Influence and Social Networks

by

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Abstract

Studying large-scale social networks can be a complex and challenging task when considering social media's rapid development. Mapping large networks and studying interactions present barriers in terms of access to data, limitations on analysis, and an approach to identify unseen influencers in the network. This study examines how connections between data points and users in a network can be mapped and understood. This method of mapping connections can allow a researcher to identify influencers within a network and find optimal routes through which content can be distributed to a broad group of connected users. This is accomplished by comparing the role of network groups to that of users. This is done by mapping organizations and connected groups of students on social media networks over time to identify influential network members.

The project involves studying several campus and community-based pro-Israel student groups organized into four geographically themed clusters. Data was collected from Twitter using various methods, including Python language code and NodeXL. Once the data was collected and analyzed using network link analysis and statistics for interconnections, visualizations and sociograms were generated using Gephi. Through analyzing network data for users and organizations, network statistics and metrics can be calculated to identify network influencers.

The study shows that otherwise unseen influencers can be mapped within a social network and that their relative social influence can be identified. Studying organizations and exponential mapping layers of connected users reveals new connections and patterns. The relative social influence, position, and communication patterns within a network generate new insights into network members. Hidden influencers were identified and show a connection between users and otherwise unknown clusters of the network.

The study results show that influencers can be identified and mapped within large and complex networks and that their relative social influence can be quantitatively calculated. This has implications for disseminating information within a network, mapping complex interactions within a social network, and understanding the structural communication pathways of social networks. This approach can be used in market analysis, research, and other social networks.

Keywords: Big data, pro-Israel activism, pro-Israel student organizations, social media, social networks, social network analysis (SNA), student activism

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Chapter 1

1 Introduction

This chapter will begin with an introduction into my research, including a research overview and the background of the study. Following this, I will explore my role as a former participant and researcher, acknowledging how my own personal experiences inevitably make me part of the very social phenomena I am studying. Finally, a conclusion will summarize the chapter and outline the structure for the rest of the thesis. Let us begin first by taking a closer look at the research area itself.

1.1 The Research Area

1.1.1 Research Overview

Social media platforms, and their influence on our lives, are used and discussed in the public forum daily. From social media influencing elections by subverting the way communities share and create self-censored echo chambers (Jacobson et al., 2016, p. 878), to the seemingly endless political upheavals caused by Donald Trump, the former President of the United States, sharing his thoughts on Twitter (Havercroft et al., 2018; Reif, 2017), social media platforms have connected us more than ever. I have often wondered about the “missing link,” the person or people who connect me to the story of the moment through popular platforms like Twitter and Facebook. For example, consider that while I do not follow Donald Trump, who is quite popular on Twitter, someone I know does. The interested follower absorbs the information Trump shares and projects it into the public sphere with ever-increasing publicity.

Within a network, the unseen “influencer” exerts influence on other network members to drive interest. Imagine for a moment that we could quickly identify who this person is in an extensive network. Talking to this person would give us insight into the network and enable taking the pulse of what is happening within a social system dependent on consensus. An influencer can connect and transform the network's fabric by influencing peers and can allow for the collecting or sharing of information to the largest possible segment of group members. Understanding network influencers' role provides a pathway to connect to both the group's leadership and the average member with a more detailed and nuanced perspective than would otherwise be possible using in-person data.

The data within a network and the conversations network participants engage in on social media can provide many fascinating insights into the collective. There is often a disconnect between the “party line” (the organization's official position) and most members in a social network. These “less official” users have more freedom to express varied opinions or dissent to those in a leadership position. The largest group of users in a network or organization typically comprises passive and uninformed members who do not have significant insights into their organization’s inner workings. Discounting those on the top and the bottom of a hierarchal organizational structure and, instead, focusing on identifying network members that communicate, absorb, and propagate information while maintaining a significant degree of influence can lead to a deeper understanding of the social community.

In this study, I will be looking at the social network dynamics of selected pro-Israel student groups on campuses across North America. I chose this topic because I am familiar with the general social and political movements that support these groups from my previous engagement with various student groups and organizations. I have a sense of the social and organizational dynamics between various student groups in this sphere. I am also familiar with the hierarchy of leadership and influence, the interplay between groups, and the many funding sources that support them. My experience with activist groups includes an awareness of the relationships between campus, national, and international level pro-Israel organizations and their affiliated student-led organizations. Despite the context of studying pro-Israel student groups on campus and, to a lesser extent, their associated organizations, this thesis is not about, nor does it discuss, the groups themselves or their politics. The thesis focuses on organization and movement within a social network rather than the underlying reasons for forming a collective social organization.

In this thesis, I will detail an example of how students interact within their social networks over time to illustrate how network influencers can be identified within ever-changing networks. I will also suggest the next steps for conducting a more detailed research project on a larger scale based on this design. This study aims to simplify the process of using social media analytics as a map to better understand network dynamics. This means that the insights derived from social media analytics can start the research process in future studies to identify who is active in the network and has the most significant influence. This data will enable researchers to recruit participants in a far less complex way, with faster and cheaper access to more accurate and high-quality responses from both key informant insiders and casual members of the social network. I can see this mixed-methods approach being relevant in many areas of research where participant recruitment can be aided by network or social media analytics.

1.1.2 Study Background

The background for this research stems from my own experiences working with pro-Israel campus groups. These experiences led me to wonder how these groups are organized internally and externally and what drives students to participate in activism on campus. After attending many pro-Israel college and university campus conferences and even being asked to present at one, I became interested in this project. Over time, I saw a discontinuity between what people believed and understood about Israel compared to what was being promoted on campus and how Israel advocates connected locally and online to engage in activist discourse. After seeing a disconnect between living in and researching the political, social, and religious divisions in Israel and what I saw from Israel advocates on campus, I became interested in this topic. For example, at a pro-Israel activist conference, participants got into a heated debate around LGBT rights in

Israeli society. I found it interesting that, without having been there, participants were ferociously defending their preconceived perceptions and polarized viewpoints, which I did not think were based on fact. This type of monolithic thinking is common when one's only frame of reference is the news or dialogue propagated by peers. With this approach, everyone in Israel suddenly becomes religious, living in the desert, and eating an endless amount of falafel. Perhaps only the falafel tidbit is somewhat accurate.

However, these conversations got me thinking about the differences between those residing in the homeland of Israel and those of Israeli heritage living in other parts the world, who I will refer to from now on as the Diaspora. It seemed to me that the homeland-Diaspora connection and the discourse that defines the positions within it may differ from reality. In other words, this layer of discussion and debate is defined by its language, symbolism, and social construction. I found this fascinating because these are students in North America, both Jewish and non-Jewish, having heated debates on campus about Israeli political and social issues based on their perception of Israel without having detailed, first-hand knowledge. Their version of what Israel is and what it represents, in many respects, did not mirror my experience.

I found this dichotomy interesting because nothing in Israel is simply black or white but is instead a morass of complex political, social, and religious issues. I explored one aspect of religion and politics in Israel with a study involving expatriate ultra-Orthodox Jews living in Israel as part of my Master of Arts (MA) thesis (Shapiro, 2013a). In this study, I interviewed religious Jews from North America, Australia, the United Kingdom, and other countries. I was fascinated to learn how they reconcile the often politically and religiously sectarian world around them. The study participants proposed ways to mediate the discontinuities between religious life in Israel and their former communities in the Diaspora. Beyond the issues surrounding religious

life and politics in Israel, the research project made me wonder how the relationship between Israel and the Diaspora communities is mediated. Unlike the expatriate participants in my MA thesis project, the Diaspora and Israel are separated by thousands of miles as well as by many social and cultural differences. Studying the Diaspora and the relationship to Israel presents many substantial questions. I could not decide what aspect of this relationship to study for my doctoral research nor which methods I could employ. As I explored the subject through articles and books to understand what was being discussed in this space, I became very interested in analyzing social media networks and exploring and describing a community by quantitative methods.

Many of the initial ideas I had for this research project were very broad and overly complex, such as understanding demographic trends in relation to campus activism by studying voting patterns or delving into how religious observance and the complex relationship it has with Israel influences observance in the Diaspora, among many others. Due to resource limitations, I explored various methods to gather data on North American pro-Israel student groups using social media. I reasoned that if I could gather enough social media and interview data, I would be able to conduct population-level research to determine how the various actors in the network are connected. Initially, I had thought that a population-level survey of campus groups and their connections would be ideal. I soon realized that the project's scope was far beyond what I was able to produce independently. Through my review of the literature, I became increasingly interested in studying influencers in a social network and understanding who participates in such networks. By extension, this led to an exploration of defining digital borders and intersections, or, in network terms, nodes and vertices, after reading a paper mapping the digital humanities community (Grandjean, 2016) and discovering various tools (Ahmed, 2015; Hansen et al., 2010;

Pitts, 2016) to conduct this type of research. Buoyed by discovering a new approach to studying social networks and their participants, I constructed this research project, which proposes a method for studying social networks and illustrates the method's application.

My attempt to objectively study social phenomena, of which I am inherently a part of myself, is not without its weaknesses however. It is for this reason that we now turn to a discussion on my role as a former participant and current researcher.

1.2 Former Participant and Current Researcher

1.2.1 Research Reflexivity

Reflexivity is often regarded as the defining feature or significant component of qualitative and quantitative research (Gough, 2017; Palaganas et al., 2017). Mason (2002) defined reflexivity as "thinking critically about what you are doing and why, confronting and often challenging your own assumptions, and recognizing the extent to which your thoughts, actions and decisions shape how you research and what you see" (p. 5). Mason also suggested that researchers evaluate their research role with the same scrutiny as their data to ensure the rigour and quality of their work. If a researcher can clearly describe the intersecting contextual relationship between themselves and their participants, the credibility of the findings increases and our understanding of the researcher's role in the creation of knowledge deepens (Dodgson, 2019). It is both a concept and a process. As a process, it allows the researcher to self-monitor the impact of their biases, beliefs, and personal experiences (Dodgson, 2019; Mason, 2002; Palaganas et al., 2017). It requires a continuous reflection of how the researcher's values, background, location, and assumptions affect their research. As a concept, it refers to a certain level of consciousness, self-awareness, and recognition that, as researchers, we are also part of the social world we are studying (Palaganas et al., 2017). This process involves giving a complete and honest account of the research process, including the researcher's position in relation to their research.

While the road has been winding to get to the point where I am writing a doctoral thesis about social media analytics and student social structures, I think there has been a central thread that has followed through my academic career and my social activities on campus. I started thinking about pro-Israel activism when I arrived in Sudbury, Ontario, a community with a

relatively small Jewish community and no Israel advocacy on campus at the University to speak of. This was not at all what I was expecting, coming from Israel. While recognizing that not every campus is involved in Israel activism, I expected there to be at least something organized with student involvement. In light of the importance of research reflectivity, I think it is useful to outline in detail exactly how I arrived at this point in my academic career and what shapes my understanding of the topic under study.

1.2.2 Introduction to Campus Groups

When I first arrived on campus, I encountered many different viewpoints from students and faculty, particularly around the issues of politics in Israel and the Israeli-Palestinian conflict, which was regularly in the news at the time. I found that the average student on campus was informed by the media or casual discussion and tended towards a very monolithic view of religion and politics in the Middle East. I was interested in discussing Israel on campus and at least sharing some of my first-hand experiences.

I have since met many students from universities with much larger Jewish student populations or, in the case of some universities, a Christian population with an interest in Israel. There are also many other groups on campuses across North America that are interested in various political, social, or religious activities. While there are many national or provincial groups with a mandate to support prominent pro-Israel activism on campuses, getting these organizations to support a “remote” school took a great deal of work. Initial successes in forming connections with large organizations that provide funding and programming support were with organizations that were internationally based or based in the United States. However, once we

started conducting impactful programming, we were able to connect with resources and organizations closer to home.

I looked at campus organizations as part of a spectrum, from being primarily religious, such as the Chabad organization, to cultural, social, and religious organizations. One example of this is Hillel, which provides religious functions across North America with an uneven stance on Israel. While they were interested in working with us, their mandate of building young leaders did not align with the type of advocacy we were looking to develop on campus.

National events and organizations created connections between student leaders and fostered leadership roles within student organizations. While these student leaders were the most engaged in their campus activities and were at the top of their organizational hierarchies, I wondered why they were involved in these particular activities. I wondered if their individual efforts on campus (such as holding events, information sessions, and tabling) had the intended effect and if members felt that their contributions were meaningful.

This is a confusing situation because if every campus spends equal amounts of money on activities, the differences in outcomes must be attributed to other factors. Perhaps the difference in success can be attributed to interest in on-campus activities, social functions, and organizers' ability to connect with others and recruit friends socially. In this scenario, participants are friends of the people running it and may not be very interested in activism. Instead, as a social structure that connects members, the club or organization takes on a social and organizational function to connect those within the network. As members grow and leave, the network is constantly developing and evolving.

I wondered if there was ultimately a net positive gain on campus or if this student activity heavily involved some members of the group to the exclusion of the majority on campus. In other words, is it merely reinforcing the message and preaching to the choir? Was having the same active students, whether involved in pro-Israel organizations or not, regularly show up to events part of the change or did they reinforce social structures? In my experience, if we held an event for any student club, we essentially had the same students showing up for movie nights and game nights and so on every time, regardless of the specific issue, cause, or film being screened. If we are encouraging what I have heard described as “pizza fueled activism”, does the money being spent on outreach and campus engagement work? I wondered if there could be a better alternative. Although this question was in the context of the Jewish student organization at my own University and Jewish student associations, and similar organizations across other campuses, I did not see a way to conduct a large-scale study without engaging many stakeholders.

1.2.3 Confronting Biases and Challenges

Going into this research project, I realize that I have biases. The experience that I have working with various campus groups and with LUJSA gives me a perspective that lets me study this thesis's topic guided by insider knowledge. Even though we all belong to a shared society, understanding the specific context is essential to revealing groups that may otherwise be inaccessible (Elias, 1956, p. 228). Having this understanding provides me with an entrance into the world of student organizations on campus and social media.

My interest in campus politics started from the very first day on campus. Upon arrival to my University, which has neither a significant Jewish nor Israeli student population, there

seemed to be a great deal of anti-Israel rhetoric on campus. This was partly due to the ongoing events at the time, including the 2008-2009 Gaza War (Gavriely-Nuri, 2013, p. 42) which led to an increased level of activism and activity on campus. I found this interesting because, unlike in larger centres, this activism seemed to be happening in Northern Ontario's vacuum, far removed from the Middle East. The activity appeared to be more focused on links to external national organizations than on conflict on the campus itself. While I knew that there was friction on campuses in Canada (Schofield, 2009), I did not expect this situation in Northern Ontario.

I remember one of my first trips to campus, standing in the doorway and staring at a poster (with the same graphic used in Figure 1), trying to understand the context of where this was coming from. This poster, which was later banned on several other campuses (Offman, 2009), was more than just imagery to me. As a recently honourably discharged soldier from the Israel Defence Forces (IDF) who had spent the majority of his service in the Gaza area, I struggled with the simplistic portrayal of what I knew to be a much more complex situation. Having been stationed at Kerem Shalom in the Southern Gaza Territorial Brigade headquarters next to the bustling commercial border crossing (Times of Israel, 2018), I felt I had much first-hand knowledge to share on the topic.

Figure 1

Israel Boycott Poster (Latuff, 2009)

At the time, I was not focused on the larger political or social context and did not really understand how these issues were viewed from Northern Ontario's lens. I was surprised by the prevailing narrative on the campus of a monolithic and relatively simplistic discourse compared to reality. The students I spoke to at the time understood that what was happening was a religious or ideological war. This was based on the false assumption that everyone in Israel is religious (which later became a precursor for my study of Israeli religious-secular tensions for my MA). I found many facts that students knew to be true were not consistent with my first-hand experience

of having spent years in the area. At the end of my first semester, I sent a letter to the professor[1] organizing pro-Palestinian protest events on campus to discuss these issues. I wrote:

"Sir, I think there are several points about Gaza and the current situation there which may be somewhat confused in the media. I recently served in the IDF in the Gaza area, where I was stationed for the majority of my military service. I experienced the situation both from within and outside the IDF. I am currently a reservist in the IDF and a student at Laurentian, I would be happy to come by and discuss the situation if you would be interested. Cheers, Sidney" (S. Shapiro, personal communication, January 8, 2009)

I did not receive a reply to my email. Several months later, I followed up by asking if a planned event entitled "Life Under Occupation: Gaza and Palestine" on March 9th, 2009 was University-sponsored. The event was sponsored by several student groups[2] and was presented as an educational/political event. I assumed that since it was being supported and promoted by many different groups on campus, the event had the support of the University. Because I had the impression that the University was neutral on this issue, I inquired when an Israeli educational evening would showcase the conflict's other side. I received a response the next day: "This is an educational event. Other people are free to organize whatever educational or political events they wish to" (S. Shapiro, personal communication, March 3, 2009). I was a little taken aback by the response, but it would prove to be typical of the attitude I encountered on campus: some on-

[1] I have left out names purposefully as the context of events is what is important.

[2] Including the Laurentian University Students' General Association (SGA), Association des étudiantes et étudiants francophones (AEF), Laurentian Association of Mature and Part-time Students (LAMPS), The Labour Studies Program at Laurentian University, the Canadian Union of Postal Workers (CUPW), and Sudbury Against War and Occupation (SAWO)

campus cared a great deal about these and other issues, and the majority did not engage on these or other issues at all.

At the time, I was quite surprised that there was no opposing, or at least politically neutral, view organized on campus. Having a great deal of first-hand insight from my experience in the Gaza area, I found it frustrating that I could not share my views as part of a dialogue. I found this frustrating, mainly since my views were quite different than what many assumed they would be. While I was aware many of these groups held events on other campuses (B. Harris, 2009) across North America, I became aware of campuses with high-profile incidents that received media attention. As the conflict in Gaza (Offman, 2009) ended, the issue was frequently in the media. To be clear, I did not want to engage in an *Us* versus *Them* debate because my views on many issues relating to the Israel-Palestinian conflict are nuanced, and I was trying to avoid propaganda. In other words, I was not looking for simplistic answers or a public debate, but rather a way to unpack my experiences and perspectives and share with fellow students who were taking stances on political positions they may not have fully understood.

One of the challenges for me was that, as a student, I had very little instructional power and struggled with navigating organizational processes for things like booking a room on campus, printing flyers, or finding sponsorship for a movie night. The organizers for the pro-Palestinian events were faculty and had an easier time organizing their positions, resources, and connections to facilitate these activities. Ironically, I was at a conference several years later and attended a roundtable discussion with a junior faculty member from Texas who expressed the same frustrations as I had, albeit with different considerations, such as tenure prospects and fear of retribution from senior members of her department. In comparison, as a student, I found that I had far fewer resources at my disposal. While some faculty on campus sought to facilitate a

middle ground and offered support, they faced their own challenges. This included academic, political, and social pressures that prevented well-intentioned faculty from getting involved.

1.2.4 Reaching Out to External Groups

I initially reached out to both regional and national groups in Canada and asked what resources were available for me to utilize on campus. Being in Northern Ontario and not having a large Jewish student population on campus made it very difficult to appear on many of these organizations' radar. As events continued to unfold (and this was a particularly contentious time), the focus of these organizations was on universities like York and Concordia (Arnold, 2016; O'Toole, 2012), where incidents on campus had received national attention (CBC News, 2009). I would forward events on campus to these organizations without any meaningful response. As I researched other pro-Israel organizations serving campuses, I realized that the situation was far more fractured than expected. Some organizations promoted cultural or social Jewish values, while others focused on Israeli politics, news media accuracy, general advocacy, environmentalism, among many others. These groups were often focused on a single issue and advocated for one aspect alone (such as religious events without political content or events about media accuracy without political discussion). My goal was to share a realistic and unbiased view of Israel with my fellow students from a small campus.

Contacting organizations in Canada and the United States to learn more about what other campuses had done in similar situations led me to be among the organizers of a re-invented LUJSA. LUJSA had existed in various forms before my arrival when there was a larger Jewish student body at the University. The organization had served in a cultural/religious/social context, particularly when there was a larger and more active Jewish population in Northern Ontario. This

trend was seen elsewhere in the north "As with all Northern Ontario Jewish communities, as members of the community retired and moved south, and as their children moved south for school and careers, the Jewish community here declined" (*Sons of Jacob Synagogue in North Bay Ontario*, 2019).

The name LUJSA was purposefully chosen, because unlike other student organizations named X for Israel, or something similar, our focus was not explicitly focused on Israel, rather on cultural and social exchange. Because we were representing Judaism as well as social aspects of Israel and the Diaspora, we needed an organization that went beyond the political. Indeed, these activities culminated years later with events including an interfaith dinner event for student leaders from both Christian and Muslim student groups (CIJA, 2016), campus engagement around Jewish holidays, co-sponsored events with Pride, and many others. Over time, we became involved with many different partners from across the campus and made many interesting alliances with various student groups. As with many other events, the interfaith dinner was "an opportunity for the LUJSA to partner with other faith groups on campus to discuss each other's faith and foster dialogue about peace and co-existence" (ibid.). This event was a clear demonstration that bridges had been built between the various student groups on campus. Although LUJSA was active on our local campus, we sought to establish formalized ties with, and get support from, regional or national groups.

LUJSA participated in leadership and training activities with several organizations and held events both on and off campus. It was interesting that some organizations focused on individual targets like cultural exchange, religion, secular aspects of Israel, and topics related to Israel. This meant that many of our activities were focused on one aspect rather than another. For

example, we held a movie night with a theme, setting up tables around a particular political issue, celebrating a secular cultural event, or a religious holiday.

Finding external resources that were interested in providing the support I was looking for was difficult. We were not only looking for sources of funding but suggestions and direction for campus programming. While many organizations were receptive and even sympathetic, they did not rush to help support a school that, from their perspective, held little strategic importance. We did get invitations to participate in national and international programs such as Birthright Israel – *Taglit* (2018), but, as there were very few Jewish students on campus, these programs did not address challenges we faced on campus or provide the types of activities we were looking at promoting.

I called many organizations and eventually received an enthusiastic offer of support from the Committee for Accuracy in Middle East Reporting in America (CAMERA). They are a "media-monitoring, research and membership organization devoted to promoting accurate and balanced coverage of Israel and the Middle East" (2018). I found it strange that our first actual contact and support came from an organization based in the United States. I think this distance, being "somewhere out there," made a big difference, as we were seen to be on par with any other campus. This was a shift from how we were usually viewed, in opposition to being in Southern Ontario. I later learned that the campuses involved in the program were right across North America and not focused on Jewish centres.

I think the distinction of location is an essential point because it is reflective of how some organizations view a school without a large Jewish population. If donors to an organization that supports on-campus programming focus on seeing local change, then campus organizations need

to reflect that. I found that many of the national and international organizations based in the US had much broader goals, and their focus was on more critical population-level goals such as societal shifts in voting patterns and promoting a positive view of Israel. I found the campus support team at CAMERA receptive to what I was experiencing on campus and willing to connect me with students across North America that were also grappling with similar challenges. Many of these students were looking for a way to respond to what was happening on their campus.

The purpose of CAMERA on Campus (the college support branch of the organization) understood that there was a problem: "[I]ncreasingly, campuses are the scene of propagandistic assaults on Israel. Distorted literature, extreme speakers and false, inflammatory images are all too common, creating harmful misperceptions of Israel. This hostile environment can be intimidating to students seeking fair and objective information on Middle East issues" (2018). Their focus was on media accuracy in Israel's portrayal, although other programming and support types were also available. Even though there were many contextual differences between our campus and elsewhere, we were able to use their support to hold events that were relevant to our campus. Their offer of support included a sympathetic understanding of what was going on. Support was extended in the form of "guidance in finding and connecting with speakers or films, planning and creating events, funding for student groups, and addressing Middle East distortions in campus publications, fliers, rallies, and classroom teaching" (ibid.). This was precisely the type of support I was looking for, not only for funding but guidance towards what we should be doing to be effective. More importantly, we were able to take their template and customize it to what we were trying to accomplish on campus, namely cultural and social programming to promote awareness. While we held events showing what Israeli culture is like (for example,

Israeli movie nights with Pride, a falafel dinner on campus, discussion events), we could not use the funding for religious events (such as hosting Jewish holiday meals).

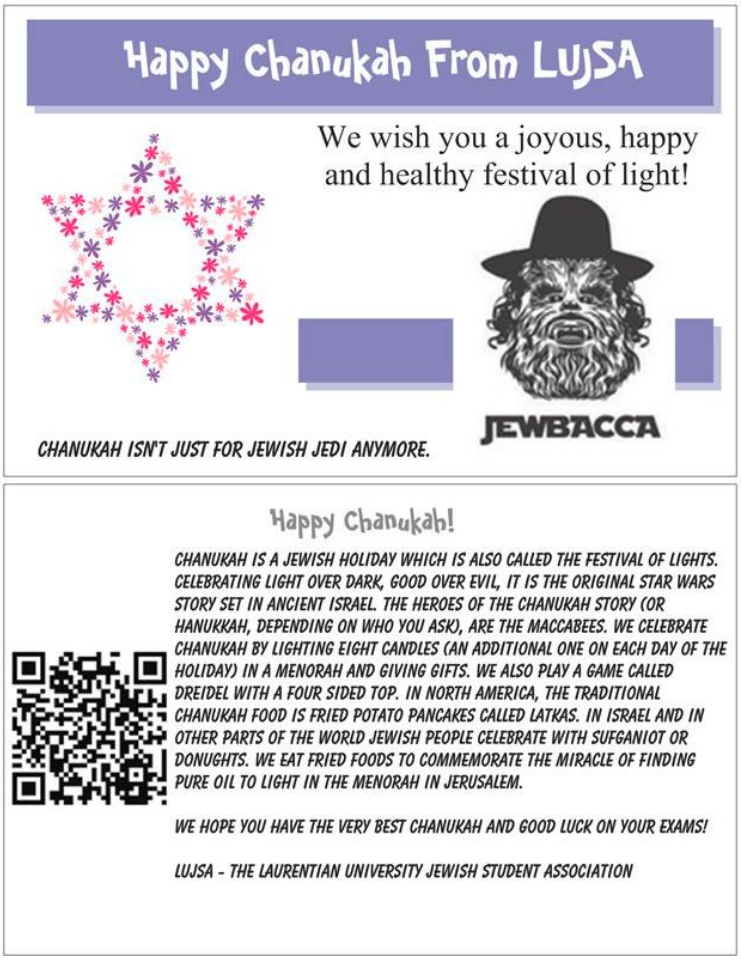
Calling various organizations made me realize that not only were there many common elements between the various national organizations, but they had very similar mandates. After we started working with CAMERA, it was easier to get support from other US-based national organizations. It still took a sustained effort over several years to raise the profile of LUJSA to get local (based in Ontario or Canada) support for our campus activities. While there was some overlap in the various types of funding we had access to, we eventually found ourselves working with various groups simultaneously. For example, our events ranged from the religious (sponsoring a *Rosh HaShanah* – Jewish New Year dinner) to the social (setting up tables and offering students snacks from Israel) and political (holding movie nights about politics in Israel). Even though we were the same group hosting these events, our funders required them to be separate, such as some organizations prohibiting religious or political aspects to the event.

While the various organizations had different motivating drivers, all involved passionate students and staff. Many of the participants had links with one another, to other student groups, and as a network, had significant overlap. I found that, as I became more involved with pro-Israel campus groups across North America, many of the participants involved in campus student groups were the same people. In other words, there was a socially engaged group of students who tended to belong to more than one group, both at the micro-level on my campus and at the macro level across North America. The majority of students were not engaged in these issues and did not belong to any particular groups. They did have competing discourse around Israel, though geopolitics was not central to their education.

While my university was relatively small in comparison to many of the other schools, our activity budget allowed us to hold events that generated much awareness on campus. For example, we engaged in educating the school about the *Chanukah* holiday by giving away thousands of donuts (as can be seen in Figure 2 and (Lambda, 2014)), reaching a large portion of the student population. Along with thousands of donuts from the campus Tim Horton's, we provided oversized postcards with information about *Chanukah*, which also worked as a convenient coaster. Jelly-filled donuts, or *sufganiyah,* are eaten in Israel to celebrate the holiday. Potato pancakes, or *latkes*, are more common in North America.

Figure 2

Happy Chanukah Card From LUJSA



I was asked to write a brief article for the *Lambda*, the Laurentian University student newspaper, during one of the years we did the *Chanukah* giveaway. I have attached it in Appendix A, as it shows an interesting connection between the holiday's religious and secular aspects, such as why this celebration of a minor religious holiday is more about cross-cultural connections, explaining Israel, and providing an opening to starting a conversation. I wrote a similar report in 2013 for CAMERA on Campus explaining the event (Shapiro, 2013b). From an engagement perspective, I think this type of event was very successful and became a template for

many of the other on-campus events held over the course of the following years. Yet it still seemed to me that there was a disconnect between many of the activities of formal organizations on campus and social realities on the ground.

1.2.5 Development of Research Interest in Social Media

By maintaining relationships with many different sponsoring organizations, the executive members attended conferences and meetings with other student groups from universities across the United States and Canada. This led to many connections and alliances and a support network for ideas and campus programming. However, as we grew and engaged with a larger population of students from across campus, I wondered what impact we were making, not just from the perspective of the wider student body, but the more than two hundred engaged members on campus (273 followers as of 2021 on Facebook (LUJSA, 2018)), many of whom regularly attended events, served on the executive organizational committee, and helped organize events.

As I was involved in many student groups, filling as many as nine group executive positions simultaneously, I noticed that many other highly engaged students were members of many different groups. There was much overlap as a result of many different factors. This state of affairs made me think about how members of a group or their executive board organize socially in various configurations. Understanding why they are in the group and their impact on the organization becomes much more critical when connected to a measurement of their relative voice and power. This line of thought, as well as the subsequent research it inspired, led me to discover social network analysis (SNA), the investigation of social structures through the use of networks and graph theory. Specifically, SNA is the study of nodes, or actors, and the edges, or interactions, between them. SNA allows us to map out nodes, in our case Twitter users, and

edges, in our case the relations between twitter users. This method can reveal many additional insights into how networks are structured and tell us which actors are the most influential when it comes to propagating their message throughout the network.

I had wanted to explore whether those in positions of power in formal organizational hierarchical structures were also the most influential when it comes to spreading their message in the wider public sphere. SNA is a good tool to do this, as it may help to identify lesser-known members of a network or organization (Can & Alatas, 2019). According to my own experience on campus, those in positions of power within organizations were often less influential than those I refer to as "hidden influencers", well connected social media users with the ability to propagate their message farther than others. The question naturally arose, would this personal experience also be reflected in the data at a wider level? This thesis is motivated then by my desire to test out this hypothesis.

1.2.6 Subjectivity Considerations

My role as both a former participant and current research is not without its weaknesses, as I am inevitably part of what I am studying. The fact that my own personal experiences and relationships shape how I see the world means that, like everyone, I cannot be entirely objective in my interpretation of the social phenomena I study. It is therefore not reasonable, in my opinion, to be entirely removed from the subject area, especially given my background in pro-Israel activism.

Despite this however, it has been several years since I have been engaged in this type of activism on campus and I am now on the outside of student politics. Also, in this particular study, I am not connected to any of the study participants' groups or networks on social media.

In fact, I would argue that having a basis in the subject lends more detail and accuracy to the end product, even if absolute detachment is impossible (Elias, 1956). Having served on many club executives and been active in the Laurentian University Jewish Students Association (LUJSA), I think I both have the knowledge to understand how similar groups function on campus elsewhere and can appreciate how these issues fit together with a detachment that comes from not being involved in school politics.

In this research project, I engage in involvement and detachment (Elias, 2007), and step back in order to attempt to understand others' experiences, observing the patterns they engage in while comparing this information to that of my own. While I cannot be completely detached from my own subjective experiences, I believe that my knowledge and involvement in this area help to orient the project and provide greater insight into the topic. This thesis seeks to discover examples of how social networks of pro-Israel student activism organizations on north American campuses function and hypothesize ~~about~~ how pathways between users of interest are maintained to propagate information. Using this example, it is possible to explore how social network analysis (SNA) can be used to gain a better understanding of the organizations and individuals that make up these complex interconnected networks. But what exactly is social influence? And how does it relate to the research objectives and questions of this thesis?

1.3 Definitions, Objectives and Research Questions

1.3.1 Defining Social Influence

Social influencers can be understood as a constructed persona "through strategically manufacturing authenticity and relatability" (Scholz, 2021) when the influencer is aware of their position and seeks to influence others. Influencers are highly sought after to promote products and ideas, ~~and are a~~ making them key marketing tools (Kim et al., 2021) to connect corporate interests and consumers. Influencers can act as moderators of content between organizations and their target audience (Minguez & Sese, 2021) and ~~can~~ are able to polarize (Giese et al., 2020; Maclay & Ahmad, 2021), shape (Dan Hiaeshutter-Rice et al., 2021), and direct those in the networks surrounding them (Tobon & García-Madariaga, 2021). Influencers connect with networks in new and often unexpected ways, creating new pathways for connection within social networks.

Social influence often does not align with a traditional organizational hierarchy (Barley, 1990; Eagly, 1983). Influencers' social currency is derived ~~through~~ from their effect on the network around them, ~~this~~ which is often a result of their perceived authenticity (Moore et al., 2018). Authenticity is generated by presenting material that connects with an audience, which can be from the perspective of an insider (such as a CEO or a marketing professional (Yomi Adegoke, 2021)) or by being an outsider ~~and~~ presenting a viewpoint ~~which~~ that appears to counter the authority of an organizational hierarchy (Dawkins & Burroughs, 2016). Methods of propagating influence and social capital in a network may backfire when perceived to be unauthentic (Hu et al., 2020), ~~for example,~~ such as when the corporate elite tries to influence their network (Yi et al., 2020). While there are many influencers ~~that~~ who are aware of their role

and use their influence as social currency, networks may also contain hidden influencers who may not be aware of their role.

1.3.2 Objectives

This thesis is motivated by personal experience with the relative ineffectiveness of existing student activism organizations on campus. Campus groups are often insular (P. A. Miller, 1981), ~~and~~ promote events to a closely knit network of followers, and do not have wider campus or societal reach (Eaves & Husser, 2017; Harper, 2015), even though this can often be their stated goal as part of an effort to promote political socialization (Andolina et al., 2003). As such, the main objective of this study is to uncover the reason why campus-based organizations appear less effective than they otherwise could be and find important connections between social structures comprised of organizations and individuals.

This by done exploring the divide between the relative social reach of those in positions of authority within formal organizational hierarchical structures and so-called “hidden influencers”. Hidden influencers are difficult to identify (Duan et al., 2014) and have a high degree of influence within their respective social networks, both absorbing information from others and transmitting it to others. Influencers have a social reach beyond that of the organization and remain relatively inconspicuous, as it may not be apparent to others in the network that their content is being mediated by a socially manipulated algorithm. Influencers also create new network structures~~,~~ and pathways for organizations to connect to distant and previously unseen network members. Organizations tend to contain formal organizational structures that parallel

their hierarchy, this makes influencers an undervalued asset and a useful tool for organizations to connect with those beyond their immediate vicinity.

1.3.3 Research Questions

This study therefore seeks to employ social network analysis (SNA) for the purpose of examining the underlying social networks of pro-Israel activist organizations on North American campuses as an example of ~~the~~ how the method can be used. The study aims to identify the most influential participants within these networks. It also seeks to determine whether such individuals constitute hidden influencers, possessing a wide reach on social media networks. As such, the following three empirical research questions will be explored:

1) Can SNA be used to understand the underlying social network dynamics of pro-Israel student organizations on North American campuses?

2) Can SNA be used to identify the most influential participants of Pro-Israel student organizational networks?

3) Can SNA determine whether hidden influencers connect various pro-Israel student organizations on Twitter?

The implication is that if hidden influencers are indeed identified, pro-Israel student activism organizations could stand to benefit from reaching out to these individuals and making use of their extensive network reach. This could be done by employing social network analysis (SNA)

to uncover the hidden influencers in their respective networks. Given the potentially exponential nature of social reach on social networking sites, the benefits in terms of understanding how hidden influencers relate to organizations and using a quantitative view of the network to expand reach could be significant.

1.4 Conclusion

This research project seeks to build upon my personal experiences with Israel activism on campus and the connection between organizations and individuals in this space using examples of interconnected network data. It takes an exploratory approach, which is used to build a foundation upon the literature, techniques, and approaches being used in this space by applying it to the novel study context. There are no initial assumptions about how individuals interact within the network or how the network is formed as a sum of these disparate parts. The project's goal is to suggest new avenues of exploration, establish a baseline for further study, and arrive at new and unknown conclusions. In this context, the project is an illustration of how a social network can be studied, unpacked, and used to reveal insights into social dynamics.

This thesis seeks to answer three empirical research questions. Firstly, can SNA be used to understand the underlying social network dynamics of pro-Israel student organizations on North American campuses? Secondly, can SNA be used to identify the most influential participants of Pro-Israel student organizational networks? Thirdly, can SNA determine whether hidden influencers connect various pro-Israel student organizations on Twitter?

There are ~~however~~ certain limitations however ~~in~~ regarding the scope ~~to the~~ of this project. It is important to note that the Israeli-Palestinian conflict and current Israeli affairs are not studied in this thesis in terms of politics or history. There is no question that the political situation in the Middle East is complex. This can also be a driver of tensions with the student population involved in the pro-Israel networks being mapped. These social, geopolitical, or religious issues may act as a lightning rod for controversy and political activism on some campuses. It must be stated that exploring the political and historical context and background that explain the tensions on campus is essential but beyond the scope of this project.

The rest of this thesis is structured as follows. Chapter 1 provides a discussion on the importance of interdisciplinary research in academia. Chapter 2 offers an examination of the literature on social networks, student activism and the Diaspora-Israel relationship. Chapter 3 outlines a theoretical framework for social network analysis (SNA). Chapter 4 describes the methods taken and practical problems faced in this thesis. Chapter 5 presents the results ~~through~~ with the use of sociograms, a graphic representation of actors, or nodes, and their relationships, or edges, in a social network. Chapter 6 discusses the significance of these results, as well as the limitations of the study and avenues for future research. Chapter 7 concludes.

Chapter 2

2 Interdisciplinarity

This section is analogous to the minor paper for the comprehensive exam. Interdisciplinary study is a vital part of this project and as such, it is included here as a chapter in its own right. The section begins with a review of the literature on interdisciplinarity and a discussion of explicit and implicit interdisciplinary programs and research. Following this, the importance and relevance of interdisciplinarity for this thesis will be outlined. Finally, a conclusion will sum up the importance of this method and general terms and for this research project. Let us begin then by taking a closer look at interdisciplinarity research.

2.1 Interdisciplinarity Research

2.1.1 Castle and Rocks: Explicit and Interdisciplinarity

In one of my PhD classes, my professor described the disciplines as “castles”. Each is fortified and protected, representing and defending their sometimes-warring territories from each other, and from outsiders. Much like roaming individuals and castle communities in the past, when an area of study comes along which does not quite belong, the first reaction of the discipline is to drop a rock on them and subtly encourage them to research elsewhere. Growing tired of having rocks dropped on them by an endless number of castles, the area of study decides to construct its own castle between two or more others, and thus creates a new interdisciplinary space. They establish communication and alliances with the other castles (Moran, 2010), trade routes, and, at times, pretend to live in isolation until it serves to engage with the greater world around them. This new construct is open to membership from those who do not exactly fit in the castles of their neighbours but may still be challenged by those further afield. Eventually, the new castle also starts dropping rocks, and so the cycle continues.

2.1.2 Study of Boundaries and Interdisciplinarity in the Academy

This paper is a study of interdisciplinarity from the literature and a reflexive review of my own academic career leading me to this point. My academic career has been at the crossroads of many intersecting fields of study, and the subjects that I have studied have often been at the intersection of politics, society, and religion, while using tools from various areas of science and technology. I have been fascinated by overlapping layers of social structures, knowledge and/or belief influence, and how societies function and what this means for praxis in my academic

career (Dooling et al., 2017). My experience with a liberal arts education has indeed been one of "synthesis, holism, [and] connectedness" (Klein, 2005, p. 3). From the starting point of why something is happening, to the theoretical basis, to understanding the underlying mechanics, I have come to appreciate that interdisciplinarity can be interpreted in many ways, often depending on the approach of the discipline.

The study of interdisciplinary research is timely, as there has been an increased interest in the practice of interdisciplinary research of recent, and it has "gained popularity in policy, practice, teaching and research circles" (Chettiparamb, 2007), while also being perceived as an inherent value to the approach (Huutoniemi & Rafols, 2017, pp. 498–499). This may also be because there has been a shift in what we study and how we study it. Geertz sees this as a shift in the social sciences, that have "turned away from a laws and instances ideal of explanation toward a cases and interpretations one, looking less for the sort of thing that connects planets and pendulums and more for the sort that connects chrysanthemums and swords" (Geertz, 1998). With new technological tools and methods, the line between the social and science becomes even more blurred.

The idea that the disciplines are silos and completely independent of each other may seem to be accurate, but the reality has been quite different. There are many academic areas that utilize tools sourced from various disciplines, using new approaches and paradigms. These tools are often required to answer complex and multi-faceted questions, which are of exponentially increasing complexity and number as new knowledge is discovered and redefined in novel ways. The connection between the disciplines "resists linear definition […] [and] contributes to present day perceptions of complexity" (Morin, 2008, pp. 99–100; Strathern, 2004). There has been movement towards the wider adoption of a transitioning paradigm and breaking the barriers

between these silos (Palmer & Fenlon, 2017). The idea that "disciplines are not static but are dynamic" (Jacobs, 2017, p. 36) and constantly shifting has become more widely adopted. This discourse can be seen through "[a] closer look at the metaphors being attached to disciplinarity and interdisciplinarity not only [revealing] their complementarity but also [hinting] at the function of the discourse itself. One may speculate that the renewed popularity of interdisciplinarity indicates a fundamental shift in the image and self-concept of science as a unified though heterogeneous institutional arrangement" (Stehr & Weingart, 2000, p. 2). While interdisciplinary thinking has not resulted in a radical transformation of the academy, there is now an "expanded set of materials and scholarly approaches that counter the status of disciplines as isolated domains" (Frodeman & Klein, 2017).

In this paper, I argue that while the silos represent the main pathways of specific knowledge, there are many offshoots, combinations, and spaces from which to draw in order to create, store, and form new types of knowledge. This process is often implicit (Borrego & Newswander, 2010) and is reflected in the everyday, tacit cooperation found at all levels in the academy (Travaille & Hendriks, 2010).

To understand what a discipline is, it is important to start with the historical origins of the disciplines in order to appreciate the changes that have occurred over time. This study gives a new perspective to understanding where the disciplines now "live," what boundaries they cross, and how they interact, depending on the core definition of what a discipline is. Jacobs once wrote that disciplines arise as an:

> organizational manifestation of the need for an academic division of labor […] contemporary scholarship is so vast that no single person could master all of it. […]

> There is thus a need to divide the intellectual terrain into fields of inquiry, even while practitioners know full well that extant dividing lines are fuzzy and sometimes arbitrary. (2017, p. 35)

In this contested space (Repko, 2008, p. 7), the divisions between the disciplines may relate to many factors. Studying the disciplines in the context of boundary change requires study in "terms of both space (stressing geographical differences) and time (stressing historic changes)" (Chettiparamb, 2007). Understanding how these shifts have happened over time and space paint a picture of shifting boundaries, novel links between silos, and new ways of conceptualizing the academy.

Foshay makes a distinction between disciplines that cross over into society from academia and notes that this depends "whether one is examining them in relation to the broader society and economy or in relation to the overall mission of the modern university" (2011, pp. 5–6). From there, it becomes a distinction of distance between the function of a discipline in the academy and how a discipline connects with social relevance (Frodeman et al., 2017). This is along the lines of how Frodeman envisions the linkages between academia and society (2010). As research sometimes grows apart from its societal utility (at least in the immediate sense) due to specialization, such as the "necessary and even inevitable narrowing of the focus of research [and] ever more specialized investigation […] [this] leads to a distancing of research from the teaching and disseminating function of the university within its institutional vocation in wider society" (Foshay, 2011, p. 6). The apparent conflict between interdisciplinarity and specialization comes from the preservation or redefinition of established disciplinary boundaries. Klein notes that "[I]nterdisciplinarity and specialization are parallel, mutually

reinforcing strategies. The relationship between disciplinarity and interdisciplinarity is not a paradox but a productive tension characterized by complexity and hybridity" (2000, p. 7).

In many ways, I think the study and practice of interdisciplinarity reflect both my academic career and my dissertation topic. I find it fascinating that, in a research project mapping the interaction of individuals within groups, I think of the disciplines operating in much the same way, growing, reconfiguring, and contracting. The interconnecting spaces between firmly entrenched bodies of knowledge often create new and complex spaces of their own or perhaps branch off into whole new ranges of possibilities. For example, the field of study relating to academic publications, bibliometrics, creates a "socio-technical network [that is] […] a methodology for the study of scientific communication [and is an important element of] […] contemporary sociological thought on science" (Gomez Morales, 2005). By being able to gauge the way a piece of knowledge is used, new ways of studying the overarching discipline(s) can be implemented. There is praxis between both the theory and the applied tools which form a new way of thinking and a new attitude towards interdisciplinary research (Edelbroek et al., 2018, pp. 11–14, 154). This depiction underlines the very essence of interdisciplinarity and adds a quantitative measurement to visualize academic disciplines and the interdisciplinary areas that bind them.

There are many examples of how some knowledge is privileged by the gatekeepers of a discipline. At a recent conference I attended, one of the presenters discussed how Indigenous cultural knowledge is privileged and segmented into disciplinary domains (Ian Kalman, 2017). In the presentation, this idea of privileged knowledge spaces was explained by the process of "Indigenous elimination, which is evident in the way anthropology does or does not study particular "[c]ultural" groups" (Simpson, 2014, p. 67). In this example, an Indigenous person's

beliefs were mediated by a reporter, which the presenter saw as qualifying which information was legitimate, and what was not. The idea is that while the outside sees certain knowledge as legitimate (in this case, traditional beliefs), some knowledge may not be considered valid (which the reporter saw as belonging to knowledge outside of traditional beliefs). In this case, the values and interpretation imposed by the reporter on the individual qualified what was and what was not "appropriate" knowledge. There are parallels in academia, where certain knowledge by the disciplines, despite being privileged knowledge of the group, is not considered to be worthy of inclusion by the disciplinary gatekeepers. This internal struggle is exacerbated by the "breadth of disciplines [and] is accompanied by substantial internal differentiation. Specialties abound, creating lively (and sometimes unpleasant) internal politics" (Jacobs, 2017). In other words, even within the academy, some types of knowledge are considered legitimate while others are not because they do not fit within the accepted boundaries of disciplinary knowledge. There are many parallels here with other types of knowledge and disciplines.

2.1.3 Silos and Privileged Spaces

The boundaries of disciplines can be mapped to distinguish between what is inside the boundary and what is not. While this may be true on a technical level, the underlying theoretical foundation of this mapping is flawed. While it may be possible to "see" where one silo begins and another ends, the reality is that interconnections happen all the time without being seen. Disciplines may have started as discrete reflections of academic fields, but they shift over time (Davis, 1995, pp. 3–4). For example, examining the quantitative number and topic of published papers will show explicit distinctions, but variations are often more subtle. Committees and funding agencies are increasingly requiring researchers to show social utility, to form

interdisciplinary committees and panels, and consult with external stakeholders, all of which bring a level of interdisciplinary cooperation, even if it is not explicitly recognized as such. Using the interdisciplinary label, as Jacobs puts it, can have negative connotations (Jacobs, 2014). Interdisciplinary scholarship “can take on a wide range of meanings” (ibid.) and, in many cases, is dependant on a context-specific understanding. The way the term interdisciplinary is used can hold different meanings and are context-dependant (Moran, 2010, p. VIII). The shared understanding of what interdisciplinarity is and how it is applied in many ways mirrors the underlying division of the disciplines.

The work the academy and each discipline undertake has a duality, both the pursuit of knowledge and societal acceptance and legitimacy. The discipline has a purpose and is itself both a repository of knowledge and a structure for granting legitimacy and authority to the knowledge it serves. This authority is generated by the academy and is imbued in the work done in conjunction with society. For example, the links between the fields of academic and applied law or medicine and the boundaries around them, legitimize and protect their branch of knowledge. Turner notes that the essence of this legitimacy comes from the academy, but it is mediated by society. He notes that “[t]he model of "public understanding of science," […] is the product of a long history of thinking about the fundamental problem that results from the dependence of science on the public for support and the inability of the public to understand the content of science” (Turner, 2017). While there are many instances where social perception and science align, there may be others where the discipline functions as the gatekeeper for knowledge outside of the public sphere. This can be a dynamic process as fields emerge and evolve, interdisciplinary collaboration can be a step in this evolution as new boundaries are defined and crossed.

There are, of course, many examples of programs which have an explicit interdisciplinary focus and are not limited to programs that study the underlying mechanics of how disciplines work together. There are programs, departments, and even entire schools that use this terminology to characterize their educational approach (Moran, 2010). In the liberal arts system of education, many, if not most, programs require taking courses from other disciplines in a holistic approach to education (Mehrens, 2016). Some programs go even further and include not only a selection of courses, but integrate them, creating new types of knowledge and connections with interdisciplinary spaces. Henry refers to "integrative and interdisciplinary studies programs" (2005, p. 4). We see that there is less a focus on de facto interdisciplinary programs which are interdisciplinary in character, but the analysis rather focuses on explicitly interdisciplinary schools, departments, and programs (ibid. p. 6). This distinction is crucial because programs, left to their own devices outside of the disciplinary silos, are disadvantaged by their solitude. This is because there are many programs that, for funding or research purposes, are required to demonstrate some degree of interdisciplinarity, a trend which is increasing over time, particularly in closely related fields (Barthel & Seidl, 2017).

One of these spaces can be seen in how computer science, engineering, and healthcare combined create new bodies of knowledge which are at the same time both part of their parent disciplines and create new expertise and knowledge within their fledging domain of biomechanical engineering, health analytics (Y. Wang et al., 2018), technology aided epidemiology (National Academies of Sciences et al., 2017), and so on. My area of research takes place at the intersection of computer science, sociology, and communication. These disciplinary areas have many offshoots and interconnections. One of these is the cluster of social network analysis, where practitioners may be part of many other groups, yet come together over

new methods, theory, and knowledge. What these spaces are called, how they conceive of themselves as interdisciplinary, can be measured in two ways: a study of bibliometrics through an analysis of published papers, or surveying researchers to identify the extent of their collaboration (Okumus et al., 2018). These two approaches qualitatively and quantitatively measure not only what has been done, but where new collaborative knowledge is being generated, and how it can be used beyond the boundaries of the disciplines (Choi & Pak, 2006).

Knowledge within the disciplinary boundary is developed, stored, and transmitted, often through scholarly journals and conferences, but this product can, itself, evolve as it is taken up by integrated spaces and transformed into the backbone of new paradigms. In this way, the implicit evolution of knowledge into interdisciplinary spaces, and the inverse, creates a flow of information and influence which can be seen on many levels. For example, advances in the interdisciplinary area of computer science can enhance the capabilities of many monodisciplinary fields, yet advances in monodisciplinary fields like material science, physics, geology, can also help to propel the field of computer science. Change takes the form of rethinking the barriers between the disciplines and exploring the ways by which boundaries can be reimagined (Wallerstein, 2001, p. 239). I argue that even if interdisciplinarity is not acknowledged by name and is merely assumed on an implicit basis, it does happen and becomes a reality in many instances.

On a macro level, the organization of the disciplines requires some flexibility as new and complex interactions are found between disciplines. Eventually, these “study areas” may turn into disciplines (or sub-disciplines) and require spaces of their own to create new knowledge and explore new ideas. The structure of the disciplines changes as new interconnected pathways are formed, while others collapse, in a never-ending cycle of creation, transformation, and

destruction. This is not to say the idea of the strict disciplinary silo is dead, rather there are many possible structures and connected spaces where domain knowledge of the discipline can be preserved. At the same time, by having new spaces connect between disciplines, an exchange of knowledge and ideas with newly emerging and entrenched repositories of knowledge is allowed. This is beneficial to the academy as a whole, as it prevents the endless perpetuation of restrictive silos and privileged spaces.

2.1.4 The Implicit and Explicit Interdisciplinarity

Klein (2013) writes about a "concealed reality", the idea that interdisciplinary work already happens under other names but is not explicitly identified as such. This practice is covert because it is usually not explicitly acknowledged as the product or study drawing from multiple disciplines, rather there is the pretence of unitary disciplines preserving areas of authority. When a program does use the interdisciplinary label, it becomes an acknowledgement of the legitimacy of this kind of knowledge. The process of forming these cooperative links connects knowledge from an understanding of how to adapt institutions that have traditionally focused disciplinary boundaries. These institutions use a silo approach of separating the domains of knowledge and associated programs into discrete and exclusive domains.

When examined as praxis, Mackey (2002) notes that there is a difference between "doing" interdisciplinary research, and the study of interdisciplinarity itself. This reminded me of a parallel with United States Supreme Court Justice Potter Stewart famously saying "I know it when I see it" (Stewart, 1964), referring to "knowing" (or interpreting) what was considered pornography under the law. This is very similar to the closed interpretation of what interdisciplinary work is, or can be, in academia. While there certainly is a field of research to

study how interdisciplinary spaces and practices work, I think that these studies should not constrain and limit collaboration by distinct rules.

2.1.5 The Interdisciplinary, Transdisciplinary, and Monodisciplinary Research

There are different ways to understand creating, storing, and transmitting knowledge outside of a single discipline. I use the definition by Choi and Pak: "[m]ultidisciplinarity draws on knowledge from different disciplines but stays within their boundaries. Interdisciplinarity analyzes, synthesizes and harmonizes links between disciplines into a coordinated and coherent whole. Transdisciplinarity integrates the natural, social and health sciences in a humanities context, and transcends their traditional boundaries" (2006). The landscape of these interconnecting fields can be thought of as "a continuum which runs from multidisciplinarity […] where different scholars focus on the same area of study but remain strictly within their disciplinary boundaries, to the utopian ideal of post-disciplinarity […] in which […] no disciplinary boundaries are recognized" (Grix, 2004). The degree of interconnection depends not only on the methods used, but also on the underlying theoretical or ontological assumptions (ibid.).

As can be seen in the definition of Aboelela *et al.*, there are several elements that make up their definition of interdisciplinary beyond that of Choi and Pak. Their definition expands on "analyzes, synthesizes and harmonizes" (Choi & Pak, 2006) to include "[…] any study or group of studies undertaken by scholars from two or more distinct scientific disciplines. The research is based upon a conceptual model that links or integrates theoretical frameworks from those disciplines, uses study design and methodology that is not limited to any one field, and requires the use of perspectives and skills of the involved disciplines throughout multiple phases of the research process." (Aboelela et al., 2007)

The spectrum continues to transdisciplinarity “in which we all learn from each others trade” (ibid.) with academia and others also seeing this as creating external connections. For instance, connecting knowledge from the academy with members of the community. An example of this can be seen in the development of citizen science, where members of the public, untrained in science, contribute to and shape research (Bonney et al., 2014). This link between the academy and the population is bidirectional, although the authentication and dissemination of knowledge is still often regulated using the traditional boundaries of the academy. While these systems solidify, control, and provide legitimacy, new technologies and methods of transmitting, discussing, and storing knowledge, fueled by citizen science and public interest, may take these repositories of knowledge to new places. An example of this is the use of blogging or social media, which, through public discourse, may in turn transform the connection the disciplines have with the public and provide new information that reforms the absolute hegemony of the discipline (Jones, 2016).

The methods and tools used in collaboration between discrete disciplines may be influenced by the distance between areas. While there may be a more natural fit in collaboration between closely related disciplines, and more risk associated with those that are farther apart, distant connections may lead to research which has more difficulty in being accepted by their component disciplines (Yegros-Yegros et al., 2015).

2.1.6 The Differences between Interdisciplinary and Monodisciplinary Research

Newell (2013) claims that there is a lack of progress in the development of interdisciplinary theory as a field of study. There is a distinct sense that he felt a lot of frustration with how interdisciplinary work has evolved. Perhaps, more accurately, he feels that it has been difficult

for many in the field to adopt his theoretical position. I suppose that there is a disconnect between seeing it happen and trying to theoretically explain the underlying process of what interdisciplinarity is, and how it can be explained. For Newell, it is not enough to see collaboration happen without being able to explain the underlying motivations and processes. I understand his objection to the simplified diagrams of Jantsch (ibid.) and how this can be used as a justification to create interdisciplinary programs by combining university resources without consideration of what the underlying goal is, but I am not convinced by the need to use complex theory to describe and explain what he posits is a complex system of interconnections.

Disciplines concentrate a great deal of control and power over knowledge in their domains. Disciplinary hegemony is a theory which brings the idea of the priority or dominance of certain types (or sources) of knowledge from philosophers such as Foucault together with the concept of hegemony from those like Gramsci (Weiner, 1998). Agger acknowledges the power relations between and within the disciplines and argues that research is the product of "underlying philosophy and assumptions" (ibid.). He posits that each disciplinary silo is protective of its ability to produce, or control knowledge, and that it becomes "much harder to publish genuinely heterodox work of a kind that seriously challenges the literary production of disciplines" (2013). In other words, the better-established disciplines use the power and control at their disposal to exclude or delegitimize emerging disciplines which could threaten their primacy over particular types of knowledge, and, by extension, funding and resources.

Even though it would seem that there is a strong trend towards encouraging interdisciplinary research in many different areas (Goodwin & Causgrove Dunn, 2018), evidence from various fields, particularly those with well established boundaries, points to entrenched barriers. For example, this can be seen from monodisciplinary papers in certain disciplinary areas

being cited far more frequently than multidisciplinary articles (Levitt & Thelwall, 2008). However, even in these fields, new strategies are being devised to reach across disciplinary boundaries (Miller & Leffert, 2018). While progress may be difficult in some areas, power sharing through interdisciplinary research is possible (Lillard, 2018), but requires some degree of flexibility and reinvention.

Henry argues that the disciplines are holding on to their power and policing knowledge within their domain (2005), which Shailer generally agrees with (2005). In Shailer's view, while there is a movement towards greater interdisciplinarity, this may be at odds with the academic system and is being driven by external forces (ibid. p. 1). While there are some institutions, for various reasons, which have embraced an interdisciplinary approach, funding which mandates interdisciplinary research possess has a disruptive effect. For Henry (2005), this type of development means the academy will be forced to change and adapt its model of instruction from a cookie cutter "McDonalds" approach (Hayes & Wynyard, 2016) to one which meets the needs of a complex world, and tailors its courses to real world requirements (Henry, 2005).

2.1.7 Explicit and Implicit Interdisciplinary Programs and Research

Synthesis is a part of everyday life. We constantly take in and process new information, reimagine it, and put it back into the world. With the daily experience of interpreting and making sense of information and news, filtering distractions, and processing an endless stream of information vying for our attention, there is no inherent conflict in how we mediate synthesis. Perhaps this every day function is the implicit result of working towards informational homeostasis, or optimal information processing. Contrastingly, in terms of the academy, reaching "[i]nterdisciplinary synthesis, however, presents heightened cognitive demands and

requires deliberate instruction" (Boix-Mansilla, 2017, p. 261). In other words, when we purposefully think of what knowledge belongs to a particular domain, these divisions need an explicit explanation in order to be reconciled.

An example of implicit interdisciplinary study from Laurentian University are certificates in the Faculty of Arts. These programs might be better categorized as unidisciplinary collections of courses which are contained in a single certificate. In many of these programs, there is interest in interdisciplinary studies because programs and students "perceive that interdisciplinary studies gives […] [them] a competitive edge" (W. H. Newell et al., 2008, p. 40). For example, there is a certificate in social research methods which combine courses from various disciplines into a new structure. The website notes that "[S]tudents completing a B.A. degree can obtain a Certificate at the same time without having to take any additional courses beyond those required for the degree" (Laurentian University, 2018a). In other words, a collection of disparate courses comes together to create this new learning objective. While the courses themselves are not fundamentally linked, students with a background in the various courses offered should be able to make new connections between the subjects, which is what the certificate represents (Strathern, 2004, p. 15).

There are also explicit examples from Laurentian University, such as my program (the Human Studies program), which allows the student to "specialize in several areas of study, including cognition and communication, Franco-Ontarian and Francophone studies, interpretation, values and ethics, regional and cultural studies, and gender relations and sexuality studies" (Laurentian University, 2018b). While the program does not have the word interdisciplinary in the title, it is understood that bridging "several areas of study" is the explicit

goal. The program teaches a focus on the study of interdisciplinarity, which is quite different than the practice of combining knowledge from various disciplines and becoming praxis.

An example of how this works in various health programs (including medicine, nursing, etc.) at the University is the use of Interprofessional Education (IPE) learning elements integrated across various programs. The goal of IPE is to "[involve] educators and learners from 2 or more health professions and their foundational disciplines who jointly create and foster a collaborative learning environment" (Buring et al., 2009). The focus on both practice and foundational disciplines underlines the importance of a new and collaborative praxis that results from otherwise separate bodies of knowledge and experience. Taking a collaborative approach creates a pathway to move beyond the silos of their profession and foster "collaborative learning, fostering awareness and enthusiasm for IPE" (Margalit et al., 2009), which speaks to both the underlying theory of disciplinary collaboration and IPE, in and of itself, as an object of study. This interdisciplinary movement, though in closely related fields, is another example of an approach that integrates multiple fields.

In another program, Interdisciplinary Health, students "[A]pply a critical, interdisciplinary perspective on contemporary health issues in human development, psychology, sociology, kinesiology, gerontology, public health, medicine, or related health fields" (Laurentian University, 2018c). While this program also shows links between the various fields as they work towards the goal of "applying an interdisciplinary perspective" there is a focus on the practice of interdisciplinarity, rather than the theoretical underpinnings behind it.

These "boxes" are not random or arbitrary, but the process of a choice that defines them. Klien states that "[t]ypologies are neither neutral nor static. They reflect political choices of

representation by virtue of what is included or excluded, which activities are grouped within a particular category, and how narrow or wide the field of vision is in a spectrum ranging from small academic projects to society at large" (2017). There is a defining element to how a discipline carves out a niche, and, over time, evolves into new spaces in conjunction with surrounding forces. These programs are all examples of the discussion around what exactly interdisciplinarity is, and how it is practiced. By using terms to define privileged spaces, new understandings are created. Whether it is explicit or implicit, the links between the theory, practice, and bases of knowledge build towards a new collection of knowledge, one which is larger and more nuanced than the sum of the monodisciplinary component parts.

In sum, interdisciplinarity is a complex and nuanced concept the exact meaning of which can be difficult to define. Yet the practice of interdisciplinarity is often highly useful in terms of uncovering new insights about the world by looking at problems from a different angle, which is exactly what this thesis seeks to do. Let us turn now to a discussion on the importance and relevance of interdisciplinarity for this thesis.

2.2 Importance and Relevance

2.2.1 Importance for this Thesis

Social networks are not new phenomena, but rather a reimagining of an age-old communication paradigm. Although "[s]ocial networking websites have become a significant component of people's daily lives and are built on the concept of traditional social networks, which connect users to new people having common interests" (Iordache & Lamanauskas, 2013, p. 24), these networks are a reflection of corporeal societal functions. As the mediums through which these social functions take place change, the tools we use to study society with must change as well. As such, researchers like myself should welcome interdispclinary methods, since the combination of different techniques and ideas can help to reveal important insights about the world which may not otherwise have been possible.

It is for this reason that my thesis seeks to use qualitative, sociological research on social networks and quantitative, computer science related techniques to visually map out student activist social networks on North American campuses. This allows me to explore the underlying structure of such social networks in a more robust way than would have otherwise been possible by remaining within the traditional boundaries of academic disciplines. Before further highlighting the interdisciplinary nature of network research and how using this approach brings additional benefits however, let us first examine the interdisciplinary parameters of the study, or in other words, what exactly this thesis seeks to achieve through the use interdisciplinary methods.

2.2.2 Interdisciplinary Study Parameters

My research is at the intersection of many new and emerging fields, including data analysis, computer science, media studies, and social media analysis. Now that social media has begun to mature, analytics, the process of quantifying and understanding the trillions of pieces of interconnected pieces of data, can lead to new types of actionable information. While using technology and understanding its underpinnings may be far removed, new tools that bridge many applied and academic areas are critical to better understand larger volumes of data. This discussion's context is essential as the political and social context surrounding the act of analysis has changed rapidly and continues to evolve.

My research is well suited to interdisciplinary methods because it involves several different knowledge areas, generally falling under the banner of interdisciplinary social research. The focus of my research study involves the structure and organization of pro-Israel student networks on Twitter. The subject of the research in the fields of Jewish Studies and Israel Studies draws from many disciplines. While there are explicit Jewish Studies programs with a specific disciplinary focus, the field is dominated by those from a vast number of disciplines, including "Classics, History, Literature, and Philosophy, as well as some of the Social Sciences" (Baskin, 2014). I will also draw from Israel studies, which include "Israeli history, politics, society, and culture" ("Project MUSE – Israel Studies," 2016).

I am not, however, particularly interested in the study of religion in the context of dogma, exegesis or practice. Rather, my interest lies in the social/religious phenomenon which is central to Diaspora identity in North America. My background is in political science and sociology, areas of literature from which I will be drawing on, such as diaspora studies, social and campus

activism, and Israel and Jewish studies. In some respects then, this work can also be characterized as being at least partially transdisciplinary, in the sense that my research project seeks to connect academic knowledge and society (Frodeman, 2010) and has many other applications outside of this specific inquiry. Although the complex nature of social research may often warrant the use of interdisciplinary methods, let us now take a look at why such methods are particularly necessary in the context of network research.

2.2.3 The Interdisciplinary Nature of Network Research

My research uses social media analytics to examine how student activists on campus are connected to on-site organizations. Blending the two approaches of Computer Science and Sociology using an interdisciplinary approach mirrors Klien's explanation that the goal of this fusion "is to improve the quality of results, typically by borrowing a method or concept from another discipline to test a hypothesis, to answer a research question, or to help develop a theory" (2017). My aim is to study this population using a novel population recruitment tool and to better understand the internal network dynamics of this population. Because this research crosses many boundaries, it is the perfect fit for an interdisciplinary research project.

My primary focus is understanding large networks. To that end, social network analysis "is now well-established as an interdisciplinary field drawing inter alia on contributions from mathematics, computer science, social science, media, communication, and cultural studies, and design" (Bruns, 2012, p. 4). By applying methods and techniques from these various fields, the population I am studying can be examined both as independent actors within their networks and through a holistic view of their interactions and the structure they create. To that end, the fields of Jewish Studies and Israel Studies draw faculty and researchers from a number of disciplines.

While there are many Jewish Studies programs which have a specific disciplinary focus, the field is dominated by those from a wide number of disciplines including "Classics, History, Literature, and Philosophy, as well as some of the Social Sciences" (Baskin, 2014). For example, the Jewish Studies program at York University in Toronto offers a "cross-disciplinary Faculty of Liberal Arts & Professional Studies program [that] […] explores the texts, histories, cultures, sociologies, languages and fine arts of the Jewish people from biblical times to the present" (York University, 2018).

Many of these areas focus on the cultural and social context of Jewish and Israel studies in their contemporary and historical context. There are also fields which focus on religion such as religious studies, theology, and related disciplines. Examples of this type of program range from academic programs to those that involve applied religious texts, such as the Undergraduate Torah Studies program from Yeshiva University, that include "an intensive analysis of classic Jewish texts in their Hebrew and Aramaic originals" (Yeshiva University, 2018) along with a religious context and practice. With many overlapping fields of study, in this context, interdisciplinary research can be used to address a complex social issue. The many facets and intersecting dimensions of the political, social, and religious elements of how Israel is understood and experienced in North American campuses require a broad approach that is best suited to solving complex problems (de Greef et al., 2017, p. 9) using various resources, theories, and tools.

As a discipline, Israel studies includes "Israeli history, politics, society, and culture" (*Project MUSE - Israel Studies*, 2016). An example of this in Canada is the Israel Studies minor at Concordia University in Montreal. The program offers "courses in history, political science, religion, literature and language [...] [where the] study of modern Israel is a significant focus of

the program" (Concordia University, 2018). These programs tend to focus more on the modern State of Israel, and less on the religious historical context outside of academic study. While the research tools, theoretical orientations, and methodologies employed may vary, the various contributions to Jewish and Israel studies programs create diversity and allow research from many perspectives. My research connects these two areas. Some aspects of my research question relate to Israel and how it is constructed as a political and social object on North American campuses among students. This connection is often mediated by how Judaism, or secular cultural Judaism, is practiced in the Diaspora. One example of this divide is how Israeli citizens overseas are unable to vote in Israeli elections. While Israel touts itself as the "Jewish State", the domestic and Diaspora political, social, and religious agendas can be very different (Oster, 2019). Trying to reconcile the Diaspora into the domestic worldview of Israeli politics requires tools that go beyond the study of religion or politics.

The fragmentation of the academy mirrors the way by which society has become polarized and divided. When individuals primarily associate their identity with issues, as opposed to a larger monolithic social structure, there may be many unexpected outcomes. For example, among American Jews, there is "growing polarization […] between the politics of Reform and Conservative Jews and Orthodox and ultra-Orthodox Jews, both when it comes to U.S. politics (anti-Trump versus pro-Trump) and their views and connection to Israel" (Kraft, 2018). This complex interaction of religion and politics in both Israel and the Diaspora shows how alignment with issues supplants the idea of simply being part of a larger Jewish community with strong ties to Israel. This state of affairs leads to "Israel's conflicted identity as a Jewish and democratic state" (Tayler, 2011). To understand the many pressures, it is important to create a bridge between "the perspectives of religion, politics and law to achieve an understanding that no

one discipline could produce" (Tayler, 2011). This situation parallels what is happening in the academy. Israel or Jewish studies, as interdisciplinary spaces between political science, sociology, religious studies, etc. represent a challenge to these larger (and more established) disciplines. Just as individuals create their identities and seek control over their own narrative, disciplines function in much the same way, seeking to solidify their control and authority.

My research question and plan are suitable for an interdisciplinary approach because they involve several knowledge areas, generally falling under the banner of interdisciplinary social research. The central plan of my study involves the intersection between state and religion in the context of the Diaspora. This refers to a religion that "is now called 'religion' [but] was [in the past] coterminous with culture" (Fredericks, 2010, p. 163). Looking at the cultural and social representations of religion and how these concepts relate to the Israel-Diaspora divide will help to explore the differences and similarities of these distinct groups. I am interested in the social structure mediated by the cultural manifestation of nationalism, religion, and politics as they are constructed in the campus context. This approach requires "casting a wide net" to understand the social and cultural context of Diaspora participants.

I am not particularly interested in religion itself (e.g., dogma, exegesis, or practice), but the social/religious phenomenon which is central to Diaspora identity. My background is in political science and sociology, and I will be using literature from those areas as well as Diaspora studies, social and campus activism, and Israel and Jewish studies. This project is interdisciplinary because I am seeking to unify several areas of knowledge and explore a problem using resources and tools from disparate (though anchored in the social sciences) knowledge areas. The methods I will be using in my study (including social network analysis) are used in many other fields. How they are adapted to this context will be the challenge. The

specifics of this study require an interdisciplinary approach, the research question cannot be answered from within one discipline (W. H. Newell & Green, 1982).

In some respects, this work can also be characterized as being at least partially transdisciplinary, in the sense that my research project seeks to connect academic knowledge and society (Frodeman, 2010; Frodeman & Klein, 2017, p. 154), and not fall into the trap of specialized research being "inversely [related] […] to societal relevance" (Holbrook, 2017, p. 485). I think the questions the thesis poses are relevant on multiple levels. From the macro of understanding how populations can be studied using social data, to the micro, where participants in a network are sampled to understand network dynamics, there are many parallel applications and potential advances to understanding the nuances of this specific space.

In sum, interdisciplinarity is highly relevant to this thesis due to its importance for the subject matter. By combing research from distinct areas within the academy, the study can look at the social phenomena of interest from a new angle and gain a deeper understanding into the underlying dynamics at play.

2.3 Conclusion

This chapter has explored the nature and importance of interdisciplinary research. Interdisciplinary work is vital for broadening our understanding of the world and avoiding knowledge silos and privileged spaces in the academy. Such methods are particularly important for this thesis, which seeks to combine sociological research with computer science techniques. By combining separate areas knowledge from different disciplines, this project is able to reach a better understanding of how pro-Israel activism on North American Campuses is structured socially. Chapter 3 will examine in further detail the sociological literature in this area to date. In particular, it will explore the Diaspora-Israel connection, social media and campus and student activism.

Chapter 3

3 Literature Review

This chapter provides a review of the literature regarding the three interconnected areas which initially motivated this study. Firstly, the Israel-Diaspora connection will be examined in greater detail. Following this, social media and how it has changed the way in which we communicate will be looked at more closely. After this, activism in the context of social media will combine elements from the previous two areas to give us a better understanding of how pro-Israel organizations operate on North American campuses. Finally, a conclusion will sum up the literature and outline the remaining gaps that this thesis seeks to fill. Let us turn now then to an examination of the Diaspora-Israel connection.

3.1 The Diaspora-Israel Connection

3.1.1 Israel and the Diaspora Meet the Campus

The term "diaspora" comes from the earliest Greek translation of the Old Testament. In Deuteronomy, the fifth and last book of the Torah (also known as the Hebrew Bible or Old Testament (Cook, 2019)), the translation of verse 28:25 reads "Thou shalt be a diaspora in all kingdoms of the earth". This refers to Diaspora in the context of "migration and colonization" (Shuval, 2000) and forced exile (Fludernik, 2003, p. 291). From the time of this translation in the third century CE, the term Diaspora has taken on an expanded meaning, going beyond the Jewish and Greek context (Cohen, 1992, 1996). In my research, I use the word Diaspora in relation to the connection the North American Jewish community has with Israel. It is important to note that the relationship between Israel and Jewish communities worldwide is complex, despite elements of a shared religion. There are many critical differences, including social, political and religious organization.

Pro-Israel organizations, particularly those on campus, tend to focus on a single version of the Israel-Diaspora relationship. In the context of this study, there are structural connections within individual networks localized on campus and, at the same time, links to other similar organizations. Understanding which organizations are connected, and the ideology of the national and international organizations with which they connect and engage, creates the background that informs the view of the groups being studied. Because of the relatively small network size, some information based on influence and engagement can be gathered. There are many divisions and differences between Israel and the Diaspora, some of which are minimized from the campus perspective. While this aspect is outside of the scope for this project, it is

important to understand the context of the Diaspora. Representations of Israel in the Diaspora may have very different political, social, and religious connotation than how they are viewed in Israel.

3.1.2 The Diaspora

For many in the Diaspora, the relationship with Israel has been substantially transformed over time (Sasson, 2013). As a result, the conception of what Israel represents as a secular state and religious symbol has changed. The Diaspora and Israel, the Holy Land, are no longer characterized by the foreign community and "home" paradigm, represented as a core-periphery relationship. Rather, the Jewish Diasporas outside of Israel have become unique places with distinct religious and social characteristics. Traditionally, historical pressures and persecution have caused the Jewish community to form a unique social identity because they were not able to integrate (Heilman & Cohen, 1989). Following the *Haskalah* [the European Jewish Enlightenment (Etkes, n.d.)], Jews generally became more accepted in the public sphere. Through this acceptance, they no longer faced constraints on their development as an integrated minority. In contrast, since the foundation of the state of Israel, where Jews are a majority, the place of religion and how it is practiced in society differs significantly from that of the Diaspora.

The Diaspora has become a central element of the Jewish experience and, "[o]ne way or another, it is impossible to understand notions of 'diaspora' without first coming to grips with some central aspects of the Jewish experience" (Cohen, 1996, p. 1). The division between religion and secularism in Israel contrasts greatly with how these elements have developed elsewhere. Judaism in the Diaspora is less structured and allows for pluralistic social and religious practice in new and divergent directions (Safran, 2005). While religion in Israel is

practiced both as a public and somewhat secular identity as well, these divides look quite different in the Diaspora.

The Jewish community in the Diaspora is rapidly evolving into its own society (Schwarz, 2013). While there are many links between North American Jews and Israel, the American Jewish community developed progressive values (in social and religious terms), resulting in the development of a growing rift with Israel. This creates an interesting tension in which culture, religion, and perceptions have shifted, leading to the question of what commonalities remain. In the Diaspora context, there are specific structures and institutions which define the larger community and create linkages between Israel and a worldwide Diaspora collective. One example of this is the religious plurality developing in the Diaspora with new streams of Judaism, such as Conservative and Reform, becoming increasingly popular over the last century (Rosenblum, 2013). In contrast, the majority of Jews in Israel, despite being secular "traditionalists", have remained affiliated with the traditional Orthodox stream (Sobel & Beit-Hallahmi, 2012).

Israel and the Diaspora are separated by physical, cultural, and social (Ray & Diemling, 2015) boundaries, and these shape how identity is constructed (Biale, 2015). There are a number of theories which can explain the complex relationships between and within individual Diaspora communities (Gertheiss, 2015, pp. 53–84) and what motivates activism. While there are explicit Jewish and Israeli values, these may not hold the same sense of importance for Diaspora Jews.

In terms of North American secularism, this can be seen in the distinction between Jewish values and universal (humanist) values (Sucharov, 2011). An example of this is the concept of *Tikkun Olam* (Hebrew, literally, repairing the world). While the concept of serving

humanity as an aspirational goal is tied to many elements of Judaism, it has become a key value among some secular Jewish communities in the Diaspora. The primacy of this value over others is at odds with the more traditional Jewish values held in Israel among secular Jews (Sagi, 2015). In Israel, the more orthodox or traditional values practiced widely in society place a lesser importance on external goal of "improving the world" and generally focus on the more immediate patterns of life with ritual and observance. When we look at this divide, particularly in the context of pro-Israel campus activism, it is important to understand that the monolithic "Israel" ideal may not match the religious, political, or social values of campus activists.

3.1.3 The New Periphery and Core Relationship

The idea of a periphery and core relationship goes back centuries in Judaism (McNutt, 1999, p. 94). Indeed, the Mishna, a record of complex discussions referred to as the oral Torah compiled in the second century CE (MJL, 2021), talks about setting holidays based on the testimony of witnesses who had seen the new moon (Forta, 1995, p. 42). Since the Jewish calendar was based on the lunar cycle, witnesses would need to report seeing astronomical phenomena to set the time for the next holiday. In the period of the second Temple (516 BCE and c. 70 CE), this became more complex as many Jews lived in the Diaspora. When reports arrived from outside of the land of Israel, there may have been differing accounts of when the new moon occurred (Johnston, 2004, p. 258). This ancient practice of setting the date for the holidays and the challenges faced with slow travel times over great distances (Hachlili, 2013, p. 339) is reflected in modern religious practice. Some holidays for example now have two or more days of celebration (R. L. Eisenberg, 2020). This is to ensure that the holiday occurs in the right time and as a remembrance of the tradition. Today, the Jewish world is physically much larger in terms of the

Diaspora and spread over greater distances. Yet we are able to communicate instantaneously and bridge the physical distance between various communities.

Many of the same challenges exist when looking at bridging various Jewish communities across the world. While they share a common relationship, disparate communities often have different concerns and a complex relationship with each other and with Israel (Ehrlich, 2009, p. 349). This is because what Israel represents to Jews across the world as both a physical place and a spiritual ideal differs. Different communities in the Diaspora view these factors as opposing or complementary (Haberman, 2014, pp. 186–187). The modern State of Israel, where religion, secularism, and nationalism are complex and intertwined, has its own unique history. In Israel one of the many divides is over the religious concept of the "Land of Israel", a holy entity that either complements (as seen in religious Zionism (Peled & Peled, 2018; Schwartz & Stein, 2009)) or conflicts with the secular modern State [(as viewed by many Jewish followers of religious orthodoxy (Mahla, 2020)]). These distinctions are also present in the way Judaism is practiced in the Diaspora. Despite the fact that over time the Diaspora began to develop its own character and Jewish communities were established in various places, there has always been a link back to Israel, either through a religious ideal, or in terms of an actual location. This relationship has often been fraught with the underlying distinction of whether Israel was simply a place or whether there was some inherent religiosity in the biblical land of Israel (Gordis, 2019). For many, the answer is probably a combination of both factors. While this may seem like a minor issue, the religiosity of Israel and its relationship with the Diaspora has influenced politics, religion, and representation (Breger et al., 2013; Liebman et al., 1983). These questions have set the tone for relations between Israel and communities around the world for years and remain an important factor in Israel-Diaspora relations.

While Jewish people have been successful at forming their own communities in the Diaspora, they have remained cognizant of where they came from and the place that Israel took in their lives (Ben-Rafael et al., 2014; Rawidowicz & Ravid, 1998). Of course, this relationship between the religious centre and the permutations of religion in the periphery has dramatically changed over time. Before the Enlightenment, very few Jews lived in Israel. The idea of a homeland was theoretical and a representation of an aspirational religious goal. While there was a place where individuals could visit sites of Jewish religious and historical significance, this did not necessarily play an important role in their day-to-day lives.

This changed following the creation of the State of Israel. For the first time since the creation of the Diaspora (nearly two centuries previous), the State of Israel and the idea of the religious land of Israel collided for secular European Jews. Jews in Europe were fully immersed in the Enlightenment movement of secular integration and had very little reason to seek a Jewish homeland as an extension of identity (Feiner & Naor, 2011). Following the turn of the 19th century and the rise of antisemitism in Europe, there was renewed interest in seeking a Jewish homeland (Fischel, 2020, p. 360). Finding the historical homeland of the Jewish people, one which had historical significance, eventually became the ambition of Diaspora Jews seeking a homeland (Troy & Shcharansky, 2018). This did not necessarily change the way that secular Jews viewed religion. For many Jews, Israel was a religious ideal but was not a tangible physical space. Creating a secular state with Jewish roots was a compromise to find both a physical and, to some, spiritual homeland (Connolly, 2018). As Jews were expelled from much of the Arab world and Europe following the Second World War, many immigrated to Israel and various other places in the Diaspora en masse. This large movement of people dramatically increased the Jewish population in Israel and constituted a major influence in shaping the character of the state.

A parallel to the secularization in Europe and the early days of Israel can be seen on North American campuses. There are many divides and debates over the ideologies of how Israel manifests in this context. Much like the debate on campus surrounding pro-Israel activism, the State of Israel itself did not turn out to be a secular utopia, instead becoming a place of religious, cultural, and social flux.

While Israel was founded with a secular ideal, many factors contributed to making it a complex gathering of Jewish diaspora populations from across the globe. There are many divides to society in Israel, including political pressure from religious minorities and the ultra-Orthodox demographic, division based on secularism, and religion. Religion itself is often political with the creation or expansion of religious schisms and underlying ethnic divisions between Israelis. Many of these complex divisions are not seen from the Diaspora, which tends to view Israel as a monolith of religion and society. The Diaspora has its own culture and society, shaped by both its relationship to Israel and the cultures that surround local communities.

It is important to understand that, in Judaism, there is not a single monolithic method of religious practice. There is no central religious authority, such as the Pope of the Catholic Church. Instead, it remains comparatively decentralized (Sigal & Hadidian, 1977), as it has been divided into many streams over time (Wertheimer, 2020). There are many different groups and streams which are organized on the basis of ethnic background, origin, and many other factors. Today, Israel is home to many Jews that originate from more than 160 countries with many different iterations of religious practices (Markowitz et al., 2015, p. XI; Rebhun et al., 2004), even though there are some common elements among them. What drives a distinct wedge between North America and Israel is the way by which religion is controlled on an administrative level in Israel versus the independent and individual versions of Judaism which

are practiced in the Diaspora. There are many examples of this, particularly with the widespread adoption of various streams of Judaism which focus on individualism and modernity. These movements may break with traditional historical patterns of Jewish life. From a religious perspective, an “unbroken chain of the generations” may be easier to accept than religion and secularism coming into conflict throughout history.

For example, in the reform movement, there is a redefinition of how Judaism is practiced, what precepts apply, and what, ultimately, is the purpose of the practice of religion focusing on an element of personal involvement. This means that individual participants will go to services and redefine their religion in a way that suits them. Contrast this to how religion is typically practiced in Israel, where religion is the domain of the ultra-Orthodox and viewed as a service on demand. If someone is secular and requires religious services, they want to find the most religious person to deliver the required ceremony or service, but the rest of the time are comfortable not being involved in the practice of religion itself and comfortable being secular. To further complicate this, there is a very wide range in terms of what secularism and religiosity mean in both the Israeli and the North American context. Depending on what questions are asked, it may appear that a large percentage of the population is religious or a large percentage of the population is secular.

If this sliding scale is accepted on the basis of the adherence to various religious principles, then, in both Israel and North America, there is a large segment of traditional Jews and non-traditional Jews who practice an open-minded version of Judaism as opposed to a rigid system of practice by the ultra-Orthodox. However, in North America, there is also a very large segment of Jews who practice in other streams such as Reform, Conservative, and Reconstructionist, who, in some respects, reinterpret their religion because these groups are not

necessarily well formed in Israel. This creates a difficult division. On one hand, someone may be fully involved in the personal practice of religion in North America. On the other hand, it is difficult for them to see a religious parallel in Israel, because the way that Israeli Judaism is practiced may not parallel their own.

If Israel is understood to be the religious ideal, this divide between the religiosity of Israel and the Diaspora becomes even more complex. This is because, in their belief, Israel is simply a modern state and their religious convictions do not matter to their place in society. Because Israel is governed by ultra-Orthodox authorities, all matters of religion related to the private sphere are governed by the state through these authorities. It creates a situation where there are dramatic differences. A good example of this is the many incidents related to women of the wall. Women who want to pray at one of Judaism's holiest sites, the Western Wall, get into constant clashes with religious authorities who seek to preserve the space for male dominated prayer services, as has traditionally been the case. These disagreements do not always have the same degree of traction in public opinion in Israel as they do in the Diaspora. This is due to the public nature of religion in Israel where, while the state is secular, religion also has representation in aspects such as official religious holidays, religious courses, and a relatively small degree of separation between church and state. In the Diaspora, there is generally a greater separation between religion and state, which is reflected in the personal practice of religion.

Many educational programs, such as Birthright (or in Hebrew, *Taglit)*, a program to connect Diaspora youth to Israel, attempt to bridge the cultural and social division. The hope is that youth from the Diaspora will begin to realize they are part of a larger community with many variations, including social, religious, and political differences, yet also part of the same religious faith. For many young, secular Jews in the Diaspora, the place of Israel in their lives and their

practice of Judaism has shifted over time. The place of religion in society no longer represents the same ideal as it did to their parents or grandparents. Understanding this relationship is a key element to unpacking why individuals participate in pro-Israel activism and how their beliefs or views have an influence in their future sentiment towards Israel.

It is possible to quantify this relationship in terms of whether an individual will have an impact on Israel-Diaspora relations. For example, one of the goals of the Birthright program is to shape the Diaspora attitudes towards Israel, build social connections, and instil a sense of Jewish identity. This can be studied at the population level through ongoing analysis of engagement following the program. Although there may be a relationship, how the differences between religion and individuals are mediated remains complex and tied to how religion is practiced in the Diaspora. There is increasing pressure on Israel to change how religion is practiced in the public sphere by Jews in the Diaspora. There are many contentious issues, including the administration of religion by religious courts and authorities. This attitude also impacts the geopolitics of the state, as Israeli domestic and foreign policies may not necessarily align with the values of Jewish communities in the Diaspora. This means that external financial and political support can become contingent on how the Diaspora's often differing values are taken into account when making policy.

For example, many in the Diaspora feel that women should have a more prominent role in religious services and that religion in general should be more egalitarian. This can be seen with the "Women of the Wall" movement, looking to expand women's role in public prayer spaces, such as the Western Wall (Lahav, 2015). Generally, the public in Israel does not seek to change the religious gender status quo (Shain, 2000). Yet because of support for Israel by donors in the Diaspora, progressive Jews feel they can influence Israeli policy (Frank, 2019). This idea

extends to many other areas as well, such as foreign relations (Inbar, 1990), and the Israeli-Palestinian conflict (Dov Waxman, 2012), the Law of Return (The Jewish Agency, 2013), and many others. Many in the Diaspora would like input into how religion and policy are shaped in Israel and do not feel well represented in a generally Orthodox led religion with little secular input (Eli Gottlieb, 2021).

Of course, these ideas have strong support via the collective voice of Diaspora Jewry and that of the secular majority in Israel. There are many others, such as the ultra-Orthodox minority in Israel, that seek to influence the state in yet another way. Other groups, such as the avowedly secular segment of society or those who believe in the confluence of religion and Zionism, have their own goals as well. There are, of course, even more groups, all of whom have a critical stake in the future of the Israel-Diaspora relationship.

3.1.4 Social, Political, and Religious Divides

Religion is one of the many fault lines in Israel that influence issues of national importance and demarcate social, political, and religious divides. These differences can occur between the extremes of the ultra-Orthodox and secular populations, or from the tensions that arise out of government policy in Israel which is influenced by religious consideration. Ben-Porat states that:

> religion serves an indispensable role in consolidating and demarcating territorial boundaries and legitimating the exclusionary practices of the nation-state within the ostensible secular national system as well. When operating within the framework of a national discourse, secularism often relies on religious foundations; it has, therefore, a far more complex relationship with religion than most secularists would be willing to admit; one that often undermines an ethos of equality and freedom (2000, p. 223)

There are many pro-Israel student groups on campus which try to maintain a secular distinction between what they do and supporting a religion with a focus on something more neutral, like technology or current affairs. There are also many religious groups that provide religious services on campus without explicitly endorsing Israel. As Israel has a complex relationship between its secular and religious citizens, student advocates in the Diaspora often try to take a balanced approach.

From the outside, it is complicated to discern exactly which aspects are the priority focus of a particular advocacy group. Although it would be simple to focus on one generic aspect or another, the State of Israel and religion are intrinsically connected. This puts groups that advocate for a religiously or politically neutral stance in a complicated position when trying to connect to their audience in the Diaspora. The boundaries between state and religion that connect these issues may appear differently in the Diaspora. The religious undertones that are part of these conversations may be more difficult to ignore in a discussion of Israel and politics on campus.

At the same time, there are also groups in this space that are focused entirely on religion and the religious ideological support of Israel. These include religious Zionists, who see the modern state as a manifestation of the divine plan. Conversely, there are even a small minority of ultra-Orthodox anti-Zionists who do not believe in the modern state of Israel due to religious reasons. Their belief is that while the Land of Israel is intrinsically holy and the land of the bible, without the Messiah granting the land to true believers, the secular State is usurping the religious destiny of the Jewish people. It is, however, unlikely that anti-Zionist groups would be present on campus due to their positions against integration, secularism, and modernity. For these groups, and the many others operating in this space, answering the question of how a group

presents Israel can be complex. For many, this involves endorsing religion, while at the same time, not acknowledging politics or the social factors that cause these divisions.

In sum, there appears to be a disconnect between the views of students in North America and how social discourse, society, and politics function in Israel. This raises the question then, why is there still such a disconnect in a modern era of lightning-fast communication technologies which allow us to instantly connect with people from all over the world? To answer this question, let us turn to a review of the literature on social media.

3.2 Social Networking and Social Media Sites

3.2.1 The Changing Nature of Communication

As previously mentioned, social networking, or the maintaining of patterns of social relations in groups, is far from novel in the history of human development. What is new however is the widespread use of social media, online sites allowing us to connect, communicate and post content to one another. As a result of the rise of these technologies, more and more of us than ever before are becoming connected as part of an increasingly integrated global network.

Sharing information and instant communication has become a hallmark of the modern era. This form of communication gives new meaning to the concepts of conversation and community. The use of social network sites has become a central part of everyday life, with "[s]ocial networking websites […] now [the] primary means of communication for people among all age groups" (Balan & Rege, 2017a, p. 43). This has "transformed the user from being a passive recipient of knowledge to a participant, focusing on […] content creation, communication, interaction and collaboration among users" (Fayza, 2017, p. 267). Unlike the unidirectional act of absorbing media through reading a newspaper or listening to the news, social media rapidly propagates messages and is shaped by those interacting with it. No longer limited by time and space in terms of communication, members of these online social networks, collectively called social media, generate the content they consume – a modern communication ouroboros.

While conversations and the exchange of ideas take place in a virtual space, there is a real-world counterpart to these conversations. Social networks can have an impact and

"communities […] that are both virtual and physical can alter the patterns of activities and prompt the organizers to make valuable changes to their activities" (Komorowski et al., 2018a, p. 2). While this does not mean that the virtual and corporeal are always intrinsically linked, "there is a subtle and complicated relationship between culture and Twitter [and social media] use" (Acar & Ayaka Deguchi, 2013, p. 21). Users both generate content and, by doing so, create virtual communities where they can share ideas and build likeminded consensus. Virtual and corporeal social associations are the product of information sharing. As there are new ways for many to interact with information, "those […] [sharing] information have, in fact, ended up creating communities" (Amaro-Jiménez et al., 2016, p. 2) with the associated parallel representations offline (Lund et al., 2018).

While users of social media may be on the same initial tier in terms of their ability to share information, as certain users gain more traction within the network, their message is amplified. Indeed, "[s]ocial media is a means to connect to a larger audience" (Balan & Rege, 2017a, p. 44), where the right message resonates though the network. For example, the right users, or those with a degree of influence in their networks, have been used to promote varied messages and content including organ donation (Shi & Salmon, 2018), fan reactions to sports events (Wakefield & Bennett, 2018), and disaster communication (Palen & Hughes, 2018), among many others.

As social media becomes part of our everyday lives in new ways, studying this ever-changing online community becomes increasingly complex. This is due to the available technology, access to large-scale data, and a paradigm shifting problem of scale where population size may be beyond the scope of most researchers. However, there is no doubt that virtual conversations and communities provide valuable insight. Indeed, "[a]s a consequence of

large use, […] [social media] attracts increasing interest from the scientific and professional fields, like sociologist[s], online reporters and communication scientists" (Abdelsadek et al., 2018a, p. 217). One of the aims of this research is to strike a balance between understanding a limited network and collecting the right type and size of data to support this.

3.2.2 Social Media and Society

Social networks have brought about new modes of interaction and communication. This extends to both the private and public spheres, and "[i]n this interconnected globalized world, online social networks have drastically changed the way in which people and companies inform, communicate and connect with each other" (Cortado & Chalmeta, 2016, p. 2). To be a part of a community is to be able to navigate complex social groups that may be dispersed over space and time, indeed, "connectedness has become the new passport" (den Berg & Albert, 2014). In many ways, the new norm has become connecting on social networks for personal and professional reasons, though these may not be in the same places. By creating networks in which membership is expected (such as someone who is in business and uses their LinkedIn account to connect with colleagues, clients, and prospects), new patterns of interaction emerge.

We see this change in how people communicate as "[t]he use of social networks is exponentially growing in our society, having as a consequence a deep change in the manners that people react to events and interact with each other" (Abdelsadek et al., 2018a, p. 204). Not only is there a receptive audience for practically every ideology, but instant communication allows us to connect and, as a community, parse and process events in near real-time. These "tools are disruptive technologies that radically alter the way people view and use communication" (Griesemer, 2011, p. 201). With near instant connectivity, people have new ways to share ideas

and network. Going from past mediums that required both time and space to connect users, new technologies allow for rapid growth without barriers.

There have been many recent examples of this, as social media can be quick to take notice of issues, change direction, and grow exponentially. The ability to retweet, or easily re-share an item is a critical part of "pushing" data around the network. This is done with very little social capital spent, as data is communicated to the users' surrounding network, and waits to once again be pushed by others as it propagates further. Twitter created a button that was both easy to use and allowed for sharing someone else's content without claiming ownership. This feature caused exponential growth in the network as content was retweeted, often with commentary. The sharing of meta data, or contextualizing messages for the original tweet, adds a layer of complex data as the message propagates. In one example during the 2016 election campaign, "impulse-sparked sharing caused outrage and disinformation […] [such as the claim] that […] Hillary Clinton is running a pedophile ring in the basement of a pizza shop" (Kantrowitz, 2019) with very little consequence. While this assertion was patently false, it was widely spread by the public through sharing and resharing the story (Kang, 2016). In this case, a social media user believed that Clinton was harbouring sex slaves in a pizzeria, drove six hours to the location, and was arrested after shooting an assault rifle without anyone being injured (Kang & Goldman, 2016). Fake news resulted in very real risk and potential harm. Perhaps this is an example of the idea that, even within a sheltered community on social media, the majority are unlikely to engage beyond casual "slacktivism", or the click of a button to show support and engagement. However, there is a small minority that can be driven towards or given a reason to exceed societal norms.

The link between social media and the corporeal world is complex. In some cases, individuals and communities can be targeted with information designed to whip them into a frenzy (Goel et al., 2018) and possibly influence elections around the world (Baviera, 2018; Effing et al., 2016; Sokolova & Perez, 2018), but social media can be ephemeral, particularly when trying to cause real world significant change. A stark example of a viral social media campaign leading to inaction is the failed Kony 2012 campaign (Kurasawa, 2019), which, despite "hashtag activism," ended with very little being accomplished (Gao, 2018). Trying to connect the online and offline worlds can be difficult, as social media "can add significant value […] when implemented as part of a systematic and long-term online and offline relationship-building strategy but are not well suited to short-term applications intended to influence the outcome of particular campaigns" (Harris & Harrigan, 2015). While it is easy to share and keep the network engaged, actual impact in the real world, as a result, may be more complex and nuanced.

3.2.3 Social Networks and Interactions

Social media networks are a place to share ideas, express outrage, and build consensus in a way that would not otherwise be possible in real life. Not only are users able to share their thoughts but they are able to communicate them with ever growing audiences. Tweets, posts and messages can "go viral" (Al-Rawi, 2019; Bravo et al., 2019; Hemsley & Tanupabrungsun, 2018), taking on a life of their own as they propagate through the network. While social media is used as an important part of people's lives to interact (Hall, 2018), engage (D. Lee et al., 2018; Nisar et al., 2018; Tafesse & Wien, 2018), and share (García-Perdomo et al., 2018), the way by which it is used provides a forum for new and complex expression that does not mirror the offline world.

Social media becomes a “complex topic built by its characteristics, how people use it, and the feelings it can elicit in others. Using social media provides easy access to people's lives and can serve as a means of emotional support for its users” (Hetz et al., 2015, p. 260). This means that these spaces bring emotion into communication in a way that does not have a parallel in the corporeal world.

Social media becomes a place where people share their stories, create a narrative, and form a larger community. This medium of communication may be new, but “[p]eople have always told stories to express themselves and to connect with others and, in doing so, to make meaning of their everyday existence” (Papacharissi et al., 2017, p. 1). This storytelling becomes part of the online community milieu. Sharing stories has become a reinvented art with new forms and methods. The online spaces we use to tell stores “ provide a variety of ways with which to tell, share and feel our way” (Papacharissi & Blasiola, 2015, p. 211). Creating social media content gives meaning for both the individual and the online community they are a part of. This distinction is important as community making and storytelling are not only features of technology, but social functions. We see that “connectedness [does] […] for politics and networked publics in the digital age, […] [t]echnologies network us, but it is our stories that connect us” (Papacharissi, 2016, p. 307). These stories “that rely heavily on personal “content” generation, personal experience, and emotion” (Gregory & Singh, 2018, p.177) contribute to the creation of a virtual space, but are more intimate and personal than an aggregation of news or other media. The ability to put thought and emotion “out there” and have members of the virtual community pick up and examine various thoughts or recommend a particular message to others is an interesting aspect to the idea of interconnected virtual community. Items trend because they have increased engagement from the community. In the same vein, other posts and ideas may not

gain traction. Clearly there is an underlying societal organization, perhaps one that is unstructured, which dictates how the members of a community engage and interact with themselves and the wider world of the network. For example, there is a certain freedom in what and how people share on social media. In this form of engagement tempered with emotion, "[it] is likely that Twitter is not considered as a direct interpersonal communication tool like the telephone or e-mail, but just a platform where one can update his/her status without worrying about social norms" (Acar & Ayaka Deguchi, 2013, p. 30). There are two interpretations about what happens with this type of liberated self-expression. As Lindgren once wrote:

> …a certain friction has developed in public debate as well as in new media research. Some commentators focus mainly on the optimistic analysis of the potential for new media audiences to come together, subvert power structures, and take control over the flows of communication in society […], while others are more pessimistic and underline the risk of over-emphasizing the democratizing potentials of social media and forgetting that power structures prevail and may even be strengthened by these same media [...]. (2013, p. 208)

This is particularly true with the conflict in the democratization of social media. A community functions based on shared ideas expressed openly, however, this happens on a social media platform owned by a corporation with policies and standards that may not align with ideas of free speech and open expression.

3.2.4 Self-Presentation, Collective Intelligence, and Content Flow

The image that users of social networks present to the world can differ from that which they present of themselves offline. This creates an interesting problem if the micro (the individual

user and what they choose to share) differs from the macro (the overall network). Consider that when trying to determine sentiment or trends, much social network research centres around the writing and flow of information in large groups. The idea of self-presentation, selecting a persona that can be free to express viewpoints which may go beyond what they would share offline, is an individualized choice. As Kim and Tussyadiah described it:

> [P]eople use various online channels to present themselves to the world, which may involve strategic selection of self-related information and images […]. Self-presentation is considered a form of communication, in that people try to communicate a message about who they are to others (2013, p. 78).

These individual accounts, often connected to receptive networks where they find compatriots of similar interests, form something beyond the individuals and coalesce into a loosely formed network. These "technologies offer the capability to both receive and create content with the hope a collective intelligence emerges" (Griesemer, 2011, p. 201), and, on the macro level, this is often the aggregate result of users, communities, and networks forming a larger collective.

In the larger network, or the collective intelligence we use as the proxy for society, there are moderating factors to "online self-presentation strategies. One major factor with social media is the sense of connectedness one feels when using it" (Hetz et al., 2015, pp. 260–261), making the network a duality of individuals creating identity and forming a collective that is an amalgam of such individuals. It is interesting that, in this environment, the primary focus of communication is not on inter-personal relationships, but rather on the one-to-many connections between an individual and the collective. Even though there is an "indefinite number of

opportunities […] [t]he loose structure of networks on Twitter makes people less interested in using it as an interpersonal communication tool compared to other platforms" (Acar & Ayaka Deguchi, 2013, p. 29). Although there is a difference between sharing content directly with other peers and the network at large, these two modalities of communication tend to take place at the same time. This distinction is important for our topic, as the level of consensus in the macro network and the measurement of engagement and influence may present themselves in different ways when all actors (members of the network) are playing a specific role in a massive online drama. That being said, the effects of individual self-presentation are muted as the sample size increases and we study the flow of information in larger networks, which may more closely represent the collective intelligence. Making sense of the network and the collective intelligence can be done in many ways. This includes:

> looking to the content that flows through the networks or the structure of the networks and the resulting ability to reach or control important resources. Content refers to resources available in a network (e.g., information, gossip, money, disease); structure refers to identifiable patterns of nodes and ties in a network. […] Some researchers further argue that the nature of content flow (e.g., whether the right resources are available in the network) determines the value of a social network (Lin, 1999). The actual content that members exchange creates a web of cooperative relationships that breed norms, trust, common purpose, and coordination—that is, social capital. (Kane et al., 2014a, p. 5)

Ultimately, the currency in these networks becomes social capital, which "broadly refers to the resources accumulated through the relationships among people" (Ellison et al., 2007) and is "an elastic construct used to describe the benefits one receives from one's relationships with

other people" (Steinfield et al., 2008). This capital can differ online and offline, depending on how it is curated and used (Smith, Smith, & Shaw, 2017). But, once users build a following or become of interest in a shared virtual space within a highly engaged network, individuals begin to contribute to and influence the larger collective. This has benefits both for the individuals and the network as a whole (Pendry & Salvatore, 2015). The way by which users "spend" their social capital can impact their further accrual of capital or minimization of influence within the network.

3.2.5 The Bubble: Are Social Media Networks Polarized Echo Chambers?

The amount and type of content users are exposed to is an important factor in understanding the creation of bubbles or echo chambers. The idea is that, if users were only able to interact with a certain segment of the network, they would be self-selecting a sub-group of users with whom to engage. In this homogeneous environment, the group could be targeted with ads or content to persuade them in ways which would not be possible otherwise. This is one of the contentions in the Cambridge Analytica scandal and speaks to the idea of how social networks can represent both vast collections of conversation and be extremely limited in terms of engagement. While an insular network is the common understanding of users gravitating towards a self-selected community, the literature shows that this is not always the case, and many users may engage with larger segments of the network.

Understanding insular communities is important to how ideas and politics are discussed and argued across the network. Part of building a consensus and creating civil discourse is engagement with a wide audience in society. Having this dialog is important, and "political theorists have argued that dialogue across lines of political difference is a key prerequisite for

sustaining a democratic citizenry" (Boutyline & Willer, 2017, p. 551). This idea of challenging your assumptions by engaging in discourse with those of whom you do not agree has been a critical part of civil society for centuries (Gutmann & Thompson, 1998). Theorist John Stuart Mill "held that political disagreement enables individuals to develop skills for critically assessing political claims and provides the challenge necessary for determining if one's own ideas are justified" (Boutyline & Willer, 2017, p. 551). Without these challenges, individuals cannot test their assertions. It seems that, in the polarized online world, this can often be the case.

There is a degree of self-selection in regards to where users tend to find their news and community. A "relatively small number of information resources receive most of the news audience traffic" (Jacobson et al., 2016), showing that user engagement, when self-directed, can in fact lead to an echo chamber. This means that displaying a preference for particular types of connected information may dictate what content a user is later exposed to. This self-driven selection of content can be thought of as network members choosing to isolate themselves within online communities of like-minded individuals.

Trying to connect to self-isolating communities and understanding the degree of external connections are important to determine the degree of isolation in each chamber. When identifying a particular user as an influencer within a community, how they connect with like-minded versus oppositional users is an important consideration. For example, in some highly polarized communities (in this case dealing with the topic of climate change):

> most users interact only with like-minded others, in communities dominated by a single view. However, we also find mixed-attitude communities in which sceptics and activists frequently interact. Messages between like-minded users typically carry positive

> sentiment, while messages between sceptics and activists carry negative sentiment […] social media discussions of climate change often occur within polarising "echo chambers", but also within "open forums", mixed-attitude communities that reduce polarisation and stimulate debate. (Williams, McMurray, Kurz, & Hugo Lambert, 2015)

This shows that there are two elements of engagement taking place simultaneously. Even though members of the community create an echo chamber on issues where they have widespread consensus, other connections to "open" spaces, where there is a plurality of opinion, exist as well. These connections mean that even if there are self-selection preferences in terms of a network, there are many other connections to different communities being forged at the same time. Although "Twitter users are […] exposed to political opinions that agree with their own [...] users who try to bridge the echo chambers, […] pay a "price of bipartisanship" in terms of their network centrality and content appreciation" (Garimella et al., 2018, p. 913). This shows that, while it is possible for users to build bridges into other communities, it can be difficult. Connecting to a new network is possible but comes at a cost in terms of social capital and influence in new networks.

While the amount of neutral and oppositional content in a network varies, there are times when self-selection bias tends to build a smaller, more inward-looking community. This accounts for the perception that some "more extreme and more conservative individuals tend to be more homophilous than more liberal and more moderate ones" (Boutyline & Willer, 2017, p. 551). There is a "sense that social media […] [have] momentous consequences for democratic politics flows from the argument that either through a conscious choice or algorithmic filtering, users are narrowly exposed to information that reinforces their political outlook" (Bastos & Mercea,

2018a, p. 4). While these examples show that the echo chamber is reinforced, it happens within the larger context of vast interconnected social platforms.

By gaining access to a social media network on a particular platform, users are exposed to not only their "target destination," but encounter neutral and opposing content which becomes a forum to introduce and interact with opposing views. Even though there are polarized pockets of users on social media, "the vast majority of online news consumption is accounted for by individuals simply visiting the home pages of their favourite, typically mainstream, news outlets, tempering the consequences—both positive and negative—of recent technological changes" (Flaxman et al., 2016, p. 298). This limits the possible effect of polarization to the degree that users are able to exclude all but their own community. The literature shows that "previous work may have overestimated the degree of ideological segregation in social-media usage" (Barberá et al., 2015, p. 1531) and that "core users followed an even more politically diverse group of Twitter accounts, so neither group lacked exposure to alternate views" (Shore et al., 2018, p. 1). This reveals that even core influential members of polarized networks have a degree of connection with those around them and interact with the larger network.

In sum, social media sites can, at times, act as polarized echo chambers, giving us only one side of the story and helping to perpetuate stereotypes involving one-sided views. This is due to the development of smaller communities within the network which can serve to reinforce a single point of view. This inevitably raises the question then, do such communities manifest themselves in a similar way when it comes to activist groups? To answer this question, let us now turn to a review of the literature on activism.

3.3 Student Activism and Social Media Sites

3.3.1 Social Activism

In an example of social activism, employees of Google staged a walkout. They protested in response to how sexual misconduct allegations were handled by the company (Knowles, 2019). One of the organizers, Clair Stapleton, said that when she first started at Google "[t]here was incredible lore around Google's culture — its openness and transparency and the collaboration and all these incredibly smart people. And it just felt to me like this utopia of what a company could be" (Goodyear, 2019). At the start of her career, this was what she believed the company culture to be, and was shocked when allegations surfaced from "a news story […] about a [...] $90-million dollar payout that had been made to a sort of known harasser in the company" (Goodyear, 2019). This disconnect lead to walkout from offices around the world by over 20,000 employees and subsequent claims of retaliation by the firm (Tiku, 2019). It is interesting that, at the same time, Clair is quoted in a CBC article saying that "I was on a 'Google moms' mailing list. It is a very, very active internal community. It is all anonymous. And people started sharing stories of things that happened to them in their careers in technology, and it was really eye-opening to me" (2019). This story is representative of the disconnect between what the company communicates, and what those on the inside are sharing. If we were able to access the data being shared internally, a very different picture than that shared publicly by the organization would likely emerge. In this case, the mom's group was private, anonymous, and internal. However, there are endless use cases where employee or group member sentiment is publicly available and can be compared to the corporate communications or "official" message passed down in the hierarchy.

There are many examples of how society transforms through organizing online and offline. By forming virtual social groups and communities, members can find each other in new ways and start a dialog that leads to change. Through this process, there is a reallocation of social capital and power, with social and political boundaries being demarcated and re-drawn. This process of shifting social boundaries can be seen through collective public participation in social networks (Schäfer & Van Es, 2017). When users coalesce around ideas and connect, this has a ripple effect and draws in more participants, building towards a movement that gets noticed. For example, political Tweets tend to have a frame or an agenda and cannot be taken at face value. As this media propagates in the social network, communities for and against emerge, pushing the content further. This response is referred to as the "micro propaganda machine" (Albright, 2016). This underlines the relatively recent phenomenon of social activism in the era of shifting societal priorities, "fake news," identity politics, and political populism. New forms of social organization and activism on social media are not confined to the "virtual world" but have contributed to significant political change (such as the Arab Spring (Hänska Ahy, 2016), Brexit (Gorodnichenko et al., 2018; Howard & Kollanyi, 2016), various elections around the world (Jaidka et al., 2019), social fundraising (Haruvy & Popkowski Leszczyc, 2018), and the development of new and interconnected communities (Ngenye & Wright, 2018; Swart et al., 2019).

Of course there are also examples of when slacktivism, or "partaking in low-cost, low-risk online activism" (Lee & Hsieh, 2013) or a token symbolic action online (Kristofferson et al., 2013), bring together large numbers of people virtually, only to have disappointing results. The KONY 2012 campaign was a movement designed to bring awareness to the situation concerning the Lord's Resistance Army (LRA) leader in Uganda, Joseph Kony. In a very short amount of

time, it gained a tremendous amount of traction on the Internet very quickly, gaining more instant fame than Susan Boyle (Basu, 2012), another overnight sensation. This campaign, and the story behind it, became "a quintessentially American fable printed on an African canvas, […] [that turned] out to be a brief diversion, just a bit of Internet chatter" (Schomerus et al., 2012, p. 2). The ease of participating in what seemed like topical social activism by clicking on a campaign led to feeling part of a larger social movement (Glenn, 2015). The rapid success of the campaign quickly fizzled out as the community lost interest with issue and community dispersed. While this is not an example of positive social change, it does demonstrate the rapid construction of a large virtual social group and a discontinuity between the public perception on social media and the organization seeking to propagate its message and plan for further political, social, and military (Finnström, 2012; Madianou, 2013) action.

3.3.2 Social Media, Community Building, and Advocacy

One of the interesting aspects of organizing activism on social media is the low barrier to entry. Anyone can post anything with the hope of propagating the message beyond the immediate network. As the message propagates, there are many that casually engage with the material, but their interaction rarely leads to any actual action or change. This divide is similar to online dating applications where it is quite easy to swipe but may be difficult to translate the virtual into the real world (Sumter et al., 2017). Connecting and organizing social media users for social and political causes can be equally challenging. Building trust that connects users from an online community to the offline world may be complex (Tan, 2010). It is not enough to create a cause that generates a large amount of public attention. If there is no follow up or movement as a result of the campaign, then the underlying cause does not progress. Therefore, it is important to build

networks that both engage the right audience and lead to action and attention from the people that they are trying to influence.

Many social causes can attract a very general audience, which can raise the volume of the issue and bring it to the attention of leaders or the people who have the power to create change. Students organize around many causes, including "protests against tuition hikes, austerity measures, joblessness and deep cuts in public spending" (Giroux, 2013, p. 516), among other issues of concern. We know that "[a]dvocacy groups of all types use social media to reach their constituents" (Ewbank, 2015, p. 26) and connect to a target population to get the message out. If a student organization is trying to campaign but does not engage their own local members and instead gathers membership from the larger network (which could include global interaction), it may not be as effective. Student groups often focus on building internal networks that tend to be are smaller and more localized, which can then be mobilized around local issues. At the same time, these groups will also connect with other similar groups on a national level, creating intra-group links.

Student groups require continuity over time. As students graduate and the membership of a group changes, social media can be an effective bridge between the various cohorts within a campus organization. Because "students are on campus for only a finite period, it is sometimes harder to maintain movement the momentum of a movement. Student leaders are only on campus for a relatively short period of times, which often means students fight for quicker changes that allow them to reap more immediate benefits" (Broadhurst, 2014, p. 3). At the same time, groups can build institutional memory through social media, so an incoming cohort will be able to connect to a defunct network from previous years and reinvigorate it. To successfully run

a student organization, links need to be maintained both within the community and the larger student body, as well as within the larger organization.

Social media connects with the pattern of traditional forms of advocacy by engaging participants in the spaces they frequent on social media and building a following. Once an online connection is established, the transition from the virtual to in- person meetings and events becomes very important. Even though students may be heavily engaged in social media, under typical circumstances, they must still participate in person on campus to effectively organize. By doing so, they are able to harness the connections provided by virtual networking to promote action that in turn enables change. The vastness of the Internet makes it hard to localize and find a group of peers, yet new technologies connect the virtual to the corporeal by blending the concept of a community tied to a space.

Even within a near endless social network, there are many pathways connecting small and localized networks of participants such as students on campus. While there is the possibility of connecting with a global audience on the same network, it becomes challenging to scale outside of the typical boundaries. In the case of students, this may mean reaching out across campus, or across the world. Even though student activists connect with millions using the same technology and the same platform, reaching new members and connecting around topics or issues can present a challenge. Even though there are barriers, a cause normally confined to a local campus or a relatively small group of students can be catapulted into the international limelight through the wider potential power of being connected.

Because of the way this technology works and the way boundaries of networks and groups shift, it is possible for a post to go viral through network propagation. While traditional

routes like media coverage can bring attention to an issue and raise awareness, there is a unique characteristic to social media allowing for rapid dissemination of information. For example, a student group protests something on campus with the aim of getting the attention of the university administration. The student activists start a campaign and organize with other students locally, becoming the first layer of contacts in the network. Members of this group can use social media to expand their collective reach, connect to each other, organize events, and build the size of their group. In order to grow using traditional media, the campaign would need to go beyond the campus, and this can be a challenge when competing for airtime with new stories that interest the population at large. Using social media, students are able to connect, engage, and network with other students from around the world, potentially leading what was a local cause to become one of national or international interest with a low relative cost.

3.3.3 Activism, Engagement, and Populism

Individual connection to a wide population has been one of the reasons Donald Trump uses Twitter heavily. Donald Trump has often maligned the traditional news media. Trump and his supporters believe that traditional media outlets are biased and focused on undermining the messages of the right. By using a platform where an individual message can be spread to the masses, and by having followers push the message along, a populist connection is created between the leader and the people on a much smaller scale. This is the same kind of process that happens in a university network. Whether university groups are trying to engage with a small, localized community or aiming to reach millions, they essentially use the same technology and the same platforms. While the communications methods may have changed, “technology, such as social media, [allows students] to engage in activism that extends beyond traditional forms of

protest (Biddix, 2010), they more commonly utilize such long practiced tactics as marches, sit-ins, teach-ins, and street theater to further their agendas" (Broadhurst, 2014, p. 12). Social media allows students to communicate and organize faster and provides an organizational topology – a network – to discover and promote ideas and leadership.

Within the network, as ideas are being moved by members, social capital is given to the points that make up the network, posts, individuals, and ideas. This can now happen in a way that represents a "new biography of citizenship which is characterized by more individualized forms of activism" (Bosch, 2017, p. 1), allowing individuals to participate in a true democracy of ideas. When the propagation of ideas is supported by the larger community, groups of users are then able to circulate the message forward. Once that happens, there is a carry-on effect that reveals that a user's popularity increases and the message or point of data that they accompany spreads even further. As these messages gain exponential attention within a network by influencers pushing content, the data and associated users are promoted or acquire greater strength and prominence on the network. The node of interest gains much higher prominence and standing within the overall network, going beyond their smaller, localized cluster. This means that through using social media and finding the optimal pathway to broadcast the message, either locally or through the larger network, individuals are able to engage large populations quickly.

We know that social media "have played an increasingly important role among activists seeking new means to communicate with both like-minded individuals and the general public" (M. P. Evans, 2013, p. 67). Social media companies equally have the capacity to act as a medium of engagement and influence. It is also possible that users can target specific populations and try to connect with users that are of interest to them. For example, a community of members looking to recruit other students to their organization or looking to connect with members of the same

campus networks can identify and reach their target audience and spread their message more effectively. As the network grows, it defines the boundaries of who is within the network and works to promote content within it.

In sum, social media can be a very powerful tool for activists seeking to engage large audiences and propagate their message farther and wider than others. The ability to share information from one virtual community to another creates near endless possibilities to spread content throughout the network.

3.4 Conclusion

This chapter has discussed the interconnected areas of the Diaspora-Israel connection, social media and social networks, and activism in the context of social media. These areas show how students interact frequently online to share information. This begs the question however, are some people more important than other when it comes to spreading information? By analyzing social networking data, it seems likely that complex interactions can be observed and mapped, providing greater insight into how social networks form, propagate, and share content. Chapter 4 will present the theoretical framework of this study. It will examine the concepts of social network analysis (SNA), involving the use of large-scale network data to identify how individuals connect and promote content, and hidden influencers, involving those unsuspecting individuals who are able to spread content further and wider than others.

Chapter 4

4 Theoretical Framework

This chapter involves a theoretical framework of the concepts that will be used and built upon in this research project. It will begin by taking a closer look at the concept of social network analysis (SNA), a method involving the use of large-scale network data to identify how individuals connect and promote content with others. Following this, it will look at how networks differ from formal organizational hierarchies. Next, it will examine the concept of hidden influencers. Finally, a conclusion will sum up these concepts and outline the empirical research questions generated from the discussion. Let us begin by taking a closer look at social network analysis (SNA).

4.1 Social Network Analysis (SNA)

4.1.1 Nodes, Relationships, and Social Networks

Social network analysis (SNA) is the study of network data to understand the structure of the network, the interaction between users. The smallest unit of analysis for users in a social network is the node. In the case of Twitter, this one individual account (human, bot, or otherwise) can be viewed by what is posted from their account, who they interact with, the collection of other accounts they follow, and those that follow them. These relationships are called edges and enable network diagrams, or sociograms, to be constructed, detailing the relationships between nodes within a complex network. Studying actors in a large network can show not only their interactions, but also those of the users around them.

It is important to understand that nodes can be more than individual accounts. They can represent any piece of data within the network, including "persons (e.g., students, principals, policy makers), organizations (e.g., firms, schools, school districts), objects (e.g., policies, documents), or even events, i.e., school meetings, political campaigns" (Finnigan et al., 2018, p. 233). By compiling large-scale data, greater network (and perhaps even population level) insights can be obtained. As the size of the network is scaled up, increasing numbers of individual actors form a larger interconnected community of people and ideas. These elements represent the network and the movement between users as data is transmitted between nodes.

On an individual level, each of these elements can be studied. For example, it is possible to follow an individual user and see with whom they interact. Expanding the study to include the networks of second, third, and further connections builds towards a large-scale topography of the

network and provides the ability to isolate clusters of users in communities with the associated statistics for influence, impact, and so on. There are many barriers to comprehensive study of social networks without enormous resources, as they can encompass trillions of pieces of available information. It is estimated that there are over 500 million tweets sent per day on Twitter, or 1.095 trillion tweets since this statistic was announced in 2014 (Hootsuite, 2019). A network can often be understood, and its boundaries determined from the method and use of communication, which allows for a detailed community to be explored without analyzing the larger external network in its entirety.

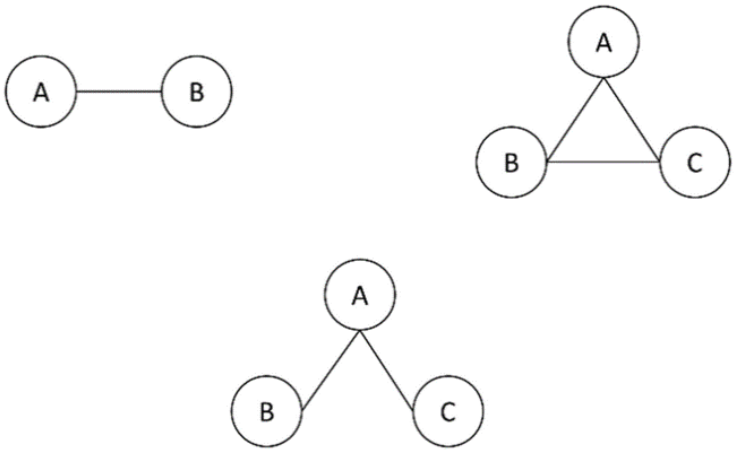
4.1.2 Modeling and Sociograms

Using modeling to understand the relationship between users is a central element of SNA. By gathering information on a community, "one could understand, for example, how cohesive a selected research community is […] [and] potentially identify the most popular, approachable, powerful, or prestigious authors in that research community" (Kumar & Jan, 2014, p. 389). This is done by using SNA to "examine or uncover the underlying connections among people, behaviours, events, objects, and institutions within and across social systems that might not be obvious otherwise" (Finnigan et al., 2018), and connecting data which may not have an obvious connection through a network paradigm. These techniques have been used to create many types of models and maps that have had an impact on how relational data is understood in many disparate fields, from epidemiology (Shoham et al., 2015) and education (Hodge et al., 2016), to migrants (Ryan & D'Angelo, 2018) and the study of murder (in homicide networks) (Faust & Tita, 2019; Fox & Allen, 2017).

These connections are mapped using sociograms, which is a "graph of actors and their relationships […] [where] actors are visually represented by nodes and their relationships by lines" (Finnigan et al., 2018) as illustrated by the figure below. The basic building blocks of these diagrams are a dyad and triad. In a dyad, two users are connected through a social media connection (Flores-Parra et al., 2017). These networks become increasingly complex as they expand in size and number of interactions (De Nooy et al., 2018).

Figure 3

Basic Social Structures: Dyad and Triad (Finnigan et al., 2018)

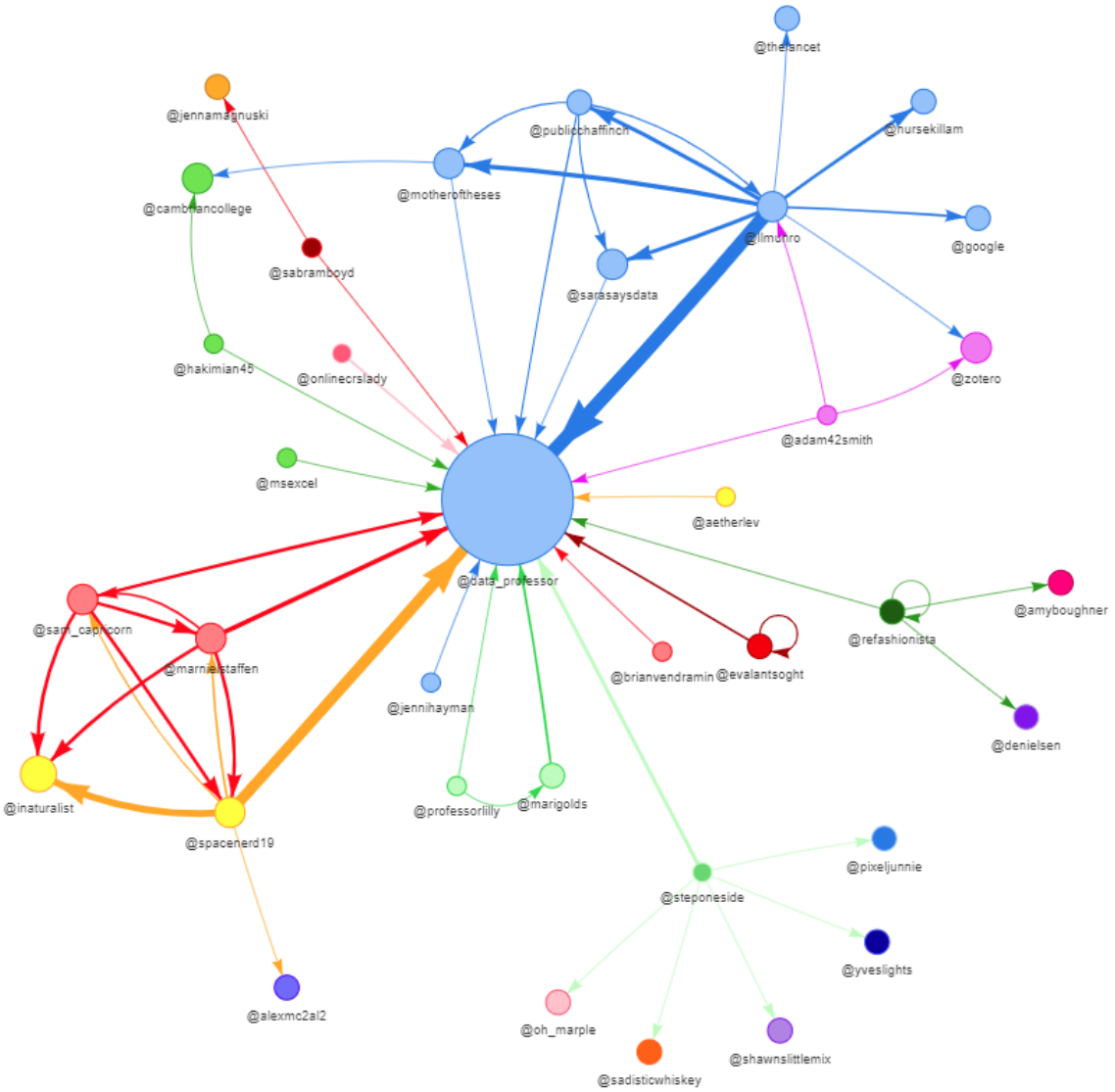


The position of a user in a sociogram, when designed to portray influence, shows the number of connections and, thus, their influence in the network. The number of connections shows the authority of a user to communicate and propagate information. We can see that, when looking at the network as a whole, "[t]he most influential members are typically located at or near the center of the network and have a larger percentage of […] relationships […]. Less influential members have fewer relationships and are positioned in remote locations along the network's periphery" (Hambrick, 2012, p. 21). An example of this is the following sociogram, or network map, of my personal Twitter account. Based on the previous 100 interactions with users

in my network, the diagram shows the degree of influence indicated by the size of the circle representing the node, and the direction and power of the connection, indicated by the size and direction of the arrows connecting the nodes. In this model, each node "is connected to another user when there are interactions between them […] [and are] proportional […] so [it] is a good indicator of the influence of a particular person in a network of conversations; different colors represents different community where the dynamic of interactions are more frequent" (Socioviz, 2019).

Figure 4

A Sociogram of 100 Recent Twitter Interactions (SocioViz, 2019)



This sociogram reveals localized interactions (who relates to me) as well as what is happening outside of my immediate context (who is interacting with each other, and what communities they belong to outside of my interaction with them). The sociogram becomes more complex and detailed with larger data sets, revealing many new relationships. In this example, expanding the chart to include both the users I interact with (the first layer of connected nodes)

and a full list of everyone they interact with (the second layer of connections). When the data is analyzed, the connections and interactions between users can be explored. Using this example as a starting point, it is possible to expand the network and build a larger one which grows exponentially as more data is added. Creating a large network model will help to determine where social clusters and communities are located, how they form, and whether they can reveal any additional connections of interest.

Using network visualization and SNA allows for relationships to be understood in new ways. In network analysis, the "widely used node-link visualization method excels at showing the network topology and attributes simultaneously" (Chaturvedi et al., 2014, p. 1). Consider the above network sociogram of my twitter account. As this is a model of influence, I am the largest node in the center of the diagram. Less central nodes that have less frequent interaction, or those that are "friends of friends," i.e., connections mediated by another node, are at the edges of the diagram. Based on both my interaction with each node and their interactions with each other, the beginnings of a community can begin to be discerned. Studying the network from the perspective of other nodes could show that, to them, I am of relatively little importance. By studying the network as opposed to individual nodes, with the understanding that this then becomes a network centric perspective, interactions between nodes and networks can be revealed.

For example, I may not know that a large collection of my contacts not only know each other but are also connected to a larger external network. While I may never go bowling and would not purposefully follow someone who was a professional bowling star, perhaps many of my contacts do. By expanding my view of the network, identifying who is influential, and what they are discussing, new insights into this previously hidden network can be explored. Social networks can focus on one topic or issue, such as bowling, but could have many interconnected

topics or social permutations as the size of the network expands. In this case, we could then determine which contacts are interested in both bowling and other hobbies, thus building a more accurate model of the communities to which these nodes belong.

4.1.3 Network Characteristics

Social networks have many characteristics, from a single node or user on the micro scale, to a community of connected nodes forming a large and interconnected network. There are elements of a social reality that create the virtual space within the network, generate trust (Lewis & Weigert, 1985), and provide social capital (Steinfield et al., 2009). Social networks are " a set of actors (individuals) connected by a set of ties" (E. M. Eisenberg et al., 2015a, p. 147); in other words, a virtual community with shifting boundaries within a larger network. Within this space, the social network "is a set of social entities connected by social relationships, such as friendship, co-working or information exchange" (Celli & Rossi, 2015, p. 2) that dictate the type of interaction and the feelings or attributes individuals assign their community.

It seems strange that, in an online network of equally connected people and information, a user can assign emotion and forge personal connections on one hand, and, on the other, read dispassionate news media and information. Looked at as a whole, "social media [is] a space where indifferent detachment and intimate comfort between citizens can coexist, a kind of 'warm impersonality' that is central to the possibility of democratic politics in a diverse and unequal polity" (Bosch, 2017, p. 2). This means engaging the public both through micro rhetoric and "facts", the definition of which has become quite complex in the era of misinformation or "fake news" (Lazer et al., 2018). The content that influences networks is generally led by personalities and human actors, though interaction with automated bots is becoming increasingly frequent

([Chu, Gianvecchio, Wang, & Jajodia, 2010]). The popularity and need for "authentic" (Marwick & Boyd, 2011b, 2011a) content and voices on social media comes from the understanding that "[p]eople are not hooked on YouTube, Twitter or Facebook, but on each other. Tools and services come and go; what is constant is our human urge to share" (Hermida, 2016, p. 1). The underlying facet of these communities is that they are built around storytelling, sharing, and communicating, providing not just information, but interactivity and accompanying exchange of influence.

The degree of influence between users is an indicator of the strength and direction of connections between individuals in the network. The more social media sites are used and relationships built, the more that deep connections are formed which "provides increased access to knowledge and can generate networks of social support that can be leveraged to influence […] policy" (Evans, 2013, p. 68). Ultimately, influencing users to join networks that support a particular ideology, or trying to identify where users that can be influenced are, comes down to understanding how influence, connection, and topic unite a community. For example, "as social network sites […] have been shown to connect individuals to people with whom they have a previously established offline connection […] it is likely that people turn to [social networks] as an efficient way to tap these connections for information-seeking purposes" (Iordache & Lamanauskas, 2013, p. 18). This shows that not only are individuals forming connections online but there is a significant offline component to community or network membership.

4.1.4 Network Communities

In a vast sea of individual users, communities are formed by the attention some users pay to others and the following they build. Through the exchange of influence or social capital, users

form a community with loosely defined boundaries, which may be in constant flux. Those who are in or out can be determined using various measurements, including scale and time frame. For example, if we were to analyze an evolving network around an unfolding news event, the interaction and network would be quite different from the week before or the week after the event.

The elements that comprise a community relate to the "community structures […] and the relationships between them […] [based on] people who frequently interact with each other" (Chaturvedi et al., 2014, p. 1). This means that the community does not have to be formalized, rather, it is a space in which members associate. Membership in the community may be casual, where users can drift in and out of network or contribute to conversation with low barriers to entry. As users become more involved and adopt and promote content of their own and others within the network, data propagates and amplifies within the network. This system of data transmission and promotion relies on users interacting, creating, and sharing their content and that of others. These factors allow for in-depth insights into the network and community members.

4.1.5 Self-Organization

As social network have quickly grown into a new form of societal communication, new ways of theorizing about this type of communication are needed. With these shifts, "even relatively minor technological differences may result in profound theoretical consequences for individual and organizational behavior" (Kane et al., 2014a, p. 2) and may reshape how individuals interact with one another. The way these networks are used can grow beyond the intended purpose and structure as originally designed, potentially providing additional "insights into the interleaving of

human interactions" (Bruns, 2012, p. 4). For example, very few could have predicted the central role Twitter now plays in political (Molyneux & Mourão, 2019) and social communication (F. Miller et al., 2019). Social networks share common self-organizational features to promote content which can in turn influence public discourse.

Some users or nodes in a social network rise to prominence as their content is promoted by others in their communities. This happens for many reasons, including creating the relative social power to promote content and expand its reach. Power and influence within the network are "fundamental [aspects] of social structures, [and are] […] inherently relational" (Kumar & Jan, 2014, p. 388). This means that there is social currency being generated and spent as users interact with and promote content of various forms. Indeed, analysis of the network "is based on theoretical assumptions about the mutual influence of structure and agency [...] [and] empirically focuses on the relations between individual behaviour and the social context" (Jörgens et al., 2016, p. 984). This means that actors gaining traction within a network "[depend] both on their relative position […] and on their individual attributes and actions" (Jörgens et al., 2016). The combination of these factors means that communities are self-organizing, constantly curating content though a collective process. By "admitting" and promoting some content and users over others, the structure of the network is determined, often without the use of a central organizational mechanism, but through widespread consensus within the group.

4.1.6 Constant Change

Social networks therefore have a constantly changing structure due to complex interactions between self-organizing users. Network models can be used to understand sentiment, gather feedback, and evaluate strategies. SNA can be an effective tool for program evaluation (E. M.

Eisenberg et al., 2015b, p. 143) and provides a way to tap into large amounts of feedback and public opinion, as well as relational data. Network graphs or sociograms, when used as representations of a social media network, can be rearranged based on the underlying statistics of the network as it is shaped by a dynamic evolutionary process (Borgatti & Li, 2009). Unlike a static network, "content flows through [social] networks differently […] digital resources can be copied, manipulated, aggregated, and searched" (Kane et al., 2014b, p. 6). This means that when a node (one central user, idea, or piece of data) goes "viral" and is quickly propagated through the network by others, it may mutate and adapt as it is transmitted.

The use of a quantitative measurement with "the network as its central construct" (Kane et al., 2014b, p. 4) makes SNA unique. This is not to say that the act of mapping the network itself creates a barrier to qualitative research, rather, this is the common entry point to understanding the network from a structural perspective. Using layered analyses, a "system of paths in turn forms a structure, in which each node occupies a particular position. One of the key concepts of SNA is that the position of a node within a network determines the opportunities and constraints it will encounter" (Kane et al., 2014b, p. 4). More prominently located nodes will have greater influence over the network and generally have a greater proportional influence than nodes on the periphery. The concept of positionality within the network relates to other social research concepts, including social capital, network influence, and centrality.

While it is possible to "see" the data on a sociogram and map a "finite set or sets of actors and the relation or relations defined on them" (Wasserman & Faust, 1994, p. 20), these connections are only part of the puzzle. Relational information can be charted based on the communication between nodes (ibid.). Understanding both the nodes and their connections based on communication allows for a mixed-methods approach which incorporates "qualitative

[research] […] combined with data-driven analysis" (Komorowski et al., 2018b, p. 2). Both the structure and communication patterns of the network can be analyzed with quantitative measures.

In sum, social networks represent complex webs of human interaction, especially given the advent of social media platforms. SNA appears to be useful way of mapping out these webs of interaction and visualizing their underlying characteristics. But what are the main advantages of analyzing networks when compared to looking at organizational hierarchies? Is SNA well suited for testing the initial intuition in chapter 1 that individuals in positions of authority within formal organizations aren't necessarily the most successful in terms of promoting their message in the wider network? To answer these questions, let us now turn to an examination of organizational theory and SNA.

4.2 Organizational Theory and SNA

4.2.1 The Hierarchical Organizational Model

Hierarchical organization models have very clearly defined structures and although there may be movement between various levels, in general the way that individuals communicate within that structure are fixed. As opposed to having ranks or a communications protocol, any individual user within a social network is able to propagate information, connect with various types of information, and build networks of their own. This is significant because it allows for possibility of those with a lower formal rank in certain organizations but with a highly engaged network to become more effective at propagating their message and connecting with larger audiences. The use of SNA therefore is highly beneficial for uncovering such patterns of interaction, yet it requires more complex tools than traditional methods. While this more technical approach to studying networks may be facilitated by new technology, the underlying premise of studying societal organization is not at all new (Knoke & Yang, 2019). Comparing social networks to hierarchies using a comparative research approach has been used in other contexts, ranging from studying the social order of chimpanzees (Funkhouser et al., 2018), to entrepreneurs in China (Burt, 2019), to public participation in society (M. Zhao et al., 2018). I believe that this research approach is topical and represents a new paradigm for the population being studied. Hierarchies are often the public-facing representation of an organization or community, and new technologies allow us to look into the inner workings of a network using public data to reveal the hidden structure underneath. When dealing with networks of increasing size and complexity, understanding what is happening under the surface requires a new approach.

There have been many studies on “subversive” voices in organizational contexts (K. S. Davis, 2001; Holmes & Marra, 2002; Townsley, 2003), as the dominant narrative of the organization has the power to overwhelm individual members. This paradigm is shifting as social networks allow for the democratization of the public forum. As a unit of study, social networks are complex, constantly changing and connected to how the dynamics within the network shift. SNA allows for the collection of a large amount of information about the structural characteristics of the network and provides a space to explore and test the strength and influence of ideas outside of the organizational hierarchy. Additional features such as interconnections and metadata can be used to establish complex and rich data describing the network.

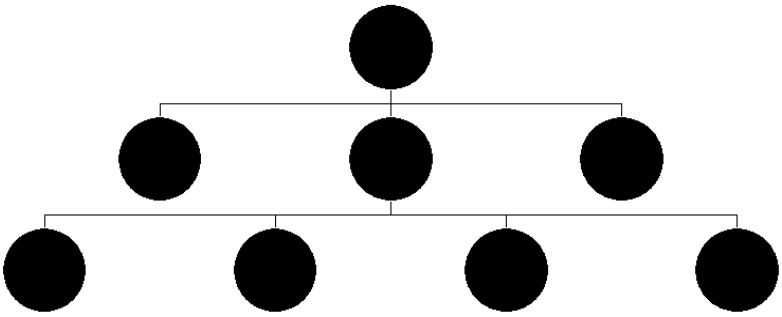
4.2.2 Hierarchy Versus Networks

As social networks and organizations transform into new, shifting, and previously unseen organizational hierarchies and schema, the ways in which we interact with and view society are endlessly changing and being reshaped. For example, the position of an influential member of an online social network group may not correlate to their social position in the “real world”, or the hierarchy in the organization the network represents. This means that while a user might have the organization's pulse and be a key informant in the study, the same level of involvement and insight would be more challenging to attain if using a traditional method to study organizational hierarchy. An influencer, or groups of influencers, can propagate the message through the network in complex and often hidden ways. Studying influence in a social network can reveal internal network dynamics and act as a starting point for mapping sentiment and other types of analysis.

The following figures visually illustrate the differences between these two organizational models. In Figure 3, a hierarchy dictates how information is shared between members (or nodes); and in Figure 4, a dynamic connection exists between members, many of whom are connected to multiple other members in a complex and interconnected fashion.

Figure 5

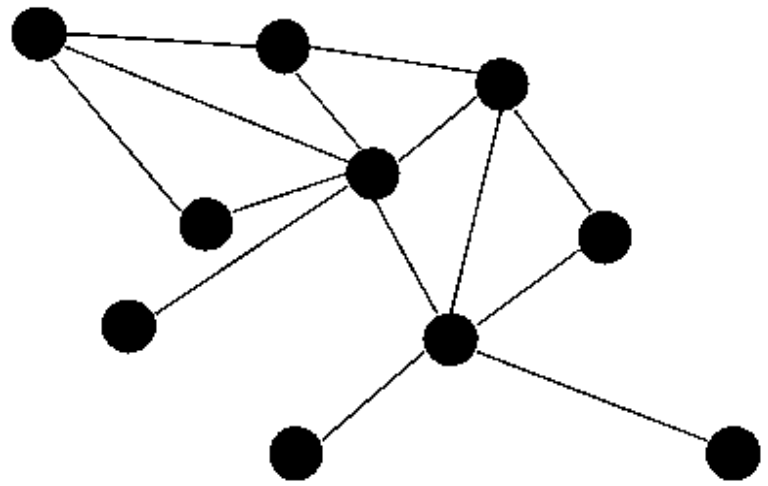
Traditional Organizational Hierarchy



Note. In a traditional hierarchy, nodes on each level connect to others above and below.

Figure 6

Social Network Diagram



Note. In a social network, the connections between nodes are more complex.

In this study, I decided to use this approach to explore the network dynamics of pro-Israel campus activism with a select group of organizations that operate on campuses in North America. Studying this illustration and comparing the inter-and intra-network dynamics of these groups will pave the way for future research and the application of this method. While this research focuses on the methods used, the illustration demonstrates how this approach can help to understand complex network interactions. This leads to creating a *matryoshka* or nesting-doll thesis, exploring the method and its application in this specific context. While this space does not entirely mirror reality (Jha, 2017), there are significant parallels between the corporeal and online social organizations (Dunbar et al., 2015), particularly when studying student populations (Eid & Al-Jabri, 2016).

4.2.3 The Benefits of Studying Networks

Describing the configuration of social media groups from a data perspective generates new questions including: What are the features of pro-Israel student groups when examined using social data? Do groups share common features? What are the degrees and strength of connection inside the groups? Are there regional, structural (such as the organizational mandate), or demographic considerations that influence the degree of interconnectivity within and between groups? These questions all focus on the representative nature of social media and the connections between users. By finding how users connect to each other, and the type and direction of influence they have over those around them, new patterns emerge. Trying to understand how users connect has been studied in relation to social media and political messaging and elections (Yaqub et al., 2017), in business and sales (Popp et al., 2017), and sentiment in financial markets (S. Y. Yang et al., 2015). For example, public policy discussions online use particular references or symbols. Examples are numerous and include use of the Twitter hashtag #onpoli when discussing political issues in Ontario (Hodson, 2019; Moy & Scheufele, 2000; Spiteri, 2018), the use of social media in American politics (Enli, 2017; Stolee & Caton, 2018), and many others. These communities create new virtual boundaries that are being drawn, connected, and pulled apart in an ongoing transformation.

On a basic level, I could ask if the social connections we see on campus are mirrored by their online counterparts. There are many similar hierarchical characteristics of both student organizations on campus and student activism online, but there are certainly many differences. Social media tends to have a degree of permanence, at least in the way organizations use it to share their messaging. It is natural to assume that a student would be more likely to walk by a

table to pick up a flyer or share a slice of pizza at an event than become an avid follower and contributor to a social media discussion. While there is no doubt that this happens, differences between social media platforms and corporeal engagement can be understood in terms of the level of commitment needed to belong to a digital community.

Social media and social organization have parallels in terms of social messages being created and transmitted through a connected network of nodes with varying degrees of power. Organizers use these networks to propagate their messages to followers while casual observers are able to interact or passively consume this content. Those who are ostensibly in control of the network seem to control access and the message, but there are cases when this is untrue. Social connectivity (which can also be looked at in terms of social power) can be analogous to understanding the nodes with the greatest power and influence. However, this network of interconnections is quite different from a hierarchy traditionally found in an organization because of the way it is constructed.

The digital geographic considerations (such as which areas attract attention from nodes and how they congregate and connect around certain issues) may be quite different from the social dynamics on campus. There are, however, similarities, particularly with respect to social dynamics, interactions, and composition of social groups. Groups can draw not only on new users in the immediate periphery, those with close connections to someone in the group, but to a vast number of outside users as well. The analogy of this in a traditional organizational hierarchy would be holding a meeting, giving away pizza, or sending out an informational newsletter to attract new members. Being connected to an endless sea of interconnected nodes allows for endless possibilities. There are potentially trillions of tweets and millions of users that require the

right activation to coalesce around a particular topic or issue. While this enormous potential power can be harnessed to propagate content, it often lies dormant.

In this study, while all initial groups that are considered show some type of growth over a year period (which would indicate organizational continuity between two different school years), none accelerate or "go viral" in any meaningful way. In other words, despite the potential for exponential followers, interest, and growth in an organization, many student groups limit their social media activities to what they engage with on campus or a less frequently updated proxy of them. Representing who is inside the group and who is beyond the periphery can be complex when social media does not accurately reflect the organization.

Over time, there has been an ever-widening social divide between polarized communities on social media. This "us and them" mentality establishes boundaries and creates spaces with self-reinforcing messaging. In a polarized political landscape, where public discourse often is more about hyperbole and less about constructive dialogue, understanding the relative position of individuals and groups within a social network becomes increasingly important. This is not because of a focus on individual members of the network or the reasons they are interacting in particular groups, but the type of data that can be studied. By using cross sectional analysis or even a longitudinal study over time, the boundaries of these groups can be revealed alongside how they intersect with other groups and what the individual's position is within the larger social structure.

We can see he emergence of echo chambers in the sharing and promotion of messages as additional users join in. There are influential members who act as the mouthpieces for those at the top of a hierarchy and serve to promote their messaging. Users with the connections and

reach to influence many outside the typical networks can become powerful promoters of content and influence the behaviour of the overall network. In recent years, a very public example of this was how former US president Donald Trump interacted with Twitter members. While the President was a frequent user of Twitter and constantly putting out messaging targeted to his many followers, the impact of these tweets reached beyond merely these users. Many users who did not follow the former President in fact interacted with his content on a regular basis.

This was made possible through the extensive coverage of the traditional mass media or a third party re-sharing his content. These influential users amplified the message as it passed through the network. By being able to quantitatively measure the shape and internal structure of a social network, we are then able to identify the real power brokers of social capital and their influence over the rest of the network. These unseen influencers are often responsible for promulgating a message throughout the network, but very few people can identify them. We may not know who that third party is as their influence may not be overt and explicit, but these influencers are effectively the connectors that absorb social information and pass it out to users across the spectrum. By doing so, new users are brought into the conversation and the message continues to gain traction.

In sum, looking at hierarchical organizational models alone when determining who is the most influential at spreading their message may not be useful in the context of pro-Israel campus activism. Instead, it seems likely that SNA can be used to help us to uncover hidden patterns of interaction that would not otherwise be visible with the use of more traditional methods. In other words, this method can likely help us to identify hidden influencers. But who really are these hidden influencers and why is it important to find them? Additionally, how exactly can SNA be

used for this purpose? Let us answer these questions by taking a closer look at the concept of hidden influencers.

4.3 Hidden Influencers

4.3.1 Who Are Hidden Influencers?

Hidden influencers are members of a network who can absorb information from elsewhere and propagate it throughout the network. These members are in areas of the network that allow for the connection between various groups and give them the ability to disseminate information throughout the network rapidly. They are also called "unsung heroes" (Bondavalli, 2015) who are essential to the network and create connections between nodes but may not even realize that they are essential to the network's structure. These users may be unknown but represent a point of significant interest and value to companies looking to gain "authenticity" among network users (Hund, 2019).

4.3.2 Why is it Important to Find Them?

These leaders may be hidden for various reasons, and diverse approaches are needed to be taken to uncover their identities and their importance to the network (Lane et al., 2017). Leaders may influence their organizational hierarchy or may influence a network less visibly. This can be macro influence, such as a celebrity posting messages which are propagated by vast numbers of users, or micro-influence by smaller and more targeted influential members of the organization (Rakoczy et al., 2018). These users can be seen as power brokers (Esteve del Valle & Borge Bravo, 2018) who influence large groups external to organizations.

A more insidious example of this would be accounts that are automated users seeking to influence and connect with influential members of the network. These accounts can be identified using various means to determine their influence on the network as a whole (Szep, 2019). Ways to detect them and their influence continue to evolve as they become more complex and subtle in their approach to influencing large numbers of users (Paudel et al., 2019). While bots are of concern, polarized networks may continue to function in much the same way without their influence (Hagen et al., 2020). In short, finding human hidden influencers remains by far the most important.

4.3.3 How Can SNA Can Help?

Organizations are usually studied by using their structures and understanding the power dynamics between various levels. This means that the corporate voice of an organization would come from the leadership. At the other end of the spectrum, ordinary employees of the organization would have very little idea about what was happening within the company. Indeed, most users in a typical hierarchy would know some details relating to issues surrounding their position (such as co-workers, their supervisor, and subordinates) but would not necessarily be able to influence the entire hierarchy.

Using social media analytics to understand an organization and look at the organizational hierarchy from a different perspective provides a new way to understand the place of an individual within an organization. There are many user cases for this type of network research. It can be used to identify influential members to help propagate content, for example, to promote Covid-19 vaccination education (Yusuf et al., 2021), identify false information (Pudjajana et al.,

2018), or find those who enable an organization to connect with an extensive network of new potential customers (Wibisono & Ruldeviyani, 2021).

By decoding an individual's relative social influence and the various pathways they are connected to within the network and beyond, users with a great deal of power and influence, as well as the ability to absorb information in greater quantities, can be readily identified. The contention is that these users will enable rapid dissemination of information throughout the network and lead to the identification of better informed and influential members.

In sum, the identification of hidden influencers, or unsuspecting individuals who are able to propagate information farther than those around them, can be very useful for helping organizations to spread their message. Yet while the previous two sections have detailed the benefits of SNA and hidden influencers, they have not determined the research questions for which we seek to use SNA to answer. How then can SNA be used to better inform our understanding of the social phenomena which initially raised the motivation for this study? Let us now turn to an outline of the three main research questions that arise from this theoretical framework.

4.4 Empirical Research Questions

1) Can SNA be used to understand the underlying social network dynamics of pro-Israel student organizations on North American campuses?

2) Can SNA be used to identify the most influential participants of Pro-Israel student organizational networks?

3) Can SNA determine whether hidden influencers connect various pro-Israel student organizations on Twitter?

4.5 Conclusion

This chapter has discussed two main concepts that will be built upon to better inform our understanding of how pro-Israel activists organize themselves socially on North American Campuses, namely SNA and hidden influencers. SNA appears to be a very important concept for visualizing the structure of social networks and gaining a deeper understanding of how they function. Hidden influencer is also a very interesting concept which could help us to better understand how information is propagated through these networks. Yet the question remains, which methods can be used to apply SNA to our research questions? Chapter 5 will explore the problems with my initial study design followed by the specific methods used in this research project.

Chapter 5

5 Methodology

This chapter involves a detailed account of the methodological steps taken in this research project. It will begin with an examination of what prevented me from carrying out my initial study design, including the high dimensionality problem and access to data at an affordable cost. Following this, it will look at the specific taken to answer the research questions, including the sampling method, quantitative data collection steps, and data collection and analysis tools. Next, it will consider the broader methodological issues of validity and ethics. Finally, a conclusion will sum up the methodology along with its relative strengths and weaknesses. Let us begin by taking a closer look at the initial study design.

5.1 Original Study Design

5.1.1 Initial Study Goals

When I first started to plan the research, I was working under the assumption that there would be correlations between funding, engagement, student population, and other factors. My rationale was that by gathering large amounts of varied data, I would study how individuals participated in the group at the micro-level and how groups were linked at the macro level, perhaps via centralized organizations that provided training and funding to pro-Israel student groups across North America. My initial study design therefore involved large-scale data collection and population-level surveys distributed via social media. The next step was to decide which social media platform to use.

5.1.2 Social Media Platform Choice

The social media platform chosen for this analysis was Twitter. This platform allows for the observation of "social-network members in their natural settings, defining their roles within the social network, and analyzing their network" (Hambrick, 2012, p. 20). This therefore has the benefit of being a naturalistic approach, permitting us to capture relevant social information in a non-artificial manner. Twitter is an ideal platform for this type of analysis due to the open nature of the network and the large amount of social data at the disposal of this social media company.

While an alternative platform Facebook was also considered, several privacy scandals in the run up to this research ultimately led it not being chosen. The Cambridge Analytica scandal for example involved the data analysis company Cambridge Analytica exploiting a flaw in the Facebook API to obtain user's information without their permission en mass (Isaak & Hanna,

2018; Schneble et al., 2018). Although this alone does not necessarily indicate malintentions on the behalf of Facebook, the level of public outcry was significant, raising the possibility that new regulations on the firm may limit the way in which its data is collected and distributed. With long-term continuity in mind then, I chose Twitter as the platform to be used in this study.

While many features found on Twitter can also be found on other platforms, what is unique about it is the limited space users have to compose a message (Komorowski et al., 2018a, p. 4), and the open access to the entire network. These factors make it an appealing network (Balan & Rege, 2017b, p. 45) for users to interact. The Twitter format condenses messages and "provides […] flexibility, convenience, timeliness, low cost, and efficiency" (Clarke & Nelson, 2012, p. 29). Being part of a community and gaining traction within the network may be as simple as having a high level of engagement. Twitter has become a transformative communications tool (Komorowski et al., 2018a, p. 2) which is widely used by many as a new commons for discussion and debate, led by those with the greatest degree of influence.

Despite the masses of data, Twitter allows users to connect in many different ways and find their space. This is enabled by Twitter leveraging "the 'globally public by default' nature of tweets [and lending] itself to the development of means for automatically organising discussions of specific topics through shared conversation markers" (Bruns, 2012, p. 1). There are a number of ways users can find each other and make connections through the use of symbolic markers. These markers include hashtags (denoted by the # symbol) and @ markers (which are used to reference individual accounts). The combination of these symbols means that sub-groups can emerge from the larger network. This smaller sub-group has characteristics of users that are both primarily interested in their community and, at the same time, maintaining connections to the

larger outside network. Although users can connect over the same people, topics, or ideas, they may reach the space through different conduits.

The pathways that individuals take to form a reciprocal relationship within the network can be varied. This means that, while "established relationships and "friendships" are not required in order to interact and connect with others [...] one can read and participate in conversations with complete strangers and even organizations […]. [...] [T]he norm on Twitter is to leave the accounts unprotected, there is a very low barrier to interaction in Twitter" (Clarke & Nelson, 2012, p. 29). With the majority of content on Twitter both public and unprotected, finding information that bridges many different social intersections becomes a core concept of using the network. An example of bridging these gaps is that Twitter can be used for both personal and professional communication and to engage with very different audiences (DeGroot et al., 2015, p. 420). While there are many positive advantages to representing yourself on social media, "crossover" from one community to another could have potentially negative consequences (Langenfeld & Batra, 2017) and publicity. This often happens when celebrities share their thoughts on social or political issues which results in a backlash (Pennington et al., 2016). The result is often the erasing or hiding of the offending post and working on strategies to re-gain their relationship with fans.

Privacy and the ability to join communities of users on Twitter, passively interact (sometimes by design [Knight & Kaye, 2016]), or theoretically engage millions across the network are important distinctions when comparing this platform to others, such as Facebook. Over time, many alternative social networks have increased privacy or built mechanisms where users can enact barriers to interaction (Pruchniewska, 2019). There is also a changing landscape in the way users make their data public and share personal data in a non-protected space

(Pavlicek et al., 2019). For example, privacy settings can prevent someone from joining a Facebook group by requiring an introduction or invitation for admittance, though these boundaries can be arbitrary or unevenly applied (Child & Starcher, 2016). While this possibility exists on Twitter, the openness of the network is an attractive feature and enables users to both find each other and engage with communities or clusters of users.

Much of the engagement on Twitter comes from influencers promoting "authenticity". These users show a glimpse into their lives and project the impression of an interesting user that others choose to follow. The way in which communication happens leverages content such as images and text with the community in which the user is positioned. This unique and abbreviated method of communication reveals that "[a]t the heart of Twitter is a modelling of human relationships that some have argued sets it apart from other successful social networks" (Grant et al., 2010, p. 580). Twitter has many "unique characteristics […] (e.g., connection, interaction, boundaries, communication)" (Clarke & Nelson, 2012, p. 31) which distinguish it from other forms of social media. Twitter can be a way to "dip in" to see what users have posted and share in their "[updates of] […] personal life activities, people producing real-time information and people following other people's RSS feeds, which is a way to keep informed about personal interests" (Celli & Rossi, 2015, p. 1). This has changed over time, as users came to find ways to express more with less text, causing Twitter to change from a site where users simply updated their status to sharing more complex "things such as what they were doing, their intentions, and so on" (Acar & Ayaka Deguchi, 2013, p. 22). Unlike other forms of social media, the general openness of Twitter's data allows users to passively read content or actively interact and engage.

The endless stream of live data on Twitter means that this data "is updated via any online device and provides an opportunity to preferentially link to particular users or groups"

(Jacquemin et al., 2014, p. 22) in near real time. Territory and boundaries within the network are demarcated by hashtags, "keywords marked with the # symbol […]indicate discussion 'channels' within the largely unstructured flow of posts through the service [...] [that are] efficient for constituting "ad-hoc publics" to mobilize people in relation to significant events" (Lindgren, 2013, p. 210). As Twitter is used by an increasing number of groups and people as a daily communications medium, the sheer number of users and the endless content they provide make it an ideal network for academic (Knight & Kaye, 2016; Mohammadi et al., 2018), business (Tang et al., 2016; Wright & Rogers, 2019), and government (Kim, Park, & Rho, 2015) study. The data users generate "reveal social, economic, and political processes and practices" (Graham, Stephens, & Hale, 2013, p. 100) from which a detailed and nuanced network allows the collection of sentiment and data related to a given population.

Yet while Twitter seemed well-suited to my initial goals involving large-scale data collection and population-level surveys, certain restrictions, namely the high dimensionality problem and data access limitations, prevented me from doing so, as shall be outlined in greater detail below.

5.1.3 The High Dimensionality Problem

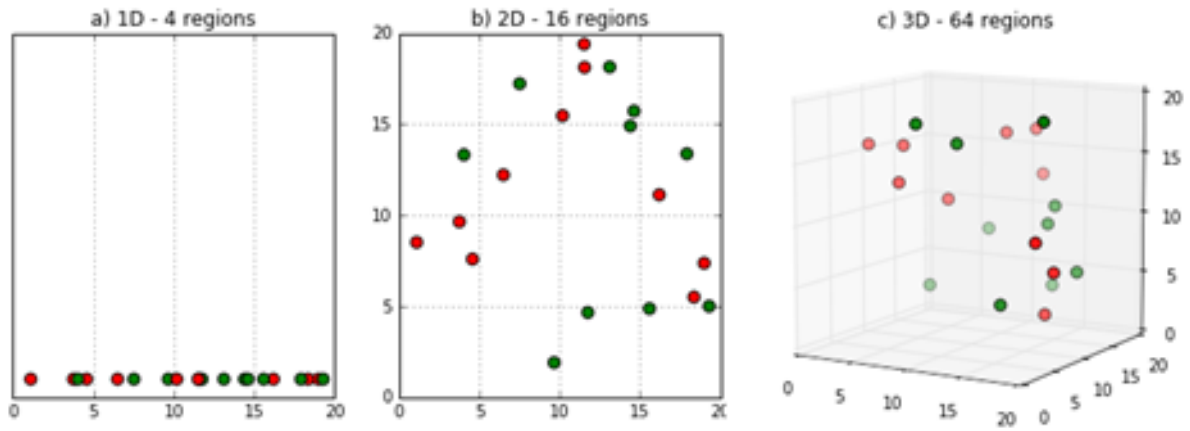
Gathering large amounts of complex network data requires new processing strategies to process the data. When storing tabular data like a spreadsheet, the number of possible intersections is generally low. For example, ten factors can be compared to ten other factors in a matrix or a table. These factors can then be compared against each other to check for correlation and association as the volume and scope of the data expand and as, in the case of social network data, the number of features or dimensions increases exponentially. This means that not only is there a

lot of data in terms of quantity, but the complexity of the data also increases as well. As data becomes more complex, users and machines have difficulty processing and analyzing it highly complex data. This is often referred to as the curse of dimensionality (Altman & Krzywinski, 2018). With an ever-increasing amount of highly complex data that can be processed in many ways, configurations, the number of possible interpretations increases to the point where the processing power required increases glows dramatically.

One common example of high-dimensional data is Netflix. An algorithm takes many input factors, such as the type of content the user is interested in watching, the various choices they have made in the past, and various other preferences to determine within seconds what to next recommend next with a high degree of accuracy. This type of data processing requires quickly finding an answer from high dimensional data in which where many different factors are processed and while also evaluating an exponentially increasing amount of negative data or null space. This space is created in high dimensional space is a data frame where most of the area does not contain data but rather supports sparse data points. In the case of Netflix for instance, there are many users and movies, but not all users have seen all movies. Information about what types of movies a user has never made the effort to see before also then becomes a useful data point from which to determine what they may be interested in watching in the future.

Figure 7

Data Dimensionality



Note. This figure shows a 1, 2 and 3 dimensional representation of data (DeepAI, 2019).

The amount of processing power needed to build ever more complex models as users interact more and add additional data becomes challenging. Although solving the high dimensional data problem with additional processing power is possible, this solution will ultimately yield diminishing returns (Bessa et al., 2017). One possible alternative is to circumvent the need for ever greater exponential processing power by reducing the data's complexity and simplifying it by using various dimensional reduction techniques (Charles et al., 2019; Xuan, 2018). Although the real-time capture and reduction of static data make it easier to process, it becomes problematic in a dynamic system such as a social network. In the network context, the volume and velocity of data and the many complex interconnections therein constitute create a very real-world practical challenge to process the data as it expands exponentially. SNA focuses on connections and points of reference and then before scaling to include larger interconnections. Acquiring network data in its entirety is difficult due to the sheer

size, access, and complexity of anyone other than the network itself. Setting more narrow criteria allows researchers to understand, analyze, and track more limited data references, ultimately explaining what is happening within the network.

Networks and the vectors that compose each interaction can be very complex, with many interconnections between users. Each node is connecting with another or an influencer talking to their audience. From a micro-level perspective, mapping the connections between users allows for the study of specific interactions between nodes. Modelling the interactions allows for different types of social configurations to be tested and re-tested for varying interactions. Once models for communication on the network are established, the methods and patterns of communication between network members can be modelled.

Social media analytics can encompass various scales from the micro to the macro. The network's movement and form are interesting because they provide the network's structural context, though it frequently changes. While on the other hand, there is also considerable detail that is passed within the content itself; it will be possible to do textual analysis of or thematic analysis of the data's interactions between in interactions between nodes. To understand another level of what is happening within the network, it is possible to observe various users communicate with each other, and the direction as well as the content of their messaging. This provides a context for the interactions between users, and by extension, provides metrics to understand these factors at scale for the entire network.

This qualitative and quantitative divide speaks to who is communicating and how and what they are talking about communicating to improve technology to analyze more extensive and more complex data simultaneously. Many of these distinctions will begin to fade as we could

conduct more detailed mixed methods research on social networks by using population-level data and, because of difficulties, accessing and analyzing exponential data. At the moment, a subset of this data to create our sample population is required to understand examples of network interaction in the future. This will look very different as new technologies allow for the study of unstructured data in a way that provides for population-level analysis, not only based on text but based on many other mediums, and network configurations and interactions. Not only is the dimensionality problem a barrier to achieving my initial study goals involving large-scale data analysis however, but so too are data access limitations.

5.1.4 Data Access Limitations

In many ways, the concept of discourse in the public sphere has moved to the online world. Where once "scholarship investigating the public discourse in pre-industrial bourgeois society of the 18th century […] explored extensively […] arenas such as Britain's coffee houses, France's salons, and Tischgesellschaften in Germany" (Bastos & Mercea, 2018b, p. 2), there are now chatrooms, online clubs, and forums. While the location of public engagement has shifted over time (Vårheim et al., 2019), there are still many conversations regarding the state of affairs. These spaces can gain the attention of society and politicians and can set the policy agenda.

While these public forums exist for the purpose of discussion, they are ultimately controlled by corporations who are responsible to shareholders. Spaces that are owned and controlled by private interests with a commercial agenda can limit discussion or debate that violates their policies but would otherwise be acceptable in a public forum. In terms of influence, the record of "Twitter data as legitimate manifestations of public opinion in the early 21st century" (Bastos & Mercea, 2018b, p. 2) shows that this space has taken a key role in public

discourse. The historical record of societal discourse is debated and recorded in a space that has a corporate gatekeeper and on platforms which limit participation to those with the means to connect and stay within the defined rules. In this context, the Terms of Service (TOS) of a social network set out the conditions for participation in the network. For the millions that are able to participate, there is an exponential amount of data generated by users that contributes to both the current conversation and builds a detailed historical record.

This new forum has many challenges and barriers to participation in terms of the sheer size and scope of information. Where once the social elite formed a relatively small nexus of power and discourse, social media networks encompass billions of users (Foster & Jackson, 2019) generating near endless content. The exponential growth of network data can present challenges to access and analyze data. From an equity and governance perspective, access to data, control of discourse, and the structure of the network all become important factors to inclusion.

When mapping a network, a very large amount of data is needed to build a large and complex network representation for analysis. In the previous chart of my social network, I used a free service to aggregate the last hundred interactions my account had with my surrounding network and display a sociogram based on influence. Twitter makes historical data available for about a week through computerized access using an Application Programming Interface, or API (Hino & Fahey, 2019). After this time, or when too much data is requested at once, Twitter imposes data rate limitations. This can make gaining free access to large amounts of data quite complex and the process of doing so often relies on many repeated samplings of historical data (within the allotted time frame) or the capture of live data. While there is a mixture of paid and free options from which to gather Twitter data, the amount of data, the age of the data, and

quality varies significantly (Littman, 2017). Data that is not provided for free is usually available through paid services.

Imagine a library with trillions of books. To determine which are applicable, it would take an enormous amount of research and physically hunting for the right collection of books. The API is analogous to using a database or card system to identify which books are of interest. Just like this imaginary library of books, all tweets are accessible though the website and application, but, without API access, capturing them in a systematic way becomes complicated if not impossible. While there are researchers that have worked on "web scraping," or the automated parsing of web based data using various methods (Al Walid et al., 2019; Bruns, 2019; Kishore et al., 2019), this approach is both time consuming and resource intensive.

The commercial applications for Twitter data are endless. This mass of data provides insights into global conversations and networks. However, to unlock this data in a manageable way, keys are needed to access the volume, quality, and type of data required, a complex task in a sea of nearly limitless data. To that end, Twitter changed how access to data works. In 2011, Twitter changed the rules regarding the way the API works. This approach is normally used by developers to gain access to large amounts of data with an automated mechanism. Rather than having to go through the site and connect to potentially trillions of pages via the web, which would be slow and cost prohibitive, the API allows for large-scale access. In "early 2011 [Twitter] began to interpret its API access rules in a significantly more stringent fashion, referring potential users who needed access to very large datasets on Twitter users and their tweets to a new commercial access provider" (Bruns, 2012, p. 3). This means that projects that rely on large amount of data "now find themselves cut off from their data source and unable to afford […] (substantial) commercial access fees" (ibid.). Although the data is available publicly,

limiting access to bulk data sources means the difference between trillions of clicks, a time consuming and potentially never-ending task, and downloading large files with a huge amount of data. Projects that rely on data to map social networks now face challenges of funding and commercial viability to afford the cost of data. In this environment, new methods of collecting data have emerged, along with changes to how much data is required to conduct studies that are more limited in scope. Collecting population level data has become out of reach for many researchers, and this presents a first challenge to collecting and analyzing social network data. Part of the problem lies in the fact that the public forum is increasingly owned by private interests. The private technology companies that run social media sites, such as Facebook, Google, Twitter, and so on, have an inherent conflict in fostering conversation while maintaining a code of conduct. The online commons, a place to express ideas and exchange dialog, is not actually free, and "it can be argued that contemporary social media is largely run by corporations that exploit audiences as consumers and whose main goal is to generate surplus value" (Lindgren, 2013, p. 210). While the for-profit companies use the information given to them for commercial uses (such as advertising), maintaining standards becomes complex when political and social discourses intersect social media. Many companies are placed in a difficult position, having to choose sides between the generation of content and the freedom of expression of their users, and their obligations to policies that may conflict with national, international, and corporate policies. These values may be at odds with social norms or expectations and the obligations of the platform to their users in the public.

These policies can be complex and act to regulate the community to a degree beyond what the public in other forums would come to expect from, for example, the limits of free speech. The purpose of this control is varied and not all of these community policies are equal:

> Although platforms experience similar commercial and regulatory imperatives, social media companies may adopt differing strategies for the kinds of discursive communities they seek to cultivate. Several companies have adopted a rhetoric of free speech advocacy […].These depictions suggest differing orientations around the company's obligation toward policing user content: a "free speech"–oriented company may be more likely to design its policies around defending free expression, while a "community"-oriented company may place greater focus on fostering good behavior among users and curbing harassment. (Myers West, 2018, p. 4367)

The way platforms manage their users, and the resulting policies, may be the product of social issues and the advocacy of network members. For example, having political leaders (Ssozi, 2016; Straus et al., 2016) or the president of the United States on Twitter is not new (Wang, Li, & Luo, 2016), but the degree of use by former US President Trump to share personal and political messaging or "tweet politics" (Kreis, 2017) creates new levels of complexity regarding the implications of his social media use. In one example, a few members of Twitter sued Donald Trump for blocking them from his account because they did not share the same point of view, which they claimed was a violation to their first amendment rights (Roberts, 2019). The courts sided with the plaintiffs due to the fact that political messaging and important announcements by the administration had previously been communicated through social media before official channels (Tankersley & Phillips, 2018). In this example, the Twitter account of the president was being used for personal communication, relaying official government policy, and the promotion of personal celebrity (McDonnell & Wheeler, 2019). Because the account of the former President was connected to many in society for different reasons, it took on a quasi-official role, and became a way to directly communicate with supporters and citizens.

The question becomes how the platform can police or enforce policies against the leaders of their own countries. This conflict was resolved by Twitter creating special rules for world leaders, and allowing them to violate the terms of service policies which would apply to the average user (T. B. Lee, 2019). Twitter took a very fine line between public communications for world leaders and enforcing their policies. This came to a head in the waning days of the Trump administration with Twitter permanently suspending the account of the former President and many associates (Twitter Inc., 2021). While this first and very public policy change shocked many, there are ongoing implications for the limits of speech on private social networks.

There is an underlying question of if social media platforms can truly be a means where individuals can freely communicate (Evans, 2019). Habermas defines the public sphere as an open forum (Bruns & Highfield, 2015; Papacharissi, 2019) and "argues that […] [it] does not exist in modernity largely due to the influence of money via corporate interests within mass media" (Kruse et al., 2018, p. 63). This is because the public sphere "requires unlimited access to information, equal and protected participation, and the absence of institutional influence, particularly regarding the economy" (ibid.). We are therefore left with something quite different: an engaged public forum policed by corporations with an interest in creating both communities and the limits that govern conversation within them.

Another example of this conflict of social responsibility is the challenge of news agencies and social networks with conflicting responsibilities of covering social media from terrorists (Mortensen, 2018). On the one hand, the companies do not want to promote terrorism or the use of the networks to propagate content that goes against the platforms code of conduct or terms of service. On the other hand, free exchange of ideas and open dialog is exactly why these

platforms were created. Censoring some users and banning discussions simply encourages users to go elsewhere (Zannettou et al., 2018) and begin the cycle of cat and mouse censorship anew.

National governments have also attempted to influence the speed and responsibilities of social media platforms, such as in the aftermath of the Christchurch attack in New Zealand, with the goal of "a global co-ordinated response that would make the likes of Facebook, YouTube and Twitter more responsible for the content they host" (Cheng, 2019). This is particularly problematic when the jurisdiction of the national government may not cover content being accessed from elsewhere. In a similar example, German legislation in 2017 imposed large fines on companies not removing illegal (in Germany) content from their site or limiting access from their jurisdiction. The responses from the social media platforms included complaints about "this perceived censorship and threat to democracy. However, these same companies are hedging their bets and preparing compliance plans" (Theveny & Phillips, 2018, p. 175),. While, in both these cases, companies based in the United States (with content stored both on and offshore) were being asked to adhere to laws in other jurisdictions. This is informed by political consensus.

The other side of this argument is tech companies that agree to wholesale censorship in compliance with national governments, such as China (Nieva, 2019). Companies like Google have made the choice to pull out of the Chinese market entirely rather than apply government controlled censorship, only to quietly make their way back over time, much to the chagrin of their employees and the public in the West (Nieva & Zhou, 2018). There are opposing functions of social media that use "democratized […] [networks that] have been employed by the people to promote their causes, organize protests and to disrupt and circumvent the official flows of information stemming from traditional media or economic and governmental institutions" (Lindgren, 2013, p. 207). These uses create new ways to promote a political or social agenda.

Ultimately, this comes down to the political alignment of companies, and, despite trying to remain neutral to all members of the network, national governments, and so on, this remains challenging to do.

In sum, while my initial study design involved large-scale data collection and population-level surveys, these ambitions proved impractical given the high dimensionality problem and data access limitations outlined above. The resulting question then was how could I answer my research questions in the face of such constraints? To answer this question, let us examine my final study design.

5.2 Final Study Design

5.2.1 Overview

The final study design, given the limitations encountered above, is based on the Mystery Story approach (Alasuutari, 1995). This approach uses a study of known cases and variables to tell a story and reach an unknown conclusion (Silverman, 2000). Exploratory research allows the researcher to change directions as a result of new data and insights (Stebbins, 2001). The objective of the study is not to offer conclusive solutions, but rather to dissect a problem that is not clearly defined and propose an approach that could be valuable for a future research project related to the topic.

To that end, I use social media network analytics to guide the sampling process. This is a two-stage process of network mapping and data collection to identify nodes (data points representing groups, individuals, accounts) of interest, followed by in-depth analysis of data. This technical process has many complex elements and involves years of research and experimentation to collect and analyze enough data using various methods. This approach seeks to discover new insights, key informants, and participants of interest within the target network, namely pro-Israel activists on North American campuses.

The challenge when studying a network is finding a cluster of participants who are “in the know” or, in other words, social influencers or leaders within the network. These influential network members, often unseen, shape the pathways and flow of information and propagate content. Studying network participants and interactions offers an effective, quick, and inexpensive method to identify and sample informed members who may be otherwise invisible.

This research design is accessible and provides a means of studying networks without specialized equipment.

Instead, network data can be acquired using open-source software. Being able to locate a sample of the population with a high degree of influence and connection, who at the same time may not represent the peak of a hierarchal organizational authority, can be very complex. This type of untargeted and representative sampling requires large-scale data collection from often uninformed members. By identifying influential participants and then expanding the parameters of the search, data analysis can be used to better understand the target population.

The unit of measure in this study is the formation of social networks associated with organizations. Capturing this involves a quantitative study of both the members within these networks and their connections. Although the initial motivation for the study may have been activist networks, the content of communication between the groups under study is not examined here. Rather, the focus is on the means of communication and the network between members. While the study concludes with an examination of how nodes may relate to these members' organizational hierarchal position, what members discuss or the politics around their positions are not considered.

Top candidates, identified based on network position, are then compared to their public profiles and any possible indication of their position within their organizational hierarchy. In this project, suitable candidate organizations are selected, followed over time, and quantitatively studied using SNA to provide a qualitative textual study of information associated with nodes of interest, allowing us to better understand the context of such nodes within the wider network.

5.2.2 Sampling

At a recent research presentation, I was asked to give an analogy to explain how social network analysis would function in the real world. I think a good parallel to the way that we interpret social networks is fishing, or quantifying which fish are present in a large lake. Looking at the lake, it is very difficult to see the totality of the ecosystem and understand what exactly is happening beneath the surface. There may be many complex interactions between the various ecological elements, and it is hard to determine the overall state of affairs by merely catching a few fish. This is because the goal of mapping the network is to both understand the structure and "reveal some semantic aspects behind the network topology [which] […] can be reached by identifying the highly intra-connected groups of nodes or communities […] [and] study the common characteristics of social groups and what makes peoples group together in a community" (Abdelsadek et al., 2018b, p. 205) . Within the ecosystem, there can be ongoing and continuous changes which may or may not be impacted by the intervention, depending on its relative size.

Large social networks are very much the same as the lake. Many social groups, nodes, and boundaries are in constant movement within their network or community. Along with this movement, the semantic understanding of the network can shift. Even if a network or community is within clearly defined boundaries (for example, they are all members of a specific community), it is quite possible (probable) that the members of this network will engage in completely unrelated conversation. Analyzing a network where both topical and unrelated discourse take place would therefore bring in many other external points of data that may not link to the initial hypothesis which determines the context of the network/community discourse.

There can be limitations to examining all macro data without adequate resources, because “even though advances in technology have facilitated the analysis of ever-increasing network sizes, the exponential nature of the number of connections in networks” (E. M. Eisenberg et al., 2015a) may be overwhelming. In other words, it is important to understand which users are of importance and to use a focused sample, rather than attempting to capture the entire network.

Instead of collecting population level data for everyone in the wider North American campus social network then, I resorted to a more targeted approach. By connecting with the person in the group (our key informant), we can quickly discover not only what is happening in the network by gathering statistics and detailed information about the network using a modified snowball sample approach (Baltar & Brunet, 2012; Goodman, 1961; von der Fehr et al., 2018). This process can inform who should be studied or approached next (the second most influential member tier of the network) and provide insight into the network with less effort and expense than creating a representative sample. My thinking was that if I am able to understand network dynamics, I would be able to conduct a “super-snowball” sampling approach.

The initial sample for the study was purposive with a pre-selected selection of organizations that would fit the following requirements: they are pro-Israel campus organizations, have an active following on social media, and have engaged participants. Because the study occurred over the course of multiple years, it was important to select individual organizations with a degree of continuity. Otherwise, from one organizational administration to the next, there may be dramatic changes within the entity.

The sampling process for this research study was broken down into two stages. The first stage was to identify active Israel student groups on campuses across North America. This was

done by looking at social media on both Twitter and Facebook. This approach was then modified to focus specifically on Twitter as the method of study. Because of data privacy issues that have surfaced surrounding Facebook in the subsequent years, I decided to limit the focus to Twitter while only using the Facebook data as a point of comparison. The Twitter data were also more readily accessible. The first phase of data collection assembled a list of 97 pro-Israel groups on Facebook and 38 other campus groups and their directors. This was then broken down thematically in the second phase into 16 large organizations, which served multiple campuses. The 16 organizations consisted of six Chabad (an ultra-Orthodox Hasidic organization also known as Lubavitch) campus organizations in the United States, Canada, and internationally; 20 campus groups in the United States; five campus groups in Canada; and three groups that had a presence on Facebook but not on Twitter or vice-versa. These organizations were then mapped on April 3rd, 2018. The number of tweets, followers of the organization, who the organization follows, and likes were captured for Twitter, and the number of likes and follows for Facebook. The rationale behind selecting these groups was that there is a degree of duplication between various groups' mandates. Therefore, it seemed likely that they would have connections between them. Additionally, there may be similar communication patterns within groups, which enabled an exploration of the study's social network versus organizational paradigm. One of the challenges to analyzing the various groups in this way was the technical element of gathering large amounts of social network data and analyzing it, as well as ensuring that the theoretical model of what was trying to be accomplished matched the availability of appropriate technological tools to answer the research questions.

In stage two, cluster samples were created based on themes. Following nearly of year of data collection, these numbers were again collected and compared. Similar to before, Twitter

data was collected in the form of tweets, followers, follows, and likes, and only the groups showing a net increase were kept in the analysis. This demonstrated that the organization was active over the span of two academic years, 2017-18 and 2018-19, and showed an overall growth in at least one of the categories. This process limited the number of potential candidates to 14 large organizations. The organizations were then clustered into three groups based on the organization's type, as shown in Table 1. Group 1 contained large, possibly multi-campus student and activist organizations. All of these groups support, develop, and fund programming for groups in some manner. Group 2 was comprised of Chabad organizations on various campuses in the United States, Canada, and Internationally. Group 3 included on-campus, student-run, pro-Israel organizations – generally student clubs.

Table 1

The Three Groups of Pro-Israel Student Organizations Under Study

Group	**Name**	**Location**	**Rank**[3]
1	The David Project	US	7
1	The Israel Project	US	4
1	AIPAC	US	2
1	Jerusalem U	US	8
1	Hillel International	US	5
1	StandWithUs	International	1
1	A Wider Bridge	US	9
1	Act for Israel	US	3
1	Students Supporting Israel	US	13
1	CAMERA on Campus	International	11
1	The David Project	US	7
1	IAC Mishelanu	US	14

[3] Rank is based on the size of all Twitter measurements combined (tweets, following, followers, and likes), by size within the individual group. This is done because group 1 contains much larger organizations than within the other groups.

1	SSI Movement	International	13
1	ICC @ Israel Campus Coalition	US	10
2	Chabad on Campus	International	1
2	Chabad in Campus DFW	US	5
2	Chabad of UCLA	US	2
2	Chabad Kingston	Canada	4
2	Chabad WVU	US	3
3	Bruins for Israel	US	3
3	Hillel at USC	US	5
3	Trojans for Israel	US	9
3	Badgers for Israel	US	1
3	SSI Georgia	US	2
3	SSI Loyola Marymount	US	10
3	Liberty University Stand with Israel Club	US	4
3	BU Students for Israel	US	6
3	Tulane for Israel	US	7

Note. The table includes the general location (primary area of operation), and relative rank for each organization.

In all cases, none of the groups studied experienced exponential growth during the one-year study period. The groups in the study were comprised of real (human) users, as much as could be determined, as opposed to automated bots. All the groups studied had relatively small growth rates in terms of the number of users who joined the groups. While in some cases membership declined, none of the groups increased or decreased in size by more or less than 100% from their starting point. Additionally, the users maintained ongoing conversations with other members of the network over the course of an extended period of time, a difficult feat for automated bots to achieve. This indicates that it is very likely that every individual, or at least the most influential individuals, were accounts represented by real people.

All the organizations in the sample maintained an active presence throughout the study period. The maximum increase in tweets was 40.45%, the maximum increase in followers was 23.15%, the maximum increase in following was 16.81%, and the maximum increase in likes was 230.81%. There was a 0% decrease in tweets in terms of the minimum numbers. There was a 24.65% decrease in following. There was a 16.67 decrease in followers and a 1.44% decrease in average likes for the remaining 29 organizations. These organizations have all shown positive growth in at least one factor, indicating some degree of activity. This allows for the identification of individuals and also of a complex network spanning multiple years.

By connecting with the person in the group (our key informant), we can quickly discover what is happening in the network by gathering statistics and detailed information using a modified snowball sample approach, a method in which initial research participants are used to

recruit others (Baltar & Brunet, 2012; Goodman, 1961; von der Fehr et al., 2018). This process can inform who should be studied or approached next (the second most influential member tier of the network) and provide insight into the network.

I continued with the project and was interested in how a population could be sampled with less effort and expense than creating an extensively representative sample. My thinking was that if I were able to understand network dynamics, I would be able to conduct a "super-snowball" sampling approach. Snowball sampling has been modified before (Sadler et al., 2010), and has been adapted using social media data on Facebook (Baltar & Brunet, 2012) and Twitter (Riddell et al., 2017) with various populations (Marlowe, Brown, Schrier, & Zheng, 2017; Wang, Mentzakis, Brede, & Ianni, 2019; Wright, Denney, Pinkerton, Jansen, & Bryden, 2016). This approach uses quantitative data to understand the study population using lists, nodes, keywords, and hashtags that form a digital community (Al-Khateeb & Agarwal, 2019). I started to consider that using a quantitative measure could allow me to identify influencers in the network and chart the network's internal social dynamics. The reckoning behind this was that in future research, once I understood how the groups were organized, I would then be able to interview or conduct a focus group with influencers to gather qualitative data. Once this was done, I could then continue sampling by either having participants help recruit additional members of their network or by repeating the process once again to identify the most promising secondary nodes.

There are a number of issues to consider when sampling large networks on social media. Determining a starting key informant to represent a social group is an important first step to finding a node with dense connections to the rest of the network. Once starting points are determined, it is possible to research their relative social position within a hierarchy. The social position of a particular member of the network can be determined both online and offline as part

of a social organization. For example, a student who has been part of the organization for multiple years may be quite different in terms of social connections than one who only recently joined. Starting with prominent members of an organization and mapping the social connectivity can shed insight into the structure of the group.

In addition to social position, time is an important factor for the collection of data. As an organizations' map of networked users will change over time, there may be changes in how connected individuals in the network are represented over time. Data for the network is generated during relatively small windows of time, broken down into a series of cross-sectional data snapshots. They are then pieced together to build a representation of the larger network. This necessarily means that data representing a student captured in a cross-section of the social network may be slightly different than if the study was conducted longitudinally. Where a cross-sectional study takes a snapshot of the network at any one time, a longitudinal study would gather data over a longer period of time and follow individuals as they interact. This becomes more complex as the various participants join and leave the network, creating more data and interactions. Given the limitations of gathering and processing this type of data, a cross-sectional model of a network can be more practical for studying the interconnections over time with room for refinement.

The sample of schools and organizations to start the data collection was purposive and driven by an initial list of starting nodes. Once the next level of data was expanded to include network members, the associated collection of individuals had an element of random selection. This is because users are able to join and leave the network and may be missed by the relatively slow collection methods used to gather data. Individual participants were not selected before the research study began; rather, data collection started with a list of loosely related organizations.

Information about the starting organizations and their followers led to the collection of data about associated individuals. From these first rounds of data, individuals were chosen by virtue of their connection to the network, social position, and relative influence.

5.2.3 Quantitative Data Collection Steps

The quantitative data collection process began with the collection of network information on the initial groups. Part of this process also involved collecting the volume, direction, and frequency of interactions which, when later compiled, would indicate the degree of connection and relationships between nodes. The initial data collection took place over 36 weeks between April 3, 2018, and December 15, 2018. The initial data collection period allowed for the detailed study of the first-level organizations. It provided enough time for trends and links between and inside groups to emerge over the course of multiple data collection periods. Following this, additional data was gathered in 2019 and 2020 to build more complex network models and gather additional connections.

Before any data was collected, the size of the initial groups in terms of likes, followers, and other metrics was evaluated over time to determine the level of activity within each group. Data was collected on Twitter and Facebook metrics for all organizations for comparison. The study itself however involved only the collection and analysis of Twitter data. Groups that maintained and showed positive growth over time were selected for the study. Due to the changing nature of student groups, it was important to identify groups that continued to be active over multiple semesters and academic years.

Data was collected using three starting groups or clusters. Group 1 consists of fourteen larger national and international campus-based student organizations. Group 1 is primarily based

in the United States, with the exception of three international organizations. Group 2 consists of five student-focused organizations related to the Chabad organization. Group 2 includes the umbrella organization for Chabad on Campus, three organizations based in the United States, and one based in Canada. Group 3 consists of ten campus-based student organizations in the United States. The data were gathered at a number of levels to define the overall network. Starting with the initial organizations, then dividing the data based on group, and finally gathering and processing global metrics for all the collected data.

Table 2

Facebook and Twitter Data

	Facebook Likes	**Facebook Followers**	**Twitter Likes**	**Twitter Followers**
Group 1 (14)	2,802,712	2,718,688	29,293	316,811
Group 2 (5)	9,652	9,552	493	4,944
Group 3 (10)	10,749	10,619	1,818	4,680

Note. This data was collected during the initial exploratory phrase of the study and included both Twitter and Facebook metrics.

Table 3

Percentage Changes in Twitter Data Over the Study Period

	Tweets	**Following**	**Followers**	**Likes**
Group 1 (14)	10.91%	0.50%	7.50%	40.95%
Group 2 (5)	5.73%	-0.32%	3.45%	3.58%
Group 3 (10)	3.15%	0.09%	2.87%	3.81%
Overall (29)	7.34%	0.22%	5.21%	21.70%
Standard Deviation	0.098	0.042	0.095	0.284

Note. On average, all groups show growth during the collection period (aside from the following metric in Group 2). The size of the groups, or the number of organizations they encompass, are noted in brackets.

Various data points were collected for each user's publicly available data. Data included username, when the account was created, a unique ID for each Twitter, follower count, count of friends, status count, post count, friends, and other factors. These parameters are attached to Tweets and user accounts as metadata, which describes the account or content. This data can be used in some cases as a proxy for demographics, geographic location, and other factors. These factors are used to construct a model of the network. While the metadata includes user location

and coordinates, these fields are not often used or contain user-reported data and were not included in the analysis.

The collected data could be used in many different ways. For example, the tweet text can be used for sentiment or textual analysis. On an individual level, the number of followers for an account and the age of the account show the connection between popularity and rate of growth over time, indicating highly active and influential accounts. Data from the collected accounts can be used as a proxy for demographics such as age by calculating age based on the age of the account. The gap between account creation and posts with student accounts tends to be relatively small, as the minimum age to use Twitter is 13, but many users trend older. The 13-17 age group makes up only 7.8% of Twitter users as of January 2021 (*Global Twitter User Age Distribution 2021*, 2021). For the average Twitter user, account age may likely act as a proxy indicating age. Using the account age statistic provides additional confirmation that a "college-age" student is running a particular account, and acts as confirmation of the user within the student network following the identification of a node of interest.

Several other elements were used to map pro-Israel campus activism through secondary data and reference material such as the recent Israel on Campus study, which details many campus-based advocacy events. There were 5,323 events conducted by pro-Israel campus groups in the 2015-2016 academic year (Israel on Campus Coalition, 2016). The data from that report was geographically mapped to reveal the most significant campus-based Israel activism concentrations in North America. While not a focus of this project, it would be possible to map student events and their promotion to social media. The specific impact of student-promoted events could indicate more network activity due to promotion and recruitment activity, which tends to be seasonal and ongoing throughout the academic year.

5.2.4 Data Collection and Analysis Tools

While the study's concept was being revised, deciding and defining how to carry it out was a complex challenge. From my initial plan of capturing endless amounts of data, to determine groups' boundaries, to the project's various potential designs, there has been a steep learning curve. One of the most significant issues is network size. Even if a large amount of network data can be captured, many barriers include limits to visualization, exponentially more immense processing power to process the data, and advanced technical knowledge to collect and interpret data (Eisenberg et al., 2015, p. 149). In other words, while it may be possible to capture millions of data points, finding a suitable methodology to display and interpret these points and their interconnections becomes increasingly difficult at scale.

Data is captured by saving individual nodes and their relationships into active memory. While different approaches use other techniques, all require a combination of active memory, processing power, Internet speed, and sufficient quantities of data. Capturing network data can also be done by doing multiple searches to look at each network user's different aspects and determine where the links and boundaries are between them and their associated nodes. This means that, when studying large networks, the computer's memory can be used up quite quickly as the size of the network increases (Joshi, 2018).

While there are scalable solutions to gathering network data (d’Amore et al., 2015; Faysal & Arifuzzaman, 2018; Silva et al., 2019), these tools are limited when trying to capture an extensive network in its totality. To gather the data that I needed on approximately forty relatively small student groups, with a total magnitude of tens of thousands of nodes, I had to purchase a dedicated computer with enough Random-Access Memory (RAM) to download and

analyze the dataset. This is because the computer that I usually use did not have enough RAM and therefore could not process an extensive data collection. The software requires a “sufficient amount” (M. Smith, 2014) of memory, which is based on the size of the network (O’Flynn & Barnett, 2016). Various approaches use alternate methods to collect data, including downloading information about each node. These stored data points are then stored in a file. Information on participants in the network and their connections can be accessed in a variety of ways, such as downloading (using the API), scraping (using data available to a web browser), and other technologies. The limitations of these methods include computing power, data availability, cost, and processing time. The processor I ended up buying was an Intel i5 processor with 32 gigabytes of RAM. This configuration allowed me to capture the network I was interested in (all the student groups at once) without the computer crashing. I also used an i7 iMac with 72GB of RAM and several online options to gather and analyze data throughout the process.

Another option was an attempt to build a server farm, or a network of linked computers to access greater processing power. The plan was to utilize several linked computers to capture various aspects of the network. The rationale for this would be to enable continuous captures of various parts of the network and exceed the Twitter API rate limit. The data could then be combined in order to reconstruct the network. Inevitably, it became clear that it would be easier to capture the data using only a single, powerful server. Future research could utilize this method and employ additional servers. Using larger and more powerful processing resources would enable the capturing of significantly greater quantities of data at a much faster pace.

There are many ways to capture network data. This can be a confusing and complicated endeavour for those not initiated in network analysis or the technical/data side of connecting with and capturing large networks (Chatterjee & Goyal, 2015). I had initially tried multiple programs

and approaches to capture networks of interest. The initial idea was to capture vast amounts of data to perform a popular population-level analysis of what was happening within the entire social media network. For example, this would include large-scale Twitter or Facebook data, which represented every student population. Once the data was captured, the next step would be to build models to determine the flow of information and how it is connected.

I quickly realized that gathering population-level data would be much more difficult than I had initially envisioned due to the limits on the amount of data I was able to access for free. The cost in terms of time, infrastructure, and money to gather this level of data was well outside the means of what I had available to carry out the research. Without the unfettered access to Twitter data used in other studies (McCreadie et al., 2012), this can be challenging. The process involved trying many different programs to capture live streaming data and previously stored data from two different APIs. Live streaming data capture real-time keywords as they appear on the network and are then stored in a database. Using live streaming is an appropriate method for capturing data relating to ongoing events or the viral uses of the hashtag, a special symbol used before keywords and phrases that are currently popular. In this context however, streaming was not applicable as the data associated with the social network structure was too vast given the Twitter rate limits, and other software was required to work within the limitations.

I decided to try various types of software to determine which would best suit the needs of the project. Initially, I attempted to download the multiple users with a Python program on a server. This involved downloading a sample of information about users and their connections and then reassembling the network model. Downloading data through the API is relatively slow due to Twitter API rate limitations. These restrictions limit how much data can be captured in a single request, with a timeout once the limit has been reached (Cogan et al., 2012).

Because of numerous technical factors, I decided to use the NodeXL software package and continue to gather data from networks of interest in batches. Throughout multiple data captures using this software, I was able to collect a large amount of data using the API. The goal was to then build comparisons between networks by merging the various files and building a large overarching network model. This will reveal if there were macro-level connections between groups or if a connection was mediated through influencers who were multiple layers removed from the primary starting point. There are limitations to how large the data mapping could scale using this software. NodeXL is a plugin for Microsoft Excel and there are restrictions on the network's size due to hardware constraints. For capturing networks with millions of nodes, a different approach would be required, or at least much more powerful computer hardware. Even though I found a relatively cheap compromise in capturing the data and analyzing it, at the cost of only a few thousand dollars, gathering much larger networks or putting together millions of nodes networks would be many times more expensive, as this would require a much more sophisticated computer setup.

One of the problems that I faced through collecting data was the sheer scale and complexity of the data, making it incredibly difficult to gather iteratively. When I set my goals on one particular type of data collection with detailed and specific parameters, the program could take days, weeks, or even months to run and gather the data. Because of the time requirements involved with the data collection phase, it is important to sample the data to ensure its correct content and structure. The process of checking what data is captured ensures that there are no missing elements in the data, it is of adequate detail, and it represents the query for requested data. The study initially began with specific organizations and their followers. This approach led to an understanding of who followed the organizations, which users followed multiple

organizations, and the connections between organizations. However, trying to identify influencers is more complex without additional layers of data. Using programs like NodeXL or more simple Python programs yielded slow and complicated results that were often difficult to parse through before changing direction. Ultimately, I opted for a more complex solution which gathered more in-depth multi-level data.

There are advantages to using a programmatic approach which allows for the collection of high-quality data. This speeds up the process by allowing us to collect only the data of interest, reducing the number of users and tweets to process. This approach required approximately one or two days of collection per network group. The collection process was simplified, and the data was processed by storing the information in various formats. This is because even when using more powerful computers, there are many issues analyzing vast data sets when using more memory-intensive file formats. An alternative was to use open format data, such as JSON (JavaScript Object Notation) formatted data. Formatting the data in this file type allowed for parsing through the data iteratively. By using data that could be processed using small and less memory-intensive steps, the processing is dramatically sped up.

Considering the various options, a better approach was to break the large and complex program into many component elements and address them individually. By doing this, I captured much higher quality data in a shorter amount of time and ultimately found the results that I was looking for. This approach, or the learning process trying various techniques, definitely brought many challenges, including the need to learn programming skills and the changing complexities of gathering and analyzing data over several years. The approach that I ended up using involving custom software to download and analyze data was a problematic approach but ultimately led to the best results.

As the scale of data grew over the course of this project, it became more difficult to download and manipulate the information because of rate-limiting factors. The next method I tried was to switch to a Python in order program to download files and save them in text-based JSON files. Once this was done, I was able to analyze the data using several Python packages, a set of instructions which enable different types of functionality. This was a slightly different approach than what the initial strategy for data collection had been. Using this approach allowed for the continued gathering of data at scale and enabled a new way of using the data already collected. With the data collected and processed, it was then possible to build a robust network analysis of the data and generate detailed network statistics.

Once the data was assembled and processed, it was then possible to use powerful software packages to visualize and further explore the network. The collection of several years of network data led to the final analysis of the groups being studied over time by merging multiple cross-sectional network snapshots. While this approach was somewhat more complicated to embark on and would have been challenging to engage with from the beginning of the project, it ultimately proved to be a robust tool that could scale with the data. In the end, numerous Python programming language packages, including tweepy, pandas networkx, and others, were utilized. Network visualization programs used include NodeXL and the Gephi visualization program. It is important to understand the following considerations going into the project. As the research questions developed and individuals of interest within the network changed, it was essential to adapt the approach and continue gathering data. As noted previously, there is also an issue of accessing data in the quantities required for a population-level study. If the same type of research was done for commercial purposes, data would have to be purchased through a broker or

service[4], which would mean instantaneous access to a vast number of records, but at a significant cost. Conversely, it would be possible to gather smaller amounts of data over a much more extended period or multiple times within the allotted time limitations[5] and then again in the future to build a more extensive data set.

It is essential to understand that overcoming these technical limitations means that it is possible to construct a representative model or examine a snapshot within an internally valid network at the point where it was captured. This snapshot can then be compared to others in a longitudinal study. This means that while it may not be possible to capture the network in its totality or even a community extended by several exponential factors, it is possible to isolate a group of users or a particular set of issues and follow the network over time. These cross-sectional snapshots illustrate changes over time and allow for longitudinal analysis.

In sum, the final study design may not encompass the large-scale data collection and population level surveys I had originally wished, yet an alternative set of process and tools allowed me to navigate the constraining factors preventing my from mu initial study design to better understand the social network in question. Let us turn now to a discussion on the broader considerations of this method, including validity and ethics.

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[4] Which has increasingly moved in-house, to better profit from commercial access (Lunden, 2015)

[5] This is due to API rate limiting set by Twitter to control the amount of data access at once, and of different types, including API, web, and app connections (Twitter, 2019)

5.3 Broader Considerations

5.3.1 Validity

There are many studies that have used SNA to study networks of various types. In one example, networks have been analyzed to identify customers and trends (Moe & Schweidel, 2017). In other studies, SNA has been used to analyze how individuals connect (Cucchiarelli et al., 2012) in many types of increasingly inter-connected physical (Hristova et al., 2016) and virtual spaces (Bastug et al., 2017; Coutinho & Lisbôa, 2013; Sandu, 2019). Beyond the simple structure of the network, many insights can be derived from how and why information gathers in specific patterns, with tremendous amounts of content continually being added on an ongoing basis. The social aspect of many research inquiries can be explored using social network and social media analysis, revealing that these tools have both practical and theoretical utility in research.

While social media analytics "has gained considerable attention and subsequently acceptance in academic research" (Stieglitz et al., 2018, p. 156), there is much more work to do regarding the methods and applications as the technology evolves. Social media (and network) analysis provides interdisciplinary tools that other disciplines can harness for disparate purposes (Stieglitz et al., 2014, p. 89). These methods have been successfully applied to many fields. Other technological research applications of SNA include research on virtual reality technology adoption (Laurell et al., 2019), the diffusion of blockchain technologies (Grover et al., 2019), mapping cybercrime (*Open Source Intelligence and Cyber Crime : Social Media Analytics*, 2020), behavior informatics (Sinha et al., 2012), and discourse on YouTube (Thelwall, 2018).

Social media analytics has also been used on far less technological research, including understanding childhood obesity (Y. Kang et al., 2017), political communication (Stieglitz et al., 2013), eating disorders (Branley & Covey, 2017), the impact of social media-based ratings on tourism (Xiang et al., 2017), constructing population demographics (Sloan et al., 2013), natural disaster management (Z. Wang & Ye, 2018), and countless other examples.

The content available for study and the social networks that contain this data continue to expand exponentially. This expansion is characterized by "explosive growth in the social Web, where large amounts of social media contents are being created constantly by a globally distributed" (Y.-L. Zhao et al., 2014, p. 43) network of interconnected users. This growth is fostered by an ever-increasing network of devices (both human and computer) and participants who gather in constantly shifting formations. This expansion brings many new research possibilities, including "analyzing … patterns in communication [including] … insights into issues, trends, influential actors and other kinds of information" (Stieglitz et al., 2018, p. 156). There are many factors that can be analyzed, such as population-level data used to study mood by analyzing Twitter content and the time of day the data was posted (Golder & Macy, 2011). By looking for a connection between these factors, new insights about the time of day and usage can be derived. When this data is coupled with a semantic analysis of the text, detailed patterns of usage and an unknown factor, users' mood, can be analyzed. The tools used to gather data and analyze it need to address the complex and changing nature of social networks while also factoring in the many barriers that can make research of this type slow and costly.

The tools used in this thesis to collect and analyze data have been utilized in many other research projects. NodeXL has been used to study news diffusion (Ahmed & Lugovic, 2019), elections in Indonesia (Suratnoaji et al., 2018, p. 1), anti-airport expansion activism (Rowe &

Pitfield, 2018), social media impact of a library (Yep & Shulman, 2014), and countless other examples. Not limited to Twitter data, NodeXL can graph and analyze many kinds of social data. This includes atypical social networks such as email (M. Smith, 2014). The volume, frequency, participants, and direction of mail contribute to the network and many other social data types.

My second approach, collecting and analyzing data using the Python programming languages and several add-on packages, has been widely used in research. Depending on the study, using Python can be more complex as the code needs to be custom written to meet the requirements. However, it can be more scalable and requires fewer resources than Microsoft Excel and NodeXL for large data sets. There are many excellent starting points to coding for SNA, including *Practical Social Network Analysis with Python* (PM et al., 2018), *Python for Graph and Network Analysis* (Al-Taie & Kadry, 2017), and many articles and guides. I utilized such articles and guides as I researched using Python for SNA, including introductions (S. Chen, 2020), tutorials (Kapoor, 2018), case studies (Nanawati, 2019; Saqr & Alamro, 2019), and other materials (Kirenz, 2019; Ladd et al., 2017a).

In addition to data collection and analysis, I also researched how visualization tools are used with social networks (Carlotta, 2020). As mentioned above, I decided to use Gephi (Bastian et al., 2009) software and the Python network package to visualize complex gathered and processed data in Python. Gephi has been used to visualize network data in many research projects and has been used to visualize networks in many contexts. There have been many comparisons of these technologies for visualizing SNA data (Akhtar, 2014; Jun, 2014; J. Yang et al., 2017). In short, the tools which I have chosen to use are well established and have precedent in many other applications.

5.3.2 Ethics

The ethics around this type of project can be complex as there are many factors to consider. An ethics waiver was obtained from the university because all data collected for this project was in a public forum, and therefore users did not expect privacy. To that end, any content which was marked private was not collected as part of the study. Privacy notices and informed consent documents were not needed on this basis.

The data used in this study comes from the large-scale collection of tweets. This content was initially connected to individual groups, which were selected as a starting point for a focused data collection. The data and collection process became more complex as first-level tweets were collected, and then the successive levels of users associated with them were gathered. This exponential collection of data allowed for the identification of network participants, an analysis of their interactions, and the identification of hidden influencers who mediate connections within the network. Ultimately, this process led to over 500 levels of data being collected, starting from each of the groups being studied. These users were collected because of their association with the original organization or other users in the network and their data (in this case, tweets) was publicly accessible.

More complex relationships between users were also studied using quantitative network data. Influencers can be identified by studying how they propagate content and by quantifying their relative impact on the groups they are connected to. This study could continue to expand outwards and collect additional layers of followers and friends for each of the accounts for which data was collected. Yet this would ultimately grow the project to a scale that is unmanageable in complexity. Therefore, the initial set of groups was collected and expanded to the point in which

the research questions could be answered. This was chosen depending on the specific context of each group under study, as groups of different sizes required different volumes of data collection before diminishing returns regarding their explanatory value began to take hold.

The debate around informed consent on social media can be framed in many ways. Some research has advocated for publicly available personal content to be preserved and not "silenced". This is because as data is anonymized (Benzon, 2019) much of the meaning and factors relating to the identity of the author are lost. There are also issues related to the cost, scale, and difficulty involved with obtaining consent for public data (Harvin et al., 2019). There is a lack of global standards around social media and informed consent (Hennessy et al., 2016) in various contexts. Even when consent is implied through a public post, the degree and extent of use may be uncertain (Hibbin et al., 2018). Even when data is publicly shared and its use governed by regulatory schemes, there may still be issues with individuals' inherent rights over their content (Vayena & Blasimme, 2017) and the alignment of the platform's privacy policies with user privacy expectations.

The ethics around social media analytics are complex and relate to the expectation of privacy that the study population has when publicly posting content online. Various substantial changes to Facebook privacy made gathering social network data a much more complex process. Even if it were possible to study a group and conduct an ethnography with informed consent, there would be many challenges in terms of access and consent. The advantage of studying social connections on Twitter is that the data shows the connections between users, the way they interact, how users organize, and the way data propagates. In addition to these quantitative measures, there are other qualitative factors that can be studied, such as using semantic analysis

on the text of the tweets themselves. As vast quantities of public user-generated data are publicly accessible through the web, it makes an ideal corpus for study.

With few exceptions, the specific content that users share was not used aside from exemplars showing how the data would be analyzed or as examples. Users with protected accounts were not included in the analysis, and their data was not collected. This is because the study focuses on population-level interactions that do not involve analyzing individual users' content using textual analysis. Users are ranked and studied in relation to each other and to their relative social characteristics in the network. From a privacy perspective, while organizations were purposefully identified as a structural starting point, social network users are not included in the top level of data. The textual content of tweets, outside of network statistics, was not used as a method of study. The project assumes that users posted content with no expectation of privacy, as the tweets were posted in a public forum without privacy settings. Even though it would be possible for users to remove content after it has been collected, data was gathered based on the implied consent inherent in when it was initially published. The design of the study therefore incorporates procedures to ensure that the ethical principles in collecting population-level data have been respected.

In sum, this thesis uses established tools and processes to gain greater insight into the study group. While the ethical implications of using such tools can be complex, an ethics waiver has been successfully obtained for this research. Only data for which consent has been implicitly given due to its place in the public domain has been used.

5.4 Conclusion

This chapter has discussed the specific methods used in the project. In particular, it has examined why my initial study design could not be carried out, namely because of the dimensionality problem and access to data at an affordable cost. It has also outlined the sampling method, quantitative data collection steps, and data collection and analysis tools. Additionally, it has discussed broader issues relating to the study's method, including validity and ethics. This methodology is not without its weaknesses, yet given the resources available, it is able to build a remarkably detailed picture of the group under study. Chapter five will present the results of the research project, giving us a better understanding of the network through the use of sociograms and quantitative network statistics.

Chapter 6

6 Results

This chapter presents the findings of the study. It begins with a series of sociograms describing the three groups under study, helping us to get a clearer visual picture of their overall network. Following this, it examines the quantitative statistics based on the groups' network data. Next, it looks at several hidden influencers, examining their extraordinary role in propagating information throughout the network. Finally, a conclusion sums up the results.

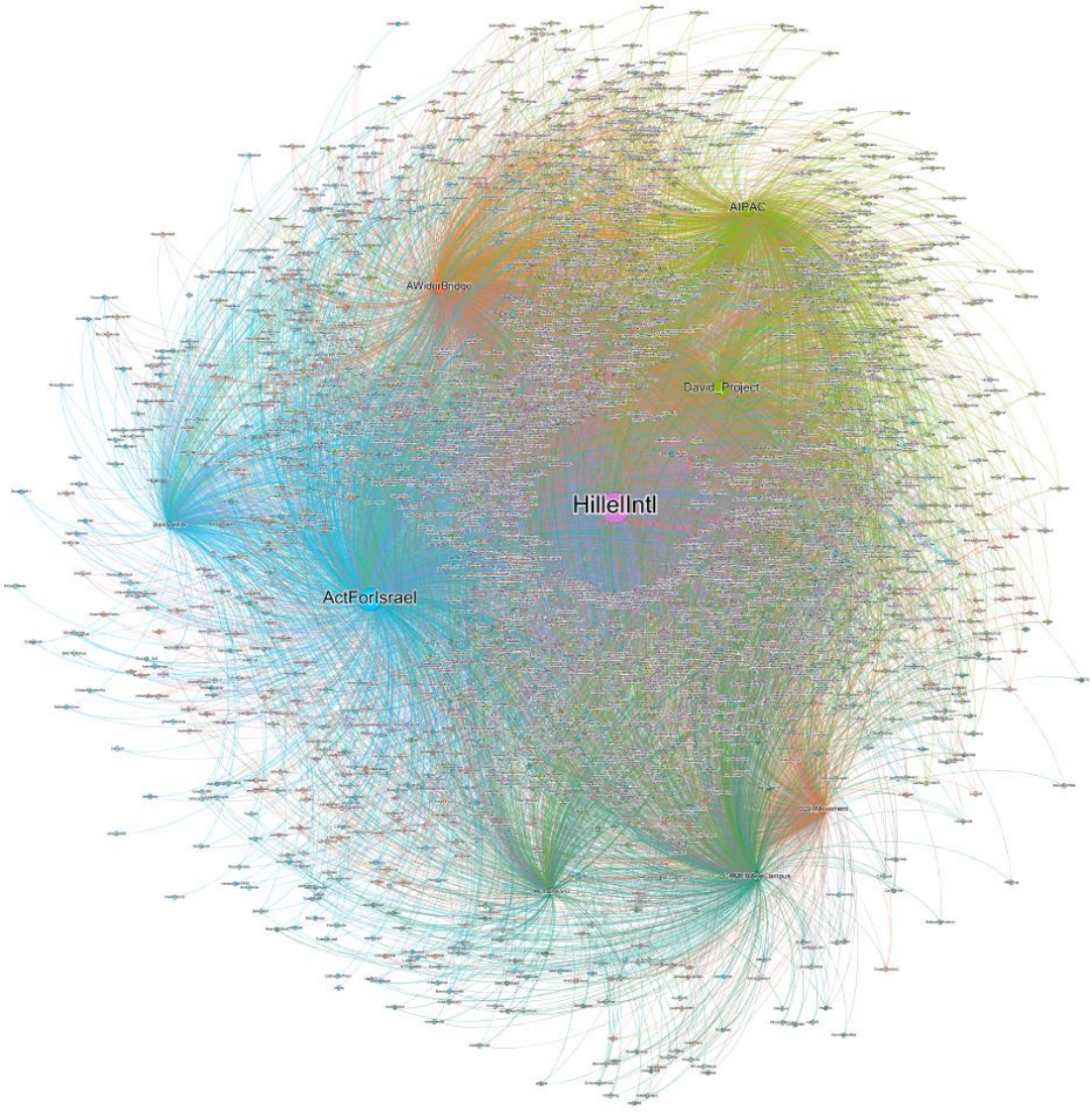
6.1 Group Visualizations

6.1.1 Group 1 – Larger National and International Organizations

The first of the three groups consist of fourteen large national and international organizations. These organizations are generally campus-based and support student organizations that span many campuses. This Group is primarily based in the United States, apart from three international organizations. These organizations have a high degree of overlap and interconnection as a result of performing similar functions and sharing many nodes in common. Group 1 shows a high degree of overlap for many users who are connected to top-tier organizations. In some instances, the connection between users and organizations is farther apart, or an organization has many more users that are not connected to the overall Group. This is demonstrated on the chart by the positioning of nodes between organizations. Those connected to many primary accounts are located close to the center of the diagram, where users with fewer overlapping connections are placed on the periphery of the graph. The majority of users cluster in space with a high degree of contact, showing a very high degree of association between the various groups and their users in this Group, as shown in Figure 7.

Figure 8

Network Map - Group 1



6.1.2 Group 2 – Chabad

Group 2 is smaller than the other groups in terms of the overall size of nodes and first-level connections. Within group 2, there are five campus organizations associated with the Chabad

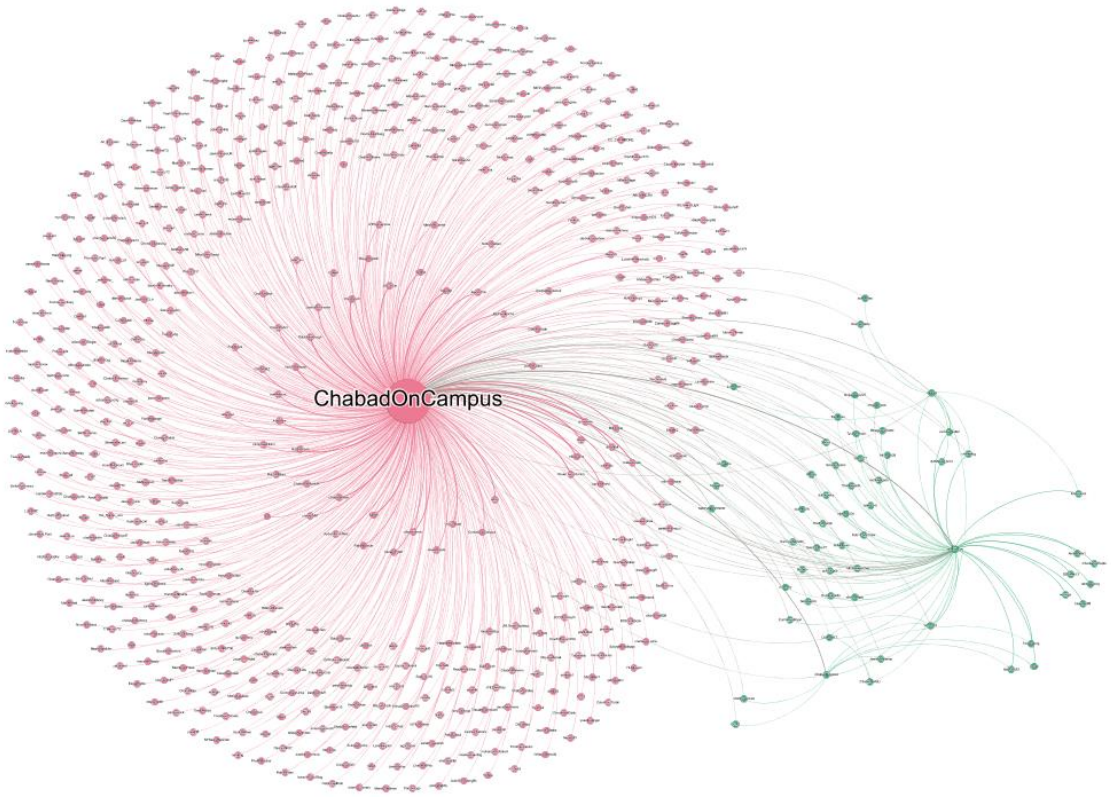
movement. In addition to specific campus-focused student organizations, where a student club or organization serves only a particular campus, Group 2 includes a larger umbrella organization. This larger organization, Chabad on Campus, connects to many other on-campus organizations associated with this movement worldwide. The organizations in this Group are based in the United States and Canada.

The second network map is interesting because the central organization, which is the umbrella group for many different campus-based Groups, has many singular connections. In other words, individual nodes are connected to the main organization, but at this level of analysis, do not appear to connect onwards to other nodes anywhere else. To accentuate this contrast, the nodes in red are connected to the umbrella organization, and the nodes in green are linked to other groups. In Group 1, top-level organizations connect and have a degree of overlap with the central structure of organizations. Individual nodes inside the smaller organization accounts tend to be connected to multiple users within the network. The smaller users in green (those without connections to primary structures) may not influence the network in the same way as a connector inside the red network (which is better situated with higher quality connections to major network structures). Nodes in red have access to many more connections within the network as mediated through the central connected structures (in this case, the founding organizations). At this level, it is difficult to see where the additional connections extend to without gathering more data and analyzing additional successive levels of the network outside of the nodes collected. If the network connections for the organizations and all subsequent nodes were to be expanded, a different picture may emerge showing that there are third-party connections between users and many other networks of interest. It is possible that other outside connected structures connect users in unexpected ways, however, visualizing this requires

additional data. Based on the data that has been collected, it is possible to ascertain that some users are very well connected within the group and have a great degree of influence. Other nodes are only connected with a shallow degree or a one-sided connection. Lower levels of connection within the network result in preventing or slowing the propagation of material throughout the network and remove the possibility of redundant alternative pathways.

Figure 9

Network Map - Group 2



6.1.3 Group 3 – General Pro-Israel Groups on Campus

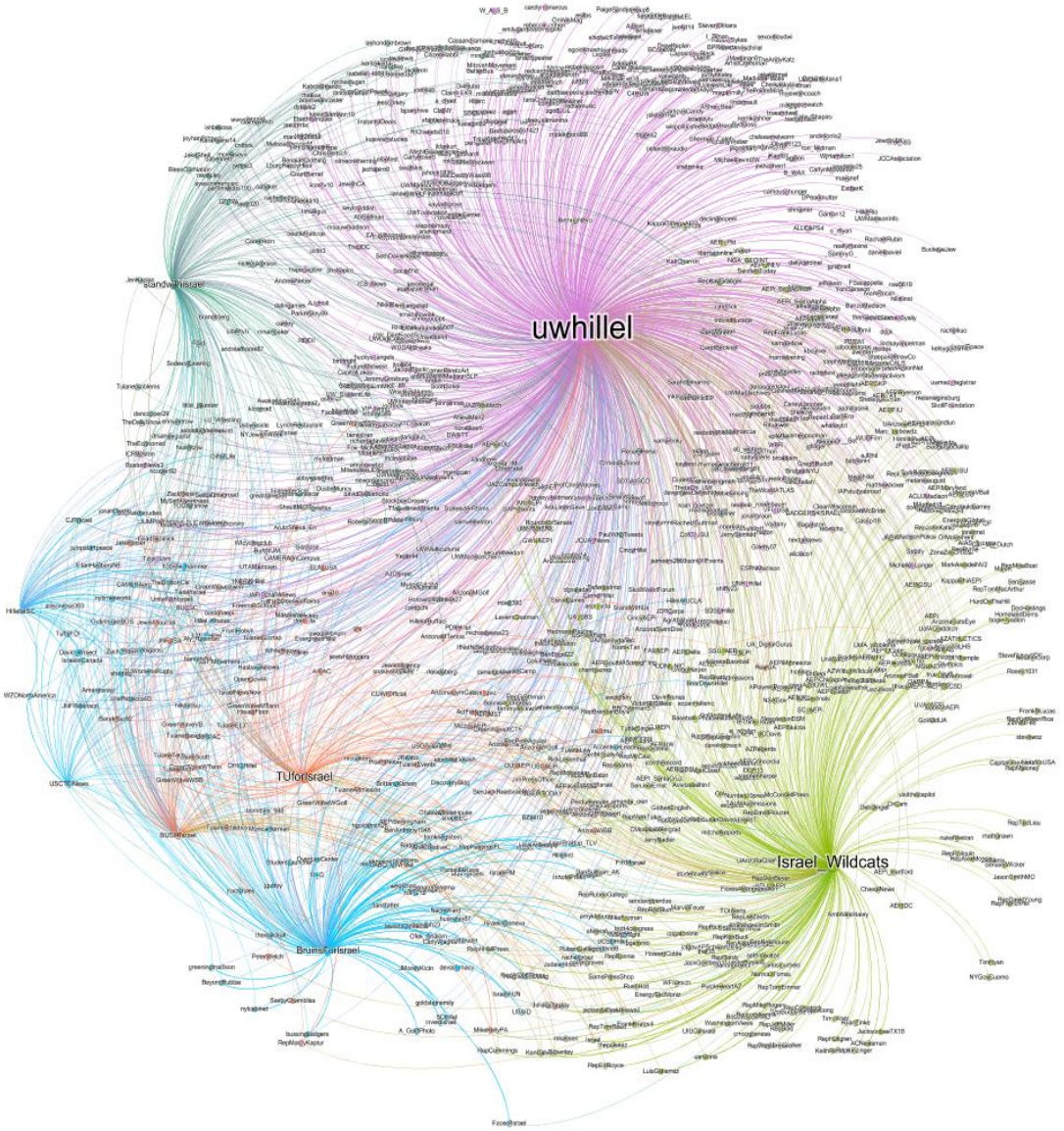
Group 3 is a collection of organizations that are less tightly connected than Groups 1 and 2. The organizations contained in Group 3 are not part of an overarching structure, nor do they have the same relationships or connection types that can be seen in other groups. For example,

organizations in this Group may not have a funding relationship or be directly connected in their activities. Due to these factors, Group 3 has a less dense network of nodes between organizations, and there is more space between the organizations in this Group and their respective users.

The network model shows a degree of overlap between groups, showing fewer overlapping connections between the various organizations in Group 3. There are still connections that exist between organizations within the Group, and some followers are members of more than one Group in this category. That is not entirely unexpected for a more diverse group of organizations operating in the same space. Because this Group has campus-specific organizations, there are fewer opportunities for overlap than with national organizations or umbrella groups. In this graph, nodes with fewer connections are at the periphery of the sociogram, showing that these users are less connected to multiple nodes overall. In contrast, nodes connected to more than one organization or connecting numerous organizations are located in the center of the graph. This view depicts the first level of data mapping nodes and organizations. Users on the periphery of the graph, who may not appear connected to more than one Group, show the connections and degree of separation between organizations and individual nodes. As successive layers of the network map are explored and expanded, Group 3 illustrates that the organizations have a degree of connection with each other. In addition, these connections are shared among many of the users associated with one or more organizations in the Group. Although the connection density for organizations in this Group is lower, there are a substantial number of connections between organizations and user nodes.

Figure 10

Network Map – Group 3



6.1.4 Combined Network Map

The fourth graph is a combination of the previous three groups. In this sociogram, organizations and their followers are drawn on the map, and the connections between various organizations and users are plotted in this cluster of groups. There is a high degree of overlap between

individual organizations as well as between nodes and multiple organizations. Both organizations and nodes are connected across the network to a great degree. While there are higher rates of connectivity for some organizations, it is reasonable to assume that large umbrella organizations would have followers from many organizations on the graph where a single local campus-focused student organization would not.

In this graph, the bottom of the chart shows more dense connections between users and organizations. This area is largely populated with organizations possessing the most significant degree of overlap between all the various groups. In contrast, the top of the graph shows less dense connections between users and organizations. This is where many of the smaller organizations with fewer connections to others are located. As with the other graphs, nodes that connect many users and organizations are located in the center of the graph.

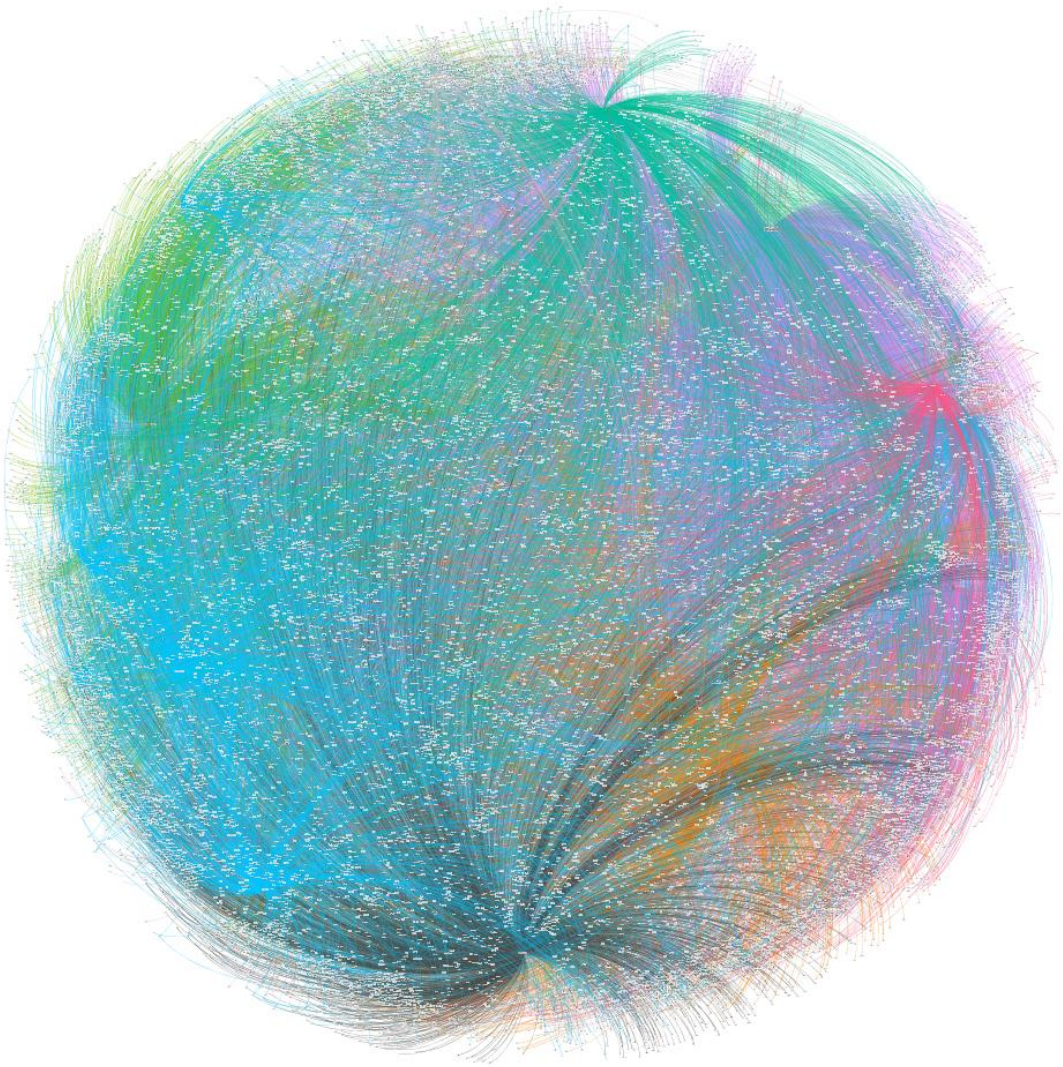
Users with a lower degree of connectivity are located on the periphery of the graph. This visualization shows that all three groups under study have varying degrees of connection between organizations and users. As this first layer of data becomes expanded with additional degrees of separation from the starting organizations in the Group, a great deal of information is revealed about hidden influencers within the network who connect nodes together. These connected influencers would not be otherwise visible at this level of analysis as the connections need to be mapped to show the pathways that connect nodes within the network.

Despite the limitations of only analyzing a limited amount of data in one layer, there is a high degree of interconnection visible in the network graph. This shows that for these types of actors (and possibly indicative of an archetype for nodes in this sector), many organizations have a common purpose and engage similar types of students. This means that the approach is the

same for many different campus-based organizations, with a focus on recruiting their members from a pool of users located in a local context such as the campus. This can be seen in the relationship between nodes and organizations. While these same students might also be connected to many different national organizations, particularly those that offer programming and funding, the primary connections of the majority of nodes is mediated by their local organization with the strongest ties to the collective Group. Other students connected to organizations that are not pictured in this Group, perhaps those with a primary national focus, may also have nodes which mediate connections to many other organizations within the sector and use the Group as a connector between larger outside structures.

Figure 11

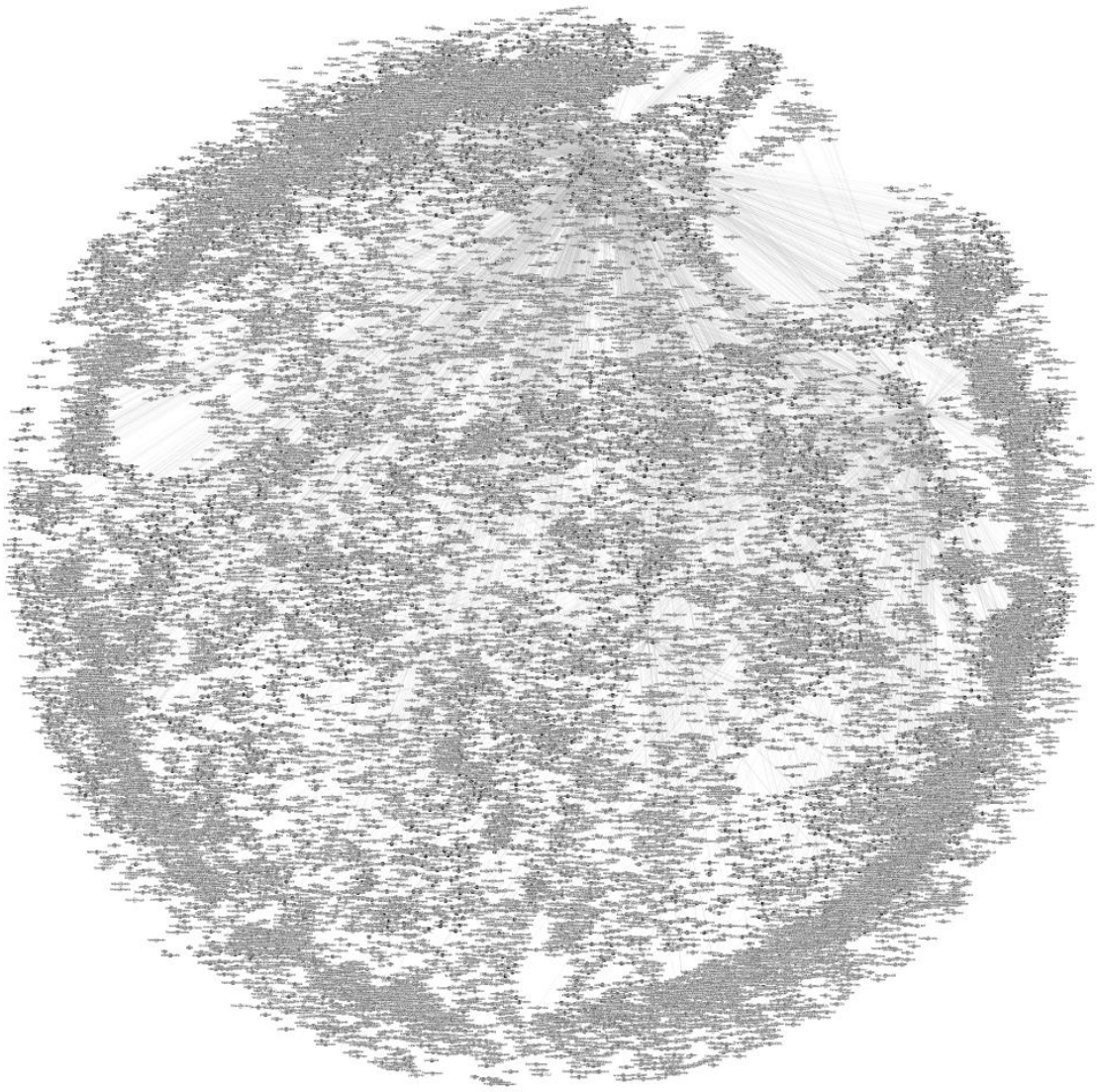
Network Map - Cumulative



Note. Colours Determined by Starting Node.

Figure 12

Network Map – Cumulative - Density



Note. This graph shows the relative density of nodes.

The above graph shows a simplified version of how all nodes and organizations interact when all three groups are visualized simultaneously. This graph is based on different parameters that sort individual and less-connected nodes at the periphery of the sphere. Users that are more

highly connected to organizations are clustered and located closer to the center of the graph. Centrally located users are more highly connected to many organizations and other nodes in the network. When visualized in this way, the sociogram reveals a fascinating insight: the majority of users are tightly clustered around organizations with similar characteristics to each other and this shows the delineation between highly connected and peripheral users in relation to the organizations. There are fewer highly connected users within all three Groups, and these nodes tend to be distributed unevenly throughout. Indeed, as can be seen in several quadrants of the graph, there are areas with extremely low levels of interactivity between nodes, so much so that there are gaps in the chart.

The number of potential influencers within this first level of data has been reduced dramatically from the number of nodes initially collected. Individual users who are connected to an organization but do not have a higher degree of connection to the immediate network are clustered around the periphery of the graph. At this level of observation, the graph is limited to users of importance to the network, in other words, all users visualized are connected to organizations or other nodes with disconnected nodes eliminated. With this limited graph only containing first-level data, influential members of the network are identified based on their position, number of connections, and degree of connection to other important structures. Many of these users now act as a bridge to connect far-flung organizations at opposite ends of the graph together. The degree of connection, and by extension, the level of redundancy connecting distant nodes can be visualized as mediated through influential nodes due to their many interconnected relationships within the overall structure.

In sum, the nodes and edges are visually displayed in these graphs to give us a better understanding of the network. By collecting additional statistics on the interaction between these

nodes and edges however, new insights about the structure of the network can be derived. Let us now turn then to an examination of the quantitative statistics obtained from this network data.

6.2 Quantitative Statistics

6.2.1 Network-level Statistics

Network Diameter describes the maximum distance, measured in nodes traversed, to reach two points within the network. For example, a graph with a diameter of 3 is less complex than a graph with a diameter of 7 in most scenarios. This is because the network is denser when it has a lower diameter, which means nodes are more closely linked. Dense networks of clustered users mean that even in large networks, connecting two distant points will require fewer intermediary connections and provide additional overall stability.

Path length provides a measure of communication efficiency for an entire network by measuring the shortest possible path between all nodes in the network. It "is a measure of the efficiency of information or mass transport on a network" (Fan Ouyang & Christiane Reilly, n.d.). Lower numbers indicate that the network is relatively more efficient and high average numbers signify greater inefficiency. If the nodes are disconnected, the length is infinite (Duane Q. Nykamp, n.d.).

Graph density measures the number of edges, or connections, within a network relative to the total value of all possible connections. A score closer to zero is sparser, while a score closer to one is denser with more overlapping pathways. The density of a network was described by Bott in 1957 as being loose-knit or tight-knit (Bott & Spillius, 2014), an important distinction because while tight-knit networks have many redundancies (and can in effect "heal" or reroute traffic between nodes), loose-knit networks are more dependent on the links critical nodes make.

Modularity measures how sub-modules (or compartments) are connected, and the degree of connection between nodes. The metric describes “the degree to which densely connected compartments within a system can be decoupled into separate communities or clusters which interact more among themselves rather than other communities” (Kharrazi, 2018). Networks with high degree of modularity have dense connections between the nodes within modules but sparse connections between nodes located in different modules.

The clustering coefficient metric describes the degree to which nodes in a graph tend to cluster together. This measure is “akin to the density metric for whole networks, but focused on egocentric networks” (Ben Shneiderman et al., 2020), referring to from the perspective of an individual node. Higher clustering coefficient scores will therefore mean that connections are more likely to all know one another.

6.2.2 Node-level Statistics

Betweenness centrality measures the shortest number of pathways that connect through a specific user node. This means that betweenness centrality is “a measure of how important the node is to the flow of information through a network” (Golbeck, 2015). A higher score shows that an individual node is more important for others in mediating onward connections and traffic throughout the network (Perez & Germon, 2016). Such nodes are more often connected to many others and “likely to be aware of what is going on in multiple social circles” (Golbeck, 2015).

Closeness centrality refers to the effort required to reach all other nodes in a network and detect those that can spread information very efficiently. A low closeness centrality score means

that a given node has few intermediary connections with the surrounding network (Ben Shneiderman et al., 2020). In contrast, nodes with a high closeness centrality score typically possess "the shortest distances to all other nodes" (*Closeness Centrality - Neo4j Graph Data Science*, 2021) and "may reach any other nodes within a few hops" (Perez & Germon, 2016). Closeness centrality is thus an important indicator of influence (McKnight, 2013).

Eigenvector centrality is a metric that measures the importance of an individual node and its connections with other influential members (Golbeck, 2013). It "attempts to capture the qualitative aspect of the connections of a vertex … [o]n the basis of the premise that connections to more influential vertices are more important than connections to less influential vertices, the measure also takes the centrality of the neighbors into account" (Parau et al., 2017). Having a large number of high-ranking connections thus boosts the Eigenvector Centrality score of individual nodes.

6.2.3 Summary Table

The following table lists a summary of statistics for the data. The table shows the breakdown of data for Groups 1, 2 and 3. These metrics describe network-level metrics, including the network diameter, path length, graph density, modularity, and clustering coefficient, as well as the average of node level metrics, including closeness centrality, betweenness centrality, and eigenvector centrality.

Table 4

Summary of Quantitative Statistics

	Group 1	Group 2	Group 3	Cumulative
Network Diameter	2	3	3	5
Path Length	1.4957	1.786	1.729	2.387
Graph Density	0.002	0.002	0.002	0
Modularity	5	2	5	9
Clustering Coefficient	0.954	0.083	0.112	0.127
Avg. Closeness Centrality	0.002	0.004	0.006	0.0005
Avg. Betweenness Centrality	4.459	3.9	3.05	23.2
Avg. Eigenvector Centrality	0.50	0.78	0.25	0.114

In sum, these groups differ on a number of key metrics, indicating the differences in how these networks are structured. This demonstrates how networks are not the same and that everybody is not always connected to everyone else. As a result, it seems likely that certain individuals will be more pivotal than others in the absorption and propagation of information in the network. Let us now turn to a closer examination of the hidden influencers found in this study.

6.3 Identifying Hidden Influencers

6.3.1 Mapping Overlapping Connections

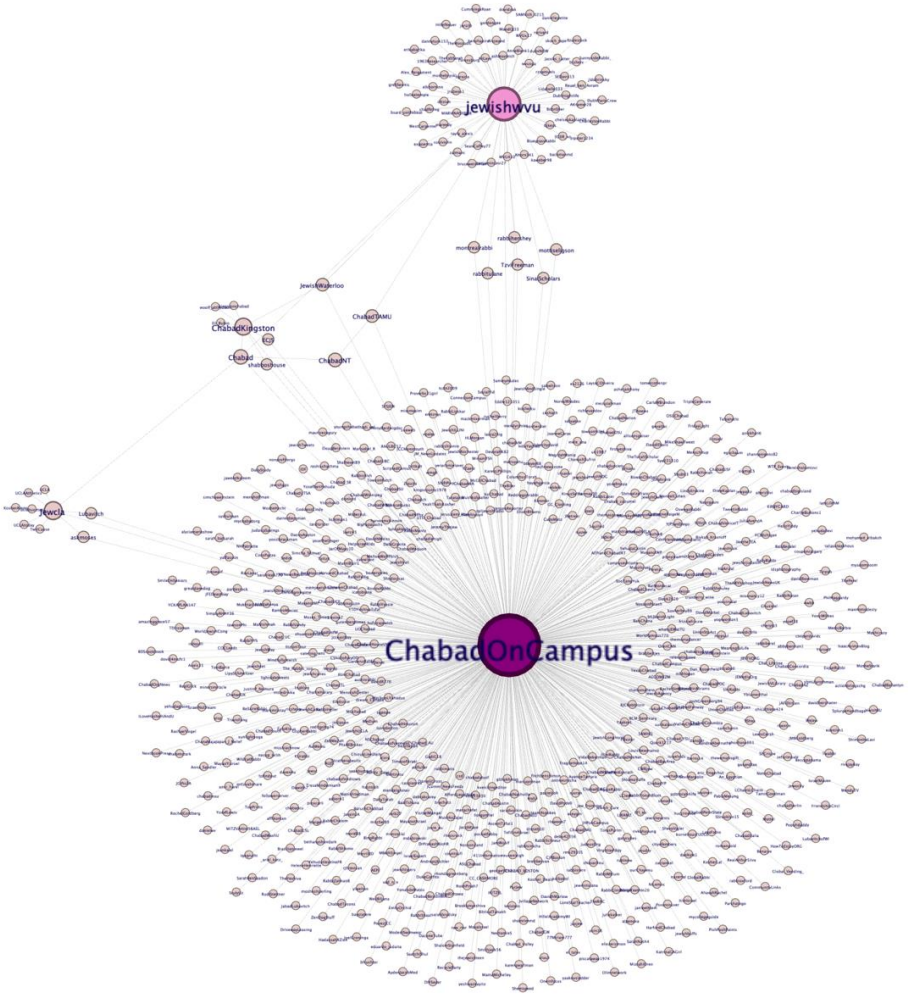
The following detailed examples use the data collected and analyzed from Group 2 to show how we can find the most influential individuals. This data was chosen as an example to explore a representation of one of the Groups because it is a smaller size than Groups 1 and 3. Due to the lower density, images of the network can be visualized and expanded to reveal specific interactions between nodes. In more complex and dense networks, relationships showing network influence can be challenging to visualize as successive layers of data are added.

The first diagram shows several major clusters in Group 2 that show the relationship between organizations and nodes. The following figure contains 851 nodes (users) and 872 edges (connections) organized in a directed graph, where "edges are ordered pairs of vertices … each edge can be followed from one vertex to another vertex" (Black, 2020). The graph details users who have connections in common with multiple organizations and other nodes. These connections indicate the relationships between organizations and nodes within Group 2 using first-level connections for each organization. Mapping the connections between the nodes in Group 2 shows the degree of influence various members of the groups have. Users or organizations with many more connections have better access to the Group as a whole and potentially access to other influential network members clustered beyond the immediate layer of users. The focus of this graph is on users connected to organizations, which act at the starting points, and additional layers of data can be acquired by mapping the network of each user and their successive connections. This gives a larger dataset through which one can find

relationships, and some data was collected with hundreds of consecutive levels to check links relating back to the starting organizations.

Figure 13

Group 2 – Student Organizations on Campus



By expanding the unit of analysis to include each Group's followers and the followers of the various starting organizations that connect within each Group, it is possible to draw a more complex understanding of the network. This network map contains 1930 nodes and 2200 edges

in a directed graph. The amount of data required to generate the second diagram is exponentially more extensive. The expanded network visualizations include up to 500 additional contacts for each user. This means that, in addition to the connections of the central organizations in the Group, overlapping data from between nodes was visualized and plotted. Nodes without other links were removed from the graph, simplifying the visualization.

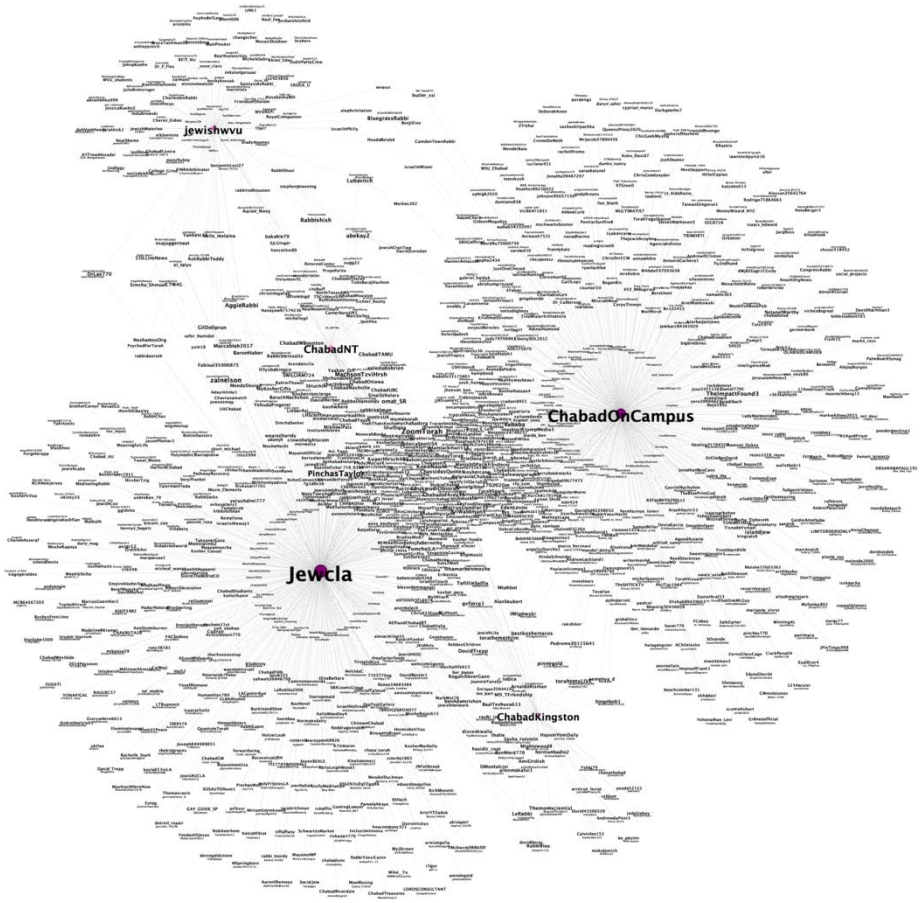
6.3.2 Finding Hidden Influencers

In the following diagram, there is a very dense band connecting the two most prominent groups. The following graphs show that there are a larger number of users connected to both organizations and influencer networks between groups. New influential nodes are revealed when moving between graphs of different scales, as more connections are added, and new clusters of highly connected significant users are identified based on connections within the network. Within the network diagram, there are users who appear due to their association with one of the founding organizations. While these nodes are connected to other integral parts of the network, these users may not be key influencers or influential followers of the organizations' accounts themselves. Instead, these users are connected to the network and each other, as a result creating new connections which are visible within the network. These clusters may be loosely associated with the organizations at first glance but provide redundant and complex pathways for communication across the network, which can be seen as the data increases. Through the study of the followers of organizations, and each successive user's followers, the network pathways which allow for the transmission of content from organizations are uncovered. Successive layers of the network, following the pathways to more interconnected users, show there are underlying levels of users just outside the view of the organizations. Unseen users contribute to the overall

flow of traffic within the network and may pass content onto other networks removed from the initial starting point.

Figure 14

The Distance Between Connections in Group 2



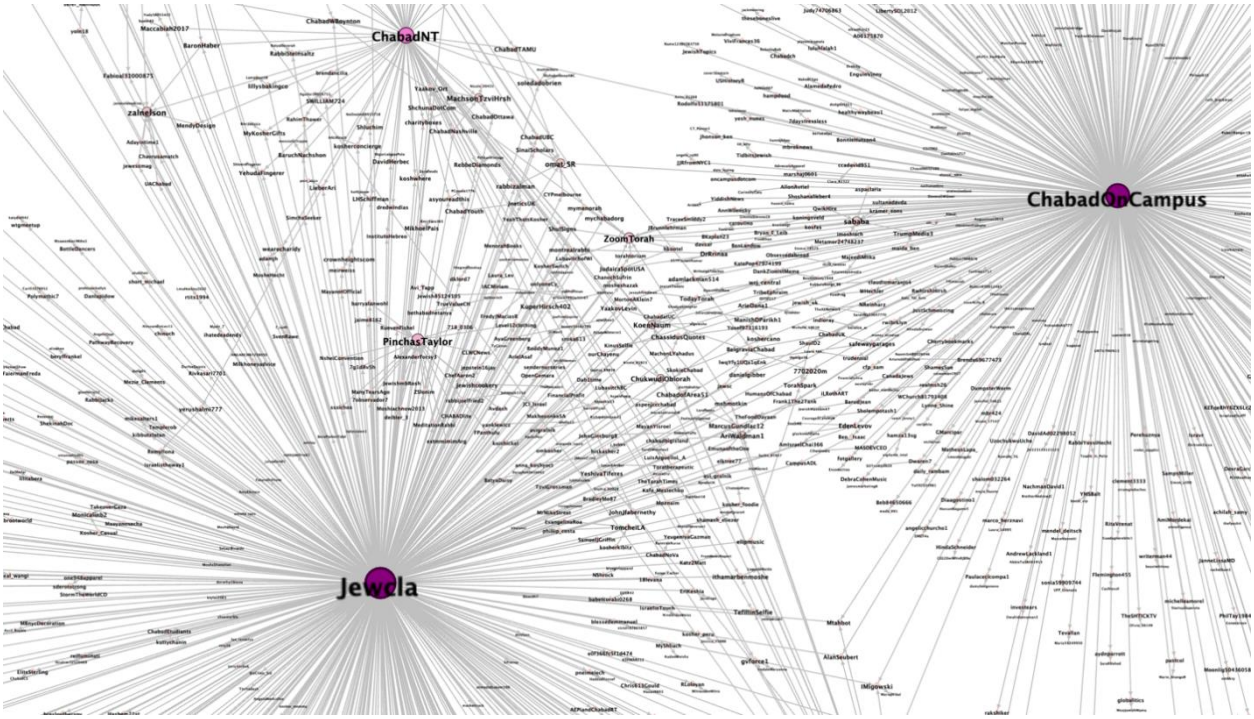
The goal of this analysis is to find overlapping connections between users inside of the network. Once associations between users and organizations are established based on their relationships, new clusters of nodes emerge. These clusters have similar characteristics in terms of how various users connect to many organizations. This can be seen as additional levels of data

are added to the model. These additional points can be used to map how nodes and clusters relate back to the originating organizations. The relationships between users can be visualized in new ways as more complex interactions are found inside of the network. The examples in this section show that there are many unknown influencers that would otherwise not be visible from the top-level organization. Using this data, clusters of secondary users that are indirectly connected to organizations can then be uncovered. While it may appear that an organization is limited in terms of size and number of direct followers, even a single connection may lead to a large secondary cluster.

The following diagram shows the connections between nodes after the inclusion of many successive layers of data. Layers are gathered by collecting all nodes and then repeating these processes to identify interconnections between users that link back to the organization or members of the primary network. The diagram shows the relationship between users and various organizations and previously unknown users who are connected several levels apart. The graphs were simplified by eliminating unrelated participants within the network to focus only on users of interest. The chart was created by gathering five hundred successive levels of data. The analysis revealed many users that are connected to each other and are connected to an organization with a connection that is mediated by an influencer. These influencers tend to be connected to many different users inside the graph and have a larger audience of users within their own sphere of influence. The graphs also show that users at the periphery are sometimes connected by many connections from an organization or another influential member.

Figure 15

Additional Layers of Detail to Reveal Influencers in Group 2



Note: This image shows a more detailed view of the users who connect the main groups that were not previously visible.

6.3.3 Analyzing Hidden Influencer Accounts

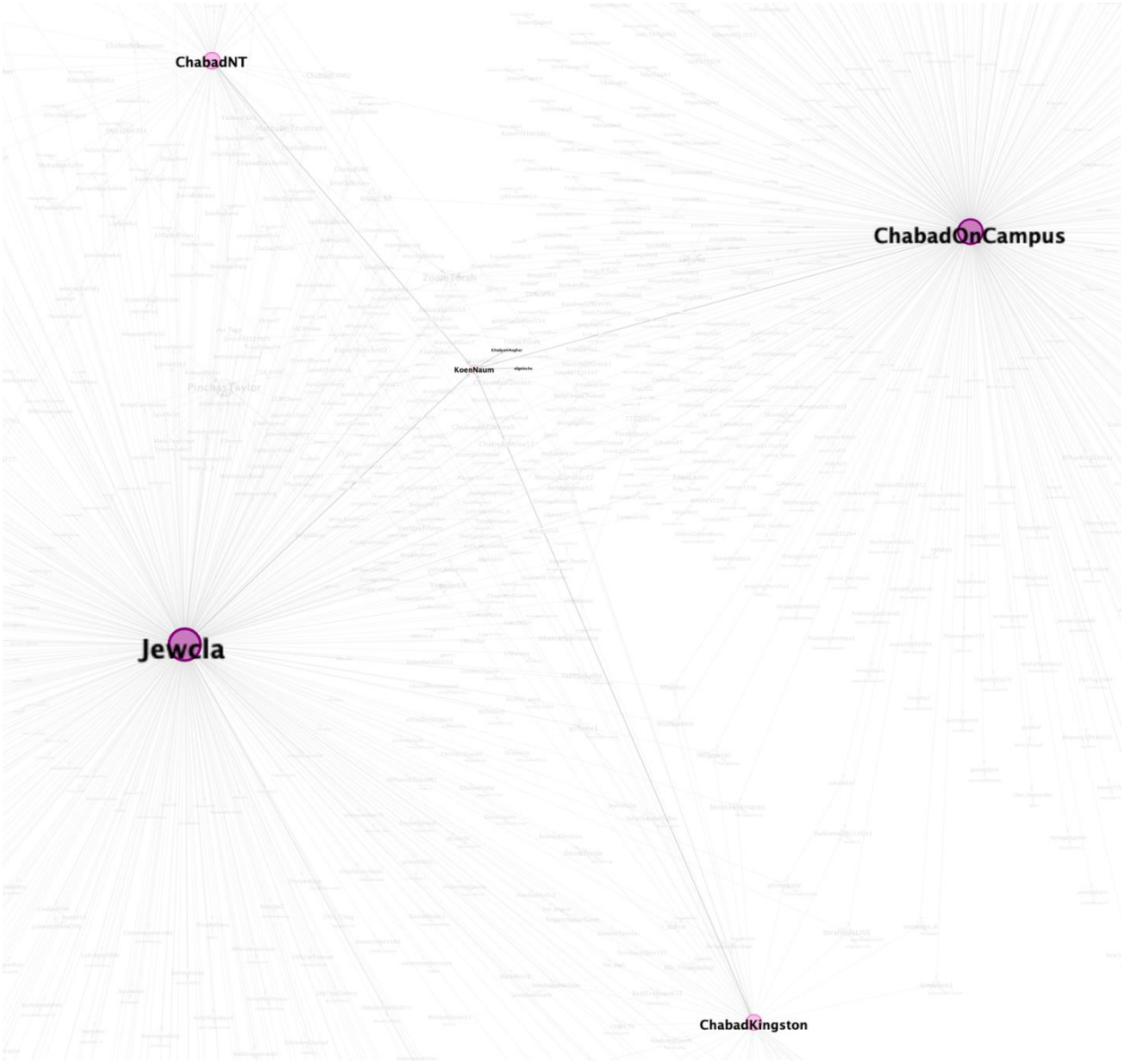
The following graphs provide examples of detailed analysis in Group 2 that identify associations between groups and highlight influential members. When many additional layers of data are added for each node, users in the network are stratified based on the number of followers and the characteristics of the other users with which they interact. In each of the four models used in this exploration, there are influencers (or key connectors) between groups anchored by organizations.

There are many other users that are associated with these influencers but are not within the networks of the organizations themselves. This means that the message of the organization may be passed on to the nodes or members that follow the influencers which are not directly connected to the organization. In other words, influencers both connect networks and their peers. The concept of relative distance and influence within the network can be easily explored visually within a smaller network such as Group 2.

In the following graph, the user account KoenNaum is linked to all the four primary organizations within Group 2. The KoenNaum user account bridges the connection between high-level organizations. Further exploration of nodes connected to this user shows that there are two nodes that are not connected to primary organization accounts but instead mediate their connection through the KoenNaum account. It is important to note that the two users connected through a mediated link with the network are not visible when looking at top-level data within the network. This means that if the network were comprised of only first-level connections, these users would be invisible.

Figure 16

The KoenNaum Account and its Connections

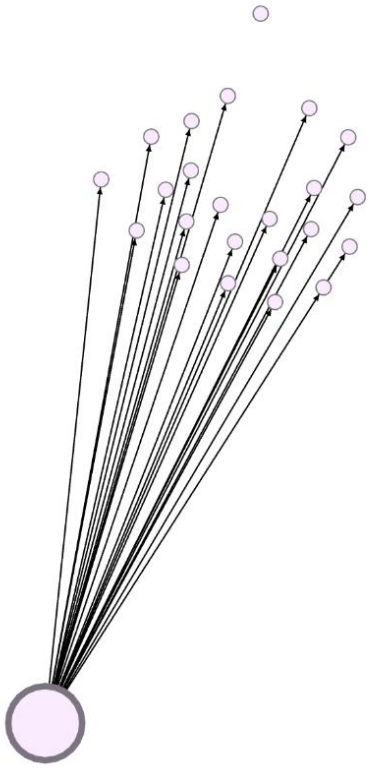


In the following example, the graph is generated using expanded data showing the connections to the PinchasTaylor account. This account links to twenty-three additional minor accounts. All secondary level accounts would otherwise be invisible to the primary

organizations. This account shows a significant conduit to one of the graph nodes (Jewcla) but not to any others in the network. This connection also indicates a degree of influence mediating information. This is a clear example of how one individual node can exponentially connect to the second level of users otherwise not connected to the higher-level Group and how they could influence or be used as a conduit to a larger potential audience. The following figures show the levels and layers of connection created by the PinchasTaylor account.

Figure 17

The Subnetwork Associated with the PinchasTaylor Account



Note. This graphic was created with Gephi visualization software (Bastian et al., 2009)

Figure 18

The PinchasTaylor Account and Surrounding Nodes

Note. Graphic was also created with Gephi visualization software (Bastian et al., 2009).

The PinchasTaylor user account plays an important role in connecting many users to organizations and other nodes. When the network is viewed from the perspective of the PinchasTaylor account, as seen in the following table, there are few links to the overall network with greater than one or two connections. Changing the focus from the top level of the network and the starting organizations to a diagram with a localized perspective shows a new dimension

to the overall network. It is interesting to note that when the focus of the graph is shifted to the perspective of the primary organization account in the network (Jewcla), the PinchasTaylor account is not as significant. This means that while an account may not be significant at the macro level, it can have a great degree of influence at the micro level and can be the conduit to many other users within the larger network. Even an insignificant connection may have exponential effect beyond the view of the primary organizations.

The two primary measures used in the graphs are in-degree and out-degree, which measure the incoming and outgoing connections between nodes, and centrality, the location of a node within the network. In-degree is "the number of connections that point inward at a vertex [and] … [o]ut-degree … the number of connections that originate at a vertex and point outward to other vertices" (Hansen et al., 2011). These metrics are based on degree centrality, which is the count of "the total number of connections linked to a vertex. It can be thought of as a kind of popularity measure, but a crude one that does not recognize a difference between quantity and quality" (Hansen et al., 2011). By examining both the position and degree of incoming and outgoing connections, each node in the network can be ranked and evaluated.

For the PinchasTaylor account, there are a total of 24 connections. These connections include an in-degree of 23 (the number of users connecting to the node) and an out-degree of 1 (the number of users this account connects to). The single outgoing connection is with a parent and higher-ranking organization within Group 2. In addition to tracing the connection within the network, there are other measurements such as page rank, a measure developed by "Google … to measure the importance of webpages … PageRank will assign a score of importance to every single node … important nodes are those that have many in-links from important pages or important other nodes" (Perlato, n.d.). The page rank metric shows the relative importance of the

node within the network in the context of the network. The page rank for the PinchasTaylor account is 0.006071041 within Group 2. These measurements are a proxy for quality and type of connections within the Group.

Using a similar measurement, the eigenvector centrality evaluates "connections … [that] have a variable value, so that connecting to some vertices has more benefit than connecting to others" (Hansen et al., 2011). In other words, having high-value connections increases the relative value of nodes in the same cluster. For the PinchasTaylor account, the eigenvector centrality measurement is 0.018764088. Successive lower levels in the network, those with weaker connections to other nodes of importance, will be much less significant from the perspective of the overall network as viewed from the perspective of top-level organizations.

Table 5

Network Data for Users Connected to the PinchasTaylor Account

Username	**In-Degree**	**Out-Degree**	**Degree**	**PageRank**	**Eigenvector Centrality**
ZSlonim	1	1	2	0	0
sssichos	1	1	2	0	0
RuevenFishel	1	1	2	0	0
NsheiConvention	1	1	2	0	0
Moshiachnow2013	1	1	2	0	0
MeditationRabbi	1	1	2	0	0

ManyTearsAgo	1	1	2	0	0
Level12clothing	1	1	2	0	0
JewishmbRosh	1	1	2	0	0
Jaime8162	1	1	2	0	0
FPanthulu	1	1	2	0	0
extmmimimArg	1	1	2	0	0
deibler_3	1	1	2	0	0
CLWCNews	1	1	2	0	0
ChefAaron2	1	1	2	0	0
CHABADlite	1	1	2	0	0
barryalanwohl	1	1	2	0	0
Avi_Tapp	2	0	2	0	0
Avdash	1	1	2	0	0
AlexanderForsy3	1	1	2	0	0
7observador7	1	1	2	0	0
7g1d8v5h	1	1	2	0	0
718_0306	1	1	2	0	0

While many tertiary accounts influence the direction and propagation of content on social networks, the structure and size of the network cannot be fully understood without gathering

many additional levels of data. Determining which pathways are the most successful is further aided by additional metadata collected from each node and relationship. Metadata, or additional layers of data describing the statistics of the network and the relationships between nodes, allows for the precise plotting of an individual node within the network and the context surrounding this point. Each node is then contextualized by relative size, activity, and velocity in the context of the surrounding layers of nodes.

To gather more complex data, increasing the number of nodes which are high-level connections, in addition to examining the relevance of additional primary nodes, helps to redistribute contacts within the network and creates new avenues for exploration. Increasing the size of the networks can be tested against criteria to ensure that each new node is still within the relevant group and will contribute additional structure to the network.

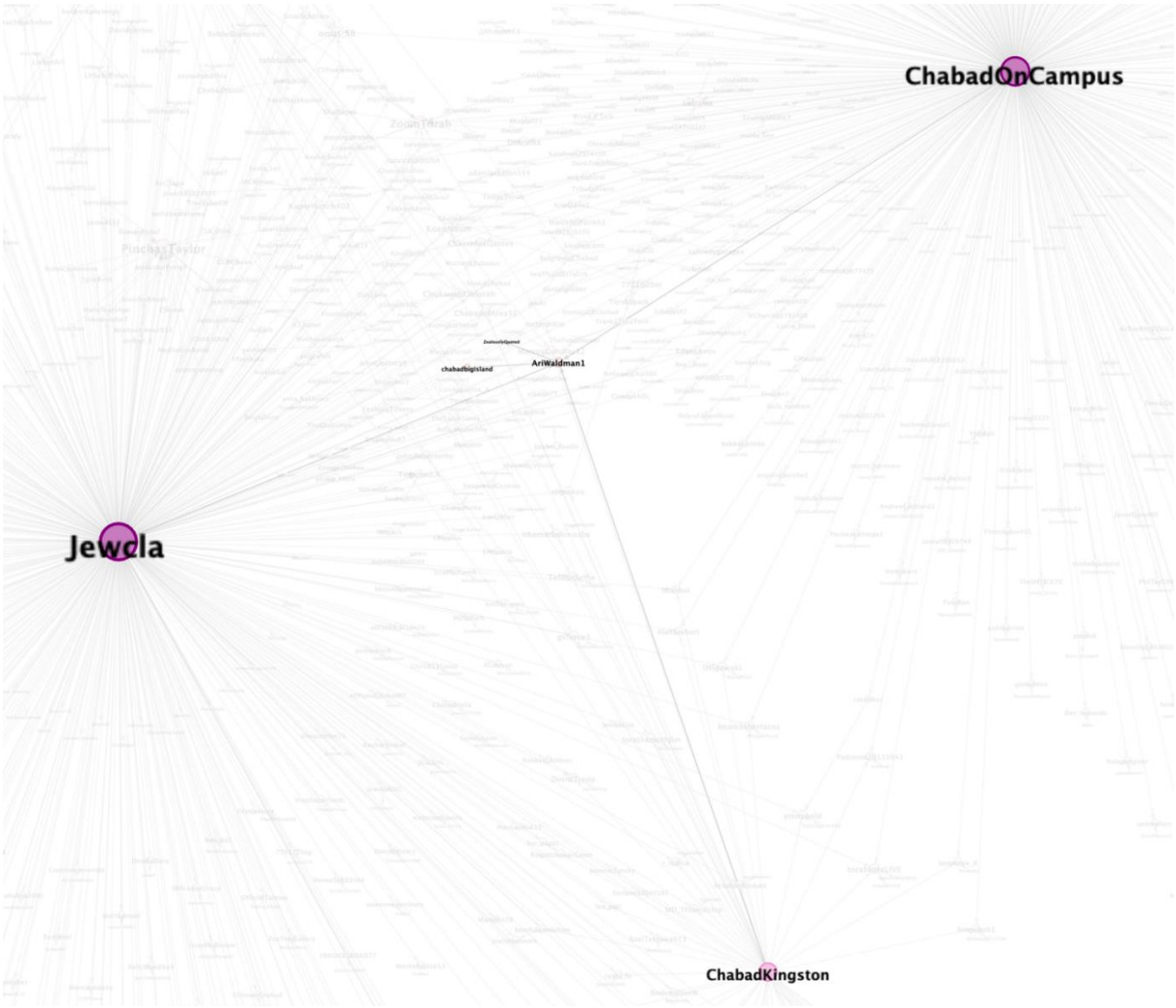
This approach was taken to increase the size of the network and filter out nodes that are connected to others within the network but do not propagate content of interest or provide significant pathways between the network of interest and beyond. This approach also allows for increased connection density that ultimately decreases the number of gaps in the network and provides many new pathways to propagate data. After filtering the data to include only nodes of interest within the data, the smaller sized network has more engaged members and a clear pathway showing how nodes and organizations connect and influence each other. This provides otherwise unknown access to truly influential members of the network and the ability to rapidly disseminate content.

In the following example, a first-tier node, the *AriWaldman1* account, is connected to three primary organizations in Group 2. While this graph is visually similar to the previous

KoenNaum example, this node has fewer connections to top-level organizations and fewer subsequent lower-level connections. While this user also connects to two otherwise unseen nodes, the relative reach and influence of this configuration are more limited in the context of the overall network.

Figure 19

The AriWaldman1 account connecting nodes from extended levels



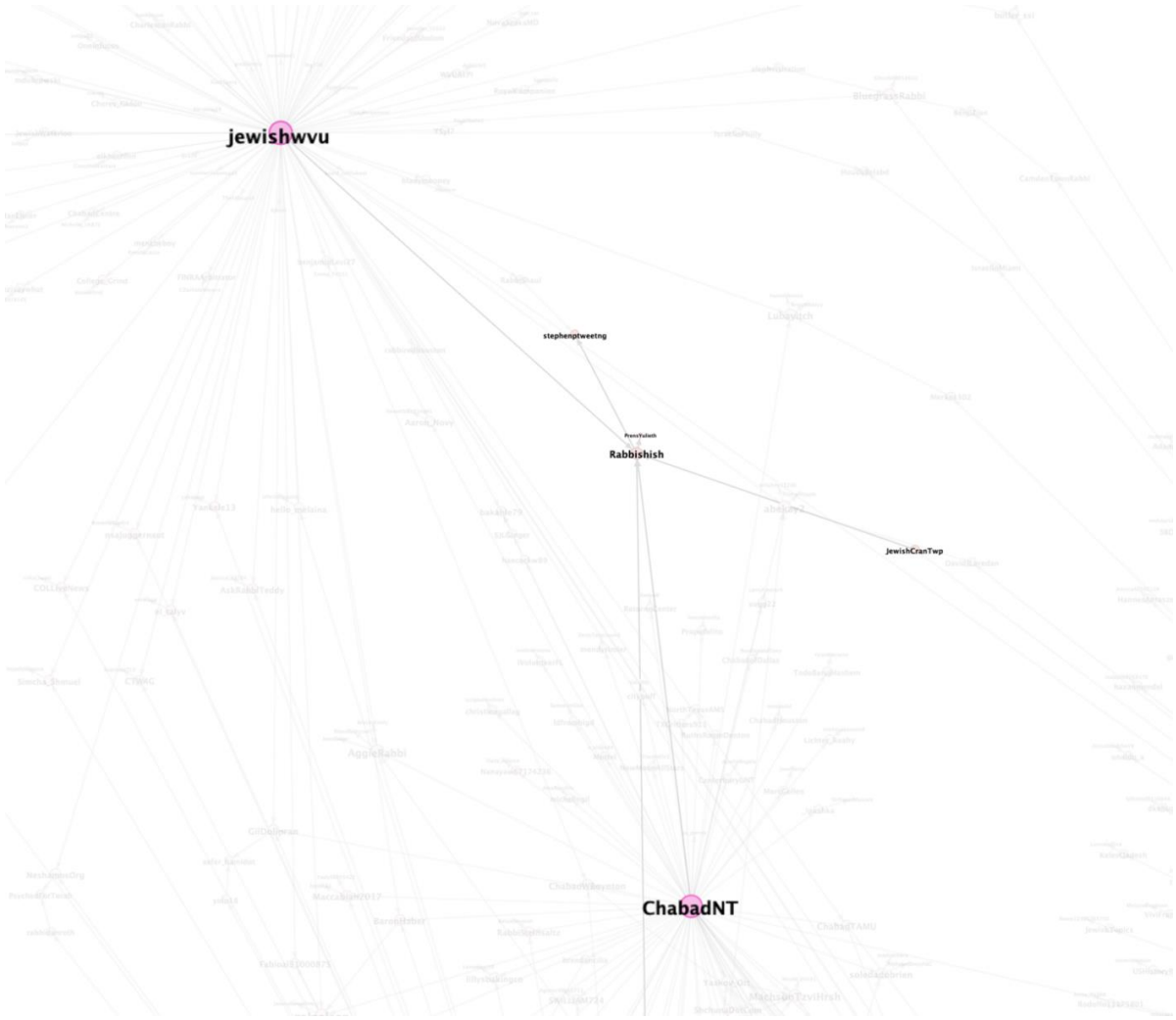
In the following example, there is a mixture of elements from the previous graphs as some of the network concepts are seen together. The *Rabbishish* user account is connected to

primary group members (both important network nodes and organizations) as well as others within the network. The smaller, secondary groups of nodes are not independent and are connected to other nodes of interest with corresponding relationships to other important nodes in the network.

Secondary nodes maintain other connections within the Group, extending the influence of organizations through user mediated connections. In some cases, secondary users are connected to multiple primary, secondary, and additional node networks. In this denser network with new pathways, there are a significant number of new exponential links and multiple pathways to reach new audiences. The link between organizations and nodes is mediated by intermediary connecting nodes, which show both connections between nodes and pathways for content propagation.

Figure 20

The Rabbishish Account Connecting Organizational and Secondary Accounts



In sum, we can use network data and SNA to identify the most influential members of the network. Influencers such as the *PinchasTaylor*, *AriWaldman1*, Rabbishish accounts connect more users and different network communities than those around them.

6.4 Conclusion

This Chapter has presented the results of the study vi network visualizations, quantitative statistics and an analysis of individual influencer accounts. Based on the various metrics used to identify essential nodes in the network and quantify their influence, it is possible to determine how nodes are connected to users outside of the immediate network and find the most influential actors. Chapter 6 will discuss what these results mean in context.

Chapter 7

7 Discussion

This chapter presents a discussion of the results. It begins with an examination of results, including the main findings, network-level statistics, node-level statistics, an analysis of the research questions and the resulting implications for pro-Israel organizations on North American campuses. It follows with a discussion on the future of SNA, outlining the benefits, future research avenues and potential negative aspects of this tool. It then proceeds with an analysis of the limitations of the study, highlighting in particular sampling, incomplete data and scope limitations. Finally, it concludes. Let us begin then with a look at the main findings of the study and what they mean.

7.1 Interpreting the Results

7.1.1 Main Findings

Several interesting findings come from an examination of the data. Firstly, these organizations are interconnected, as can be seen in the various network diagrams. Yet there are also many gaps between regular users outside of such organizations. Most of the approximately half a million data points collected are thus likely from students who join for a short period of time and are not connected to the organization on a long-term basis beyond their education.

Secondly, the distance between some users, even within the same networks, was also surprising. This means that for some organizations, there is a one-to-many relationship rather than a greater number of connections between users. There is therefore a lot of room for these networks to be brought closer together and made more integrated by encouraging a greater number of connections between users. This will allow content to more easily be propagated through broader network to establish closer relationships between users.

There may be other potential explanations for the data. This could include the method by which organizations generally communicate with their members, the types of events the organizations engage in or the types of content they typically promote. This means that there could only be a tangential association between users and the organization.

Influential members inside the network appear to pass on content and increase the reach and velocity of the messaging. Trusted third-party sources may be necessary for certain users in further networks to view the original message. In this way, influential members of the network

propagate content more effectively. If the organization knows their influencers, they can utilize this information to tap into the network and gain a better reach.

Pro-Israel activism groups on North American campuses should thus consider revising how they view their network members. Perhaps paying more attention to hidden influencers would yield significant gains in terms of promoting content farther and wider throughout the network. Hidden influencers may be very impactful, yet their presence is not always obvious. By identifying these users, seems likely that organizations can better promote their message throughout the network. Let us further evaluate the assumption that influencers are present yet often hidden by taking a closer look at the network and node-level findings.

7.1.2 Network-level Findings

The network diameter score, the maximum number of steps required to cross the network, for Group 1 is two, indicating a small degree of clustering. In other words, it is very easy to connect distant nodes with only one introduction to other active nodes in the network. Groups 2 and 3 contain a higher number of maximum steps to cross the most distant points in the network. These larger networks each have a diameter of three, revealing that they are structurally more complex compared to Group 1.

The average path length score, the shortest possible path between all nodes in the network, in Group 1 is 1.495. This means that it takes an average of one and a half connections to reach any other node. The number is less than the Group 1 network diameter, showing that there are many connections between nodes. The shorter the distance the more connections there are and the greater likelihood that data will continue to propagate across the network. Similar

patterns are found for the other groups, with an average of 1.786 for Group 2 and 1.729 for group 3.

The graph density score, the number of links within a network relative to the total value of all possible connections, for group 1 is 0.002, indicating that 0.2 percent of all nodes are connected. This shows that the network is rather poorly integrated, as there are many more nodes that are not linked to one another. This trend is also seen in Groups 2 and Group 3, which both have a graph density of 0.002, or about 0.2 percent. This means that while there are major pathways through the network, there remain many opportunities to connect network members.

The modularity score, a measure of how strongly the network is divided into sub-communities, for group 1 is 0.181, with five identifiable sub-modules. For group 2 it is 0.158, with identifiable sub-modules. This shows that group 1 is far more divided into separate communities with few links between them than group 2. For group 3 it is 0.386, with five identifiable sub-modules. Group three then is the most divided of the three groups, suggesting that here is where the most benefit to organizations would be reaped b reaching out to highly connected influencers within the network.

The global clustering coefficient score, a measure of the degree to which nodes in a graph tend to cluster together, for group 1 is 0.954; for group 2 it is 0.083. This demonstrates that nodes in group 1 tend to be more tightly clustered than those in group 2, likely due to the presence of more tightly integrated sub modules. For group 3 the figure is 0.112, indicating that this group is the least clustered and, along with the other statistics above, suggesting it could stand to benefit the most from additional connections between its members. Let us now turn to the node-level statistics to get a greater understanding of the network from a micro-perspective.

7.1.3 Node-level Findings

The average closeness centrality score, a measure of the effort required to reach all other nodes in a network, for group 1 is 0.002. ‘HillelIntl’ appears to play the most prominent role, meaning many others can quickly connect to this influential node. The average for group 2 is 0.004, indicating that this group is a little more connected. Group 3’s average is 0.006, showing that this group is more connected still than groups 1 and 2, reducing the relative importance of individual influencers, such as ‘HillelIntl’.

The average betweenness centrality score, a measure of how often certain nodes are part of the shortest possible path in the network, for group 1 is 4.459. In particular, ‘HillelIntl’ appears to be the most significant and influential member of the network. The average betweenness centrality score for group 2 is 3.9, indicating that this network relies a little less on influencers. The average for group 3 is 3.055, with ‘uwhillel’ appearing to play a highly influential role with a score of 1895.4.

The average Eigenvector centrality score, the importance of an individual node and its connections with other influential members, for group 1 is 0.50. Three nodes within this group, including ‘HillelIntl’, ‘ActForIsrael’ and ‘SSI_Movement’, appear to far more influential than others, with a score of for each of them. The average for group 2 is 0.298, indicating that this group is less reliant on important influencers and their connections than group 1. Group 3 has an average score of 0.25, suggesting it relies the least of all the groups on such influential nodes.

These network and node level findings complement the visualizations presented in the previous chapter to reveal a great deal about the underlying structure of the network. But what

are the implications of this better comprehension of the network in terms of our study's empirical research questions outlined in chapter 4?

7.1.4 The Research Questions

1) Can SNA be used to understand the underlying social network dynamics of pro-Israel student organizations on North American campuses?

This thesis has shown that SNA can be used to understand the underlying social network dynamics of organizations, followers, members, and other actors involved in campus activism. In particular, it has demonstrated how SNA allows the reach and penetration of pro-Israel organizations to be graphically mapped out, in turn allowing complex relationships to be visualized and nodes of interests and hidden influencers within the network to be identified.

Despite the network volatility generated by high numbers of students graduating and moving on from college every year, this project has illustrated how many interconnections between organizational accounts and users can be identified. All of the organizations studied in this research project experienced growth and were also able to attract more students on a year over year basis. Yet despite such apparent chaos in the make-up of the network, SNA has shown how high levels of inter-connections between members can be found throughout the duration of the study period.

One more way in which SNA has been able to give us a better understand the underlying dynamics of pro-Israel student activist organizations has been through the quantification of redundant links in the network. The visualizations and network statistics presented have allowed us to understand exactly how much a particular network relies on a limited number of pathways

for the transmission of information and compare this with others. The risk of a breakdown in the network should certain nodes leave or become inactive can therefore be quantified and addressed if necessary.

2) Can SNA be used to identify the most influential participants of Pro-Israel student organizational networks?

This thesis has how SNA can be used to identify the most influential participants within pro-Israel student activist organizational networks. The propagation of content by users between organizations and large groups of followers, such as the PinchasTaylor account, has been readily identified through visualizations and network statistics. SNA allows us to map out and quantify the amount of information that is passed to and from such nodes, allowing us to readily identify the most influential individuals.

The project has also demonstrated that SNA can also be used to identify nodes providing access to networks beyond the reach of the initial organization. Without the use of this technique, the specific characteristics of the interconnection between the followers of pro-Israel organizations would likely not have been obvious or quantifiable to these organizations themselves. SNA has been able to tell us which organizations are connected, to what degree they are connected and by whom their connections are mediated, in doing so also revealing clusters of users beyond the reach of individual organizations.

3) Can SNA determine whether hidden influencers connect various pro-Israel student organizations on Twitter?

This research project has shown that SNA can be used to determine whether hidden influencers connect pro-Israel student organizations on twitter. Visualizations, such as Figure 10 (the combined network map), demonstrate how such organizations tend to have a high degree of interconnection via various intermediary nodes. They also show that there are a relatively high number of redundant connections mediated through various influencers in terms of the wider pro-Israel student activist organizational network. Generally speaking, these various organizations taken as a whole have a relatively high-level interconnection.

The results also show that this is not necessarily the same for every organization in the study group though. Smaller groups appear to have comparatively fewer connections to other small groups and interconnections between their own members. Therefore, while we can confidently conclude that SNA is able to confirm that hidden influencers connect pro-Israel student activist organizations to one another, the level and strength of these connections can vary, as some organizations appear to be far more reliant on a limited number of influencers.

The results have clearly demonstrated the effectiveness of SNA for the purpose of better understanding the underlying structure of pro-Israel student activist organizations on North American campuses. But what exactly does this mean for the group under study? How should these organizations react to such findings?

7.1.5 Implications for Pro-Israel Organizations

The data shows that there are specific influencers within the network who act as primary nodes to receive and transmit data. Influential nodes are often hidden, or not otherwise known to be key transmitters of information within the network. Yet at times, they even exceed the relative power of an organization. Utilizing these hidden influencers and being able to tap into their respective

networks therefore offers many interesting possibilities for the transmission of messages across an expanding network.

Utilizing this approach would therefore allow pro-Israel activist organizations to build pathways that can more easily propagate information, create a relatively larger impact, and provide a mechanism for understanding the network in a new way. These organizations may not initially see the relative power that such nodes possess or realize the power that they hold within the network as individuals, but once this is determined, there are many possibilities to utilize these connections to strengthen their networks.

An example of this would be reaching out to the relevant influencers, including in this case the 'KoenNaum', 'PinchasTaylor' and 'uwhillel' accounts, and asking them to promote their content in exchange for a small gift, such as gift vouchers for books. The funding that was arguably being wasted on so-called 'pizza activism' could then be better used. Only a small percentage of students appear to seriously engage with the underlying cause behind such pizza night events, yet many people are often far more willing to engage with a social message if it has been vetted from a trusted third-party source.

In terms of how many nodes to contact, although there may be nodes of lesser importance at the periphery of the various graphs, careful observation shows that they may also reveal hidden networks which allow for the possibility of further expansion. From a pragmatic point of view, lesser-known nodes would be easier and more cost effective to target, and although they may not initially carry the same social capital or relative power within the network, they can have a great deal of influence within their own sphere and create new pathways within the network.

For pro-Israeli student organizations then, funding might be better spent on attracting a larger number of small influencers to promote their content on social media networks. Given the interconnection that seems to exist in politically minded networks across the country, such a tactic may also allow these organizations to better spread their message to those in touch in other pro-Israeli organizations and possibly those who had not yet even been exposed to such messaging.

In sum, SNA presents a great opportunity for pro-Israel organizations to further increase the effectiveness of their promotional content. The identification and subsequent engagement of hidden influencers can potentially allow them to find much larger outlets for their underlying messaging at a relatively low cost. The implication is that the so-called “pizza activism” that is all too often practiced by many student activist organizations and its associated ineffectiveness should be replaced with the identification and engagement of hidden influencers. This would help such organizations in their mission to promote a more balanced, nuanced view of Israel and Middle East issues across North American campuses. It seems likely that SNA has a great deal of potential in this regard, but what other applications does it have? Let us turn now to an examination of the future of SNA.

7.2 The Future of SNA

7.2.1 The Increasing Importance of Data

Data analysis tools such as SNA are becoming increasingly useful as an ever-larger amount of data is being stored in relational or hierarchal systems. Most organizations now seek to gain competitive advantages from the vast sums of data generated by society every day. As such, the approach used in this thesis has many possible uses. This analysis represents a new way to understand social network data and provide actionable insights based on previously unknown connections. Future research could therefore use this or potentially more sophisticated methods to look for additional insights into the structure of complex and evolving networks.

The ability to collect data has exceeded our ability to analyze it in the past, yet additional tools are emerging to bridge the gap, such as the advancement of complex technologies like Machine Learning and Artificial Intelligence (ML/AI). These allow high-dimensional data and their many, potentially infinite, permutations of connections between various types of data to be analyzed (Holzinger et al., 2018; Kibria et al., 2018; Mahdavinejad et al., 2018). Future studies wishing to make use of techniques such as SNA to analyze larger networks could therefore turn to this ever-expanding toolkit for processing and analyzing patterns in social media generated data, as outlined below.

7.2.2 Future Research Avenues

There are many different possible applications for using SNA in terms of sampling. In a commercial example, it would be possible to use it to sell a product or determine an optimum market by understanding the scope of potential consumers interested in a particular item. We

would be able to quickly isolate those with the most significant degree of communication power within their network. In other words, identifying influencers and using these connections can allow the product to spread rapidly to the remainder of the network and minimize the effort it takes to reach a large segment of the network.

There are also many business cases for SNA, including sentiment analysis (Homburg et al., 2015), referring to an analysis user's emotions on a certain subject, brand purchasing (Xie & Lee, 2015), customer satisfaction (Ramanathan et al., 2017), engagement (Omar Rodriguez-Vila et al., 2016), by identifying an appropriate market (Lo et al., 2016), among countless other uses. These cases could themselves be used for many industries, particularly as more and more companies are realizing the benefits of social media engagement in terms of marketing and business growth opportunities.

In another example, it would be interesting to see how social network analytics can be used in research, wherein trying to determine a sample population, a relatively small sample can be quickly derived by quantitatively measuring the relative strength of a node within a network, essentially looking for someone who has a significant degree of influence, both in the number of connections that they share outwards as well as the number of connections that they receive. Finding people in the network who have the most significant knowledge would require a technique such as snowball sampling. This sample might not be representative but depending on the size and type of social network, that may not be important.

A third possibility would be using social network analytics to identify individuals when trying to understand the balance of social or political structures. Social network analytics is often used to determine if the balance of power lies in one direction or another. This has become more

prevalent with the polarization in politics concerning topics such as fake news and others. As social data becomes more complex, the relationship between individuals becomes embedded in an endless web of interconnected data points. Being able to make sense of this complex web might allow us to better understand social and political structures.

In addition to simply determining who is in the network structure, further research could also examine the degree of trust or power different influencers are able to project. This could lead to a new sub-field on hidden influencers in which a detailed typologies list can tell us which influencers are the most effective when it comes to certain kinds of messages. This would allow organizations with specific types of messages, whether they be commercial, informal, emotive or another kind, to propagate their content farther throughout the network by targeting the types of influencers who are best suited to their specific needs.

It is hoped then that this study can act as a guide for the applications of SNA to a wider range of social science topics. The method has proven to be highly effective for gaining a deeper understanding into interdisciplinary problems and likely has many further applications beyond this study. Despite such widespread applications however, there are nevertheless certain potential downsides of using this approach, including the invasion of personal privacy.

7.2.3 Privacy Considerations

As mentioned previously, there were multiple scandals regarding social networks and privacy during the exploratory phase of this project shortly before gathering the data. There were many examples of negative uses of social media, such as the Cambridge Analytica scandal (Cadwalladr

& Graham-Harrison, 2018a; Granville, 2018; Ingram et al., 2018). This demonstrates how data analysis techniques, such as SNA, are still so new that the rules regarding their usage still have not been set by society. When assessing the application of the approach beyond this study then, it is useful to consider where the boundaries of techniques such as SNA should be drawn.

One example of this might be identifying where non-users may fit into the network through a process called shadowing. The data being used to predict where a non-member may be located does not directly use their data but extrapolates where a “hole” may be based on the connections of those around them. The data used to identify shadow users is collected implicitly though consent given by actual users of the network but cannot be obtained from extrapolated users themselves. In fact, the shadow user may not even be aware that identifying them on the basis of data collected from others is possible, or that their data has been captured. As a result, these users have little recourse to prevent their data from being used.

Much of the Cambridge Analytica scandal was caused by data being collected from connections without the users consent (Schneble et al., 2018). In this case, a security flaw in Facebook API allowed for the collection of user information beyond those who had originally given consent for their data to be collected (Cadwalladr & Graham-Harrison, 2018b; Isaak & Hanna, 2018). Cambridge Analytica was thus able to generate psychographics (factors included BIG5 personality inventory, intelligence, life satisfaction, political and religious views, sexuality and profession) along with demographics (age, gender and relationship status) to be used for political campaigns (Winston & Winston, 2018).

It is important to note however that while there was a negative outcome in the Cambridge Analytica scandal (Abramson, 2018), generally speaking, there are many benefits to this type of

analysis. Understanding the population's interests through social media, an unfiltered and detailed analysis can reveal what the population thinks, assuming that data was gathered and used ethically. The underlying use of social media analysis can have many positive benefits, such as suicide prevention (Eggertson, 2015; Hauser, 2016), resource planning (Neuhaus, 2011; Noe et al., 2017; Xu et al., 2016), and public health (Overbey et al., 2017; Schomberg et al., 2016; Zou et al., 2016).

Regardless, it is important then to be mindful when using techniques such as SNA. Public outcry may change the way in which third party consent for hypothesized users is required or collected in the future (Common, 2018). Public pressure in other jurisdictions, such as Europe (Satariano, 2018; Scott & Cerulus, 2018), has also led to policies which limit the ways companies can retain and collect data. Future research may thus evolve along different socially determined ethical lines, potentially rendering methods such as the one used in this study controversial. Extra care during the data collection process should therefore be taken in future studies wishing to use this technique so as not to disrespect ethical boundaries concerning privacy. Privacy is not the only potential downside of this technique however, but also negative public influence, as outlined below.

7.2.4 Social & Political Considerations

Interestingly, this thesis was written at a time when social media is at a crossroads in terms of its societal impact following many startling revelations (Bossetta, 2020; G. M. Chen, 2019; Demirhan, 2016) concerning how it is used to understand, and perhaps attempt to manipulate, the public (Bradshaw & Howard, 2017; Pang, 2013). While the public previously understood that personal data was “out there,” stored in databases for commercial use, it was perhaps not fully

appreciated that private data was being used aggressively to target individuals and influence them (Kang, Dabbish, Fruchter, & Kiesler, 2015). This trend has been seen with personalized pricing on various websites such as travel (Krämer et al., 2018), in healthcare (Mishra et al., 2015), and with storefronts/online stores (Arora, 2017; Grewal et al., 2017; Liu et al., 2019).

In each of these examples, companies used social media to understand patterns of behaviour. They then predicted the price that a customer would be willing to pay based on their browsing history. Beyond this, there has been tremendous attention paid to issues ranging from various forms of discrimination related to the job market (Heater, 2019; Thompson, 2019a), housing (Brandom, 2019) and financial credit (Eveleth et al., 2019) through the use of social media targeting. This is seen both in examples where social media are used to influence the public (Gorodnichenko et al., 2018) and target and exclude individuals (although this may be changing in some areas due to public and government pressure [Hutchinson, 2019]).

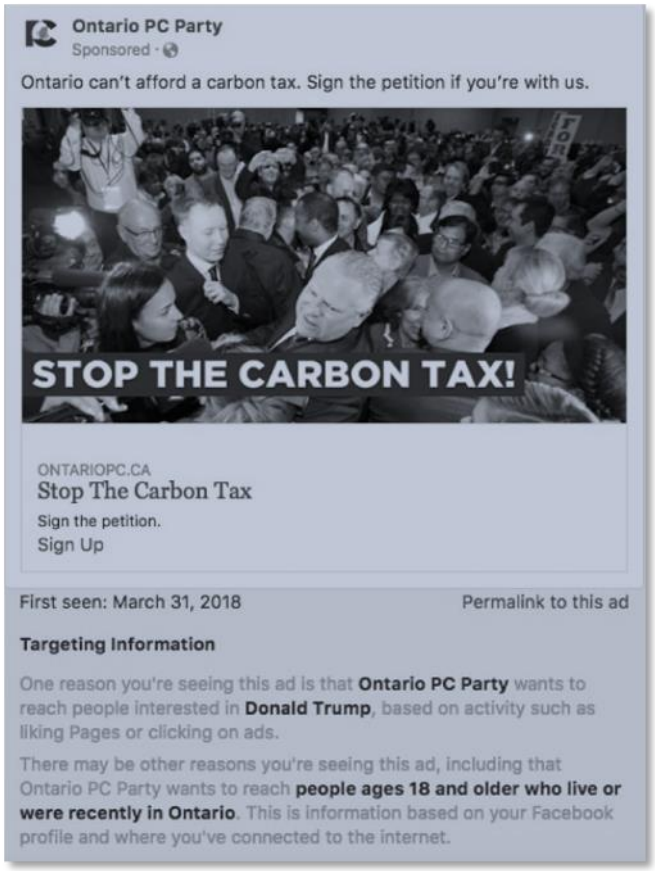
Yet such data is also thought to have been used to influence how we vote in elections (Thompson, 2019b). Not only was the Facebook data breach by Cambridge Analytica an extremely controversial issue in terms of privacy and consent, but the data was alleged to have been misused to influence voters in a United States election (Allcott & Gentzkow, 2017; Bessi & Ferrara, 2016; Persily, 2017). The data accumulation allowed researchers at Cambridge Analytica to build detailed psychometric and demographic profiles of Facebook users and target them for online political campaigns.

Social network analytics are performed to understand voting preferences in many countries, including Canada. Because a large percentage of the population uses social media, and individual users can be stratified (Groshek & Koc-Michalska, 2017), these approaches allow

political campaigns to understand the electorate's mood on a given issue (Bermingham & Smeaton, 2011; Wicaksono, 2016), spread propaganda (McKelvey & Dubois, 2017), and determine which policies resonate with voters (Fulgoni et al., 2016). For instance, in the 2018 Ontario election, Facebook was used to distribute ads based on voters' "interests, their age or where they live" (Thompson, 2018). To increase transparency, the company started showing disclaimers and ads related to "issues of national importance," including campaigns related to social issues, elections, or politics (Facebook, 2019) when setting the parameters for micro-targeted ads.

Figure 21

A political ad on Facebook



Note. This ad shows a disclaimer that Ontarians who were interested in Donald Trump was targeted for the ad (Thompson, 2018).

When political ads target specific populations, the source data typically involves publicly available information or that which has been given consent to use for this purpose (Elmer et al., 2015; Kenski & Conway, 2016). For example, the political party would specify the metrics they are looking to find for potential voters and design campaigns that appeal to a particular niche. This is the type of detailed and micro-targeted advertising and marketing that was alleged to have been a factor in the 2016 presidential election in the United States (Ingram et al., 2018). Using detailed information about the electorate gathered without their consent, new approaches for targeting individuals or groups with particular messaging could have had undue influence in the election (Bossetta, 2018) and shaped the public discourse around election issues.

The question naturally arises then, what should be the limits to the use of techniques such as SNA in terms of the social and political spheres? Should such techniques only be used for specific kinds of research and commercial purposes, while leaving aside aggressive individual social and political targeting? If so, how can we decide what sorts of research and commercial purposes they can be used for? Who would get to say what does or does not pass and under what criteria? These are the difficult questions that this emerging field is still grappling with. The exact path that SNA will take in the future then appears to remain uncertain.

In sum, SNA is an exciting tool which has many applications in research and beyond. Yet looming ethical concerns make its future uncertain. In a way, its trajectory depends as much on the rapidly changing social climate of the day as on technological development. Together, these unpredictable forces could take SNA in any number of directions. If however we can withstand

the temptation to ban practices such as SNA rather than engage with the difficult process of implementing adequate regulation, this study has shown that it offers exciting possibilities for researchers in many fields. But while the benefits and potential drawbacks of SNA have been demonstrated here, this project is also not without its weaknesses. Let us now take a closer look at those weaknesses and how future researchers should take them into account when conducting their own research.

7.3 Study Limitations

7.3.1 The Sample Population

There is a degree of randomness in the study sample population because, even though the sample of schools and organizations is purposive, individuals' identification through social media is random. In other words, participants were not selected before the research study began, and it is the organizations chosen who dictated which participants would be identified. Participants within a group can also drift in and out of the group being studied over time, adding additional uncertainty as to whether the sample population is truly representative of pro-Israel activists on campus. This is problematic because it would be impossible to determine if the findings were obtained from an unbiased sample.

However, despite such uncertainty, the study unit is the social group and the network it forms, which means that although data is derived from individuals and their interactions, the focus of the study is on the collective structure. This issue is therefore somewhat allayed then by the fact that we are drawing conclusions from organizational data and not focusing on individual participants in the study. While it may be impossible to remove bias or presupposition from the research altogether, I believe that my background experience somewhat helps to validate the representativeness of the sample, while at the same time continuing recognizing how my own preconceptions influence my perception of the world. The sampling method however is not the only potential weakness in this study.

7.3.2 Incomplete Data

Although the data used in the study captures the relationship between existing nodes, there are many potential users without access that are not captured in the graph. The representation of society does not mirror social networks, but a more vocal subset of those with access and a common agenda. This means that some in society can use this medium to advocate, while others are relegated to other forms of communication. It would be misleading to discuss social networks purely in terms of structures of users as if they represented the actual population. It is essential to consider that social networks have an inherent degree of privilege, representing a specific subset of users. Even when the users captured in the network constitute a substantial segment of society, many voices are excluded, possibly representing various perspectives to the conversation.

There are several possible solutions to the problem of representation. The position of those users not present can be extrapolated and inferred using other reference points from different social networks or other data sources. Beyond extrapolating the possibility of users not present, utilizing other means of communication and data, may help include those not active in this sphere. In this study however, it seems likely that somewhat incomplete data were obtained and not all those involved in pro-Israel campus activism were accounted for. Undertaking a more extensive mixed-method study in the future would help to more broadly understand attitudes around pro-Israel activism on campus and allow many other voices not present on social media to be heard. In addition to the potential for incomplete data however, this study also suffers from the inevitable weakness of limited scope.

7.3.3 Narrow Scope

There are many permutations of how the Jewish Diaspora manifests in North America. This often-complex relationship is mediated by political, social, and religious tensions which are ever evolving. Encapsulating this was the initial objective of this study. However, as previously mentioned, given the time and resource constraints faced, the project required a narrower focus to ensure completion. Other possible study designs could include an analysis of the perception of Israel from the Diaspora lens-shaped politics, how pro-Israel groups are positioned within the larger student context on campus (such as mapping student government and associated structures in the university), and a study of the reach and effectiveness of various students or groups.

However, these ideas would require a substantial sample population and the accompanying technological infrastructure and resources needed gain access to and analyze large quantities of data. Although it had been my original objective, such requirements proved beyond the scope of this thesis. The project was therefore limited to selected groups' structure and only used publicly available social media data from the Twitter API. Future research then could seek broaden the scope of this study in several ways. A mixed methods approach for example could combine quantitative analysis with a more in-depth qualitative understanding through interviews. Alternatively, the quantitative reach of this study could be expanded to include a greater number of pro-Israel organizations across North America given the right technological infrastructure.

In sum, this study suffers from potential limitations regarding the sample population, incomplete data, and a narrow scope. It is my sincere hope that future researchers build upon this line of analysis and address such limitations to give us a better, more detailed understanding of how social networks function in the future.

7.4 Conclusion

This chapter has discussed how individuals connect to social activism networks using social media, as well as how these networks are structured. It has found that the network structures of such groups vary in several respects. Interestingly, the analysis revealed that hidden influencers do in fact exist in such groups, such as ‘HillelIntl’ and ‘uwhillel’. SNA has therefore proved to be a useful technique for identifying hidden influencers and assessing the structure of pro-Israel campus activism on social networks. While there may be concerns regarding privacy as well as social and political considerations in terms of its use, it remains an attractive and highly useful method for future research into the structure of social networks in the context of campus activism and beyond.

Chapter 8

8 Conclusion

This chapter presents the conclusion of the thesis. It will begin with a summary of the study aims, including the initial motivation for the research and how the aims of the project changed over time. This will then be followed by a summary of the results, including the main findings, quantitative statistics, and the identification of hidden influencers. Following this, it will summarize the findings in context, including main findings, implications for pro-Israel campus activism, avenues for future research, and limitations of this study. Lastly, it will offer some final thoughts. Let us begin then by summarizing the study aims.

8.1 Study Aims

8.1.1 Initial Motivation

Shifting borders have been a key theme throughout this thesis, connecting the major and minor papers which compare interdisciplinary boundaries in the academy and those between social networks. There are unmistakable parallels between how disciplines merge, specialize, and break apart in academia, and how users, or nodes, form new social communities, propagate specific information, and create dynamic new social structures.

My fascination with these types of shifting borders begun when I arrived from Israel on campus in Northern Ontario. I was quickly confronted with a monolithic view of my home country from many other students and faculty members. This was exacerbated by some of the political developments taking place in the Middle East at the time. It was particularly frustrating for me given the fact that it seemed as though many of the people with such views had likely never visited the region itself and experienced the rather more complicated reality. The resulting desire to promote a more nuanced view therefore led me to get involved in pro-Israel campus activism. Yet it soon dawned on me that many of these official groups were in fact less successful at promoting their message to a wider audience than they could be. The so-called ‘pizza mediated activism’ (Cain, 2018) I witnessed seemed to be successful only at engaging the same set of politically engaged individuals, with little reach beyond this point. This was what first ignited my interest in the ever-shifting boundaries in the social structures of campus activism.

8.1.2 Finding the Right Design

The initial approach for the research was to investigate the state of pro-Israel activism on campus and determine if the effort and resources expended by student groups, advocates, and other key players were being utilized appropriately. By extension, it was also to decipher whether they were helping to shape public perception of Israel and influence future leaders of society, as research shows how increased connectivity to campus activities in the formative years of higher education is linked to increased societal engagement (Miller, Mundey, & Hill, 2013).

I first sought to answer these questions through the use of qualitative methods but obtaining sufficient data to understand these social dynamics more fully via interviews would have required extensive time and resources. Instead, I decided to try and answer my initial questions with the use of more quantitative measures. It was this change that led me to research on social network analysis (SNA), the study of social structures via networks and graph theory. I subsequently became fascinated with investigating the social dynamics of pro-Israel activism organizations on social media.

This in turn led to a new set of research questions. In particular, the focus of the study now turned to whether SNA could be used to investigate such social structures on North American campuses, and, as my intuition had suggested, if certain hidden influencers were able propagate information more effectively than those in formal positions of power within organizational hierarchies. This line of enquiry subsequently inspired a new research design, involving the use of SNA and twitter data to analyse the networks of the groups under study.

In sum, the initial motivation for this project led me to question the way in which the network of pro-Israel campus activists is structured. Although my original study design had to be

changed, I was able to design a new one to answer my research questions. Let us re-examine what exactly the findings of the final study design were.

8.2 Research Findings

8.2.1 Main Findings

The results from this study demonstrate how the supposition that the leaders of an organization are the best informed and aware of the "pulse" of the organization is problematic. The organizational hierarchy can be seen as the organization's de facto voice, misrepresenting the many conversations, perhaps dissenting, amongst the average members. Many more nuanced positions within an organization or social group may not be associated with leadership.

These are the conversations that tend to have a disproportionate influence in the wider network, despite the seemingly lower-ranked social standing of those engaged in alternative dialogue. This is because, as this study has found, network power is often asymmetrical, meaning that not everybody knows everyone, but a few individuals, or hidden influencers, often know many people and are able to connect distinct virtual communities together.

8.2.2 Quantitative Statistics

The quantitative statistics from this study appear to support the assertion above. Although there were differences between the groups, all three demonstrated how the social networks of pro-Israel activists on North American campuses tend to form clustered communities within the wider network. These communities are often characterised by highly dense internal connections, but relatively fewer external links in comparison. Statistics such as graph density and clustering coefficient appear to back up the fact not everybody has equal access to everyone.

Instead, certain individuals tend to bridge the gap while others remain happy in their own comparatively limited virtual social bubbles. This is clearly demonstrated by statistics such as betweenness and Eigenvector centrality because, after all, if everybody in a given community had equal access to all others, no individual would be more important and hence there would be no variation in the scores for such statistics. Instead, there is significant variation between groups and specially individuals in these scores, indicating that certain hidden influencers tend to connect both those within and between different communities.

8.2.3 The Identification of Influencers

This study has used statistics, such as those mentioned above, and visualizations to identify the presence of hidden influencers in the study groups. It has been able to show that influencers such as 'HillelIntl' and 'uwhillel' command significantly greater power in relation others within their respective networks. This is evident from their high scores on metrics such as betweenness centrality. Additionally, the respective network maps of all three of the study groups clearly illustrates, when redundant information is eliminated from the graph, the disproportionate role that these nodes play in connecting others together.

Gaining a better understanding of the relative social capital (Bourdieu, 1986; Lin, 2017) of these individuals therefore provides a better comprehension of how information from Pro-Israel organizations on North American campuses is propagated. As previously mentioned, it has been hypothesized that social capital is asymmetrical in social networks. The results of this study support this, because not only do the influencers identified here seem know many people, but given their high Eigenvector centrality scores, they also appear to know a greater number of

other influential people. This suggests that they have greater social capital and that they can spread information more effectively than the average user.

In sum, the study has used network visualizations and statistics to gain a greater understanding into how groups under study are structured socially. But what do these findings mean? Let us now re-examine the context of the findings.

8.3 The Findings in Context

8.3.1 Implications for Pro-Israel Organizations

The research outlined in this thesis has several important implications for pro-Israel activist organizations on North American Campuses. The identification of hidden influencers in this study demonstrates that such organizations could stand to benefit from the use of SNA to better understand their networks. This in turn would also them to identify those with the most relative influence in the relevant social circles. Then, by reaching out and engaging these individuals, they could then offer their influencers a small gift in exchange for helping them to promote content. This would in turn allow them to better propagate their content throughout the network.

Not only would this stand to increase an organization's reach within pro-Israel networks, but it would potentially also increase their reach in wider networks as well. So-called 'pizza activism' is often unsuccessful at engaging a wide range of people other than the usual crowd of politically engaged individuals. As highlight earlier, when a message is viewed as having come from a trusted third-party source, individuals are more likely to engage with it. The use of SNA therefore presents an important opportunity for pro-Israel organizations to spread their message throughout both their existing networks and a wider range of social circles beyond those which they could normally reach.

8.3.2 Future Research Avenues

There are many future research avenues that arise from this study. SNA itself for example has many applications in terms of the commercial, organizational and research spheres. In this sense the limits to SNA are practically boundless as new technologies evolve and new uses for the

technique are found. In terms of research however, future studies can and should use this technique to further build upon the understanding of pro-Israel campus activism gained here.

One example of this would be by broadening the scope of the groups under study. With more sophisticated technological infrastructure and greater financial resources, the network structures of a greater number of groups could be analyzed across North America. This would help to better understand how such groups are organized in the digital world and possibly even allow for the identification of geographical variations across the continent.

Another example would involve taking a closer look at exactly how influencers like those identified here are able to propagate content and whether some of them are more effective at this than others. This could be done by examining how different communication styles, such as informational, emotional etc., affect the likelihood that an influencer is able to propagate a particular piece of content. From this, a list of different influencer typologies could be made, demonstrating which types of influencers are best at spreading which types of messages.

A caveat to this however would be the caution needed when conducting such a study. Extra care and attention would be needed to not cross ethical boundaries given the privacy and social encroachments that technologies such as this have been making into our lives. A future scandal in the realm of social media or SNA, such as the Cambridge Analytica scandal, could cause public outcry to the degree that the technique is no longer a viable option for researchers. Despite impressive technological advancements then, the future of SNA remains somewhat uncertain.

8.3.3 Study Limitations

As well as ethical due diligence regarding privacy issues, future studies in this area should also seek to improve upon the limitations of this study. There is a degree of randomness in the sample population that could call into question the representativeness of the sample. Although the focus of this study is primarily organizational networks and not any single individual, future research could seek to employee a more methodical approach.

Additionally, future studies should also seek to address the potential for incomplete data. Given that not everyone has access to, nor wishes to use social media, it seems likely that certain individuals will not have been included in this analysis. This may however miss important relationships in the structure of pro-Israel student activist networks. Imagine for example that an individual is incredibly important for organizing and spreading information about pro-Israel events in person yet does not use social media.

Finally, future research should also seek to overcome the scope limitations of this study. Due to time and financial restraints, this project is necessarily limited in terms of how many organizations it can examine and how in-depth it can analyze their respective networks. With greater resources, these limitations could be overcome through securing enhanced technological infrastructure, better access to data and a greater ability to conduct in-depth, qualitative analyzes, such as large-scale interviews and opinion polling.

8.4 Final Thoughts

The existence of people with monolithic views is not a new problem in the context of world history. Thankfully, neither is the type of activity which seeks to counter this problem in the name of social harmony and cooperation. What is new in the twenty first century, however, is the rise of social media. This novel medium of exchange has drastically altered the way in which we communicate and, importantly, it has provided us with new tools to measure such communication. SNA have given us the ability to study social networks and interactions at a scale previously unimaginable. Yet the discoveries to date in this area have arguably only just scratched the surface in terms of what is possible given the trove of new social media data that is created everyday around the world. Armed with this knowledge and the underlying insight gained from this thesis, future researchers should know that there is practically no limit to where their curiosity can take them.

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Appendices

Appendix A

LUJSA Article (Shapiro, 2013)

This appendix shows the article I wrote for LUJSA to raise awareness about Chanukah at Laurentian University.

Happy Chanukah by Sidney Shapiro

Chanukah is a time for presents, family, and food. This year, on November 19th, the Laurentian University Jewish Students Association (LUJSA) will be hosting our second annual Amazing Hannukah Donut Giveaway with sponsorship from CAMERA (Committee for Accuracy in Middle East Reporting in America). We will be giving out over 1,000 donuts, coffee from the new and improved Voyager Café, and lots of really cool swag. It may be a little earlier than Chanukah this year, but we wanted to make sure everyone was able to celebrate with us before exams.

Hanukkah (sometimes transliterated Chanukah) is a Jewish holiday celebrated for eight days and nights. It starts on the 25th of the Jewish month of Kislev, which coincides with late November-late December. Jewish children receive gifts for Hanukkah – often one gift for each of the eight nights of the holiday.

It all began in 165 BCE when Antiochus IV, king of the Syrian-Greeks, was in controlled of the region of Israel. Jews severely, placing a Hellenistic priest in the Temple, massacring Jews, prohibiting the practice of the Jewish religion, and desecrating the Temple by requiring the sacrifice of pigs (a non-kosher animal) on the altar. Mattathias the Hasmonean and his son Judah Maccabee revolted and succeeded. The Temple was then rededicated, but there was very little pure oil was left. Oil was needed for the menorah in the Temple, which was supposed to burn throughout the night, every night and replaced the next day. When the temple in Jerusalem was recovered, there was only enough oil to burn for one day, yet miraculously, it burned for eight days, the time needed to prepare a fresh supply of oil for the menorah. An eight day festival was declared to commemorate this miracle.

Chanukah this year is December 16th to the 24th. For eight nights we light candles on a menorah (a nine branched candelabrum with one “helper” candle, the shamash), eat latkas (potato pancakes) or sufganiot (jelly donuts) and play dreidel (a spinning top). We eat oily foods and light candles (or oil lamps) to commemorate the miracle of Chanukah almost 2000 years ago. Chanukah is one of my favorite holidays. When I was a kid growing up in Timmins (a story of its own), my parents decided to talk about Chaukah and tell people what the holiday was and what it was about. They brought thousands of Timmies donuts to local school kids and talked about the holiday, I was on the front page of the paper with my sister lighting the menorah. It was a great experience, and I think educated a lot of people about the holiday, our traditions, and most importantly, helped join in the festivities.

Today, my parents live on a small moshav (sort of like kibbutz) in central Israel called Mattityahu (named after the high priest from the Chanukah story). In fact, all the towns around the area are named for the Chanukah story, because that is where the events of Chanukah were

believed to have happened. The story of Chanukah, the light against the darkness, the Jedi Chanukah, can be seen today in current events and the ongoing struggle for peace in the region. Israelis typically light olive oil menorahs, itis amazing to see the thousands of flickering flames in the darkness as families gather to celebrate the holiday each night.

I hope you stop by the student center on November 19th and come grab a donut and coffee and let us know if it is Happy Chanukah, Hanukah, Hanukkah or something else entirely.

Appendix B

Python Code - Network Graph

This python code shows how to construct a graph of the network by mapping the various interconnections between nodes.

```
#import modules

#handling data


import pandas as pd

import numpy as np

from scipy import stats

from operator import itemgetter

import time


#handling information

import re

import json


#handling plots
```

```
import matplotlib.pyplot as plt

import seaborn as sns

#from matplotlib import pylab

from itertools import count



#for network creation

import networkx as nx



#user group

#screen_users1 =
["David_Project","israelproject","AIPAC","Jerusalem_U","HillelIntl","StandWit
hUs","AWiderBridge","ActForIsrael","SSI_Movement","IACmishelanu"]



screen_users2 =
["ChabadOnCampus","ChabadNT","Jewcla","ChabadKingston","jewishwvu"]



#read json into a pandas data frame

#jsonFile = open("friends.json")

#jsonFile = open("friends_json.json")

jsonFile = open("friends_json2.json")
```

```
jsonString = jsonFile.read()

jsonData = json.loads(jsonString)

js = jsonData.replace('\"','"')

friend_data = json.loads(js)

df = pd.DataFrame(friend_data)

#print(df.head)



#constructing graph

graph = nx.karate_club_graph()



#adding nodes and edges

for item in friend_data:

    if graph.has_node(item['user']):

        if graph.has_node(item["screen_name"]):

            graph.add_edge(item["screen_name"], item["user"], weight = 1 if
item['verified'] else 0)

        else:

            graph.add_node(item["screen_name"],
```

```
                            group = "one" if item['friends_count'] < 1000 else
("two" if item['friends_count'] < 3000 else ("three" if item['friends_count']
< 7000 else ("four" if item['friends_count'] < 14000 else "five"))))

            graph.add_edge(item["screen_name"], item["user"], weight = 1 if
item['verified'] else 0)

    else:

        graph.add_node(item["user"], group = "mainUser")

        graph.add_node(item["screen_name"],

                        group = "one" if item['friends_count'] < 1000 else
("two" if item['friends_count'] < 3000 else ("three" if item['friends_count']
< 7000 else ("four" if item['friends_count'] < 14000 else "five"))))

        graph.add_edge(item["screen_name"], item["user"], color = 'b' if
item['verified'] else 'r',  weight = 1 if item['verified'] else 0)



#counting number of nodes and number of edges and degrees

print(f"There are {graph.number_of_nodes()} nodes and
{graph.number_of_edges()} edges present in the Graph")

degrees = [val for (node, val) in graph.degree()]

print(f"The maximum degree of the Graph is {np.max(degrees)}")

print(f"The minimum degree of the Graph is {np.min(degrees)}")

print(f"The average degree of the nodes in the Graph is
{np.mean(degrees):.1f}")
```

```
print(f"The most frequent degree of the nodes found in the Graph is
{stats.mode(degrees)[0][0]}")



#checking if the graph is connected - every node is connected to at least one
edge

if nx.is_connected(graph):

    print("The graph is connected")

else:

    print("The graph is not connected")

print(f"There are {nx.number_connected_components(graph)} connected
components in the Graph")



#checking for subgraph

connected_component_subgraphs = (graph.subgraph(c) for c in
nx.connected_components(graph))

largest_subgraph = max(connected_component_subgraphs, key=len)

print(f"There are {largest_subgraph.number_of_nodes()} nodes and
{largest_subgraph.number_of_edges()} \

edges present in the largest component of the Graph")



if nx.is_connected(largest_subgraph):
```

```
    print("The graph is connected")

else:

    print("The graph is not connected")

degrees = dict(graph.degree())



groups = set(nx.get_node_attributes(graph,'group').values())

mapping = dict(zip(sorted(groups),count()))

nodes = graph.nodes()

colors = []

for n in nodes:

    if 'group' not in  graph.nodes[n]:

        graph.nodes[n]['group'] = 'one'

    colors.append(mapping[graph.nodes[n]['group']])



labels = {}

for n in nodes:

    '''

    if n in screen_users1:

        labels[n] = n
```

```
    '''
    if n in screen_users2:
        labels[n] = n


edges = graph.edges()
edge_colors = []
for u,v in edges:
    if 'color' not in  graph.nodes[n]:
        graph[u][v]['color'] = 'r'
    edge_colors.append(graph[u][v]['color'])


# drawing nodes and edges separately so we can capture collection for colobar
pos = nx.spring_layout(graph)
nx.draw(graph, pos, alpha=0.2, with_labels = False)
nx.draw_networkx_nodes(graph,
                       pos,
                       nodelist=nodes,
                       node_size=[v/100 if v > 1000 else v*25 for v in
                                  degrees.values()],
```

```
                        node_color=colors,

                        cmap=plt.cm.jet,

                        edges = edges,

                        edge_color = edge_colors)

nx.draw_networkx_labels(graph,pos,labels,font_size=10,font_color='r')




plt.axis('off')

plt.show()
```

Appendix C

Python Code - Get Interactions

This python code shows how to get the interactions, or edges, for the various groups and uses group 2 as an example case.

```
import tweepy

import time

import pandas as pd

import json

import xlsxwriter


access_token = ""

access_token_secret = ""

consumer_key = ""

consumer_secret = ""


auth = tweepy.OAuthHandler(consumer_key, consumer_secret)

auth.set_access_token(access_token, access_token_secret)

api = tweepy.API(auth)


#Group 2 members

screen_users = ["ChabadOnCampus",
```

```
                "ChabadNT",

                "Jewcla",

                "ChabadKingston",

                "jewishwvu"]

friends = []

followers = []

def limit_handled(cursor):

    while True:

        try:

            print("moving on...")

            yield next(cursor, None)

        except tweepy.RateLimitError:

            time.sleep(15 * 60)

        except tweepy.error.TweepError:

            break



for screen_name in screen_users:

    for friend in limit_handled(tweepy.Cursor(api.friends, screen_name =
screen_name).items()):

        if friend == None:

            break

        print(friend)
```

```
        userData = {}

        userData["user"] = screen_name

        userData["created_at"] = friend.created_at

        userData["id"] = friend.id

        userData["screen_name"] = friend.screen_name

        userData["followers_count"] = friend.followers_count

        userData["friends_count"] = friend.friends_count

        userData["verified"] = friend.verified

        userData["statuses_count"] = friend.statuses_count

        #userData["favorite_count"] = friend.status.favorite_count

        #userData["retweet_count"] = friend.status.retweet_count

        #userData["user_mentions"] = friend.status.entities.clear

        userData["listed_count"] = friend.listed_count

        userData["friend"] = "True"

        friends.append(userData)


friends_df = pd.DataFrame(friends)


#to json

friends_json = friends_df.to_json(orient = "records")

print(friends_json)
```

```
#write to JSON file

with open("friends_json2.json","w") as f:

    json.dump(friends_json, f, indent = 4)



#to CSV

#to Excel
```

Appendix D

Python Code - 500 Additional Layers

This Python code shows how to get the interactions of each group with 500 additional layers in terms of obtaining the followers of followers.

```
import tweepy

import sqlite3

import json

import csv

import time

import datetime

from config import TWITTER


'''


** create_db_v2() -> Creates a new database. To change the name of it just
modify the creation string.
```

```
** run_csv_database_v2(file_path, num_layers) -> reads the names from the
file_path and uploads to the database the

names. The number of names is determined by num_layesrs.



** get_json_v2(file_path) -> Parses data from the database and creates a JSON
based on the names from file_path.



'''



#rate limiting sleep function

def limit_handled(cursor):

    while True:

        try:

            yield cursor.next()

        except tweepy.RateLimitError:

            time.sleep(15 * 61)

        except StopIteration:

            break
```

```
def search(rows, level=None):

    #set the database, in this case, group 3

    conn = sqlite3.connect('twidb_group3.db')

    cursor = conn.cursor()

    for row in rows:

        search_ID = row[0]

        #Authenticate

        auth = tweepy.OAuthHandler(TWITTER.CONSUMER_KEY,

                                   TWITTER.CONSUMER_SECRET)

        auth.set_access_token(TWITTER.ACCESS_TOKEN,
                              TWITTER.ACCESS_TOKEN_SECRET)



        api = tweepy.API(auth, wait_on_rate_limit=True,

                         wait_on_rate_limit_notify=True)



  print('Searching for followers of user: ' + search_ID)

        try:

            if not level:

                for follower in limit_handled(tweepy.Cursor(api.followers,

                                                  search_ID).items()):
```

```
print(follower.screen_name)

A = """SELECT * FROM TWITTER WHERE USER = '{USER}' AND
        SCREEN_NAME = '{SCREEN_NAME}' """. \

    format(USER=search_ID,
           SCREEN_NAME=follower.screen_name)

cursor.execute(A)

rows0 = cursor.fetchall()

if not rows0:

    A = """REPLACE INTO TWITTER

                            (USER, CREATED_AT, FRIEND_ID,
                             SCREEN_NAME, FOLLOWERS_COUNT,

                             FRIENDS_COUNT, VERIFIED,
                              STATUSSES_COUNT, LISTED_COUNT,
                              LEVEL)

                             VALUES

                            ('{USER}', '{CREATED_AT}',
                             '{FRIEND_ID}', '{SCREEN_NAME}',
                             '{FOLLOWERS_COUNT}',

                            '{FRIENDS_COUNT}',
                            '{VERIFIED}',
                            '{STATUSSES_COUNT}',
                            '{LISTED_COUNT}', 0)""" \
```

```
                .format(USER=search_ID,
                        CREATED_AT=follower.created_at,
                        FRIEND_ID=follower.id,
                        SCREEN_NAME=follower.screen_name,
                        FOLLOWERS_COUNT=follower.followers_count,
                        FRIENDS_COUNT=follower.followers_count,
                        VERIFIED=follower.verified,
                        STATUSSES_COUNT=follower.statuses_count,
                        LISTED_COUNT=follower.listed_count)
            cursor.execute(A)
            conn.commit()
        else:
            print('It already exists.')
            break
else:
    for follower in limit_handled(tweepy.Cursor(api.followers,
                                  search_ID).items(level)):
        print(follower.screen_name)
        A = """SELECT * FROM TWITTER WHERE USER = '{USER}' AND
               SCREEN_NAME = '{SCREEN_NAME}' """. \
```

```
    format(USER=search_ID,
           SCREEN_NAME=follower.screen_name)

cursor.execute(A)

rows0 = cursor.fetchall()

if not rows0:

    A = """REPLACE INTO TWITTER

                            (USER, CREATED_AT, FRIEND_ID,
                             SCREEN_NAME, FOLLOWERS_COUNT,

                             FRIENDS_COUNT, VERIFIED,
                            STATUSSES_COUNT, LISTED_COUNT,
                            LEVEL)

                           VALUES

                          ('{USER}', '{CREATED_AT}',
                           '{FRIEND_ID}', '{SCREEN_NAME}',
                           '{FOLLOWERS_COUNT}',

                          '{FRIENDS_COUNT}',
                           '{VERIFIED}',
                           '{STATUSSES_COUNT}',
                           '{LISTED_COUNT}', 0)""" \

        .format(USER=search_ID,
                CREATED_AT=follower.created_at,
                FRIEND_ID=follower.id,

                SCREEN_NAME=follower.screen_name,
```

```
                                    FOLLOWERS_COUNT=follower.followers_count,
                                    FRIENDS_COUNT=follower.followers_count,
                                    VERIFIED=follower.verified,
                                    STATUSSES_COUNT=follower.statuses_count,
                                    LISTED_COUNT=follower.listed_count)
                        cursor.execute(A)
                        conn.commit()
                    else:
                        print('It already exists.')
                        break
        except tweepy.error.TweepError as twpy_error:
            print('User ' + search_ID + ' cannot be parsed.')
            print(twpy_error)
    conn.close()


def run_csv_database_v2(file_path, num_layers=None):
    conn = sqlite3.connect('twidb_group3.db')
    cursor = conn.cursor()
    print('Opened database successfully')
```

```
print('Level 0 Search')

with open(file_path, 'r') as file:

    next(file)

    reader = csv.reader(file)

    for row in reader:

        search_ID = row[1]

        auth = tweepy.OAuthHandler(TWITTER.CONSUMER_KEY,
                                   TWITTER.CONSUMER_SECRET)

        auth.set_access_token(TWITTER.ACCESS_TOKEN,
                              TWITTER.ACCESS_TOKEN_SECRET)

        api = tweepy.API(auth, wait_on_rate_limit=True,

                         wait_on_rate_limit_notify=True)

        print('Searching for followers of user: ' + search_ID)

        try:

            if not num_layers:

                for follower in
                                                  limit_handled(tweepy.Cursor
                                                  (api.followers,
                                                  search_ID).items()):

                    print(follower.screen_name)
```

```
A = """SELECT * FROM TWITTER WHERE USER = '{USER}'
       AND SCREEN_NAME = '{SCREEN_NAME}' """.\

    format(USER=search_ID,
           SCREEN_NAME=follower.screen_name)

cursor.execute(A)

rows0 = cursor.fetchall()

if not rows0:

    A = """REPLACE INTO TWITTER

                          (USER, CREATED_AT,
                           FRIEND_ID, SCREEN_NAME,
                           FOLLOWERS_COUNT,

                          FRIENDS_COUNT, VERIFIED,
                          STATUSSES_COUNT,
                          LISTED_COUNT, LEVEL)

                           VALUES

                          ('{USER}', '{CREATED_AT}',
                          '{FRIEND_ID}',
                          '{SCREEN_NAME}',
                          '{FOLLOWERS_COUNT}',

                          '{FRIENDS_COUNT}',
                          '{VERIFIED}',
                          '{STATUSSES_COUNT}',
                          '{LISTED_COUNT}', 0)"""\
```

```
                                .format(USER=search_ID,
                                        CREATED_AT=follower.created_at,
                                        FRIEND_ID=follower.id,
                                        SCREEN_NAME=follower.screen_name,


                                      FOLLOWERS_COUNT=follower.followers_count
                                      ,
                                      FRIENDS_COUNT=follower.followers_count,

                                     VERIFIED=follower.verified,
                                      STATUSSES_COUNT=follower.statuses_count,
                                      LISTED_COUNT=follower.listed_count)

                            cursor.execute(A)

                            conn.commit()

                        else:

                            print('It already exists.')

                            break

                else:

                    for follower in
limit_handled(tweepy.Cursor(api.followers, search_ID).items(num_layers)):

                        print(follower.screen_name)

                        A = """SELECT * FROM TWITTER WHERE USER = '{USER}'
                              AND SCREEN_NAME = '{SCREEN_NAME}' """.\
```

```
                    format(USER=search_ID,
                           SCREEN_NAME=follower.screen_name)

                cursor.execute(A)

                rows0 = cursor.fetchall()

                if not rows0:

                    A = """REPLACE INTO TWITTER

                        (USER, CREATED_AT, FRIEND_ID, SCREEN_NAME,
                        FOLLOWERS_COUNT,FRIENDS_COUNT, VERIFIED,
                        STATUSSES_COUNT, LISTED_COUNT, LEVEL)

                         VALUES

                        ('{USER}', '{CREATED_AT}', '{FRIEND_ID}',
                        '{SCREEN_NAME}', '{FOLLOWERS_COUNT}',

                         '{FRIENDS_COUNT}', '{VERIFIED}',
                         '{STATUSSES_COUNT}', '{LISTED_COUNT}',
                         0)"""\

                        .format(USER=search_ID,
                                CREATED_AT=follower.created_at,
                                FRIEND_ID=follower.id,
                                SCREEN_NAME=follower.screen_name,


FOLLOWERS_COUNT=follower.followers_count,

                                FRIENDS_COUNT=follower.followers_count,
```

```
                                VERIFIED=follower.verified,
                                 STATUSSES_COUNT=follower.statuses_count,
                                 LISTED_COUNT=follower.listed_count)

                        cursor.execute(A)

                        conn.commit()

                    else:

                        print('It already exists.')

                        break

        except tweepy.error.TweepError as twpy_error:

            print('User ' + search_ID + ' cannot be parsed.')

            print(twpy_error)

conn.close()

print('Level 1 Search')

conn = sqlite3.connect('twidb_group3.db')

cursor = conn.cursor()

A = ''' SELECT SCREEN_NAME FROM TWITTER WHERE LEVEL = 0 '''

cursor.execute(A)

rows = cursor.fetchall()

conn.close()

search(rows, 1)
```

```
    print('Level 2 Search')

    conn = sqlite3.connect('twidb_group3.db')

    cursor = conn.cursor()

    A = ''' SELECT SCREEN_NAME FROM TWITTER WHERE LEVEL = 1 '''

    cursor.execute(A)

    rows = cursor.fetchall()

    conn.close()

    search(rows, 2)

    print('Finished!')



def get_json_v2(file_path):

    conn = sqlite3.connect('twidb_group3.db')

    cursor = conn.cursor()

    followers_dict = dict()

    with open(file_path, 'r') as file:

        next(file)

        reader = csv.reader(file)

        level0_dict = dict()

        for row in reader:
```

```
            level1_dict = dict()

            search_ID = row[1]

            A = """SELECT SCREEN_NAME FROM TWITTER WHERE USER =
                  '{NAME}'""".format(NAME=search_ID)

            cursor.execute(A)

            rows1 = cursor.fetchall()

            for row1 in rows1:

                level2 = []

                A = """SELECT SCREEN_NAME FROM TWITTER WHERE USER =
                        '{NAME}'""".format(NAME=row1[0])

                cursor.execute(A)

                rows2 = cursor.fetchall()

                for row2 in rows2:

                    level2.append(row2[0])

                level1_dict[row1[0]] = level2

            level0_dict[search_ID] = level1_dict

    file_name = 'twitter_mult_' +
datetime.datetime.now().strftime('%Y%m%d%H%M%S') + '.json'

    with open(file_name, 'w') as fp:

        json.dump(level0_dict, fp)
```

```
def create_db_v2():

    conn = sqlite3.connect('twidb_group3.db')

    print('Opened database successfully')

    conn.execute('''CREATE TABLE TWITTER

              (ID INTEGER  PRIMARY KEY AUTOINCREMENT,

              USER               TEXT,

              CREATED_AT         TEXT,

              FRIEND_ID          TEXT,

              SCREEN_NAME        TEXT,

              FOLLOWERS_COUNT    TEXT,

              FRIENDS_COUNT      TEXT,

              VERIFIED           TEXT,

              STATUSSES_COUNT    TEXT,

              LISTED_COUNT       TEXT,

              LEVEL INTEGER);''')

    conn.close()



if __name__ == '__main__':
```

```
    file_path = "Archive/Group3.csv"

    # create_db()

    create_db_v2()

    #run_csv_database_v2(file_path)

    run_csv_database_v2(file_path, num_layers=500)

    # get_json_v2(file_path)

    print('Done !')

#run_csv_database_v2(file_path, num_layers=500)
```

With resources from (Ladd et al., 2017b; *Pandas.DataFrame.Append — Pandas 1.2.1 Documentation*, n.d.; Sarath Sontam, 2019)

Appendix E

Python Code - Get Edges

This python code shows how to get the edges, or interconnections, between different users.

```
import json

import pandas as pd

import csv



jsonList = ["friends_group_1.json", "friends_group_2.json",
"friends_group_3.json"]

dfList = []

for file in jsonList:

    jsonFile = open(file)

    jsonString = jsonFile.read()

    jsonData = json.loads(jsonString)

    js = jsonData.replace('\"','"')

    friend_data = json.loads(js)

    df = pd.DataFrame(friend_data)

    dfList.append(df)
```

```
#nodes

user_dict  = {}

i = 1

for df in dfList:

    users = df.user.unique()

    for user in users:

        if user in user_dict.values():

            pass

        else:

            user_dict[i] = user

            i += 1

    friends = df.screen_name.tolist()



    for friend in friends:

        if friend in user_dict.values():

            pass

        else:

            user_dict[i] = friend
```

```
            i += 1

print(user_dict)

#node end



#edges

edges = []

#edge_data

for df in dfList:

    for index, row in df.iterrows():

        source = ''

        target = ''

        edge_data = {}

        for key, val in user_dict.items():

            if val == row['user']:

                edge_data['source'] =  key

            if val == row['screen_name']:

                #source =  key

                edge_data['target'] = key

            edge_data["weight"] = 1 if row['verified'] else 0
```

```
        edges.append(edge_data)

print(edges)



print("nodes to csv")

with open('nodes.csv', 'w', newline='') as csvfile:

    fieldnames = ['id', 'node']

    writer = csv.DictWriter(csvfile, fieldnames=fieldnames)

    writer.writeheader()

    for key in user_dict:

        writer.writerow({'id': key, 'node': user_dict[key]})

print("edges to csv")

fieldnames = edges[0].keys()

with open('edges.csv', 'w', newline='') as csvfile:

    writer = csv.DictWriter(csvfile, fieldnames=fieldnames)

    writer.writeheader()

    writer.writerows(edges)
```

With resources from (Ladd et al., 2017b; *Pandas.DataFrame.Append — Pandas 1.2.1 Documentation*, n.d.; Sarath Sontam, 2019)

Appendix F

Python Code - Generate CSV

This python code shows how to connect to the database and generate a CSV file for data analysis.

```
import sqlite3

import datafreeze

import dataset



con = sqlite3.connect('twidb_group2.db')

def sql_fetch(con):

    cursorObj = con.cursor()

    cursorObj.execute('SELECT name from sqlite_master where type= "table"')

    print(cursorObj.fetchall())

sql_fetch(con)



db = dataset.connect("twidb_group2.db")

result = db["TWITTER"].all()

datafreeze.freeze(result, format='csv', filename='Group2_results.csv')
```

```
print('ding')
```

With resources from (Miranda, 2017; Paruchuri, 2016; Tariq, 2019)

Appendix G

Sample JSON Output from Twitter

The following is a sample of the JSON output generated by tweets from the ChabadOnCampus account. Each tweet contains a username and the date when the tweet was created. Each individual tweet contains a unique identifier. There is also additional meta data given when expanding the list of followers (starting with the screen_name field, the first result with JensenReporter), the number of followers (followers_count) and other metrics. In the data sample, each block of text represents an additional user, or node, which can be plotted in relation to the starting node.


```
"[{\"user\":\"ChabadOnCampus\",\"created_at\":1300908955000,\"id\":271057019,
\"screen_name\":\"JensenReporter\",\"followers_count\":838,\"friends_count\":
844,\"verified\":false,\"statuses_count\":3706,\"listed_count\":51,\"friend\"
:\"True\"},

{\"user\":\"ChabadOnCampus\",\"created_at\":1373297244000,\"id\":1577941646,\
"screen_name\":\"JRetreat\",\"followers_count\":26,\"friends_count\":9,\"veri
fied\":false,\"statuses_count\":247,\"listed_count\":0,\"friend\":\"True\"},

{\"user\":\"ChabadOnCampus\",\"created_at\":1234847967000,\"id\":21066583,\"s
creen_name\":\"CadeMetz\",\"followers_count\":22420,\"friends_count\":898,\"v
erified\":false,\"statuses_count\":1202,\"listed_count\":996,\"friend\":\"Tru
e\"},

{\"user\":\"ChabadOnCampus\",\"created_at\":1441547070000,\"id\":3566729656,\
"screen_name\":\"OrenCNN\",\"followers_count\":2568,\"friends_count\":560,\"v
```

erified\":true,\"statuses_count\":464,\"listed_count\":66,\"friend\":\"True\"
},

{\"user\":\"ChabadOnCampus\",\"created_at\":1515936820000,\"id\":952534180570
726401,\"screen_name\":\"gutenbergtimes\",\"followers_count\":3846,\"friends_
count\":1405,\"verified\":false,\"statuses_count\":5721,\"listed_count\":79,\
"friend\":\"True\"},

Appendix H

Ethics Documentation

The following appendix shows my rresearch ethics exemption form for this study.

APPROVAL FOR CONDUCTING RESEARCH INVOLVING HUMAN SUBJECTS
Research Ethics Board – Laurentian University

This letter confirms that the research project identified below is exempt from the ethics review process by the Laurentian University Research Ethics Board (REB). Your ethics approval date, other milestone dates, and any special conditions for your project are indicated below.

Considering

- The public nature and ready availability of the data you plan to access;
- Participants from multiple diverse sites;
- The denominalized and aggregated collection of usage data from social network sites;
- The very low risks associated with the research;

the project has been declared by the Laurentian University Research Ethics Board Chair not to be subject to ethics review at this time. **Any modification of the protocols or purpose of the project will immediately require a new LUREB application.**

TYPE OF APPROVAL: **Exemption X** / Modifications to project / Time extension

Name of Principal Investigator and school/department	Sidney Shapiro, supervisor, Aurelie Lacassagne, Political Science
Title of Project	Influence and Social Networks
REB file number	01-09-2020
Date of original approval of project	September 15th, 2020
Date of approval of project modifications or extension *(if applicable)*	
Final/Interim report due on: *(You may request an extension)*	N/A
Conditions placed on project	Future modifications to your project may require full REB application

During the course of your research, no deviations from, or changes to, the protocol, recruitment or consent forms may be initiated without prior written approval from the REB. If you wish to modify your research project, please refer to the Research Ethics website to complete the appropriate REB form.

Congratulations and best wishes in conducting your project.

Rosanna Langer

Rosanna Langer, PHD, Chair, *Laurentian University Research Ethics Board*

Appendix I

TCPS2: Core Certificate

The following appendix shows my TCPS 2: CORE certificate.

PANEL ON RESEARCH ETHICS

Navigating the ethics of human research

TCPS 2: CORE

Certificate of Completion

This document certifies that

Sidney Shapiro

has completed the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans Course on Research Ethics (TCPS 2: CORE)

Date of Issue: **13 September, 2013**