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# Gossiping Until You Get Tired of It: A Network Model of the Adaptive Exchange of Rumors in a Small Scale Social Environment.

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## SUMMARY


- The spread of rumors in every life is unavoidable for most communities. To understand this phenomenon, we must model it.
- Model is a Higher-Order Adaptation Social Network, utilizing states for “people” and their “boredom”


## INTRODUCTION

The spread of rumors has been a critical part of society and life for centuries. It is an important activity for members of any walk of life, no matter culture, age, nor gender, and evidence shows it has been around as long as humanity itself [1]. A rumor, within the social sciences, can be defined as a piece of information that has yet to be confirmed by any sort of reliable source [5]. Their truth can be - and should be - questioned. They are still something that is rampant in society due to their efficiency in sharing information. In the past, rumors have played major roles in historical events [1]. They are argued to be important parts of a successful workplace or other organization. [2, 3, 4]. However, there is a gap in the literature around modeling gossiping on a smaller scale in a real-life scenario.

## APPROACH

The modeling approach used is a network-oriented one [10]. The approach utilizes states (otherwise known as nodes), each of which have levels of activation that are varied over time. It also has the network characteristics: connection weights **ω** (for *connectivity)*, combination functions **c** (for *aggregation*) and speed factors **η** (for *timing*) which make up the network model structure. The above network characteristics are specified in the so-called role matrix format according to the role they play in the network. Network build with support from Treur 2020.

## METHODS

| State nr | State Name | Explanation | Level |
|---|---|---|---|
| X1 | Rumor happening (RH) | Something happens to Person A that is rumor-worthy, they tell Person one | Base Level |
| X2 | Person 1 (P1) | Person one begins sharing rumor | |
| X3 | Person 2 (P2) | Person two begins sharing rumor | |
| X4 | Person 3 (P3) | Person three begins sharing rumor | |
| X5 | Person 4 (P4) | Person four begins sharing rumor | |
| X6 | Boredom 1 (B1) | Boredom 1 Suppresses person one's gossiping | |
| X7 | Boredom 2 (B2) | Boredom 2 Suppresses person two's gossiping | |
| X8 | Boredom 3 (B3) | Boredom 3 Suppresses person three's gossiping | |
| X9 | Boredom 4 (B4) | Boredom 4 Suppresses person four's gossiping | |
| X10 | Wp1p2 | Reified representation state for connection weight p1, p2 | First Reification Level |
| X11 | Wp2p3 | Reified representation state for connection weight p2, p3 | |
| X12 | Wp3p4 | Reified representation state for connection weight p3, p4 | |
| X13 | HWp1p2 | Reified representation state for speed factor w p1 p2 for reified representation state w p1 p2 | Second Reification Level |
| X14 | HWp2p3 | Reified representation state for speed factor w p2 p3 for reified representation state w p2 p3 | |
| X15 | HWp3p4 | Reified representation state for speed factor w p3 p4 for reified representation state w p3 p4 | |

**Table 1** Legend of States in the Model

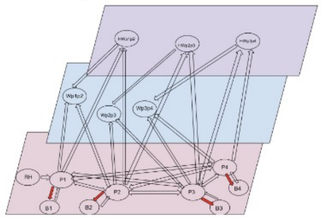


**Fig 1** 3D Representation of the Adaptive Network Model

## RESULTS

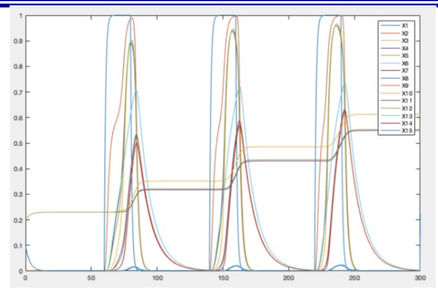

**Fig. 2** The graph of the initial simulation.

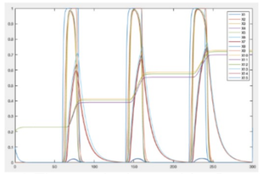

**Fig. 3** The graph changed for Scenario 1. What would happen if we decreased P1-P4’s interest in the rumors?

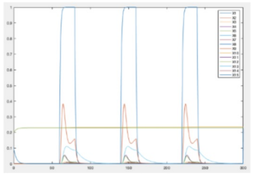

**Fig. 4** The graph changed for Scenario 2. What would happen if we increased P1’s boredom factor?

## ANALYSIS

Initial Scenario : Every time RH takes place, P1-P4 follow shortly after, before getting bored (shown as B1-B4 rising) and go back down, staying there until RH is activated again. The connection weight representation states rise in a step-like pattern, plateauing whenever the person states lower, until rising again when they are re-activated. The speed factor representation states stay lower to the bottom, only rising when they are stimulated by the person states.

Scenario 1 : Differences are the close proximity of the lines to each other, and a vaguely slower climb for P1-P4.

Scenario 6: Since P1 is the original person who receives the rumor, if they become uninvested quicker, they do not spread the rumor and therefore the other person states do not reach the same level as the original scenario.

## DISCUSSION

There has been, as of now, a lack of research done on the spread of rumors through word of mouth, which we would argue is just as, if not more, important than the modeling of rumors spreading online. This paper contributes to the need for such research, as our model is based upon a smaller community who is spreading the rumor via word-of-mouth. It also provides a new perspective on what happens when certain human behaviors are suppressed or heightened. Current models that exist pertaining or rumor-spreading do not have suppression techniques for a natural human state - boredom. This is something our model also seeks to resolve.

## CONCLUSIONS

1. The current research of modeling gossiping are lacking when it comes to a realistic model of word-of mouth rumor spreading.
2. The model used is built to be improved upon – by adding more person/boredom states or by adding other adaptive methods.
3. This is an ongoing and forever changing part of human society, and we hope other researchers will utilize our model in new and more representative ways as time passes.

## ACKNOWLEDGMENTS

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