How does Peer Pressure affect social trends online?

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Modeling Complex Systems

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Why are we modeling

- Social trends, a form of "complex" contagions, obey different rules of transmission than normal contagions
- A cellular automata will allow us to create a (simple) model of transmission for this phenomena without getting too overly complex in representation
- Some unique rules social trends obey that we want to model: neighbor skipping and social reinforcement

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Assumptions and Model Rules: Part 1

- We want to use a neighborhood scheme in our CA that allows to us simultaneously examine the direct neighbors and the neighbors of those neighbors; this allows us to properly model the generation skipping tendencies of complex contagions.
- To that end, we will be using a Von Neumann neighborhood with a Manhattan distance of 2.

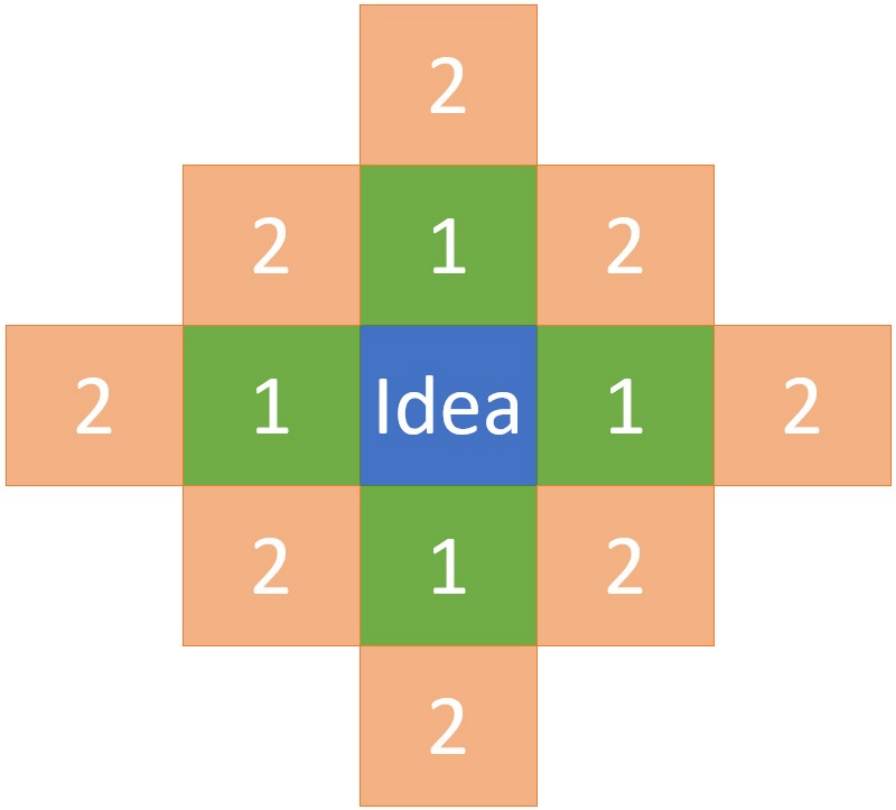
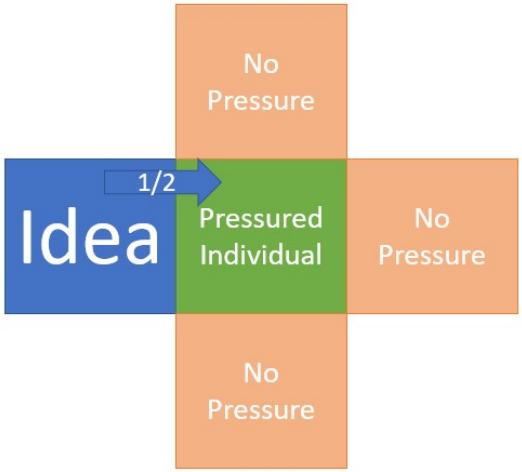


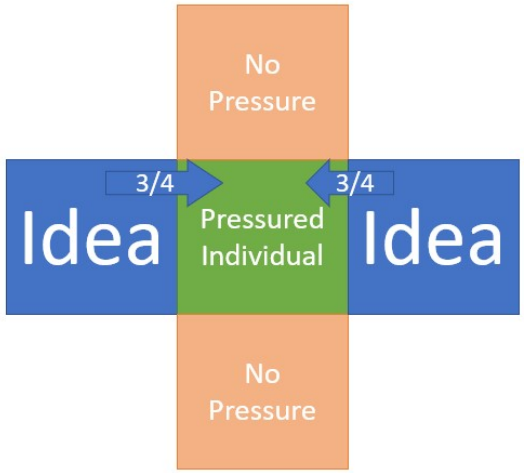
Figure: A Von Neumann neighborhood with Manhattan distance r=2

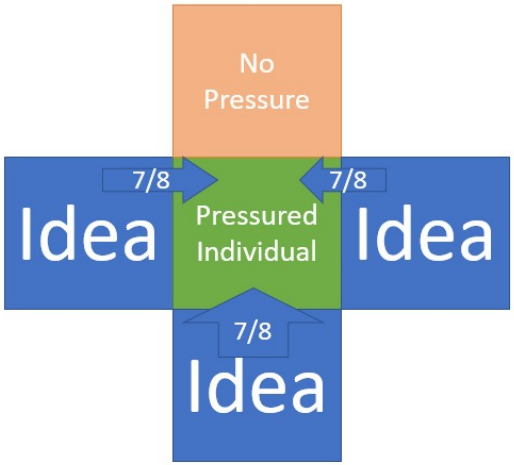
Assumptions and Model Rules: Part 2

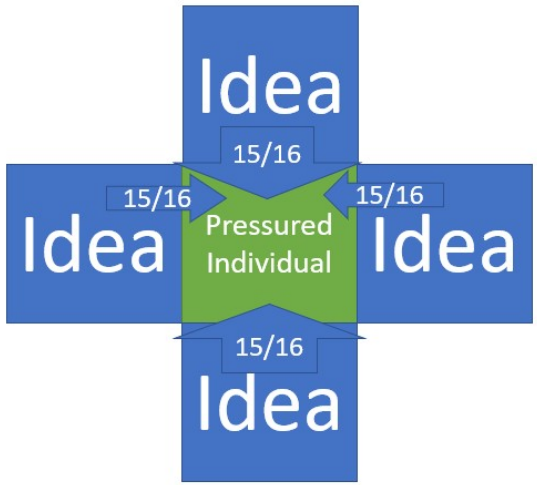
- For the sake of understanding in this presentation, all neighbors within r=1 will be pressured at a rate of $\frac{1}{2}$, and those at r=2 will be pressured at a rate of $\frac{1}{4}$.
- The other piece of a complex contagion we want to model will be the social reinforcement nature of that pressure. If an empty cell is direct neighbors with 1 "idea" cell, it is being pressured by that cell at a rate of $\frac{1}{2}$; with 2 idea direct neighbors, each is now individually pressuring the empty cell at a rate of $\frac{3}{4}$; at 3, a rate of $\frac{7}{8}$; and at 4 idea neighbors, a rate of $\frac{15}{16}$.
- This rate increase among neighbors shows that the pressure increases as others around have the same idea, but not linearly.

Compounding Pressure Rate Examples









Model Goals

- We will be attempting to implement 3 different types of initial pressure scenarios:
  - single starting idea cell
  - multiple starting idea cells
  - two competitive starting idea cells.
- Questions?