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Week#12 Assignment - Social Influence

An Experimental Study of Homophily in the Adoption of Health Behavior

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Prologue

I chose *An Experimental Study of Homophily in the Adoption of Health Behavior* before entering into the Week 13 course material. Looking on Canvas it should be noted that I completed the Week 13 lecture material before completing and submitting this Week 12 assignment. It is difficult, if not impossible, to prevent my analysis from being influenced by the material learned in Week 13. However, I think it acts much more complementary as my original position for An Experimental Study of Homophily was not one of how it fell inline with Shalizi's criticisms, but rather how it seemed to take them head on (perhaps implicitly as Shalizi is not cited) and produced an experiment and study which goes to prove Shalizi correct.

The Spread of Behavior in an Online Social Network Experiment, by Centola, chronologically precedes An Experimental Study of Homophily. In the concluding video for Week 13, The Spread of Behavior is identified as seminal work in the space of information diffusion, complex contagion, and social networks. I would argue that An Experimental Study of Homophily transitively falls into that category as well, due to the timing and the highly influenced and parallel content. It would be hard to position either paper as subject to Shalizi's criticisms. This is especially true as Centola explicitly calls out designs of the experiments and mechanisms of the study to eliminate conditions which may lead to confounding.

Summary

The objective of *An Experimental Study of Homophily in the Adoption of Health Behavior* is to show that homophily will significantly increase overall adoption of a new health behavior by spreading of a complex contagion on a social network. The title and abstract of this paper immediately drew me in because I was certain that the study would have some issues which would illustrate Shalizi's criticisms. My assumption was wrong.

Introduction

It is not just the existence of social networks which facilitate the spread of behavior, it is also the demographic composition and the distribution of individual characteristics throughout the network. Homophily can affect the extent of a behavior's adoption in a population.

There is a general observation (or belief) that healthy and unhealthy individuals do not co-mingle in social networks, and that healthy and unhealthy habits are kept within the bounds of their respective social communities. With unhealthy individuals having fewer or no ties to healthy individuals, healthy habits will not spread ("cross the chasm"). This presents the hypothesis that there are conflicting levels of homphily -- at the dyadic level, and the network level -- which support an argument that homphily will reduce the overall adoption of healthy habits.

The general idea of the experiment is to manipulate the level of homophily in a social network and measure the effect on adoption of behavior.

Experiment

Participants joined an online network geared towards promoting healthy habits. The subjects were randomly assigned to one of two social network communities: (1) a network based on homophilously structured populations, in which individual traits (gender, age, BMI) were clustered; (2) an unstructured population, in which participants were mixed at random. Small communities were formed within each network, each individual was assigned six "health buddies," and each would see the health activity just within their small neighborhood. Five independent trials of this experiment were conducted over a 7 week period.

Participants made a decision whether to adopt an Internet-based diet diary available and visible only through the study. Adoption was initiated using a healthy "seed node" in each network. Once the seed was triggered, its neighbors received notification, and the study began to measure the spread of adoption of the healthy habit across the network.

Results

The results show that homophilously structured social networks exhibited significantly more adoption than unstructured networks. At the end of week 7, adoption in all five homophilous networks was 3 times greater than the number of adoptions in the five unstructured networks. Comparison across conditions showed that homphily significantly increased adoption both among the unhealthy and healthy members of the community.

Centola notes:

> Our experiment design did not permit causal identification at the individual level; however, dyadic-level analyses of the correlations between homophilous ties and the likelihood of behavior spread indicate that partial overlap on traits between neighbors may be sufficient to significantly increase the likelihood of transmission.

Conclusion

There are two main conclusions:

1. homophily significantly improves the adoption of healthy behavior
2. homophily can significantly increase the likelihood of adoption across dyadic ties

Critique

(2) clearly describes how Shalizi's criticisms are relevant to that study,

Shalizi's primary claim is that it is practically impossible to distinguish the true motivation behind contributing factors of spreading on a social network through observational studies. When the subjective matter of the observations are used to draw conclusions, but the factors used are confounding, the applicability of the study should be questioned.

This study does not appear ripe to be criticized by Shalizi's claims. It seems to address the criticisms and concerns head on and show that the effects of how homophily can affect the extent of a behavior's adoption can be proven in a non-observational study. In fact, the experiment performed by Centola should be nominated to become a guiding template for similar studies.

This experiment is not an observational study, which almost certainly excludes it from being subject to Shalizi's criticisms. The network topology was preconceived (before participants arrived), participants were randomly assigned to one of the conditions (homophilously structured, an unstructured population), and the structure was maintained throughout (number of ties, and connections).

Questionable Conclusions

None.

Modifications

I don't think there are any modifications to this study which would make it more effective.

It is worth calling out four points which Centola presents about the experimental approach and results which are key to the success of the study; in Centola's words (italicized) and where I have additional remarks:

1. *the results indicate that the positive effects of homphily do not depend on the mechanisms which generate homophilous relationships*: the network and community construction were entirely controlled by the study, the participants did not form their own communities.
2. *the findings distinguish the effects of choice homophily in the dynamics of tie formation from the role of observed homophily in the dynamics of behavior adoption*: again, the predefined network structure and unchanging nature provided this
3. *the lattice structure allowed for identifying individual-level effects without interference from confounding effects from the neighborhood*
4. *at the dyadic level the findings suggest that there is a minimal level of similarity required for influence; this indicates a possible "threshold" effect of homophily on adoption.*