High Level Idea:

People emit information and take in information from the people around them

The information we emit is a function of our own beliefs and the beliefs of those around us (ie peer pressure to not say things too against the norm).

However, if ~~our nein~~ the people around us say things very against our beliefs, we stop associating with them and form new relationships.

Mathematical Model →

Let $X_1, X_2, \ldots, X_n$ be a set of nodes

Assume each node X_i has some intrinsic bias V_i drawn from some distribution D.

Let S_i^t denote the incoming neighbors of X_i at time t.

Also, assume at each timestep each node X_i emits a message to its outgoing neighbors with value m_i^t

We will make m_i^t a function of X_i's incoming neighbors and bias, that is $m_i^t = f(S_i^t, V_i)$

Conover hypothesized people are more willing to spread controversial ideas online, so in an "online" setting f should give more weight to V_i, and in a "real life" setting it should give more weight to S_i^t

To keep it simple, let's define (weighted avg)

$$m_i^t = f(S_i^t, v_i) = p\, v_i + (1-p)\, g(M[S_i^t])$$

where g is some function, $p \in [0, 1]$, and $M[S_i^t]$ is the set of messages passed by the members of S_i^t during the last timestep.

There are many ways we could define g, but the simplest is probably just taking the mean of the members of $M[S_i^t]$, ~~ie M[S_i^t] M[S_i^t]~~ so let's do that.

After calculating m_i^t, for each incoming neighbor X_j, we will calculate $|v_i - m_j^{t-1}|$ (ie absolute difference between my bias and my neighbor's last message).

If $|v_i - m_j^{t-1}|$ is greater than some threshold t_i, then I will delete the edge $(X_j \to X_i)$. Then I will create a new edge according to some criteria (e.g. do it completely randomly, pick someone whose last message is close to my bias, etc.)