Methodology

To analyze congressional responses on Facebook to the Oct. 1, 2017, Las Vegas attack, researchers obtained all 4,404 Facebook posts from each of the 503 voting members of the U.S. Congress who use official Facebook pages for outreach to the public and who posted at least once during the study period. All posts were created between Oct. 1 and 9, 2017. Researchers examined only lawmakers' official Facebook accounts, defined as those that link to or are linked from a member's Senate.gov or House.gov profile page; lawmakers without official Facebook accounts are not included in this analysis. Certain members who recently won special elections also are not included.

Researchers then manually examined 500 of those posts, determining whether they mentioned guns or the Las Vegas attack. Finally, researchers used these 500 posts to train an advanced classification algorithm, which examined each post's word frequencies to identify words that were associated with the original two topics: guns and the Las Vegas attack.

The algorithm, known as a "support vector machine," then applied that process to the remaining posts to estimate whether they mentioned guns or the Las Vegas attack. It achieved 98% accuracy in determining whether a post discussed Las Vegas, and 99% accuracy for determining whether a post mentioned guns. The algorithm's precision was 95% for mentions of both Las Vegas and for whether the post mentioned guns, while recall was 91% and 86%, respectively.

Researchers calculated these scores using a method known as 5-fold cross-validation. This means that five times, researchers held out one-fifth of the data from the algorithm, training it on only 400 posts and using the remaining 100 posts (which the algorithm had not seen) to test the algorithm's accuracy. Researchers repeated this five times, until every data point had been held out once, and then took the average accuracy, precision and recall from all five iterations of the process. Finally, researchers manually examined the 303 posts that discussed guns, hand-coding them for opposition, support or uncertainty toward stricter gun policies.

In order to assess how mentions of Las Vegas and guns affected the engagement a post received, researchers also had to account for differences between members in terms of their overall levels of engagement, since some members have more followers than others and may be more prone to receiving more "likes" and comments regardless of the content of their posts. This was accomplished by calculating a "z-score" for each member, based on the number of likes and comments each of their posts received between Jan. 1 and July 19, 2017.

By using this larger time frame, researchers were able to assess each member's average engagement and compare it against posts mentioning Las Vegas and guns. This test helps ensure that the analysis is less likely to be biased by differences in different members' averages and the variances of their Facebook engagement. The z-score is calculated by subtracting the mean number of likes or comments that the member received between Jan. 1 and July 19, 2017, from the number of likes or comments on that particular post, then dividing by the standard deviation of that member's likes and comments across the same time frame:

$$z_{ij} = \frac{e_{ij} - \bar{e}_j}{std(e_j)}$$

The analysis shows that posts mentioning both guns and the attack generate on average 1.3 standard deviations more likes than each member's average number of likes in the first half of 2017, and 2.1 standard deviations more comments. In contrast, posts on the attack alone generate 0.6 standard deviations more likes, and 1 standard deviation more comments. In terms of simple counts, the median post that mentioned both guns and the attack generated 141 more likes and 45 more comments than posts that did not mention either, while the median post mentioning the attack alone generated three more likes and 22 more comments.