Dark Networks Study Guide

Suggested Reading

Everton, Sean F. and Daniel Cunningham. 2015. "Dark Network Resilience in a Hostile Environment: Optimizing Centralization and Density." *Journal of Criminology, Criminal Justice, Law & Society* 16(1): 1-20: https://ccjls.scholasticahq.com/article/341-dark-network-resilience-in-a-hostile-environment-optimizing-centralization-and-density

Freeman, Michael E. 2017. "Pushing the Envelope of Pedagogical Gaming: Dark Networks." *PS: Political Science and Politics* 50(4): 1083-88.

Leites, Nathan and Charles Wolfe, Jr. Rebellion and Authority: An Analytic Essay on Insurgent Conflicts, Advanced Research Projects Agency, 1970.

Roberts, Nancy and Sean F. Everton. 2011. "Strategies for Combating Dark Networks," *Journal of Social Structure* 12 (2). Available at: https://www.cmu.edu/joss/content/articles/volume12/RobertsEverton.pdf

KEY CONCEPTS

Dark Networks explores how clandestine (e.g., criminal, insurgent, or terrorist) organizations manage their networks from the inside to make them more effective and how an external adversary—in this case, the state—can attack a network to make it less effective. The game is designed to reinforce concepts about how dark networks function, and how a state must adapt its strategies and policies to counter them. The network tries to win popular support, acquire resources, and shape the network by growing and centralizing it, while simultaneously conducting attacks in a bid to overthrow the state. The state, with only a limited view of the dark network, focuses on uncovering the network

through intelligence, disrupting it by denying it resources and attacking its structure, protecting the state against attacks, and winning the populace's hearts and minds.

Both players make three policy choices per turn. Simultaneous play forces the players to choose which policies to pursue and which to eschew based on the opponent's previous actions and the player's best assessment of the opponent's future policy choices. Once the turns are submitted, the game reorganizes the visible network according to those choices, so that each turn presents a new problem. Flexibility and adaptability are key assets for both sides.

The Dark Networks game uses aspects of social network analysis to emphasize several concepts that are essential to crafting effective strategies for disrupting dark networks, in particular, the tradeoff between security and effectiveness, network structures, kinetic vs. non-kinetic strategies, and asymmetrical access to information.

Security and Effectiveness

As discussed in Everton and Cunningham, dark networks structure themselves to take optimal advantage of the tradeoff between being secure and being effective. A small decentralized structure is more secure, on the one hand, but it is also likely to be less effective at carrying out attacks and winning popular support. On the other hand, large, popular, and well-supported networks can launch bigger and more effective attacks, but will be more vulnerable to detection and disruption. Freeman notes that this tradeoff forms the core strategic tension in the game.

Network Structure

Networks can be understood by their level of centralization, their insularity (i.e., how open or closed they are), their size, and the centrality of their individual members. To function effectively, networks must optimize these four factors according to the operational and strategic situation (see Everton and Cunningham). In the game, if the network is trying to maximize the effects of its attacks, it should grow, centralize, and expand its external ties. If it is concerned about being vulnerable to attacks by the state, then the network should shrink, decentralize, and become more insular.

1. *Centralization*

Highly centralized networks generally enjoy considerable command and control, but if they are too centralized, they become vulnerable to the removal of key individuals. Decentralized networks are fairly resilient to the loss of key network members, but if they are too decentralized, they have little control over material and non-material resources (including network members). In the game, centralized networks will conduct more damaging attacks, but will be easier for the state to discover and disrupt.

2. *Insularity*

As Everton and Cunningham explain, networks can range from being highly insular (provincial) to being largely open (cosmopolitan). Provincial networks tend to be quite dense with few external ties, while cosmopolitan networks tend to be sparse with numerous external ties. Provincial networks enjoy high levels of security because they are

harder to infiltrate and it is easier to monitor their members. However, because they have few external ties, they have limited access to much needed information and material resources. By contrast, cosmopolitan networks, with their numerous external ties, have easy to access information and material resources, but they are more detectable and easier to penetrate by the state's intelligence apparatus. The game captures this concept through the mechanism of external operational, logistical, and financial ties, which provide the network with the resources necessary to conduct attacks but which also present an opening to disruption by the state.

3. *Network Size*

Network size refers to the number of actors in a network. As noted above, larger networks can be more effective than smaller ones but are also more easily disrupted. In the game, the dark network can grow or shrink based on the strategic situation; likewise, the state can choose to shrink the network through kinetic actions. In doing so, however, the state risks losing some visibility into the network.

4. *Actor Centrality and the Decision to Target*

According to Everton and Cunningham, social network analysts often use centrality to identify the most important actors within a network. Actor centrality is typically measured in at least one of four ways. An actor may have ties to a wide range of other actors (degree centrality); be closely tied to other actors in the network (closeness centrality); be tied to other well-connected actors (eigenvector centrality); or lie along the shortest path between numerous other pairs of actors in a network (betweenness centrality). Knowing an

individual's overall centrality to the network may be useful for deciding whether to target them for killing or capture, but it may not reveal much useful information regarding their importance to the network or about the network as a whole. Moreover, as suggested above, targeting a central actor is usually more effective with a highly centralized network than a decentralized one. The game evaluates each node according to betweenness centrality, which is reflected by the size of the circle representing that node. As the overall centralization of the network increases, the game will automatically designate certain nodes as being more central. Again, this trend makes the network more effective but less secure.

The State: Kinetic vs. Non-kinetic Strategies

As discussed in Roberts and Everton, states have strategic options when deciding how to disrupt a dark network. The game highlights several of these choices. For example, if the state chooses to target a node, it can either kill (and thereby permanently remove) that node or capture it to reveal information about connected nodes. While this information helps the state develop a fuller understanding of the network, the drawback to capture is that the node will be allowedto rejoin the network in a few turns. Likewise, the game encourages players to think about the potential repercussions of an attempted decapitation attack that targets the wrong node (see Roberts and Everton). In the game, this mistake lead the state to lose popular support and decrease the visibility of the network. The state also has other non-kinetic strategies at its disposal, such as using information operations to win the support of the people and defensive measures to minimize the effects of attacks.

Asymmetry of Information

As discussed in Leites and Wolf (132-139), most conflicts between states and insurgencies involve an asymmetry of information: states have very little information about insurgent networks, while the networks have much more information about the states they seek to overthrow. In the game, the network has complete information, whereas the state begins the game able to see only a few nodes of the network. The state must use turns and resources to reveal more of the network before it can take effective action. Most often, the state never fully reveals the dark network during the course of play, but must make decisions on how to disrupt it, including which nodes to target for kill or capture, based on some level of incomplete information.