Final Project Update

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Visualization and Replication of Colby (2021)

The data for my final project replication and extension are from Colby, Darren, 2021, "Chaos from Order: A Network Analysis of In-fighting Before and After El Chapo's Arrest". link

The replication materials, including the data and R scripts for analysis can be found here.

Plot of the Networks

The main plots of the network can be found in Figures 1a-b below, with 1a showing the network prior to El Chapo's arrest in 2017, and 1b showing the network following his arrest.

Figure 1a. Cartel Network Pre−Arrest

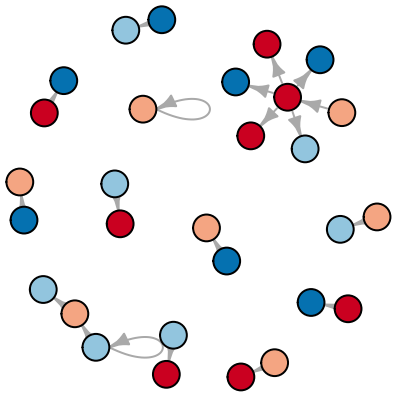
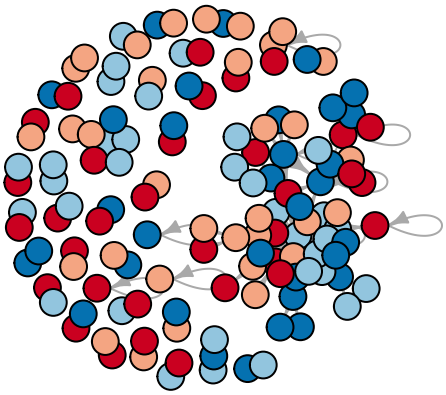


Figure 1b. Cartel Network Post−Arrest



Vertex Attributes

Vertex attributes include group aggression, militia status, subfaction status, and role as small or large cartel group. Figure 2a shows the distribution of group aggression, with a majority of groups having lower aggression scores. Aggression is the log of the number of attacks conducted by each actor during both periods. Figure 2b shows a majority of cartels being non-militia, but still a decent amount being militia groups. Figure 2c shows that most groups are not subfactions of larger groups, but instead independent organizations.

Figure 2d shows the distribution of cartel roles. The most powerful cartels – the Gulf, Jalisco Nueva Generacion (NG), Los Zetas, and Sinaloa cartels are less frequent roles. Small cartels and militias that control small swaths of territory are the most frequent roles. These cartels tend to specialize in a small number of subtasks of drug trafficking and align themselves with larger cartels. There are a smaller amount of Rising Challengers, which are relatively new cartels that are rapidly growing. Finally, the White Dwarfs represent cartels that are on the decline.

Figure 2e shows the count of cartel groups in time period 1 (pre-2017 arrest) and 2 (post-2017 arrest). There are many more cartels in the second time period.

Figure 2a. Distribution of Group Aggression

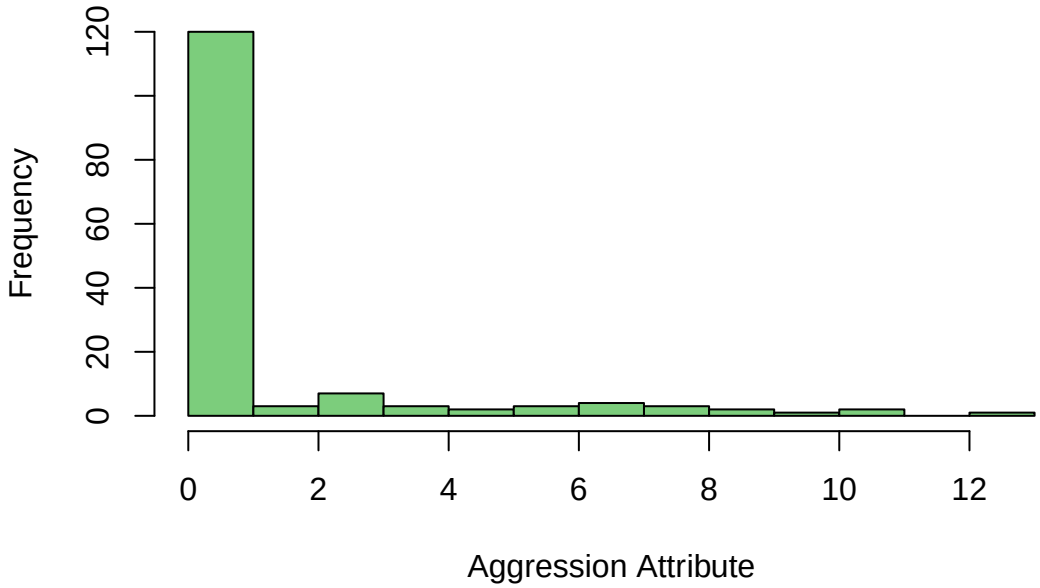


Figure 2b. Distribution of Militia Status

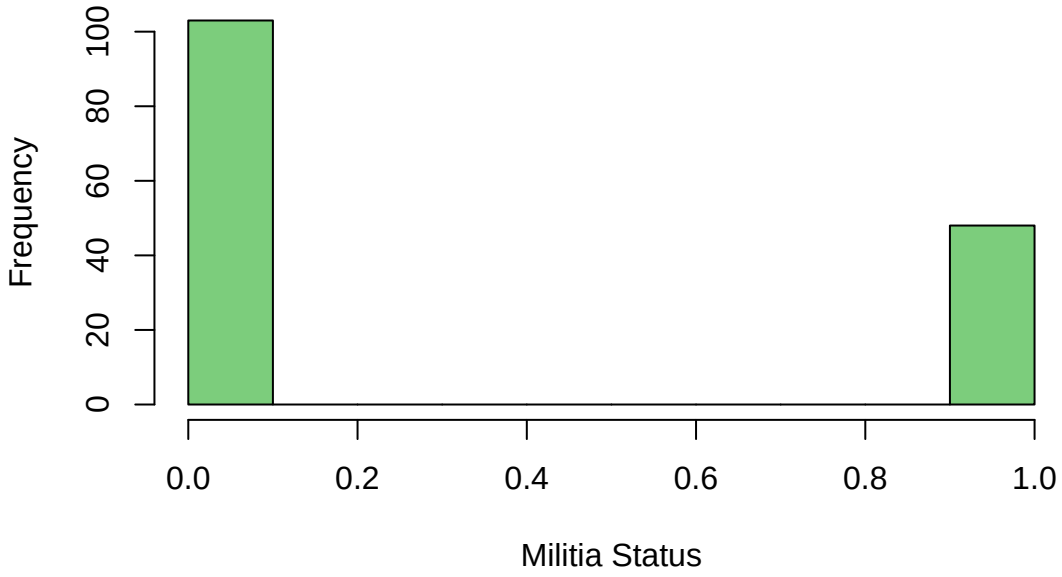


Figure 2c. Distribution of Subfaction Status

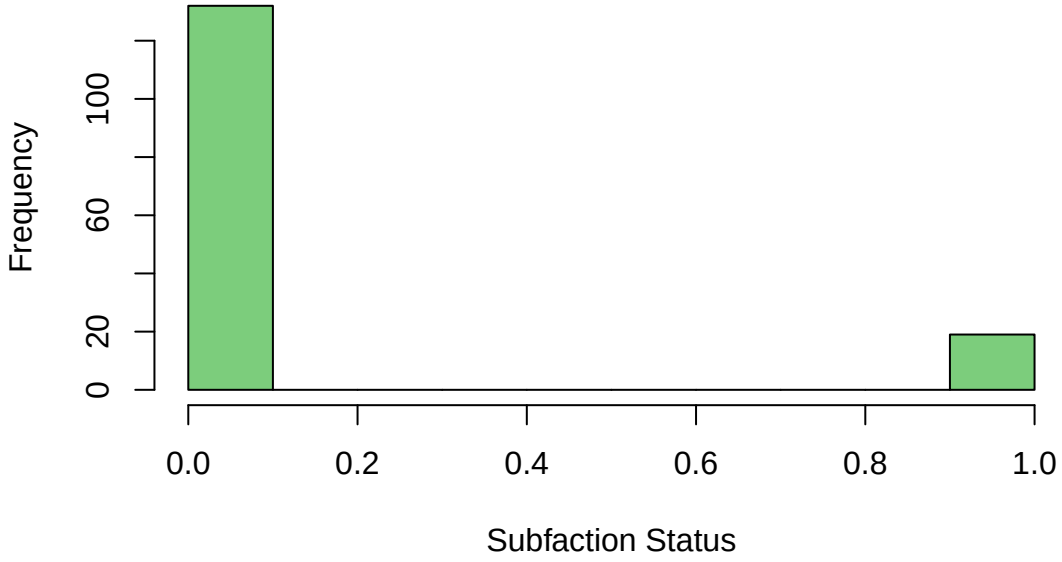
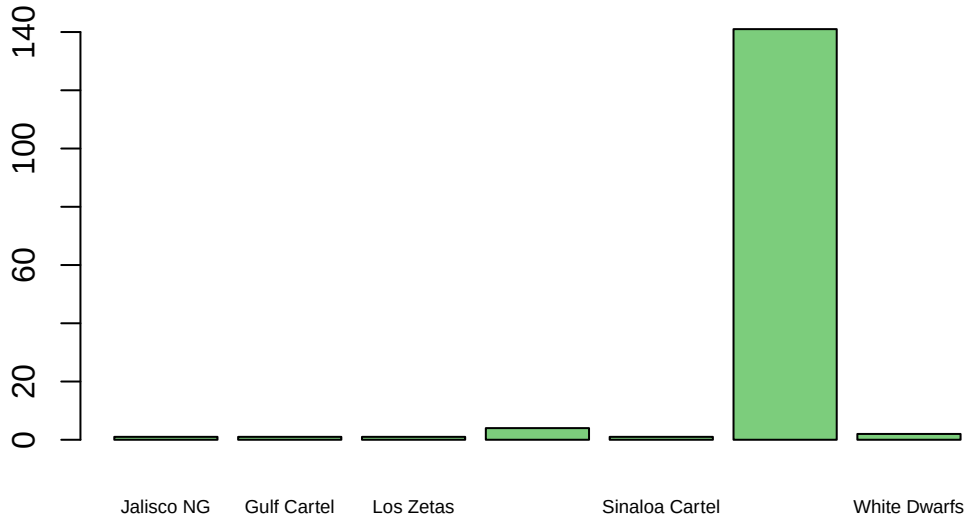
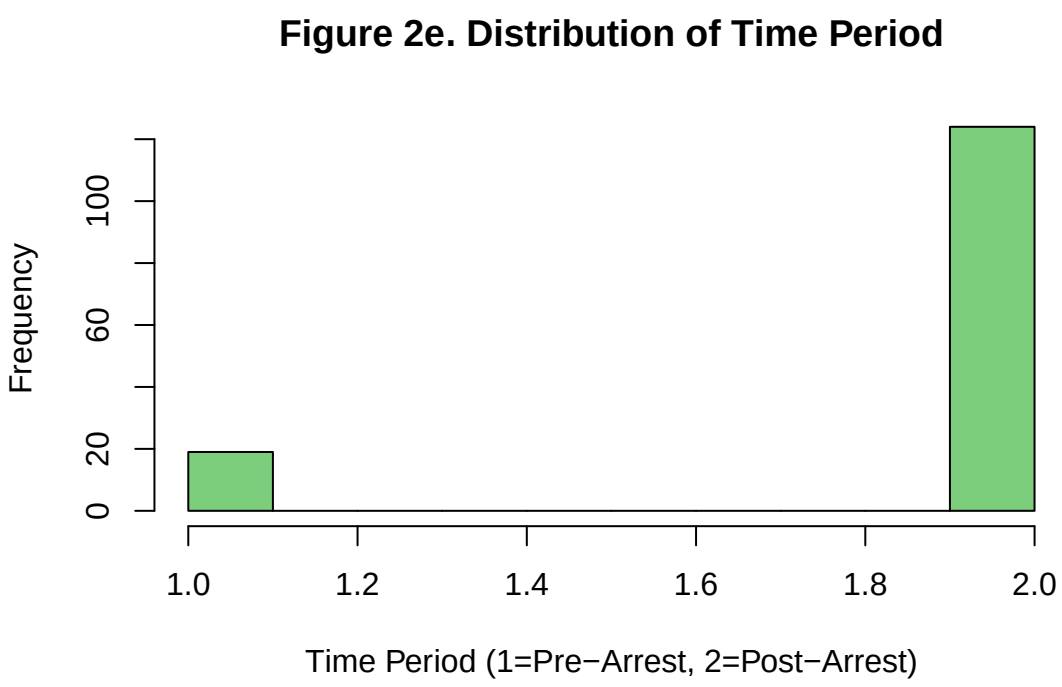


Figure 2d. Distribution of Roles





Reproduction of Results from Colby (2021)

Degree Distributions

Figures 3a-b show the replicated in-degree centrality distributions for the pre-arrest and post-arrest networks (Figure 2, row 1 in main analysis of Colby (2021)). In-degree is the number of incoming edges, and the distribution of that number increases after the arrest.

Figure 3a. In−Degree Centrality Distribution (Pre−Arrest)

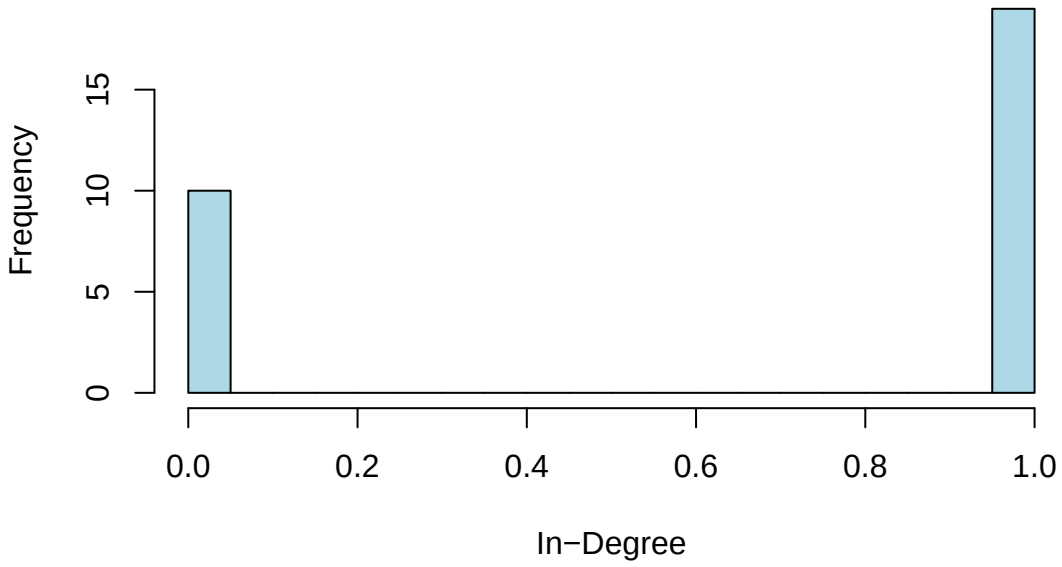
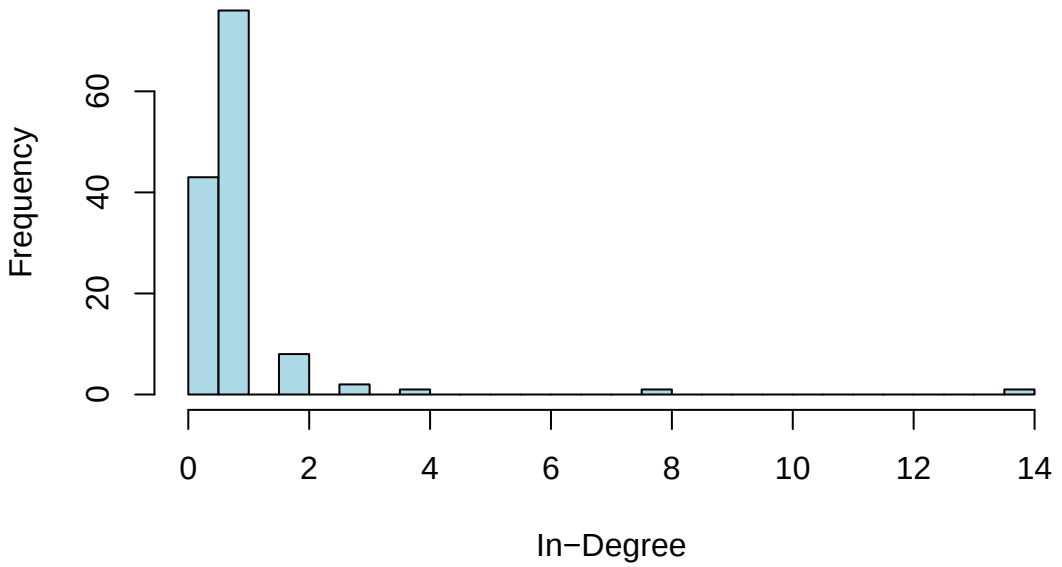


Figure 3b. In−Degree Centrality Distribution (Post−Arrest)



Figures 4a-b show the replicated out-degree centrality distributions for the pre-arrest and post-arrest networks (Figure 2, row 2 in main analysis of Colby (2021)). Out-degree is the number of outgoing edges, with the number decreasing after the arrest.

Figure 4a. Out−Degree Centrality Distribution (Pre−Arrest)

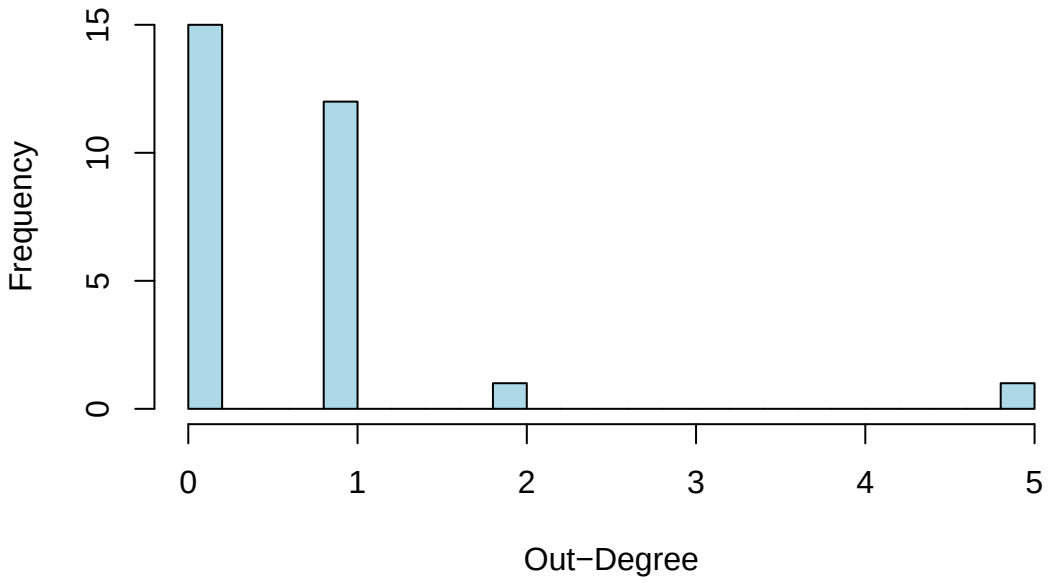
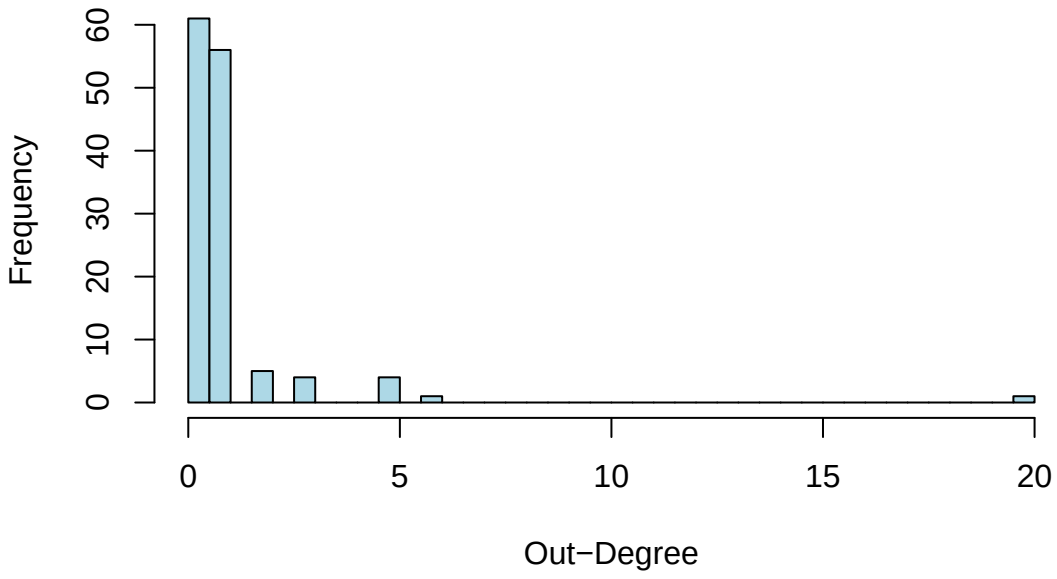


Figure 4b. Out−Degree Centrality Distribution (Post−Arrest)



SAOM Estimation

The main analysis of Colby (2021) includes estimating four stochastic actor oriented models (SAOM). Each of these estimates (1) alliances, (2) reputations, (3) strength, and (4) clustering of the cartels based on

descriptive network statistics (similarity, assortativity, transitive closure, homophily, and reciprocity). The table below depicts these results, which show that (1) alliances had virtually no effect on cartels' and militias' decisions to fight one another; (2) after El Chapo's arrest, cartels and militias faced greater reputational costs for appearing weak, and; (3) El Chapo's arrest did not greatly affect certainty about territorial control and relative power of other cartels (p. 9).

Table 1. SAOM Model Estimates - Replicated from Colby (2021)

	Alliances	Reputation	Strong-vs-weak	Clustering
Jaccard Similarity	0.13			
	(3.29)			
In-degree Popularity		0.18		
		(0.10)		
Out-in-degree Assortativity			-0.90 ***	
			(0.23)	
Transitive Closure				0.34
				(0.63)
Aggression Homophily	-0.20	-0.19	-0.30	-0.20
	(0.47)	(0.44)	(0.43)	(0.47)
Subfaction Homophily	2.06 ***	2.04 ***	1.87 ***	2.05 ***
	(0.58)	(0.56)	(0.54)	(0.55)
Militia Homophily	1.23 ***	1.20 ***	1.32 ***	1.24 ***
	(0.34)	(0.35)	(0.32)	(0.33)
Role Homophily	-1.91 ***	-1.55 ***	-2.65 ***	-1.89 ***
	(0.39)	(0.45)	(0.48)	(0.37)
Reciprocity	4.72 ***	4.73 ***	4.83 ***	4.72 ***
	(0.76)	(0.96)	(0.69)	(0.84)
Iterations	19176	19176	19176	19176

*** p < 0.001; ** p < 0.01; * p < 0.05