statistical significance using a two-sided Mann-Whitney U Test with the Bonferroni correction: * indicates significance at $p < 0.05$, ** - $p < 0.01$, *** - $p < 0.001$, **** - $p < 0.0001$ and, ns - not-significant.



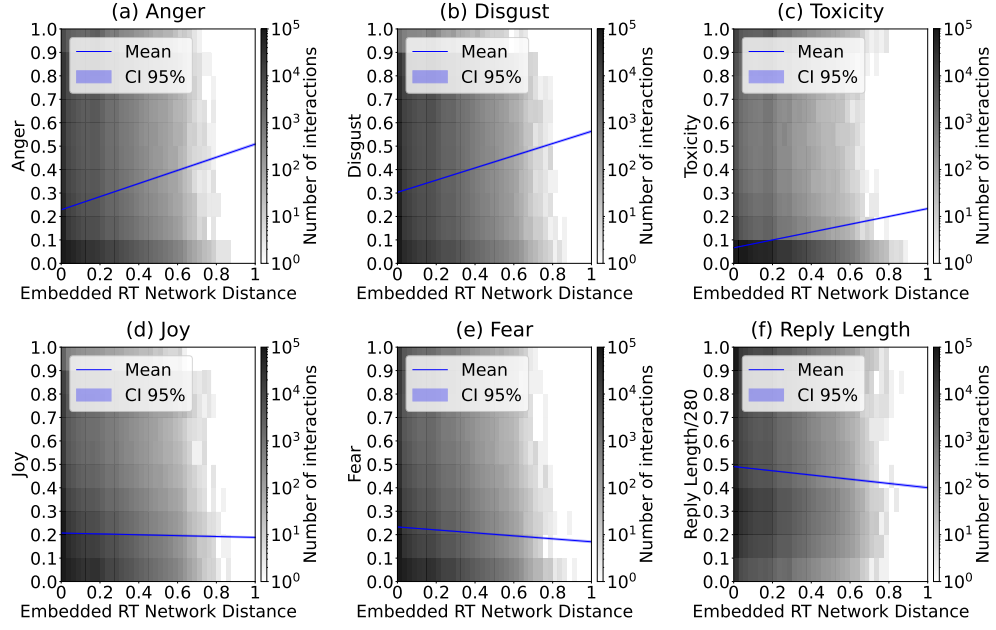
Supplementary Figure 2 Partisan differences in affective polarization in the Roe_v_Wade abortion discussions. Boxplots show confidence scores for emotions expressed in replies between same-partisanship users (in-group interactions) and opposite-partisanship users (out-group interactions) in the abortion debate, disaggregated by partisanship. Out-group interactions show more (a) anger, (b) disgust, and use more (c) toxic language, but also slightly less (d) joy and (e) fear. Out-group interactions are more likely to be shorter (f), with systematic partisan differences. The boxes span the first to third quartiles, with whiskers extending 1.5 times the interquartile range. The horizontal line inside the box represents the median, and diamond symbol marks the mean. Differences in means were tested for statistical significance using the Mann-Whitney U Test with the Bonferroni correction: * indicates significance at $p < 0.05$, ** - $p < 0.01$, *** - $p < 0.001$, **** - $p < 0.0001$ and, ns - not-significant.



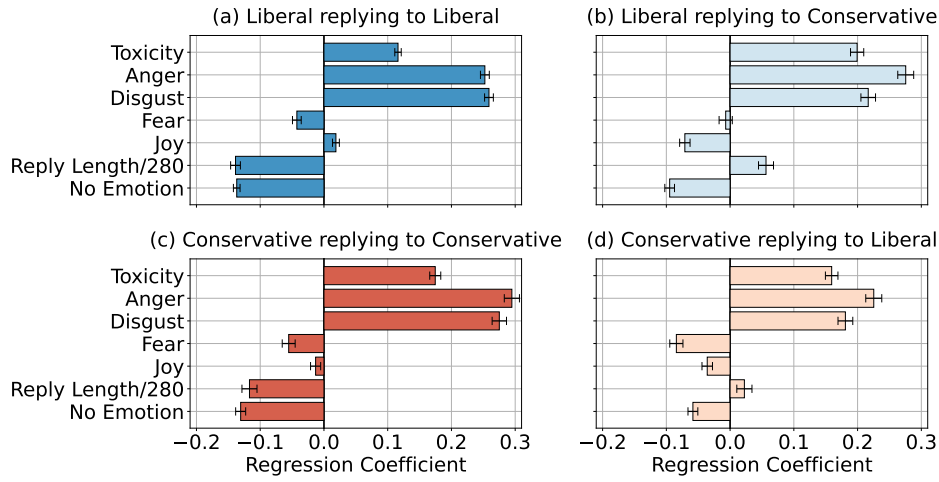
Supplementary Figure 3 Partisan differences affective polarization in COVID-19 pandemic discussions. Boxplots show confidence scores for emotions expressed in replies between same-partisanship users (in-group interactions) and opposite-partisanship users (out-group interactions) in the abortion debate, disaggregated by partisanship. Out-group interactions show more (a) anger, (b) disgust, and use more (c) toxic language, but also slightly less (d) joy and (e) fear. Out-group interactions are more likely to be shorter (f), with systematic partisan differences. The boxes span the first to third quartiles, with whiskers extending 1.5 times the interquartile range. The horizontal line inside the box represents the median, and diamond symbol marks the mean. Differences in means were tested for statistical significance using the Mann-Whitney U Test with the Bonferroni correction: * indicates significance at $p < 0.05$, ** - $p < 0.01$, *** - $p < 0.001$, **** - $p < 0.0001$ and, *ns* - not-significant.



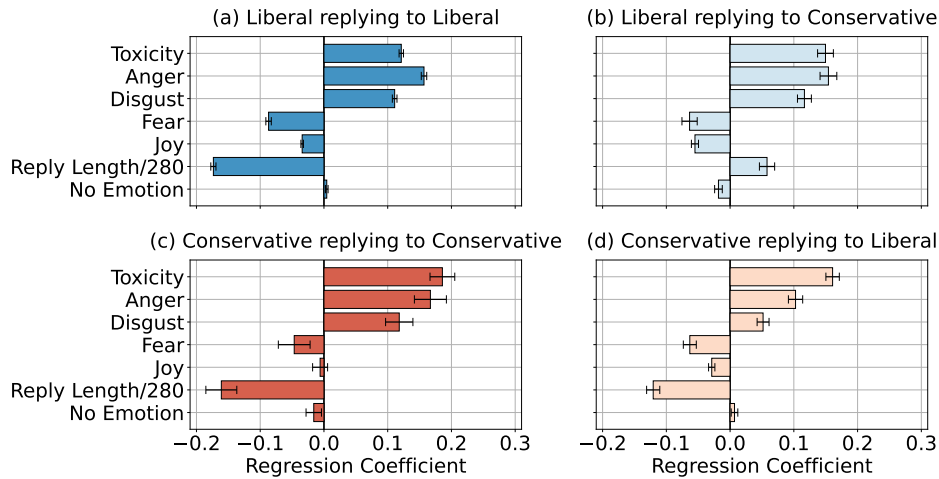
Supplementary Figure 4 Affective polarization in the retweet network of Roe_v_Wade data. Density plot shows the number of replies with a specific emotion between two users a given distance apart. Emotions like (a) anger, (b) disgust and (c) toxicity increase with distance in the network embedding space between users, while (d) joy and (e) fear decrease with distance, as does (f) reply length.



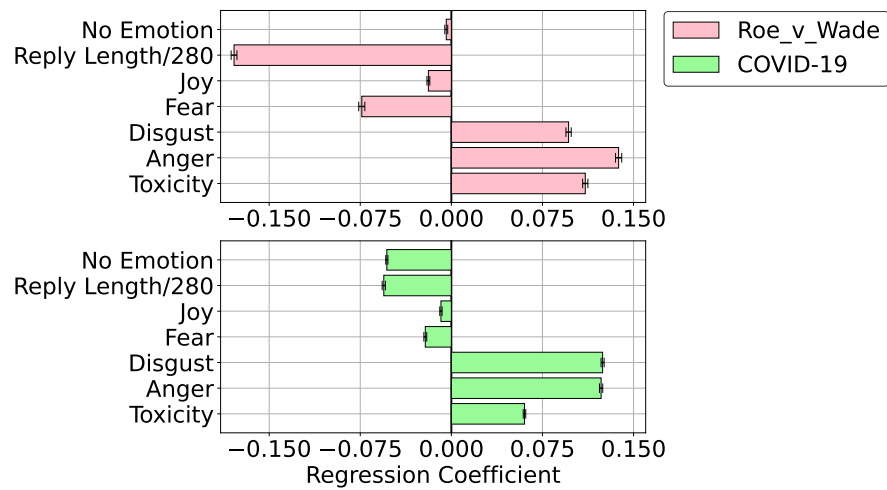
Supplementary Figure 5 Affective polarization in the retweet network of COVID-19 data. Density plot shows the number of replies with a specific emotion between two users a given distance apart. Emotions like (a) anger, (b) disgust and (c) toxicity increase with distance in the network embedding space between users, while (d) joy and (e) fear decrease with distance, as does (f) reply length.



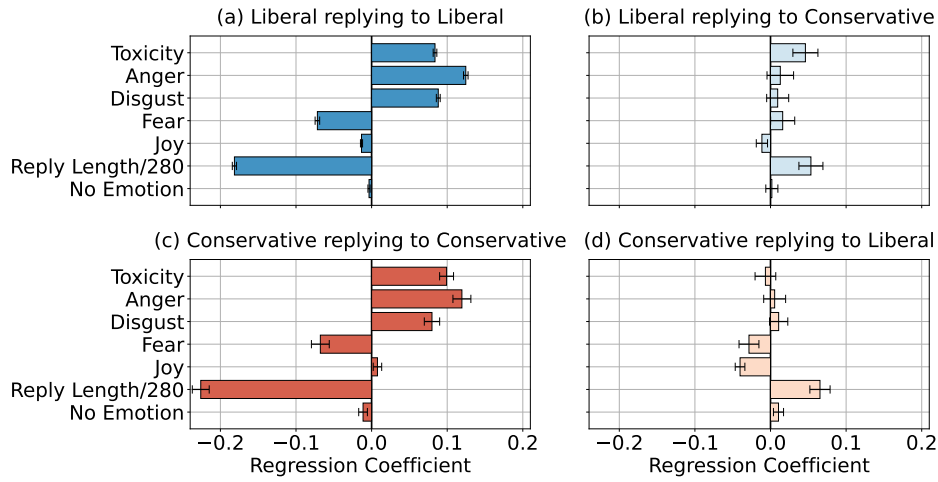
Supplementary Figure 6 Regression coefficients of affect as a function of network distance in the retweet network of COVID-19 data. The bars represent the value of the regression coefficient of the emotion or toxicity of replies as a function of embedded RT network distance between interacting users of specific ideologies. For regression analysis, distances were rescaled to unit interval. Error bars show 95% confidence interval.



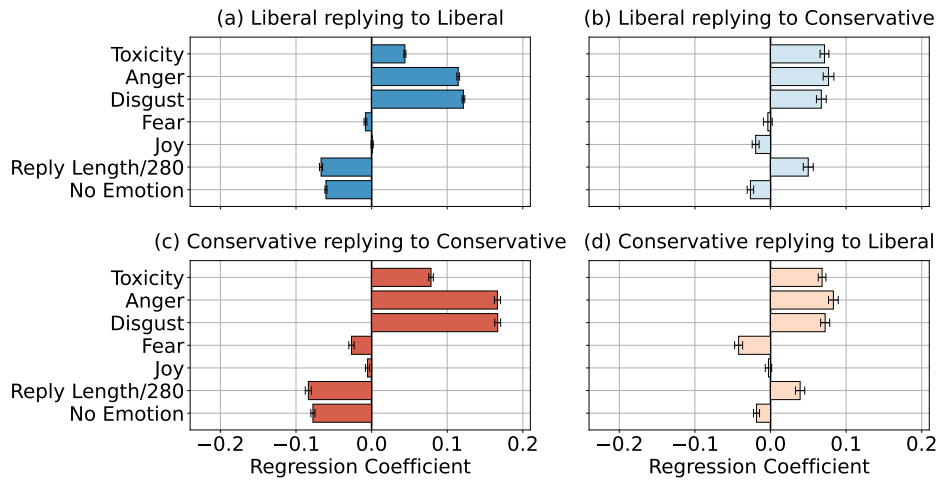
Supplementary Figure 7 Regression coefficients of affect as a function of network distance in the retweet network of Roe_v_Wade data. The bars represent the value of the regression coefficient of the emotion or toxicity of replies as a function of embedded RT network distance between interacting users of specific ideologies. For regression analysis, distances were rescaled to unit interval. Error bars show 95% confidence interval.



Supplementary Figure 8 Regression coefficients of affect as a function of network distance. The bars represent the value of the regression coefficient of the emotion or toxicity of replies as a function of shortest path between interacting users. For regression analysis, path lengths were rescaled to unit interval. Error bars show 95% confidence interval.



Supplementary Figure 9 Regression coefficients of affect as a function of network distance in the retweet network of Roe_v_Wade data. The bars represent the value of the regression coefficient of the emotion or toxicity of replies as a function of shortest path between interacting users of specific ideologies. For regression analysis, path lengths were rescaled to unit interval. Error bars show 95% confidence interval.



Supplementary Figure 10 Regression coefficients of affect as a function of network distance in the retweet network of COVID-19 data. The bars represent the value of the regression coefficient of the emotion or toxicity of replies as a function of shortest path between interacting users of specific ideologies. For regression analysis, path lengths were rescaled to unit interval. Error bars show 95% confidence interval.

Supplementary Tables

Supplementary Table 1 Statistical summary of regression analysis for affect as a function of embedded network distance in COVID-19 RT network between a user replying to another user.

Affect	Slope $\pm$ 95% CI	Intercept $\pm$ 95% CI
Toxicity	0.1673 ± 0.0032	0.0663 ± 0.0005
Anger	0.2800 ± 0.0042	0.2286 ± 0.0006
Disgust	0.2604 ± 0.0004	0.3029 ± 0.0006
Fear	-0.0632 ± 0.0037	0.2330 ± 0.0005
Joy	-0.0185 ± 0.0003	0.2070 ± 0.0004
Reply Length/280	-0.0902 ± 0.0042	0.4906 ± 0.0006
No Emotion	-0.1158 ± 0.0028	0.2259 ± 0.0004

Supplementary Table 2 Statistical summary of regression analysis for affect as a function of embedded network distance in Roe_v_Wade RT network between a user replying to another user.

Affect	Slope $\pm$ 95% CI	Intercept $\pm$ 95% CI
Toxicity	0.1698 ± 0.0028	0.1143 ± 0.0011
Anger	0.1805 ± 0.0033	0.3141 ± 0.0013
Disgust	0.1243 ± 0.0028	0.3142 ± 0.0011
Fear	-0.0899 ± 0.0032	0.3339 ± 0.0012
Joy	-0.0382 ± 0.0015	0.2079 ± 0.0006
Reply Length/280	-0.1793 ± 0.0031	0.6265 ± 0.0012
No Emotion	-0.0012 ± 0.0016	0.1593 ± 0.0006