

Role of Political Identity in Friendship Networks

Surya Gundavarapu, Matthew A. Lanham

Purdue University, Department of Management, 403 W. State Street, West Lafayette, IN 47907
sgundava@purdue.edu; lanhamm@purdue.edu

ABSTRACT

How do political views evolve within networks? Do individuals pick their friends based on their own political ideology? What is the role of political moderates within friendship networks? This paper presents a foundation for answering these questions using network analysis and theory. While this study has been done on a limited graduate student body, the same process can be repeated on a larger audience to gather insights and evaluate the outcomes of the populace at large. Further it presents an equation to evaluate the strength of friendships based on how often individuals meet up to do different types of activities. And it lays a road map for future research in this area to understand the larger societal forces that are in play along political ideologies.

Keywords: political identity, social network analysis

INTRODUCTION

Questions about how people simultaneously construct and, in the process, are molded by their social milieu are endemic in social sciences. While most social network studies of individuals focus along the dimensions of race (Ajrouch, Antonucci, & Janevic, 2001), gender (Psylla, Sapiezynski, Mones, & Lehmann, 2017), religion (Lewis, McGregor, & Putnam, 2013), education (Grunspan, Wiggins, & Goodreau, 2014), and organizational structure (Schlauch, Obradovic, & Dengel), the idea of using network methods to analyze political ideology is trending.

The objective of this paper is to examine the social network of individuals with pre-existing ties to understand if they exhibit homophily ties along the dimension of their political ideology. Political polarization - the vast and growing gap between liberals and conservatives, Republicans and Democrats - is a defining feature of American politics today, and one the Pew Research Center has documented for several years. Last year, Pew reported that over 62% of US adults claimed to receive their news on social media, while this year the number increased to 67% (Shearer & Gottfried, 2017). With an ever-increasing populace on social media, the level in which our social networks define our perception of the world, and thereby our own political ideology, is only going to rise. Thus, motivating the need for more research into social network analysis as a way of understanding the dynamics of our society.

Furthermore, the level of partisanship has led people on different ends of the spectrum to have starkly different impressions of the world around them, with individuals clustering themselves with people of similar ideology leading to a vicious cycle of division among the populace (Mitchell, Gottfried, Kiley, & Eva Malsa, 2017). Understanding and implementing steps to efficiently help individuals reach across parties and interact would help in the process of forming a more perfect union.

This paper attempts to answer the following research questions within the scope of the research defined:

- Do individuals exhibit homophily within their friendship networks? If so, is it a quantitative homophily (more friends within their own cluster than from other clusters) or a qualitative homophily (the strength of the relationship is stronger with people within their own political ideology)?

- In a social network by political ideology, what is the role of different actors? Are individuals with moderate political ideology likely to act as connectors for the rest of the network, or will taking a side give more access to the network?

LITERATURE REVIEW

Among the studies that explored the role of politics in social networks, David Lazer and Robert Huckfeldt stand out. In their 2004 paper (Huckfeldt, Mendez and Osborn 2004), Huckfeldt tried to track flow of information in a closed-network of 1108 individuals using self-defined communication networks and the respondent's own political beliefs. One of the interesting outcomes of the survey is that while a majority of respondents expressed a strong affinity for either of political parties, and claimed to be passionate about politics, most of them could not name more than four discussants with whom they regularly discuss politics with. This might be an insight into people's hesitation to discuss politics within their networks.

In his paper published by Kennedy School of Government (D. Lazer, et al. 2008), D. Lazer explored the influence of different relationships in shaping and evolving ones' own political ideology. He discussed the various ways to quantify homophily across different demographics and the paper uses various statistical methods including logistic regression to weigh the influence of different individuals within the network. Another interesting part of this research paper is that the author(s)' question set. Instead of picking objective questions that can potentially bias the respondents because of the available options, authors of this article used open ended questions and took notes along the way for the key markers that they are looking for, thereby standardizing the responses since all responses were aggregated by the interviewer. This level of open approach helped the authors quantify even foreign experiences of the respondents. For example, a Latino American male describes his upbringing in Los Angeles and his introduction to education and welfare policies, while the interviewer jotted down relevant notes.

Another seminal work in exploring the role of political ideology, Alan Zuckerman's book, *Social Logic of Politics*, stands out. Dr Zuckerman explores qualitatively how different relationships influence political ideologies of individuals. An interesting outcome in his book is that couples usually tend to exhibit strong homophily and exhibit a high level of influence on each other if their political beliefs are not alike. His study of divorce rates in couples who identify themselves on different sides of the political spectrum is quite interesting. Then, he explores the evolution of

ideologies across generations and between friends. According to him, instances where children exhibit greater conservative attitudes than their parents can be predicted by certain micro behavior exhibited by them during childhood in the play pen.

DATA

The data used for this survey comes from primary research done by the authors. The scope of this study is the student body of Purdue Universities’ Graduate School among the following departments:

- Business Analytics & Information Management
- Industrial Engineering
- Management Information Systems (PhD)
- Global Supply Chain and Operations Management.

A survey was administered for individuals who belong to any of these groups and the survey results were aggregated to understand the social behavior of individuals. The survey results are anonymized with the researcher being able to see only the ID numbers created from the master list of the survey respondents. This ensures anonymity and increases the participation rate for the survey. As witnessed by Dr. Huckfeldt, individuals are hesitant to share political opinions even if they are passionate about their beliefs.

METHODOLOGY

Once the data was gathered, we performed exploratory data visualization to understand the demographics of the respondents as shown in Figure 1 below. This helps understand the generalizability of the results. This picture organizes the process followed.

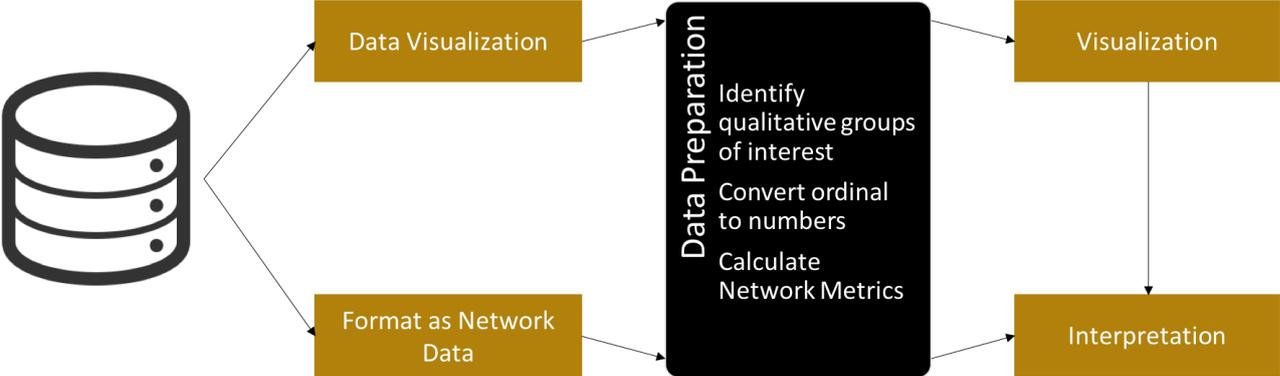


Figure 1: Methodology

The data is formatted as edge pairs to ensure edges can be weighed according to the formulae discussed later in the paper. Later, the network is visualized with overlays of the attributes and examined to answer the questions above.

Figure 2 shows us the distribution of gender in the survey data and it appears that the participation is equal across both genders.

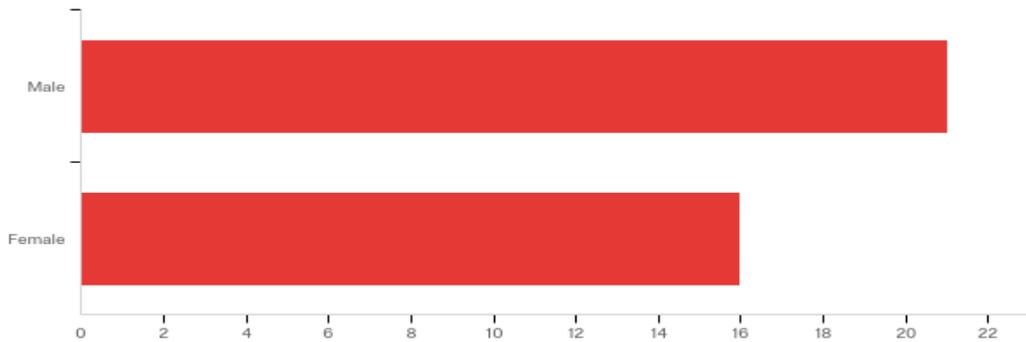


Figure 2: Distribution of gender among survey respondents

Figure 3 shows us the distribution of the ethnicity among the survey respondents showing a high frequency of Asian students shedding some doubt on the generalizability of the results. However, since the scope of the study is to understand the polarity among the student body, it made sense to use the distribution as is and move on to further analysis.

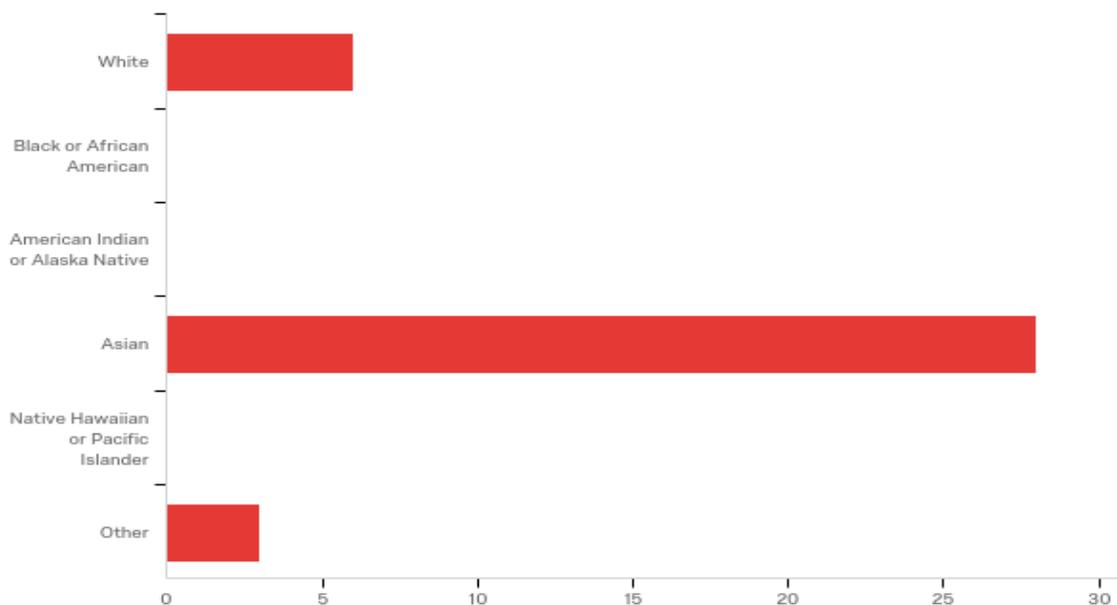


Figure 2: Distribution of the respondents by ethnicity

Figure 4 shows us the distribution of survey respondents along the political spectrum on a scale of 0 - 100 (0 being most liberal and 100 being most conservative). While the graph is skewed more toward the liberal side, it appears majority of people identify themselves as neutral rather than as liberal or conservative.

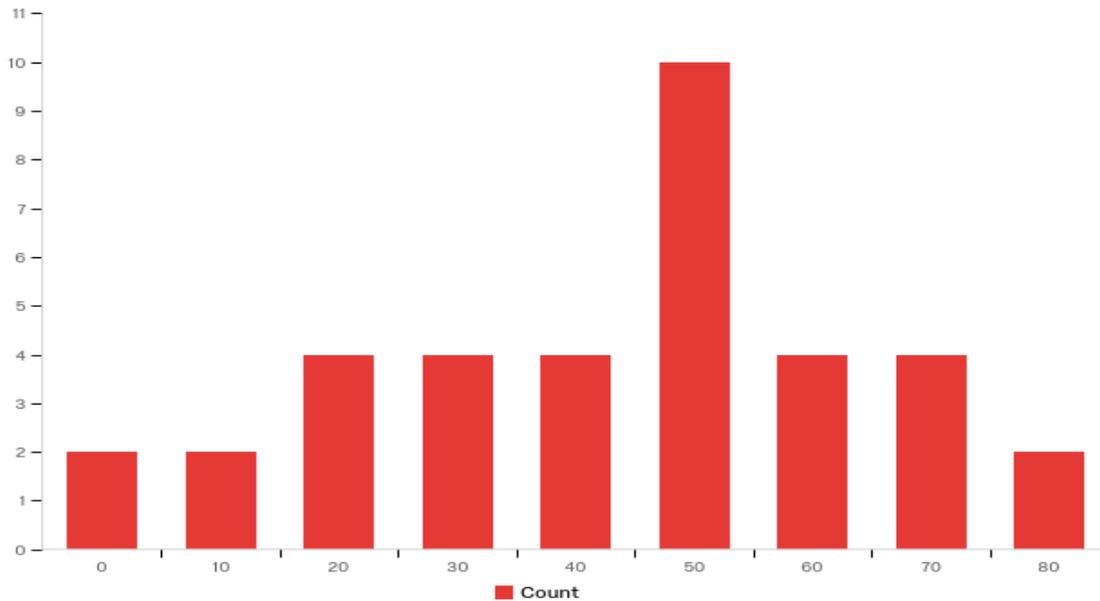


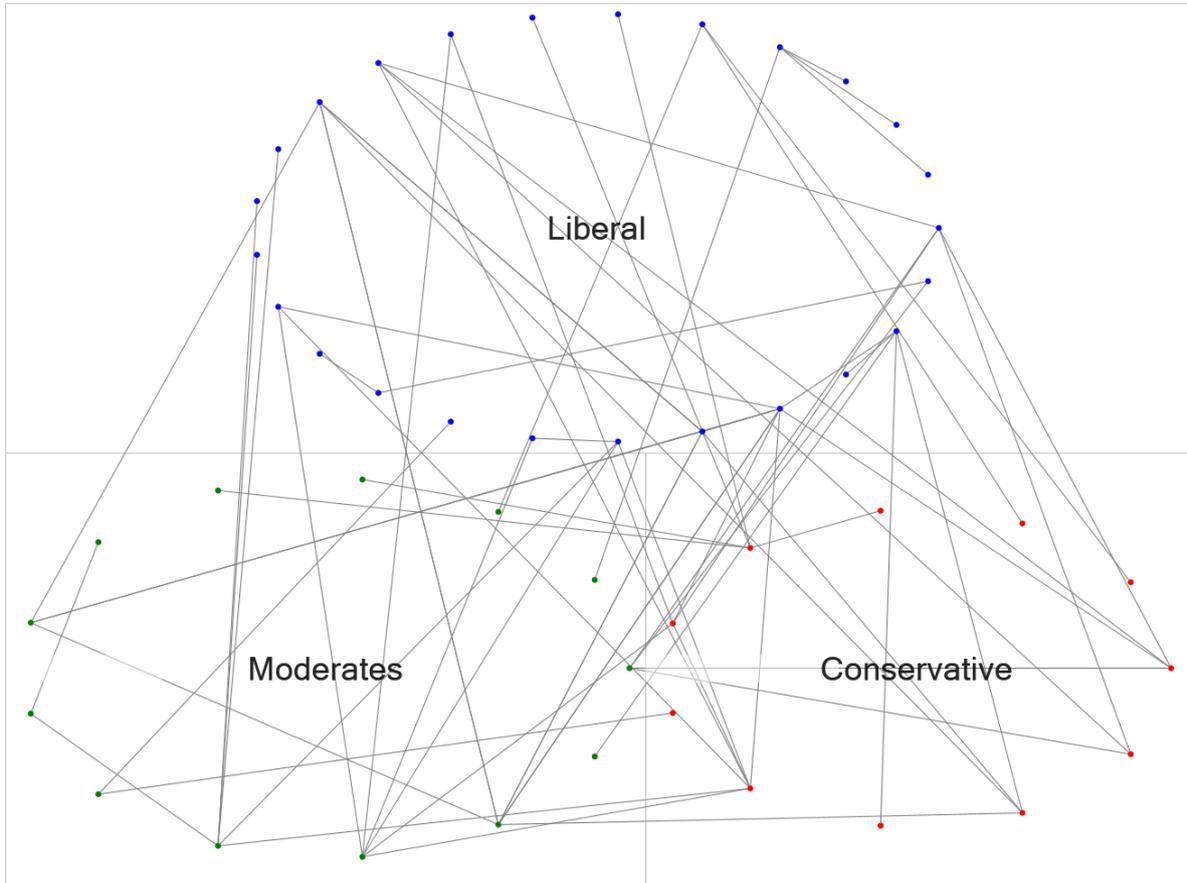
Figure 4: Distribution of political ideology among the respondents

Based on the above distribution, individuals were put into three different groups based along the political spectrum they ranked themselves and the cutoffs were as follows:

Group	Range of Values
Liberal	0-35
Moderate	35-65
Conservative	65-100

Table1: Defined groups based on distribution

Based on this ranking, the network had 25 self-reported liberals, 13 self-reported moderates, and 11 self-reported conservatives. The network for each respondent was converted into a matrix form and mapped using NodeXL software which gave us the network diagram shown in Figure 5.



Created with NodeXL Pro (<http://nodexl.codeplex.com>) from the Social Media Research Foundation (<http://www.smrfoundation.org>)

Figure 5: Political network diagram

The diagram calculates the number of inter group edges, thus allowing us to provide some evidence in answering the research question of homophily. The results of the number of edges between different groups are tabulated in Table 2. As observed, the number of edges between liberal and conservative nodes is the second highest making one reject the hypothesis that individuals exhibit homophily along the lines of number of friendships they cultivate across party lines.

Group 1	Group 2	Number of edges
Liberal	Liberal	14
Liberal	Moderate	23
Liberal	Conservative	20
Moderate	Moderate	3
Moderate	Conservative	9
Conservative	Conservative	2

Table 2: Inter group Edges

Table 3 shows some of the network metrics. A low reciprocated edges metric might indicate that not all friendships links are being reciprocated indicating different thresholds for individuals in considering someone a friend or indicate them as a mere acquaintance. Further, a low- density metric indicates that there are several potential ties that have not formed. A low number within a closely-knit group of Management students that actually meet twice a week for coffee social might indicate that people might have been keeping their existing friendship networks even after being provided with opportunities to socialize with the group.

Metric	Value
Reciprocated Edges	15%
Diameter	9
Average Density	3.13
Density	0.056

Table 3: Network level Metrics

The results in Table 4 suggest that the group metrics and the density of the graph within each group is fairly uniform. This indicates that there is no difference in how connected individuals are with people within their own political ideology. However, the difference in the geodesic distance might indicate different intra group dynamics that might need to be explored in future research.

Ideology	Number of Vertices	Average Geodesic Distance	Graph Density
Liberal	25	1.133	0.040
Moderate	13	0.769	0.038
Conservative	11	0.500	0.036

Table 4: Intra-Group Metrics

RESULTS

Once the graph metrics and network metrics are observed, it is evident that more coding is essential to answer the remaining research question. The survey also captured how often individuals spend time with others in their network and the types of activities they meet the other individual for. These activities and frequencies are tabulated and assigned the following weights as shown in Table 5.

Activity	Score
Take the same class	1
Voluntary Activities	2
Social Activities	3
Other	5

Table 5: Coding of Activities

Since our network comprises of mostly students that belong to same department, the act of taking the same class is more of a consequence of the scope than an out of normal commitment on the part of either individual. Individuals choose who they socialize with, and hence shows the individual's desire to spend more time with the other party, which led to Social Activities given a higher weight than voluntary activities. The Other activity is a free form response field with individuals reporting their house mates as part of their network.

Weighing based on frequency of activity is ordinal since high frequency indicates more interactions between the two parties. The coding of activity frequency is shown in Table 6.

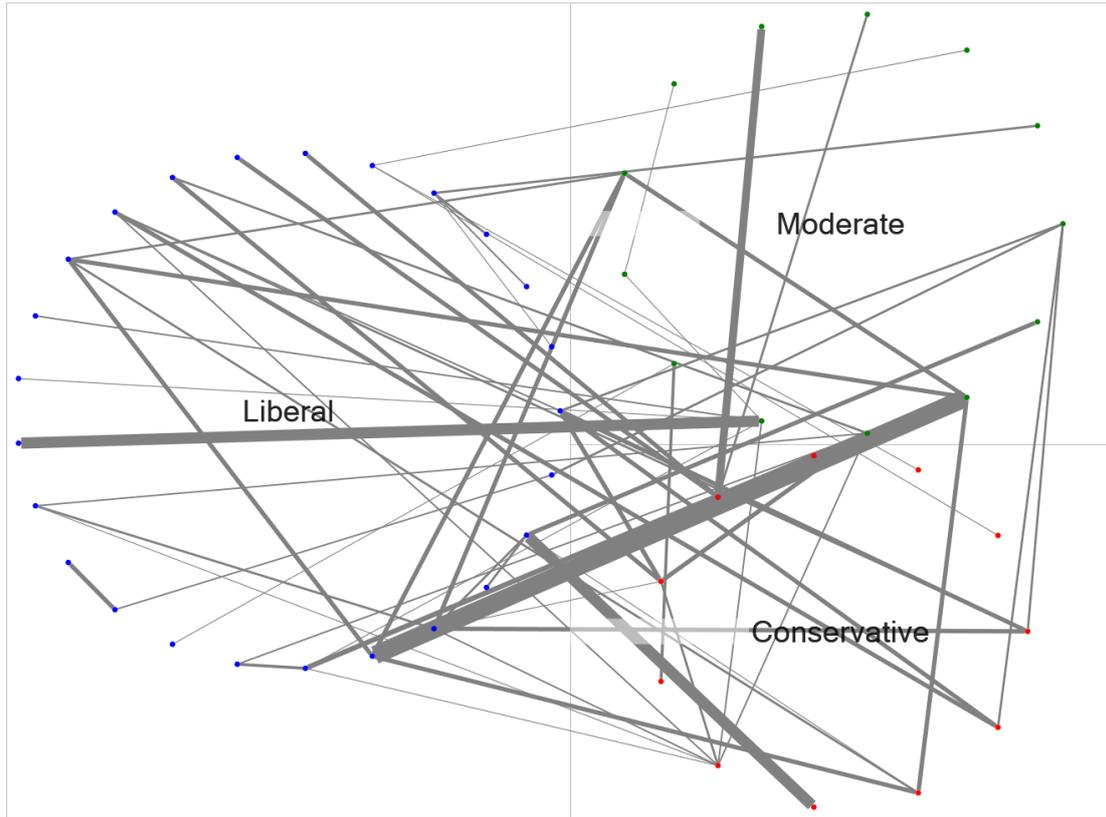
Frequency	Score
Rarely	0
Sometimes	1
Often	2
Frequently	5

Table 6: Coding of frequency of activity

Once the relationships were appropriately coded, the strength of the relationship was calculated using the formula:

$$\text{Strength of the relationship} = \sum \text{Activity Engaged} * \text{Frequency of the Activity}$$

Figure 5 shows us the network with edge width set to the strength of the relationship.



Created with NodeXL Pro (<http://nodexl.codeplex.com>) from the Social Media Research Foundation (<http://www.smrfoundation.org>)

Figure 6: Network visualized weighed by strength of relationship

Figure 7 below shows the histogram of strength of the relationships and the average strength of relationships is found to be five.

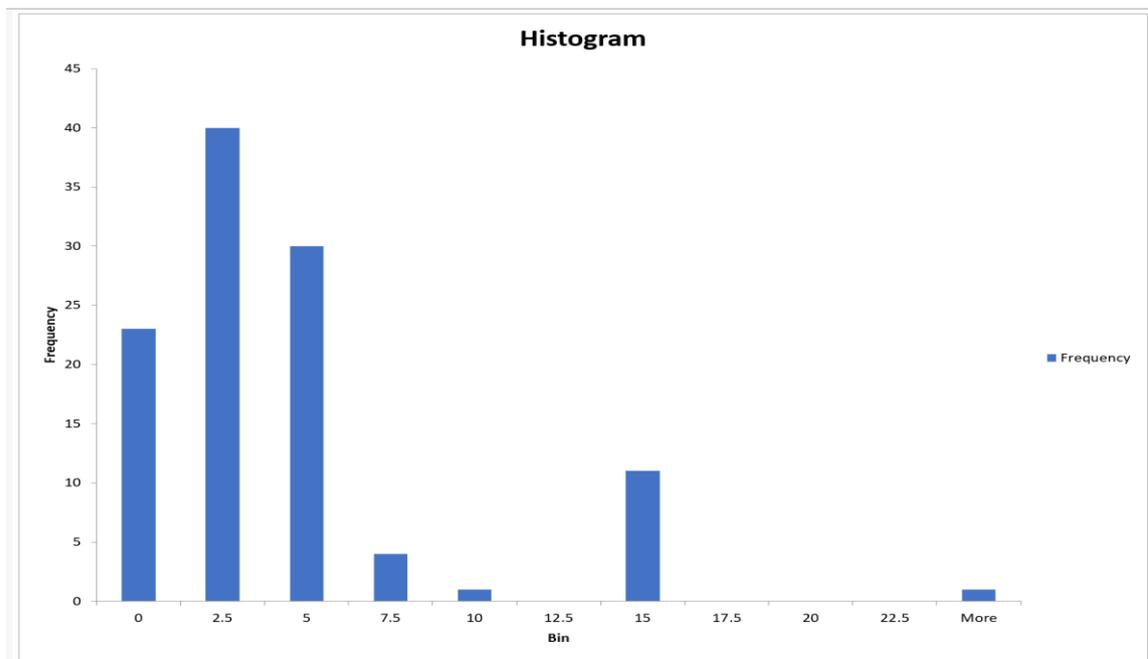


Figure 7: Distribution of strength of the relationship

Filtering our weighted network based on strength of the relationship, we found that most of the strong relationships exist between Conservatives and Moderates or between Liberals and Moderates as shown below in Figure 8.

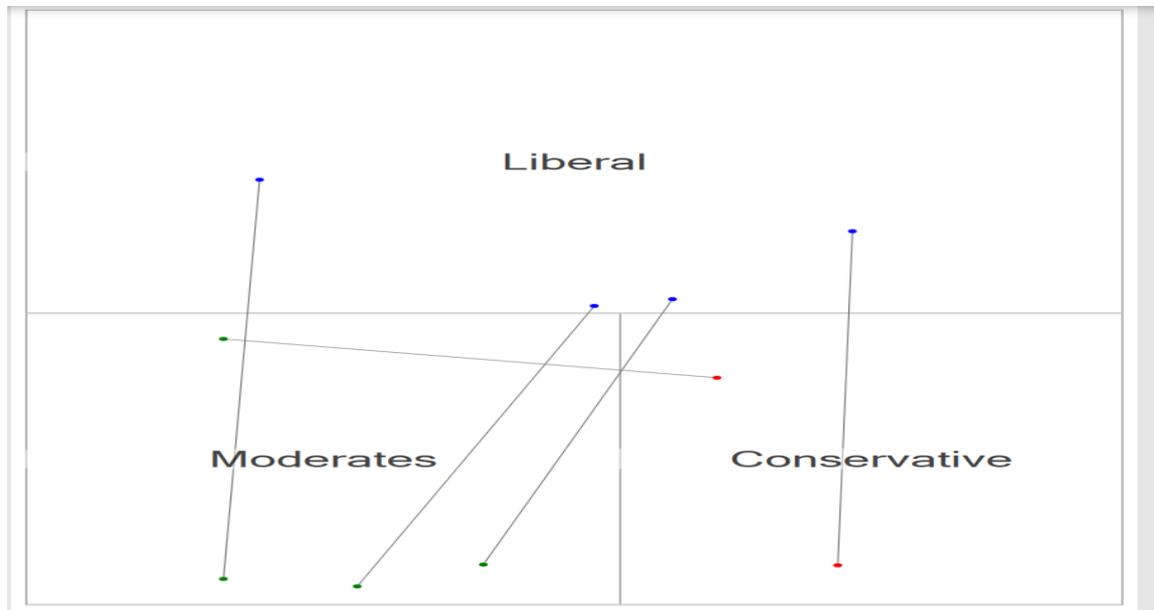


Figure 8: Strong links between nodes visualized

This suggests that there is indeed a possibility that individuals might not stray far from their own ideology when it comes to the strength of the relationships they form with other individuals.

CONCLUSIONS

This study provides some evidence that while individuals do not exhibit homophily along the lines of number of friendship ties they make with other individuals, there is indeed a possibility that individuals might not venture too far away from their own ideology when forming strong bonds. Further, a review of node metrics like betweenness centrality shown in Table 7, degree centrality in Table 8 does not show any pattern in difference across groups, suggesting there might not be a meaningful difference in the roles of actors by their political ideologies.

Betweenness Centrality	Closeness Centrality	Vertex Group
83.333	0.010	2
56.000	0.008	1
29.000	0.009	2
29.000	0.007	1
10.000	0.200	3
8.000	0.009	3
6.000	0.250	1
1.000	0.500	2

Table 7: Betweenness Centrality

Degree	In-Degree	Out-Degree	Betweenness Centrality	Closeness Centrality	Vertex Group
5			10.000	0.200	3
4			83.333	0.010	2
4			8.000	0.009	3
4			6.000	0.250	1
4			0.333	0.009	1

Table 8: Degree Centrality

The limitation in our network study is that it comprises a narrow audience shedding doubt on the generalizability of the outcomes to the mass public. While the results are valid for the group studied, further research is needed to verify if the same pattern is observed among the populace at large before applying any policy initiatives for affecting bipartisan friendships.

While this is a good pilot study in understanding behavior of social networks using network analysis in a college setting, further research could include in understanding the intra group dynamics that caused the difference in geodesic distances within groups. Further, a network evolution study could be performed to understand if people's ideologies change when they are

exposed to a populace where their political views are in the minority. Or will these individuals simply recede themselves in the situation.

Further, similar studies can be conducted to understand the influence of individuals on the rest of their network to understand if individuals do have power to effect shift in median political ideologies within their network.

REFERENCES

Ajrouch, K. J., Antonucci, C. T., & Janevic, M. R. (2001). Social Networks Among Blacks and Whites: The Interaction Between Race and Age. *Journal of Gerontology*, 56B(S112 - S118).

Grunspan, D. Z., Wiggins, B. L., & Goodreau, S. M. (2014). Understanding Classrooms through Social Network Analysis: A Primer for Social Network Analysis in Education Research. *CBE Life Science Education*.

Huckfeldt, R., Mendez, J. M., & Osborn, T. (2004, January). Disagreement, Ambivalence, and Engagement: The Political Consequences of Heterogeneous Networks. *Political Psychology*, 25(1), 65-95.

Huckfeldt, R., Plutzer, E., & Sprague, J. (1993, May). Alternative Contexts of Political Behavior: Churches, Neighborhoods, and Individuals. *The Journal of Politics*, 55(2), 365-381.

Lazer, D. M., Rubineau, B., & Neblo, M. A. (2009). Picking People or Pushing Politics. *Annual Meeting 2009* (p. 32). American Political Science Association.

Lazer, D., Rubineau, B., Katz, N., Chetkovich, C., & Neblo, M. A. (2008). *Networks and Political Attitudes: Structure, Influence, and Co-evolution*. Harvard Kennedy School of Government.

Lewis, V. A., McGregor, C. A., & Putnam, R. D. (2013, March). Religion, networks, and neighborliness: The impact of religious social networks on civic engagement. *Social Science Research*, 22(2), 331-346.

Mitchell, A., Gottfried, J., Kiley, J., & Eva Matsa, K. (2017, October 21). *Political Polarization & Media Habits*. Retrieved December 7, 2017, from Pew Research Center: <http://www.journalism.org/2014/10/21/political-polarization-media-habits/>

Murtz, D. C. (2002, March). Cross cutting Social Networks: Testing Democratic Theory in Practice. *The American Political Science Review*, 96(1), 111-126.

Psylla, I., Sapiezynski, P., Mones, E., & Lehmann, S. (2017, June 15). The role of gender in social network organization.

Schlauch, W., Obradovic, D., & Dengel, A. (n.d.). *Organizational Social Network Analysis – Case Study in a Research Facility*. Kaiserslautern: University of Kaiserslautern.

Shearer, E., & Gottfried, J. (2017, September 7). *News Use Across Social Media Platforms*. Retrieved December 7, 2017, from Pew Research Center: <http://www.journalism.org/2017/09/07/news-use-across-social-media-platforms-2017/>

Zuckerman, A. (2005). *Social Logic of Politics*. Philadelphia, PA, USA: Temple University.