How to spot a successful revolution in advance

Results form simulations on protest spread along social networks in heterogeneous societies

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Introduction

In recent years we have witnessed many protests that emerged in a decentralized, almost leaderless fashion from a small group of initial protesters, and then spread to a large part of society, sometimes leading to sudden regime changes, e.g. the „Arab Spring“ or, just a few weeks ago, the Gezi Park protests in Turkey.
Simulating the spread of complex contagion on social networks with homophilic subgroups, I show that both the level of segregation (homophily) and the number of subgroups display an inverse U-shaped relationship with the probability of a cascade occurring. Furthermore, in a society with two groups, a smaller group can be more effective in starting a cascade than a larger one.

Goals

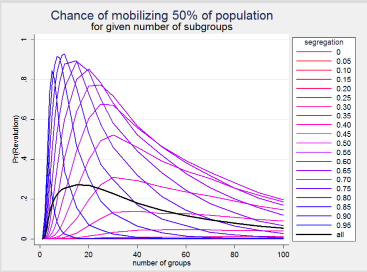
Which societies are more prone to sudden „protest cascades“ that spread from a small group of initiators to a large part of society? And which individuals are especially suited for starting such a cascade?

In answering those questions, I focus on characteristics that are likely to be public knowledge: the size of subgroups, how segregated they are, and what the group identity of that initial band of protesters is. The exact shape of (offline) social networks or the position of the protesters in it is usually impossible to determine exactly, and thus cannot easily be used to predict protest cascades.

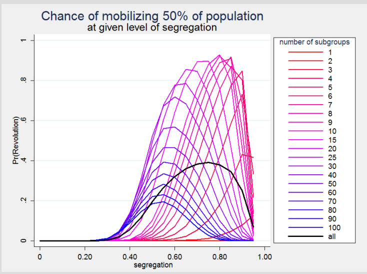
Method

I simulate both the social networks and the complex contagion using NetLogo.
A society of 500-1000 individuals is divided into a varying number of subgroups of equal size (1) or into two groups of varying size (2). Individuals form friendships at random, but with a higher likelihood (homophily parameter) of befriending ingroup members.
An initiating individual is chosen at random, and all his/her friends join the protest immediately. In each following time period, other individuals join if a high enough proportion of their friends (their „threshold“) are protesting. This continues until no more new individuals are willing to join or the protest has reached everyone.

1. „Divided“ doesn‘t always mean „conquered“

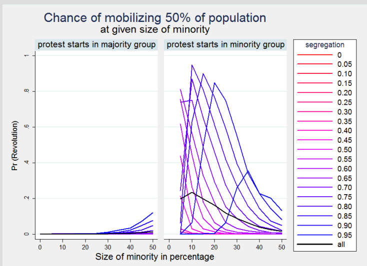


Contrary to the received wisdom of „divide and conquer“, a more fractionalized (above) or a more segregated/homophilic (below) society doesn‘t always lower the chance that the protest reaches a large part of society.
An intermediary level of segregation and number of groups are most conducive to protest cascades – but the „optimal“ level of one characteristic depends on the level of the other.



2. Minorities as breeding grounds for revolutions

Why would homophily and segregation facilitate complex contagion processes?
Common friends of the initial group are the only individuals who could know enough protesters to cross their threshold and join the movement.
Individuals in homophilic subgroups have a higher individual clustering coefficient, i.e. are more likely to know „friends of friends“. Protests starting in minorities can thus more easily gain initial momentum (Jackson & Lopez-Pintado 2013).



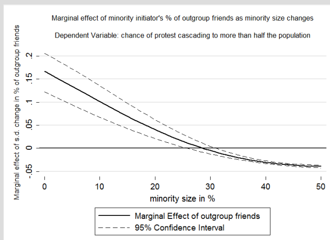
However, if the group is too small and/or too segregated from the rest of society, then the cascade, while easily spreading within the minority, will fail to „jump over“ to the majority. The more segregated society, the larger the minority needed to accumulate enough inter-group links – increasing the chance of a „wide bridge“ (Centola & Macy 2007) – to spread the protest beyond its borders.

3. Who makes for a good revolutionary?

Thus it appears that successful revolutionaries are often embedded in small, somewhat segregated minorities – „revolutionary cells“, for instance. What else distinguishes a good initiator?

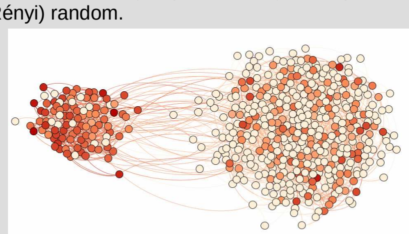
For simple contagion, like the spread of information, the initiator‘s centrality, measured in a number of different ways, is often thought to be crucial (Banerjee et al. 2012). In complex contagion, however, all other measures of centrality seem to become largely irrelevant once degree, that is the number of initial protesters, is controlled for.

Contrary to expectations, though, a successful revolutionary doesn‘t need to be connected to the majority group. Having „outsiders“ among the initial protesters only helps if the in-group is very small. Else the protesters risk diluting their forces and failing to start a cascade in either group.



Conclusion and a caveat

Complex contagion requires a certain level of clustering to successfully spread beyond the initially „affected“ individuals. Segregation and fractionalization induce clustering and can thus facilitate the spread of costly or dangerous behavior for which individuals might need enough support among their peers before engaging in it.
However, the same characteristics also risk containing the contagion within the small subgroup where it originated.
Note that clustering can come about in many other ways than accounted for in my model.
This likely attenuates the effect discovered here for real life social networks, where friendship formation within groups is unlikely to be (Erdös-Rényi) random.



Social network with 500 individuals, a 20% minority and homophily = 0.9. Intensity of color indicates size of local clustering coefficient.

References

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