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How Presidential Debate Audiences are Like Fireflies

> "Like 'congregating fireflies,' humans show massive sustained entrainment across hundreds of thousands of individuals, in matters of seconds and minutes."

Riccardo Fusaroli, Marcus Perlman, Alan Mislove, Alexandra Paxton, Teenie Matlock, and Rick Dale published "Timescales of Massive Human Entrainment (http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0122742#references)" in the 10th volume of *PLoS ONE (http://www.plosone.org/)*, April 2015.

Why the study? Profs Fusaroli, et al., point out that much research (https://www.asc.upenn.edu/news-events/publications/jamieson-disciplines-debate-contributions-then-now-and-next-quarterly) has been devoted to a multitude of presidential debate components, but no models have yet been developed to study the collective communication behaviors of human agents in a complex system during a presidential debate. **This is the first study to do so**. Like fireflies "are *entrained (http://www.ncbi.nlm.nih.gov/pubmed/17742039)* in that they match their behavior to the temporal structure of events in the environment," the authors aim to understand how massively shared sociomedia events (like presidential debates) might entrain audiences.

They ask, "**How does the unfolding action of debates and other broadcasted events impact real-time public attention and response in social media?**"

Results of the study? Even though human communication is usually a smaller scale happening, it is understood that way because the interactive dynamics are limited by dialogical and spatial factors. Recent research has shown that large-scale human entrainment happens now, and that particular dialogic exchanges combine at a general societal level and do so over time. This study finds that, with social media and other technologies in the mix, there is "massive behavioral entrainment in humans, which is intrinsically multi-scale and reproduces across events."

Quick summary? National Public Radio transcripts of each 90 minute 2012 presidential debate between Barak Obama and Mitt Romney were prepared to reflect the audio, and speech turn and interruption start and end times were aligned to the debate. Data collected from Twitter was a "gardenhose (https://twittercommunity.com/t/gardenhose-access-streaming-and-filtering-or-just-streaming/8045)" stream, or a random sampling 10% of the public stream. Only tweets with the candidates' names were included, while retweets and tweets with urls were excluded. The total tweets analyzed across all three debates was 1,806,689.

The authors started with 3 time-scale hypotheses: (1) **Immediate assertive interaction** (e.g., interrupting, keeping ground, etc.) will significantly increase tweets about that candidate until s/he loses the floor; (2) **Ongoing salient, amusing, or controversial content** will focus audience attention and significantly increase tweets (Romney declaring "I love Big Bird"); and, (3) **Long-term attention**, being subject to bursts and decay, will not be sustained throughout the debate.

Take-aways?

- The public's attention to the debate and responses on Twitter "are time-locked to the conversational dynamics (e.g. turn-taking, interruptions) of the debaters"
- The debate format had no discernable effect on collective audience attention or response
- The longer the debater holds his or her ground or interrupts the other, tweets increase exponentially
- Collective audience attention immediately coincides to cues of assertiveness and "presidentiality"
- The first content tweet occurs within seconds, peaks at about a minute, then gradually fades over 10 minutes' time
- The study demonstrates "the value of fine-grained temporal analyses at different time scales in uncovering the powerful relationship between social media and public events"

So what?

- With this knowledge, viewers can be aware of how their local responses can affect global systems
- With this knowledge, advocates can understand how communication impacts are time-locked
- With this knowledge, journalists can connect the individual with the collective

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