Introduction

Knowledge of social networks can help networks function better and create shared mental models. Shared mental models allow for those in the network to have a deeper understanding of the strengths and weaknesses of others in the network. By understanding concepts like homophily and focus theory, you can predict who may have connections in a network. This is what our network analysis aims to do. By gathering data on members of a sorority, our goal is to see how accurately friendship ties can be predicted. This information could be leveraged by the sorority to help coordinate group work or gain a better understanding of the network and the dynamics at play.

Network Theories

In an attempt to predict friendship ties within a sorority network, both homophily and focus theory will be called upon. "Homophily is the principle that a contact between similar people occurs at a higher rate than among dissimilar people." (McPherson et al., 2001, p. 416). Therefore, similar people are more likely to interact more with each other. As a result of this increase in interactions, those who are similar are more likely to become friends. In contrast, those who are dissimilar are likely to have more distance from others in a network (McPherson et al., 2001, p. 416). In addition, people often categorize themselves according to a few key dimensions. These include race, religion, gender, age, and other organizational-specific dimensions (Monge & Contractor, 2003, p. 303). This concept led us to our first research question: Are people within a sorority network who share key demographics more likely to be friends?

Another factor that affects network formation is group membership. This idea is related to focus theory. In focus theory, "a focus is defined as a social, psychological, legal, or physical entity around which joint activities are organized" (Feld, 1981, p. 1016). This can include clubs, workplaces, churches, families, and more. Those who are organized around the same focus are likely to form interpersonal connections. This is because those who share a focus are more likely to share joint activities than those who are not engaged with that focus (Feld, 1981, p. 1016). In addition, being part of a group can bond people based on similar interests or ideals. This concept led us to our second research question: Within a sorority network, does club membership affect the likelihood of friendship formation?
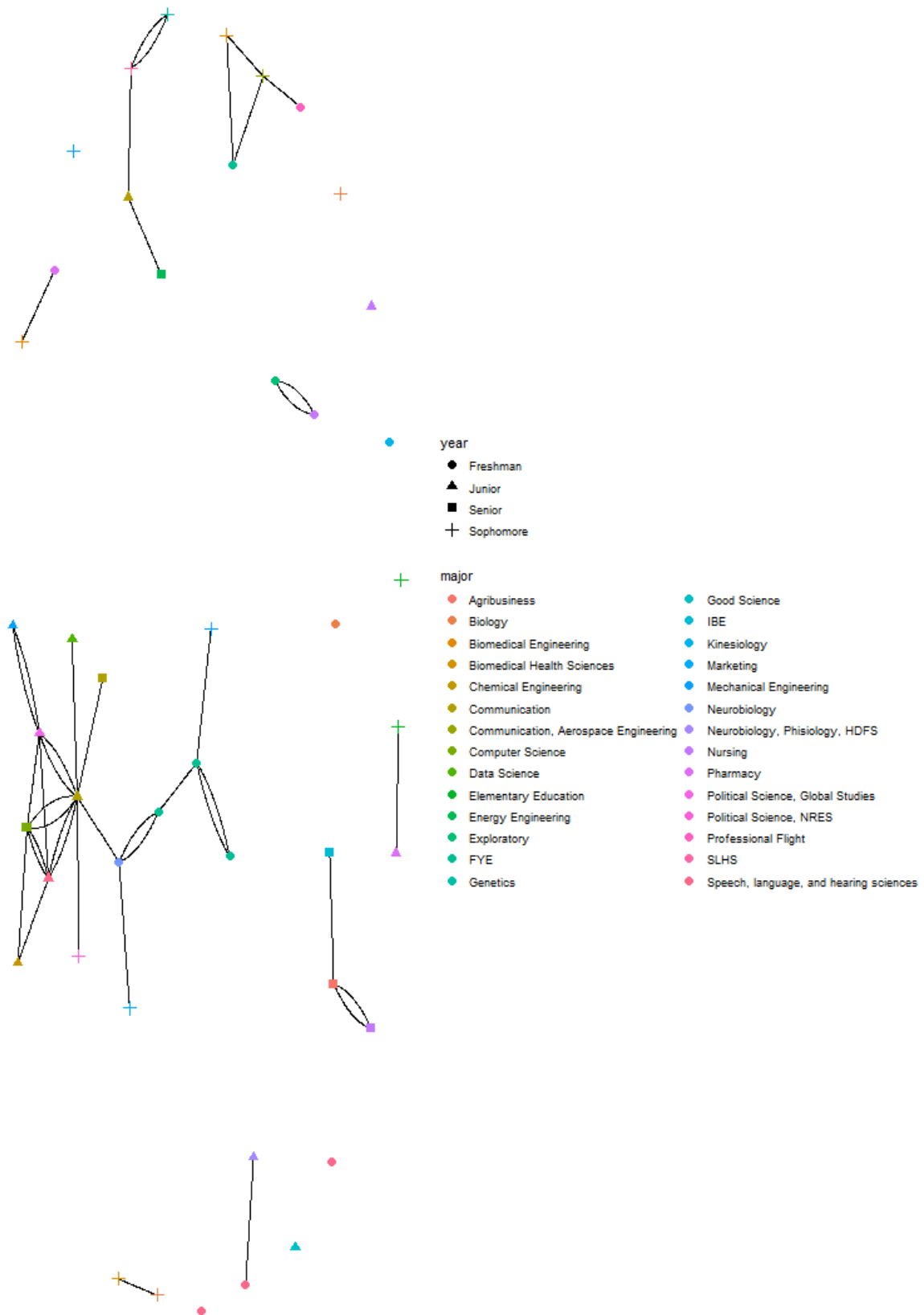
Method and Data

To answer our research question and determine if friendship formation is affected by club membership, the first step was creating and sending out a survey to all members of our chosen sorority. The survey included questions asking the participants about their age, major, year in school, club involvement, the three people they feel closest to within the sorority, etc. These questions were selected to see how much homophily plays a role in friendship formation within the group. The goal was to use these answers to draw a map between the similarities of each sorority member and who they feel closest to, predicting that those who answered most similarly to the questions above are likely to be friends. This will then either be proven or disproven by the participants and their answers to the question asking which three people they actually are closest to.
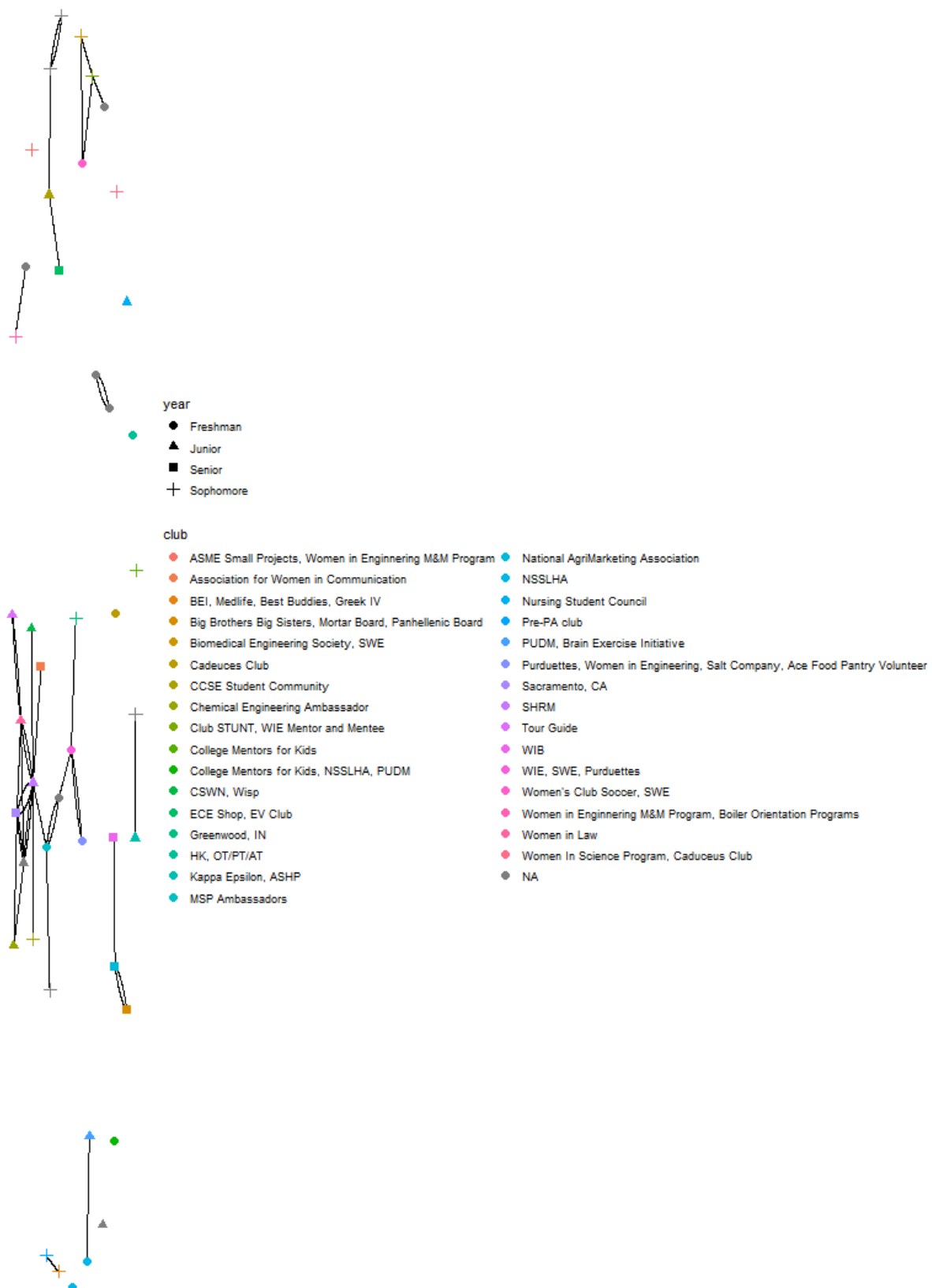
The survey will act as the primary source of data and will be used to determine predicted and actual friendship ties. Year in school and participant's major will be one specific data set

used to determine connections related to homophily, and year in school and club involvement will be the other. The analysis used will be a simple measure of the number of connections that exist in this network based on the aforementioned data sets. This method is appropriate for answering our question because we want to determine if homophily – in the form of year, major, and club involvement in this case – plays a role in friendships within the sorority, as predicted, or if friendships form in this group by other means. A simple network graph will help connect sorority members in a way that makes it plain and easy to see if homophily is present in this network.

Analysis:

The first of the following graphs compares the major and year of the members, the second of which compares clubs. Within them, we were unable to find any instances of homophily between the categories that we analyzed, although there was some data that seemed to indicate other instances. Things such as several connections between girls of a single-year grade difference (sophomores and freshmen being close, juniors and sophomores being close, etc.) where it appeared that these connections were made out of a different type of connection - that being the "big sister / little sister" connection - where girls are paired up within the sorority and grow closeness out of that. But in what we were specifically hoping for, we didn't find much.

year
- ● Freshman
- ▲ Junior
- ■ Senior
- ＋ Sophomore

major
- ● Agribusiness
- ● Biology
- ● Biomedical Engineering
- ● Biomedical Health Sciences
- ● Chemical Engineering
- ● Communication
- ● Communication, Aerospace Engineering
- ● Computer Science
- ● Data Science
- ● Elementary Education
- ● Energy Engineering
- ● Exploratory
- ● FYE
- ● Genetics
- ● Good Science
- ● IBE
- ● Kinesiology
- ● Marketing
- ● Mechanical Engineering
- ● Neurobiology
- ● Neurobiology, Phisiology, HDFS
- ● Nursing
- ● Pharmacy
- ● Political Science, Global Studies
- ● Political Science, NRES
- ● Professional Flight
- ● SLHS
- ● Speech, language, and hearing sciences

year
● Freshman
▲ Junior
■ Senior
+ Sophomore

club
● ASME Small Projects, Women in Enginnering M&M Program
● Association for Women in Communication
● BEI, Medlife, Best Buddies, Greek IV
● Big Brothers Big Sisters, Mortar Board, Panhellenic Board
● Biomedical Engineering Society, SWE
● Cadeuces Club
● CCSE Student Community
● Chemical Engineering Ambassador
● Club STUNT, WIE Mentor and Mentee
● College Mentors for Kids
● College Mentors for Kids, NSSLHA, PUDM
● CSWN, Wisp
● ECE Shop, EV Club
● Greenwood, IN
● HK, OT/PT/AT
● Kappa Epsilon, ASHP
● MSP Ambassadors

● National AgriMarketing Association
● NSSLHA
● Nursing Student Council
● Pre-PA club
● PUDM, Brain Exercise Initiative
● Purduettes, Women in Engineering, Salt Company, Ace Food Pantry Volunteer
● Sacramento, CA
● SHRM
● Tour Guide
● WIB
● WIE, SWE, Purduettes
● Women's Club Soccer, SWE
● Women in Enginnering M&M Program, Boiler Orientation Programs
● Women in Law
● Women In Science Program, Caduceus Club
● NA

Conclusion:

By analyzing the data from the sorority spreadsheets, it became evident that there were limited connections between friendships and club involvement, even before coding began. Despite our efforts to prove that there is homophily and focus theory in friendships in sororities, our results were inconclusive in R. This was most likely due to the sparse connections in the data. The members who had clubs/activities in common did not list each other as friends, which made documenting and homophily or proof of focus theory difficult.

We did have a few connections in our data, which proved that part of our theory could be true. For example, certain clusters of members with similar interests or shared activities hinted at the potential for homophily. Unfortunately, we were unable to display this clearly in R due to the limitations of our dataset and the tools we utilized. We think with more data collection and possibly including more sororities we could get a better outcome in the data.

Another issue was that not every chapter member answered the poll. This limited the scope and accuracy of our analysis, as we couldn't account for the entire network of friendships and club involvements. So, in the future, having members answer the poll during an in-person meeting/chapter might yield better outcomes.

References

Feld, S. L. (1981). The Focused Organization of Social Ties. American Journal of Sociology,

86(5), 1015–1035. http://www.jstor.org/stable/2778746

McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a Feather: Homophily in Social

Networks. *Annual Review of Sociology*, *27*, 415–444.

http://www.jstor.org/stable/2678628

Monge, P. R., & Contractor, N. S. (2003). Theories of communication networks. Oxford, UK:

Oxford University Press, 298–314.