Research Article

The increasing frequency of president donald trump's social communications: Is there a limit?

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Abstract

This brief article offers a regression formula which accurately predicts Trump's messaging rate as president ($R=.96$, $p<.001$). Rate is a quadratic function of months in office, with Republican approval rating entering the formula with a negative weight. The function has no mathematical limit, but real-life constraints associated with time available for messaging are discussed and exemplified, and a maximum messaging rate (150 messages daily, in an ongoing pattern) is suggested.

Since he became president of the US in 2017, Donald Trump has been tweeting more and more frequently on a daily basis, to the point where both political analysts and the general public have begun to comment. In several cases, more than 100 tweets have been posted in a single day. The president has other means of communicating via social media but currently tweets posted from an iPhone on the account @realDonaldTrump are by far his most common outlet. These tweets are marked as favorites by millions of followers and retweeted by hundreds of thousands of them on a regular basis. Some (6-7%) of the president's posts are in fact retweets. This brief article describes the rise in messaging rate during the first 41 months of Trump's presidency. The function relating time (months in office) to messaging rate is described, and its limit (in terms of real-life controls on messaging) is estimated. The research is conducted in the full realization that messaging data are not necessarily trustworthy, and that the author and the audience may both be other than they seem. What is being analyzed is that which is offered to the public, with no guarantees. Trump's tweet volume has been studied previously (TweetBinder blog, n.d.). His tweets were seen to peak when he entered politics, and they decreased in frequency after his election, after which they rose again. The attention paid to the president's tweets is such that even misspellings (such as the famous "covfefe" or "smocking" appearing in lieu of "smoking") draw extreme attention and many follow-up messages [1].

The function relating messaging rate to time may have a mathematical limit, but it is more likely that messaging rate will be constrained by everyday realities. Killeen's classic mathematical learning theory predicting behavior [2] includes a factor of constraint. Constraint is defined as anything that limits the possible response output rate – e.g. the hours in a day or muscle fatigue. A behaviour will decrease in frequency when constraint is high and increase when it is low. Killeen and Sitomer point out that "the time required to respond constrains maximum response rates" [2].

Method

Trump's social messages were accessed at the website trumptwitterarchive.com (n.d.). Those studied occurred between January 1st, 2017 (when Trump was awaiting his inauguration) and May 31st, 2020 (when the research described in this paper began). The main criterion of the research was messaging rate. Daily rates were calculated by dividing each monthly rate by the number of days in the month. Because the function relating month to rate was quadratic in shape, the square of month was also included as a predictor. Additional predictors were the general and Republican approval ratings for the president during the first week of each month, as reported in Gallup polls posted online (n.d.). A stepwise linear regression was employed to predict daily messaging rate from month, the square of month, and the two approval ratings.

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Results and discussion

There were moderate to strong (r=.53 to .95, p<.001) positive intercorrelations among all variables. The variable most closely related to daily messaging rate was the square of month (r=.95). Daily messaging rates were predicted by a powerful and significant weighted function (R^2=.92, p<.001) that included the square of month and Republican approval rating as significant predictors. The raw formula indicated that messages per day were equal to 52.54 + .021*month squared –.58*Republican approval. Beta values for the predictors were 1.08 and –.20 respectively. Months in the presidency and general approval did not contribute to prediction. Notably, Republican approval rating was a negative predictor of message rate within the predictive scheme in spite of its positive correlation (.53) with this variable: when Republican approval was lower, messaging was higher, once months elapsed had been controlled. Republican approval was lagged by one month in an exploratory analysis, but it did not enter the predictive scheme as the unlagged variable was the better predictor. The predicted daily messaging rate for each month is plotted in Fig. 1 as a function of month in the presidency.

The function in Figure 1 does not have a mathematical limit. Theoretically, daily messaging could rise to infinity. According to the predictive formula, if Trump continued messaging in a similar manner for 100 months, at which point his Republican approval rating was 90% his messaging rate would be 173 messages per day (close to five times what it is currently). The limits to the behaviour, if any, must be sought in the constraints of the situation.

For example, according to current US law, the president can serve for at most 96 months (two terms or 8 years). Table 1 provides some messaging rates based on characteristic results (from actual data), some based on predicted results (from the formula), and some based on constrained results (with limited time per day to devote to messaging). Predicted results are, of course, dependent on the (perhaps dangerous) assumption that the formula will work in the same way as it does now across the full timespan, and that the dynamic behind the president's messaging will not change drastically. If Trump were assumed to have 8 free hours and 20 minutes per day
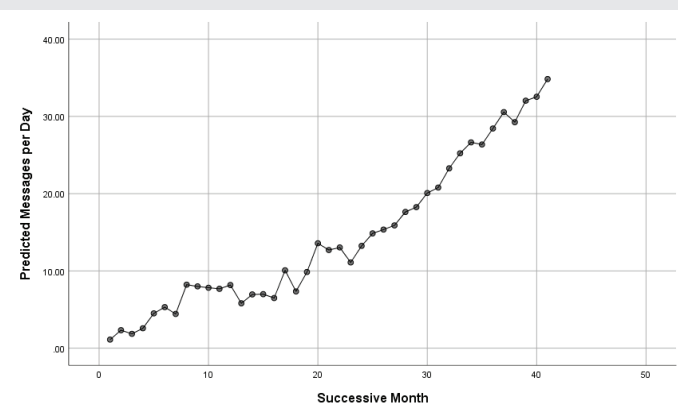
Table 1: Rates of daily messaging for Trump that are *characteristic* (actual data), *predicted* (from the regression formula), and *constrained* (on the basis of time) *.

Messages Per Day (m/d)	Description of the Rate
5 m/d	Characteristic of the second half of Trump's first year as president
10 m/d	Characteristic of the end of Trump's second year as president
20 m/d	Characteristic of the beginning of Trump's third year as president
35 m/d	Characteristic of the first quarter of 2020, Trump's fourth year
100 m/d	Predicted for the 60th month of presidency (middle of fifth year) with 50% approval rating
	OR
	Constrained, with Trump messaging 8 hours & 20 minutes a day @ 5 minutes per message
150 m/d	Predicted for the 100th month of presidency with 90% approval rating (beyond the limits of possibility because of length of term)
200 m/d	Constrained, with Trump messaging 16 hours & 40 minutes a day @ 5 minutes per message, or 8 hours and 20 minutes @ 2.5 minutes per message. Unrealistic.
>200 m/d	Difficult to imagine any circumstances under which a single individual could post messages at this consistent rate. Beyond possibility.

* The descriptions in this table apply to consistent ongoing rates of at least a month duration, not to occasional days with high ratings

to devote to messaging (500 minutes), and each message took roughly 5 minutes, the function would hit a time constraint at 100 messages per day (a rate that Trump has achieved, in occasional bursts). If one were to assume that Trump messaged for an unrealistic16 hours and 40 minutes a day, day after day, maximum possible messaging rate, allowing 7 hours and 20 minutes for sleep, meals, and business, would be 200. It is difficult to imagine any single person maintaining this rate for any length of time. This extreme situation would represent messaging on the basis of almost no input (briefings, television news, etc.).

Reposting messages (e.g., retweeting), takes much less time than composing an original message. Did Trump retweet at a greater rate as time progressed? Data from trumptwitterarchive.com suggest that the rate of retweeting was 6.8% in the first five months of 2017 and a comparable 6.4% in the first five months of 2020. The change was not statistically significant (χ^2=.42, p>.51). The rise in messaging rate cannot be attributed to proportionally more frequent retweeting. Although this article does not directly address the influence of Trump's messages on society, other researchers have investigated possible societal outcomes and noted that both the content and the frequency of tweets influences economic factors. Trump's tweets on Mexico were associated with raised volatility in the peso [3] and the volume of Trump's tweets, in a study conducted before January, 2020, was negatively related to the performance of the markets [4]. Any behavior of a public figure such as the president is capable of influencing the society in which he operates in a multitude of ways, so questions about Trump's tweet frequency are not merely academic.

The data discussed here have shown that there is a quadratic relationship between messaging rate and elapsed time, and

Figure 1: Trump's predicted daily messaging rate for each month from January, 2017 to May, 2020.

they have demonstrated the effectiveness of Republican approval rating as a potential reinforcer (when approval is low, messaging rate is relatively high after elapsed month has been controlled). The constraints mentioned in Table 1 are not part of the predictive formula itself but exist as real-world limits for the behaviour being described. To answer the title, yes, there are limits beyond which the audience can begin to doubt that a single individual is messaging at the suggested rate. On the basis of Table 1 it is suggested that 150 messages per day is likely the outside limit of possible consistent rates for messages per day, although this limit might be - and in fact has been – approached or exceeded on rare occasional days [5–8].

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