Title: Statistical tests appendix for "Measuring the effect of Facebook's downranking interventions against groups and websites that repeatedly share misinformation"
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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 A: Statistical tests

The set of accounts analyzed comprises some groups and websites that generate more engagement than others by several orders of magnitude, making the engagement distribution non-Gaussian. We thus used non-parametric statistical methods to estimate the effect of Facebook's reduction: Wilcoxon tests, and a bootstrapping approach to calculate the confidence intervals. As a Wilcoxon test compares the sums of ranks, it is less likely than a t-test to spuriously indicate significance because of the presence of outliers (Wilcoxon, 1992). The percent change in engagement were calculated using the following formula:

$$percent\ change\ = \frac{mean\ engagement_{reduced\ period} - mean\ engagement_{normal\ period}}{mean\ engagement_{normal\ period}} \times 100$$

Percent changes allowed us to normalize the engagement difference by the accounts' initial engagement level, as engagement metrics were vastly heterogeneous. We thus compared percent changes in engagement against zero, while paired Wilcoxon tests were used for the rest of the metrics (number of daily posts, proportion of low-quality links, …).

Comparing engagement during reduced and normal periods might be biased if there is a seasonality in engagement data that corresponds with a reduction period. To address this potential confounder, we used a simple sensitivity test consisting in shuffling the reduction date between the 81 groups that have shared a message saying they were reduced and re-calculating the percent change in engagement before and after this randomized date. In this case, the median percent change is -0.4%, and not significantly different from zero, W = 1504, p = 0.6. This absence of difference supports the understanding that a spurious decrease in engagement is not at the origin of the reduction described in Figure 2.