

Final Report

Suban Biixi

Iheid, Graduate Institute, Social Networks Theories and Methods

Introduction and Data

Food choices are shaped by several economic, cultural, situational, and habitual factors (Séré de Lanauze & Sirieix, 2022). Among these, social interactions within networks play a key role in the diffusion of behaviors, such as adopting vegetarian meal options (op. cit.). For example, individuals are more likely to choose a vegetarian dish when eating with vegetarians rather than with other meat-eaters (Einhorn, 2020). This poster investigates how the behavior of selecting the vegetarian option spreads within a social network of a firm. To analyze this, I use the `{law_friends}` dataset from the `{networkdata}` package, which originates from a study of a corporate law firm’s friendship networks in the Northeastern US (SG&R, 1988–1991) (Lazega, 2001). The dataset includes 71 attorneys (partners and associates).I model a hypothetical scenario where the firm has a cafeteria offering a new vegetarian meal option alongside existing meat options. My focus is on how the behavior of choosing the vegetarian option diffuses through the attorneys’ friendship network. The `{law_friends}` dataset is ideal for this analysis, as food choices are strongly influenced by close peers such as friends (Einhorn, 2020). The network is directed, but for the sake of this poster I undirect it.

Describing the network

In the following Table 1. I will explore some network characteristics measuring the networks connectedness.

Table 1: Network Characteristics	
Characteristic	Value
Maximum Path Length (Diameter)	5.0000000
Average Path Length	2.1862745
Density	0.1605634
Number of component	3.0000000

Modeling diffusion

To model the diffusion of choosing the “vegetarian option in the cafeteria” within the firm, I draw inspiration from Zhou and Chen’s (2023) use of the SEIRS model to study the spread of green production practices among small farmers. In my context, attorneys may adopt the vegetarian option (I = infected), revert to other choices (R = recovered), but remain open to adopting it again (S = susceptible). The latency period (E = exposed) reflects the time before adopting the behavior after observing peers. To improve visualisation I will delete the isolates.

Seeding

First, I am interested to see how the seeding can make a difference in how fast the vegetarian meal option is spread. First, I will choose random seeds.

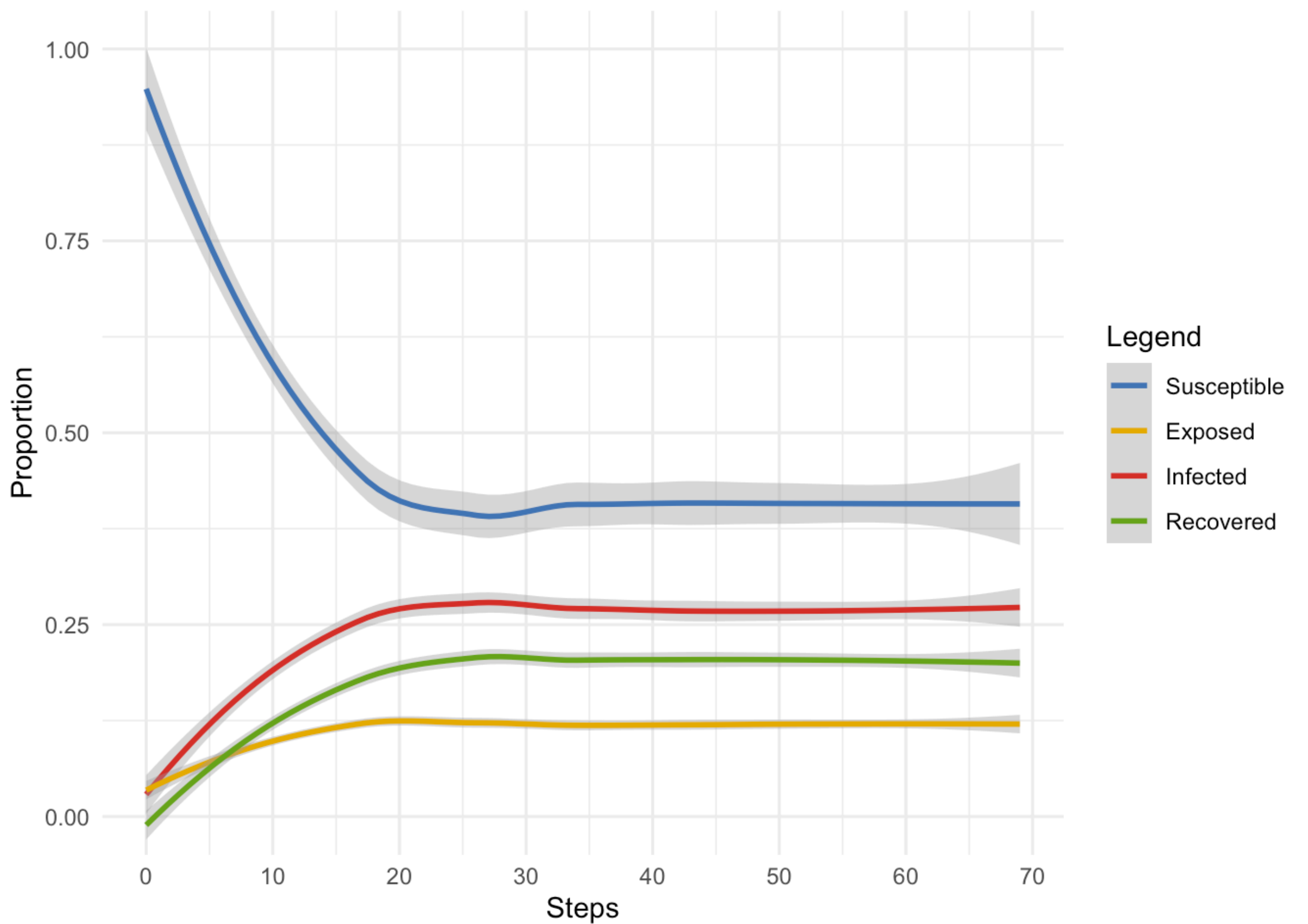


Figure 1: Random seeding

Next, I will choose the core nodes as the seeds.

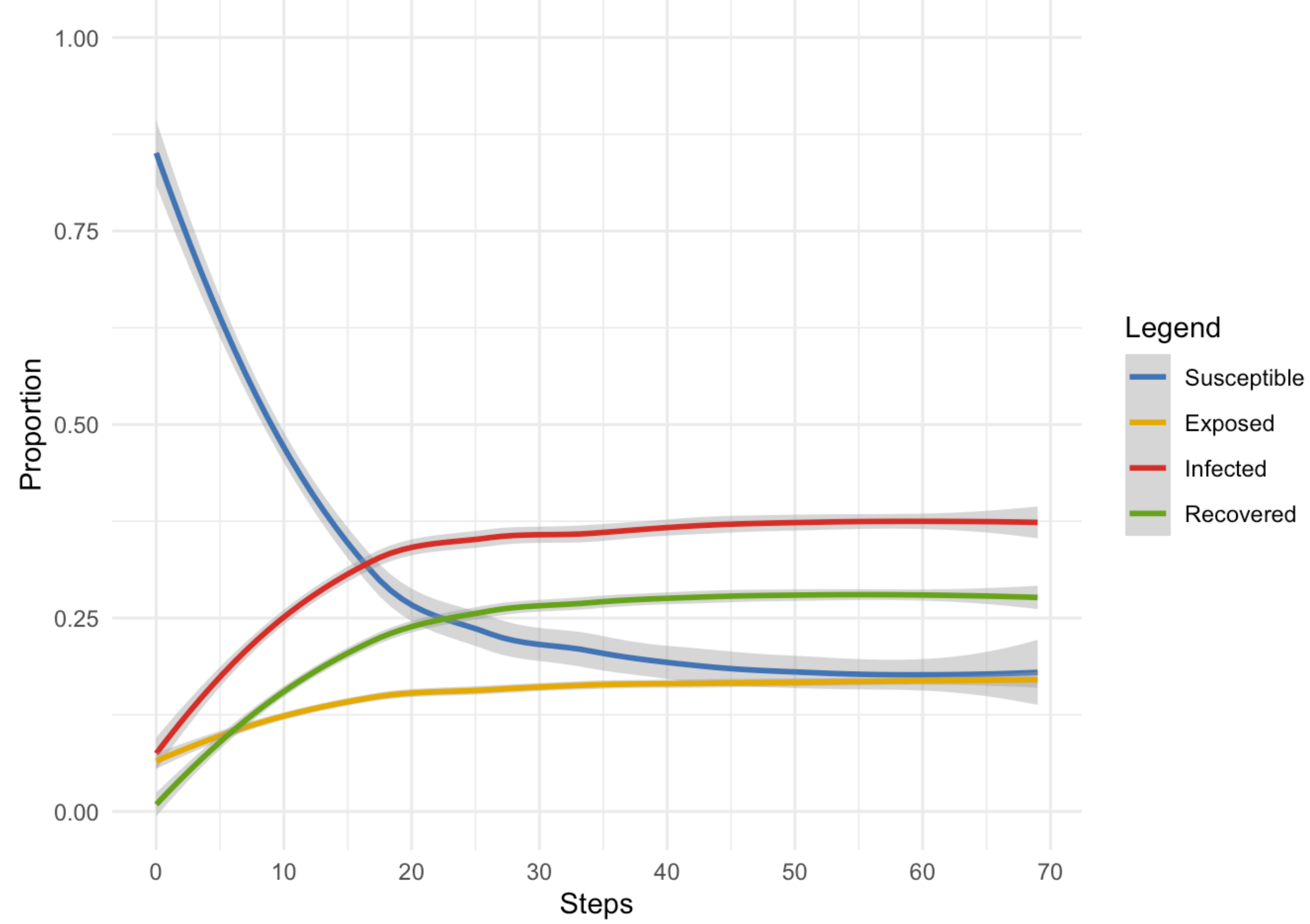


Figure 2: Core node as seed

When looking at the different seeding strategies, it becomes clear from comparing the plots, that using the core nodes as the seeds results in a faster and also higher infection of nodes.

Women are more likely than men to adopt a vegetarian diet (Rosenfeld 2020). This is why I want to introduce different thresholds for men and women, while still having an overall threshold of 0.1, which did not change. And see if applying the same seeding strategy as before, using the core nodes as seeds, leads to change of result.

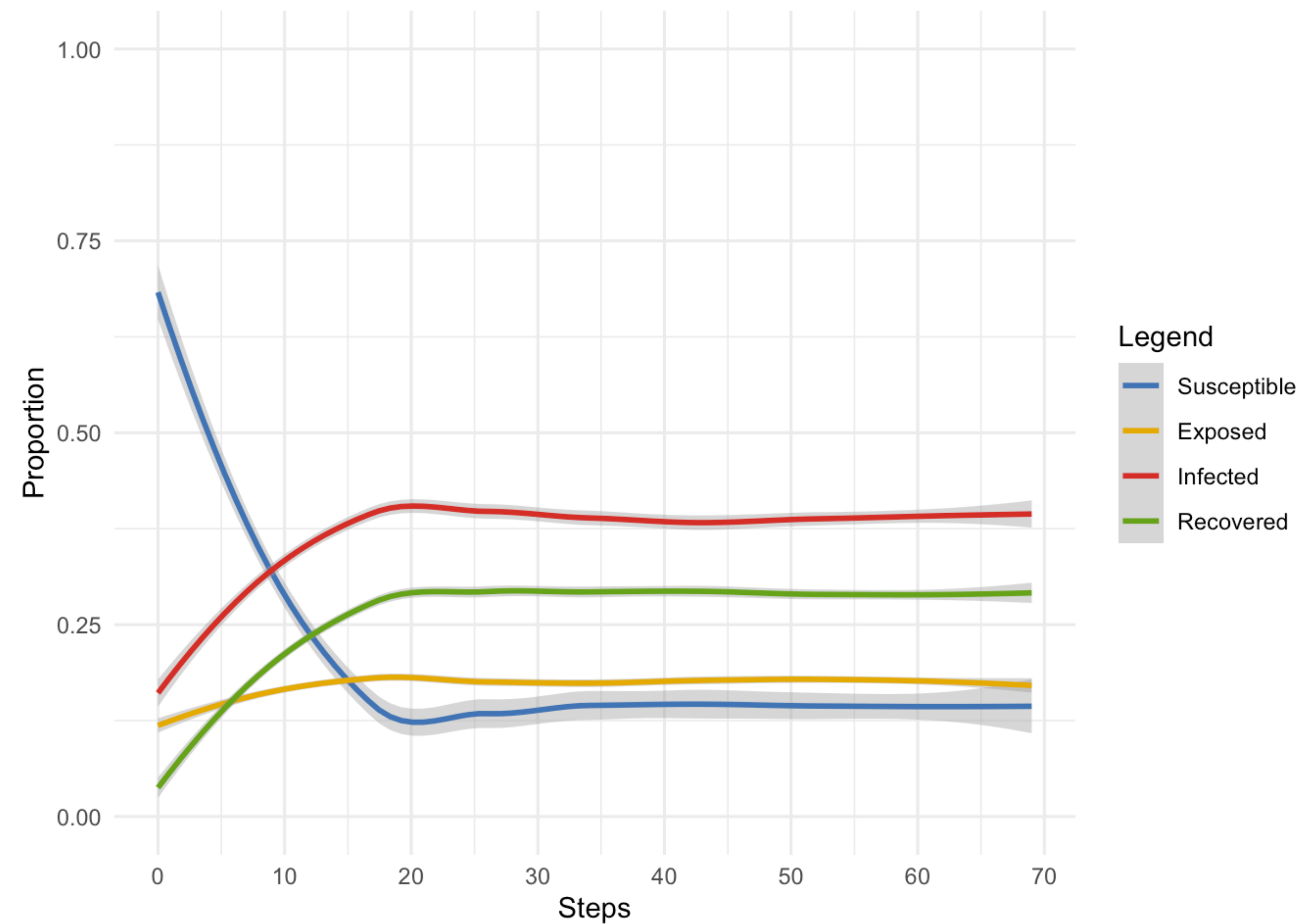


Figure 3: diff. gender resistance

We can see this does not make a difference in how fast peak infection was achieved and just a small change in the number of infected nodes. I suspect, that this is in part, because core assignment is not statistically linked to the gender of the attorneys.

Table 2: Chi-Square Test Results:
Core Status by Gender

	Statistic	DF	P.Value
X-squared	0.0175622	1	0.894571

An in fact, with a p-value of 0.89, the core assignment is not statistically linked to the gender of the attorneys.

Conclusion

When looking at the diffusion it can be seen that the seeding strategy (random vs. one of the core nodes) makes a difference. When adding different resistances to the genders (thresholds) and using the same core node as seed, it can be seen that it does not change the diffusion outcome significantly. I argue that this is because the core assignment is not statistically linked to the gender of the attorneys. Further, it is important to gather data to correctly inform the parameters for the SEIRS model.

References

Einhorn, L. (2020). Normative social influence on meat consumption. Rosenfeld, D. (2020) Gender differences in vegetarian identity: How men and women construe meatless dieting, 103859, ISSN 0950-3293, <https://doi.org/10.1016/j.foodqual.2019.103859>. Séré de Lanauze, G., & Sirieix, L. (2022). Impact of social influences and adoptive community on behaviours: An exploratory study of young French vegetarians.<https://doi.org/10.1111/ijcs.12689> Zhou, S., & Chen, H. (2023). Formation, Diffusion and Simulation of Green Production Socialized Service Network for Smallholder Farmers Based on SEIRS Model.<https://doi.org/10.3390/agriculture13101963>