Acadiensis

ACADIENSIS

Six Degrees to Phillip Buckner?
An Accessible Introduction to Network Analysis and its Possibilities for Atlantic Canadian History

Thomas Peace

Explore this journal

Cite this review

érudit

Six Degrees to Phillip Buckner? An Accessible Introduction to Network Analysis and its Possibilities for Atlantic Canadian History

OFTEN, WHEN READING OR DISCUSSING the beginning of this journal in the 1970s, reference is made to an "*Acadiensis* generation."[1] Used loosely, the term usually refers to the foundational group of scholars who brought this journal into being and renewed interest in Atlantic Canadian history.[2] Many readers of *Acadiensis* can likely draft a list of the generation's key members, but in most scholarly references the specific composition of the *Acadiensis* generation is left vague. Without the oral and experiential memories of the generation itself, how will this generation be remembered? Who are its more prominent members? And what are some of the internal dynamics that shaped its development?

One strategy for answering these questions is to use the tools and methods of network analysis. For many readers, the term "network analysis" will conjure up memories of the game "Six Degrees of Separation to Kevin Bacon." Usually played during long car rides or when passing time with friends, the goal of this game is to connect any Hollywood actor to Kevin Bacon in six connections or less. This example is a good entry point upon which to build an understanding of networks and their theoretical and methodological underpinnings. Rather than reflecting Bacon's extensive acting career, this game hinges on social psychologist Stanley Milgram's "small world phenomenon." Milgram postulated that most humans are connected through broad friendship networks linked together by an average of six relationships.[3] The game therefore can be played using nearly any example. For regular readers of *Acadiensis*, we could replace Kevin Bacon with Phillip Buckner, founding editor of this journal, linking him somewhat arbitrarily to someone such as the French *Annaliste*

---

1 For examples of the term's use beyond this essay, see P.D. Clarke, "L'Acadie Perdue; Or, Maritime History's Other," *Acadiensis* XXX, no. 1 (Autumn 2000): 73-91; Graeme Wynn, "Thinking About Mountains, Valleys and Solitudes: Historical Geography and the New Atlantic History," *Acadiensis* XXXI, no. 1 (Autumn 2001): 129-45; and Colin Howell and Peter Twohig, "A Region on Film: Metropolitanism, Place, and Meaning in NFB Films," in *Rain/Drizzle/Fog: Film and Television in Atlantic Canada*, ed. Darrell Varga (Calgary: University of Calgary Press, 2009), 6. This article develops from work conducted through a Harrison McCain Visiting Professorship I held at Acadia University during the 2013-2014 academic year. I am grateful to Ian Milligan, Christopher Minty, Émilie Pigeon, and the three anonymous reviewers for their thoughtful criticisms and feedback on earlier drafts of this article. Unless otherwise noted, all computing in this article has been carried out using Cytoscape 3.1.0.
2 Phillip Buckner, "Acadiensis II," *Acadiensis* I, no. 1 (Autumn, 1971): 3-9.
3 This game is based on Stanley Milgram's experiment, where he found that it took an average of six connections for letters to arrive in Boston from Nebraska using only personal connections between senders and recipients. The idea was that on average everyone in the world is connected by six degrees or less. For a general summary of this literature, see Nicholas A. Christakis and James H. Fowler, *Connected: The Surprising Power of Our Social Networks and How They Shape Our Lives* (New York: Little, Brown and Company, 2009), 26-30. For a more in-depth and academic study, see David Easley and Jon Kleinberg, *Networks, Crowds, and Markets: Reasoning about a Highly Connected World* (Cambridge: Cambridge University Press, 2010), chaps. 2 and 20.

Marc Bloch. Despite generational, continental, and even historiographical differences, these two men prove the rule: they can be connected through direct scholarly influence or co-authorship by way of five people, perhaps even fewer. Here is my stab at making the connection: from Bloch we can connect to the second generation of the *Annalistes*, particularly Robert Mandrou. One of Mandrou's most celebrated students in Canada was Louise Dechêne. Dechêne supervised William C. Wicken. Wicken published a chapter in *The "Conquest" of Acadia, 1710*, a book coordinated by John Reid – a scholar with whom Buckner has collaborated on numerous projects.[4]

But do these connections reveal anything deeper about our understanding of Atlantic Canadian history or the *Acadiensis* generation? Are the relationships between Buckner and Bloch indicative of an *Annaliste* influence in Buckner's work or even more broadly within the pages of *Acadiensis*? How do we go about discussing, analyzing, and understanding these networks of relationships in which we, and the people we study, are situated? How do we determine what relationships have meaning and what connections and interactions remain more or less unimportant? How do we understand these relationships as they change over time?

Social Network Analysis (SNA) is a tool that can address these questions. SNA developed over the course of the 20th century in order to assess the structure and meaning of relationships between and among groups and individuals. While it is often associated with complex computer-generated graphs, SNA predates the rise of the personal computer. It originated as early as the 1950s. In its early period, SNA involved a relatively complicated mixture of sociological theory and mathematics. It offered important insights into the overall significance of group relationships, allowing for their visual representation and rendering them comparable over time and with similar networks.[5] While many of its early practitioners are well known to historians, for the most part our discipline remains wary of using these tools to approach the past.[6] It is true that recent changes in technology, and historiography, have renewed interest in network analysis. Experts in this field, however, are critical of historians who use only the language of SNA or its digital tools without the deeper analysis and formal methods associated with this approach.[7]

This research note developed out of a workshop delivered during the 2014 Atlantic Canada Studies Conference at the University of New Brunswick. Although

---

4 John Reid et al., *The "Conquest" of Acadia, 1710: Imperial, Colonial, and Aboriginal Constructions* (Toronto: University of Toronto Press, 2004).

5 Stanley Wasserman and Katherine Faust, *Social Network Analysis: Methods and Applications* (New York: Cambridge University Press, 1994), 10. For a more recent introduction to social network analysis, see Robert A. Hanneman and Mark Riddle, *Introduction to Social Network Methods* (Riverside, CA: University of California, Riverside, 2005), http://faculty.ucr.edu/~hanneman/nettext/.

6 Contrast, for example, the prevalence of the technique in archaeology relative to history. See Tom Brughmans, "The Roots and Shoots of Archaeological Network Analysis: A Citation Analysis and Review of the Archaeological Use of Formal Network Analysis," *Archaeological Review from Cambridge* 29, no. 1 (April 2014): 18-41.

7 Shawn Graham, Ian Milligan, and Scott Weingart, *The Historian's Macroscope: Big Digital History*, http://www.themacroscope.org/. See also Shawn Graham, Ian Milligan, and Scott Weingart, *Exploring Big Historical Data: The Historian's Macroscope* (London: Imperial College Press, forthcoming).

the main focus is specifically on social network analysis, the more technical discussion can be applied broadly to other types of network analysis. Therefore, the acronym SNA is used to indicate where the discussion focuses specifically on social as opposed to other types of networks, while the term "network analysis" is used in discussions that could be applied more broadly. The general purpose of this research note is to provide a basic and accessible introduction to SNA (and network analysis more generally), the digital tools involved, and how these methodologies might be applied to help us better understand the history of Atlantic Canada. But the note's more specific goal is to encourage historians of Atlantic Canada to consider applying network analysis and tools in their own work by introducing readers to its basic terminology, methods, and software, as well as key historiographical themes and topics where network analysis may help us better understand Atlantic Canada's past.

In building this argument, I have chosen examples primarily for illustrative rather than historiographical, purposes. These examples represent short impressionistic studies conducted solely for the purpose of this article. They are intended to illustrate the basic principles underpinning this approach and, therefore, should not be mistaken for evidence from more robust and longer-term research projects. By using networks with which many of the readers of this journal are familiar, these examples aim to illustrate the promises of network analysis for the study of Atlantic Canada's past and point to a path for future network-based historical research.

Applying network analysis to the past
Much like the study of history, network analysis is relational. Putting it a different way, network analysis represents the flow of sentiment, material goods, or actions from one person to another. It focuses on the role of individual entities acting upon each other within collective settings. As such, individual units and the relationships between them are at the core of network analysis. To use the language of network science, datasets are built around two core components: **nodes** (individual entities) and **edges** (the relationships/flow between them). Figure 1 visualizes the network described in the introduction, connecting Marc Bloch with Phillip Buckner. In this "network," the historians form the graph's nodes (the circles) while the lines between them represent the edges. The Bloch/Buckner network then is comprised of six nodes and five edges.
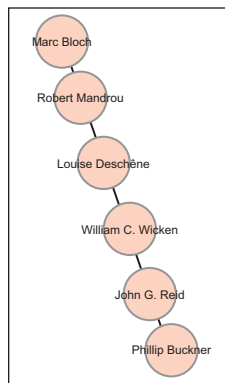

Figure 1: Five degrees to Phillip Buckner

Individual nodes and edges are not the focus of network analysis; neither is its purpose the design of complex-looking graphs. Rather, network analysts are interested in how nodes and edges work together. That is, network analysts are interested in what flows along edges between nodes. Although nodes and edges are the core units for the creation of network datasets, dyads and triads (the relationship between nodes) form this method's analytic heart. A dyad represents two nodes connected by an edge, while a triad reflects three nodes connected together. The network in Figure 1 is comprised solely of dyads. Figure 2, a triadic relationship, expands our simple Bloch/Buckner network by adding Graeme Wynn, another prominent historian of the *Acadiensis* generation who served as the cartographic editor on Buckner and Reid's *The Atlantic Region to Confederation*.[8]
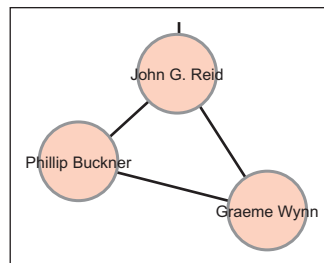

Figure 2: An *Acadiensis* triad from *The Atlantic Region to Confederation*

Network analysts, then, examine structural relationships by comparing and contrasting the interactions (edges) that flow between individual entities (nodes). Network analysis thus focuses on the quality of relationships between clusters of nodes and edges.

Nodes and edges each have unique qualities that facilitate analysis. These are called **attributes**. Value could be assigned to node attributes based on gender, ethnicity, class, or religion. Edge attributes, in contrast, might reflect the nature or type of relationship (i.e. kinship or economic transactions) that flows between nodes; they may also be weighted or directed, based on their importance, direction of flow, and overall quality. For example, in the Bloch/Buckner network, we might treat the doctoral candidate/supervisor relationship between William C. Wicken and Louise Dechêne as directed and more heavily weighted than the collegial relationship between John Reid and Phillip Buckner. It seems highly likely that Dechêne had a significant and lasting impact on Wicken (regardless of whether it was positive or negative), whereas Reid and Buckner's relationship is more collaborative and mutually constituted.[9] If we weighted the graph in this way, the edge between Buckner and Reid would look similar to Figure 1 while the edge between Dechêne and Wicken might appear thicker with an arrow pointing from supervisor to student.

In Figure 3, I have represented these attributes (which are admittedly somewhat subjective) in graph form. The node colour in this example is used to denote gender

---

8 Phillip Buckner and John G. Reid, eds., *The Atlantic Region to Confederation: A History* (Toronto: University of Toronto Press, 1995).

9 For more on the importance of weighting relationships, see Mark Granovetter's important article "The Strength of Weak Ties," *American Journal of Sociology* 78, no. 6 (May 1973): 1360-80.

(pink for male/green for female), the colour of edge represents the type of interaction (blue for colleague/orange for supervisor), and the thickness and direction of the edge represent each relationship's weight; the colour versions of the figures in this research note can be viewed on the *Acadiensis* website (www.acadiensis.ca). Node and edge attributes, then, help us assign analytical value to the networks that we intend to understand and study.
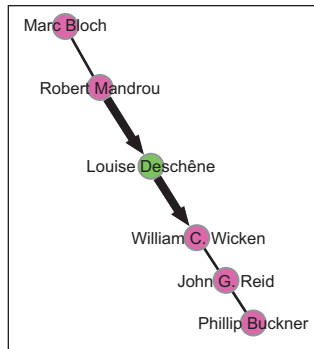

Figure 3: A weighted and directed graph representing the five degrees to Phillip Buckner

There is considerable overlap in how one branch of network analysis – social network analysis – and historians approach their subjects. In the foundational text *Social Network Analysis: Methods and Applications,* Stanley Wasserman and Katherine Faust outline four relational concepts that inform SNA and can be reframed using the historian's language.[10] First, Wasserman and Faust argue that actors and their actions are interdependent. This mirrors historians' interest in cause and consequence. Such interdependence is a key element for historians interested in understanding the nature of change over time. Similarly, Wasserman and Faust argue that SNA examines relational ties between actors and how resources flow between them. This could be reframed to focus on identifying issues of continuity and change. In both cases, the focus is on dynamic processes. Analyzing change over time, then, is a central component in the work of both the historian and social network analyst. Wasserman and Faust's last two points relate to that thorniest of historiographical issues: the relationship between structure and agency. They point out that social networks provide individuals with opportunities and constraints on their behaviour. Over long periods, or large populations, patterns within social networks help analysts conceptualize models of social, economic, and political structures. Though history tends towards empiricism – being anchored in archival sources – the relationship between historical research and social, economic, and political theory is longstanding and well established. In sum, despite differences, historians and social network analysts share much common ground.[11]

---

10 I have intentionally borrowed the language used by the Historical Thinking Project. For a summary of the project see http://historicalthinking.ca.
11 Wasserman and Faust, *Social Network Analysis*, 4.

Initially drawing on methods from sociology, anthropology, mathematics, and statistics, social network analysts argue for the use of formal methods and theories in their studies. As Wasserman and Faust summarize, "such phrases as webs of relationships, closely knit networks of relations, social role, social position, group, clique, popularity, isolation, prestige, prominence, and so on are given [precise] mathematical definitions by social network analysis."[12] For social network analysts, then, formal methods and terminology are linked together through mathematical concepts, algorithms, and theories in order to help us better understand and compare networks.[13]

In addition to the technical terms used to define the structure of network graphs, there is also a series of analytical methods and terminology, anchored in mathematics, that helps to interpret social networks.[14] To explain these concepts and methods I have created a new network using all of the secondary source citations in the third edition of the *Acadiensis Reader* (Figure 4), a two-volume collection of articles from this journal edited in 1998-99 by Phillip Buckner, Gail Campbell, and David Frank for the purposes of teaching Atlantic Canadian history in the undergraduate classroom.[15] I have chosen to use the *Acadiensis Reader* because it is an accessible non-digital collection of documents that were representative of the field of Atlantic Canadian history in the 1990s and, as an edited collection, it formed an important corpus of readings in the teaching of Atlantic Canadian history for more than a decade.

The readers are being used here as a proxy for community-based records in order to illustrate how network analysis – and SNA specifically – works, rather than as a rigorous study of Atlantic Canadian historiography itself. The conclusions about the state of Atlantic Canadian history in this essay, therefore, should be seen as tentative rather than conclusive. My approach is also known as author-author citation analysis (another type of network analysis used to understand academic relationships). Rather than focusing specifically on citation analysis, which, though sharing similarities with SNA, uses different methodologies to identify scholarly influence, I have used the *Acadiensis Reader* as a tool through which to assess the nature of community among the scholars who developed *Acadiensis*.[16] Thus, the *Acadiensis Reader* is used for illustrative purposes to answer questions that are fundamentally social in nature. From this perspective, I situate this collection of essays as a scholarly forum where each author cited in a chapter represents a conversation between the cited author and the person using his or her research. Emblematic of this

---

12 Wasserman and Faust, *Social Network Analysis*, 10-17.

13 For two key articles that serve as good examples of this interplay of math and sociological theory, see Granovetter, "Strength of Weak Ties," 1360-80; John F. Padgett and Christopher K. Ansell, "Robust Action and the Rise of the Medici, 1400-1434," *American Journal of Sociology* 98, no. 6 (May 1993): 1259-319.

14 Unless otherwise noted, this synthesis follows that used in Graham, Milligan, and Weingart, "Basic Concepts & Network Varieties," *Historian's Macroscope*, http://www.themacroscope.org/?page_id=337.

15 See Phillip Buckner, Gail Campbell, and David Frank, eds., *Atlantic Canada before Confederation*, 3rd ed., vols. 1 and 2 (Fredericton: Acadiensis Press, 1998 and 1999). Citations and authors were manually encoded using MS Excel and then imported into Cytoscape.

16 For a more in-depth discussion, see footnote 19.

relationship, along each edge in the network flows the knowledge generated by the cited scholar. If this were part of a more extended study of all the citations in the journal *Acadiensis*, rather than a mere example used to illustrate some basic principles of SNA and network analysis, the tools and techniques for citation analysis would be more appropriate than those used for SNA. With these tools, for example, we could look at publications and authors who are frequently cited together, providing more detailed analysis of the nature and state of Atlantic Canadian history.[17]

The graph below connects authors to the scholars whose work they have cited. In the *Acadiensis Reader* there are 34 essays that draw on the work of 684 scholars (nodes) and there are 818 relationships between them (edges). If each essay in this collection drew on a completely separate set of literature, our graph would comprise 34 unconnected and dyadic networks. It would tell us that there is little in common within the temporally and geographically diverse scholarship on Atlantic Canada, suggesting that there are few scholars whose work has shaped regional scholarship and – more to the point – that from the perspective of research and publication, the *Acadiensis* generation is a historiographical myth.

This is not what we find. The graph below demonstrates that the citations in the *Acadiensis Reader* create a single network. Each essay is connected to at least one other in the collection through the citation of a common scholar. Scholars whose work is cited by more than one author link the network together, while those that are unique to each essay form the graph's outer rim (the small nodes). Careful examination of the scholars at the centre of this web – whose work is most frequently cited – reveals a veritable "who's who" of Atlantic Canadian historiography. For example, key players and mentors of the *Acadiensis* generation – whose work did not appear in the third edition of the readers – include A.G. Bailey, Alan Brookes, J.B. Brebner, A.H. Clark, Lewis Fischer, W.S. MacNutt, S.A. Saunders, L.F.S. Upton, and Graeme Wynn. This list will be unsurprising to most readers. We need to remember, however, that in reading this collection (or using it for research), and even as regular readers of *Acadiensis*, we connect ourselves to this network. Imagine the importance of this technique if applied to a document or field with which we were unfamiliar. Here, from a collection of nearly seven hundred people, we have determined a relatively short list of key figures in Atlantic Canadian historiography, none of whom actually contributed a chapter to the reader. Their importance is only revealed when the essays are brought together in this fashion. It becomes a digital historiography that can be even further enhanced through more specific types of network analysis, such as a rigorous study of citations.

---

17 I have begun to look at this wider type of analysis and have used a few examples from this journal's broader corpus (1983-2014) to make some comparisons later in this text. For more on how citation analysis can facilitate this type of historiographical study and for instructions on how to analyze the *Acadiensis* corpus as a whole, see Scott Weingard, "Networks Demystified 4: Co-Citation Analysis," http://www.scottbot.net/HIAL/?p=38272, and "Networks Demystified 7: Doing Co-Citation Analysis," http://www.scottbot.net/HIAL/?p=39432. Weingard recommends using the Sci[2] Tool, which he helped develop, for this type of analysis. For an example of what this might look like for history, see Brughmans, "Roots and Shoots of Archaeological Network Analysis," and Jonathan Goodwin, "Co-Citation Network Graph of Social History Journals," http://jgoodwin.net/social-history/cites-slider.html.
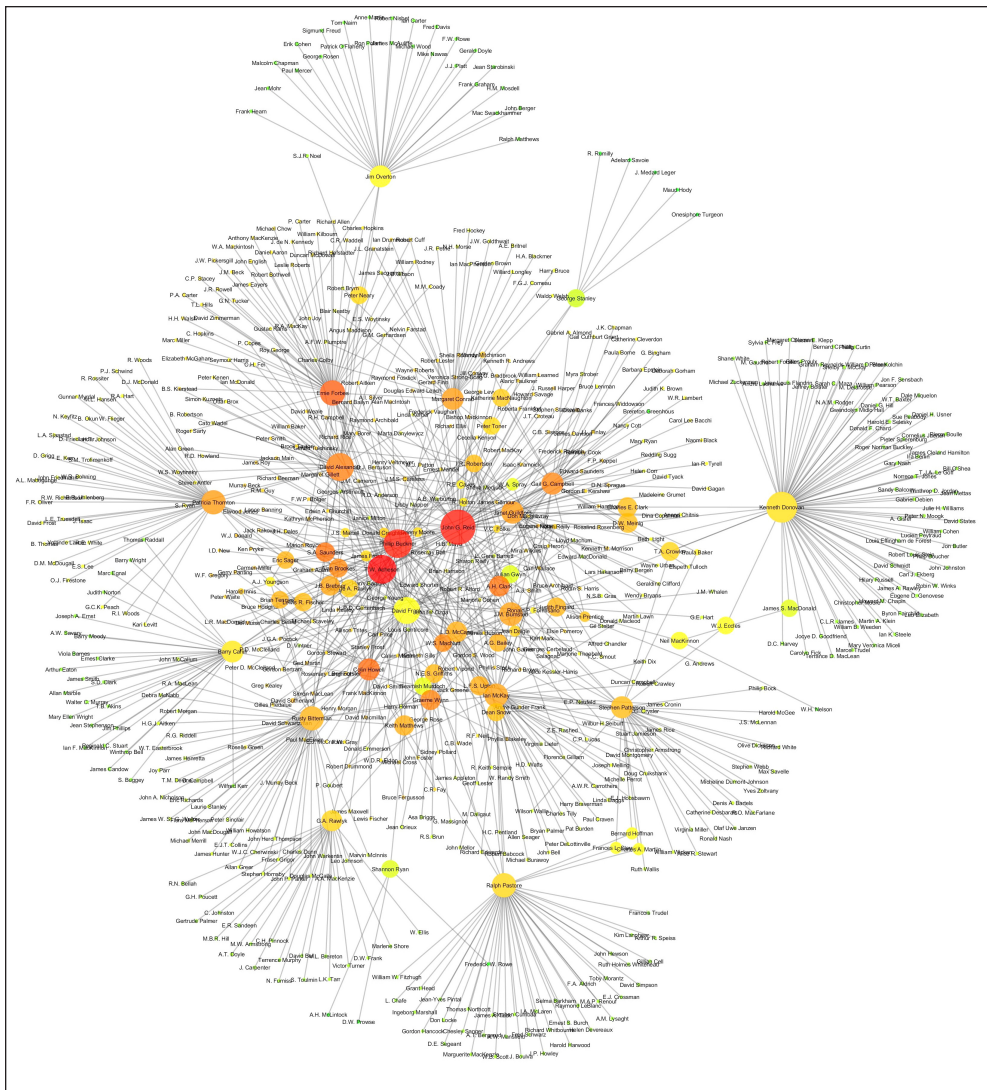
Figure 4: Scholars whose work is used in the *Acadiensis Reader*

As an image, the graph provides basic insight into the general dynamics of relationships and some of the collection's more prominent personalities. The software has laid out a general historiographical network, from which we can develop a more precise analysis. To move beyond this visual representation we need to rely on more sophisticated levels of analysis based on mathematical equations and algorithms. These techniques situate the nodes within the network, creating comparative values to evaluate the network as a whole. The two most important concepts for SNA beginners are the values determined by **path** and **centrality**.

Path length is the simplest of these concepts. A path is comprised of a series of edges connecting any two nodes in a network. Depending on the size of graph and

number of connections, there can be any number of paths between nodes. The graph above has 467,172 paths. Paths between nodes are compared based on their length (number of edges). Knowing all of the path lengths helps determine the shortest and average path length between nodes. Both the total number of paths and the average path length are generated by the software from calculations based on the shortest path length. Path length can tell us much about both the network as a whole and the specific relationships within it. In this graph, the average path length is just over four edges. The benefits of examining path length are best expressed by looking at the shortest path. Table 1 reveals the shortest paths between Phillip Buckner and William Wicken, Graeme Wynn, Margaret Conrad, and Judith Fingard.[18] Though I selected these scholars arbitrarily, here we can see that many of the "household names" of Atlantic Canadian history remain in relatively close proximity to each other. Wicken connects to Buckner through Stephen Patterson and A.G. Bailey; Wynn through T.W. Acheson; Conrad through Gail Campbell; and Fingard through David Frank. Three of the four scholars (Conrad, Fingard, and Wynn) are closer to Buckner than the average shortest path between Buckner and all other nodes in the network. Now if we take people less well associated with the region's history cited in some of the essays, such as Karl Marx and Viola Barnes, the distance grows. The shortest path between Marx and Barnes is five connections. They are further apart in the network than most other nodes. Path, therefore, helps us understand how particular individuals relate to each other and the network as a whole.

Table 1: The shortest paths to Phillip Buckner

Historian	Shortest Path	Avg. Shortest Path
William Wicken	3	4.34
Graeme Wynn	2	3.01
Margaret Conrad	2	3.13
Judith Fingard	2	3.30

Where analysis of path length is based on edges, the concept of centrality focuses on nodes. Centrality (called "prestige" in directed networks) determines the prominence of nodes within the network. Its main indicator is **degree**. This calculation is determined from the number of edges connected to a node. In the *Acadiensis Reader* example, the degree is determined both by the number of scholars an individual author cites and references to them made in other people's chapters. Phillip Buckner's degree ranks third in the network with a score of 56; Kenneth Donovan and John Reid rank first and second respectively, with

---

18 I have determined the shortest paths using an earlier version of Cytoscape, with which I could use the plug-in "ShortestPath" created by Marcio Rosa da Silva at the German Research Center for Biotechnology and the Universidade do Vale do Rio dos Sinos; see http://apps.cytoscape.org/apps/shortestpath. This plug-in does not work with Cytoscape 3.1.0, pointing to an important limitation in using open source software. Average shortest path from Phillip Buckner to any other node in the network is 2.62.

connections to 82 and 71 nodes respectively. When a network is analyzed by degree, having the highest number of neighbours identifies the most prominent node.

Volume of interaction, however, may not accurately represent a node's importance within a network. Network analysts have developed other ways of looking at centrality that focus more on a node's **relationship** to all other nodes in the network. The two most common sub-analyses of centrality are **closeness** and **betweenness**. **Closeness centrality** measures the proximity of a node to all other nodes in the network. As a measurement, it essentially represents the average shortest path in nodal form. Looking at Table 1, for example, the node for Graeme Wynn would have a higher closeness centrality than that of William Wicken because the average path length (column 3) between Wynn and all other nodes is less than it is for Wicken. **Betweenness centrality** is slightly different. Although it is also based on the average shortest path between nodes, betweenness centrality represents the likelihood that a node would be passed through on a path between any other two nodes. Betweenness centrality, therefore, points to the key people who link the network together and serve as key conduits through which the substance of the network's relationships might flow. In Figure 4, betweenness centrality is represented by the node size, with larger nodes being more important to the network.

Degree, closeness centrality, and betweenness centrality each measure different relationships to the network. Having the most connections or serving as a prominent bridge between nodes in the network does not necessarily mean that a particular node is the closest to all of the others. In the *Acadiensis Reader*, the nodes with the highest degree, closeness, and betweenness centrality differ. Kenneth Donovan, who cited the most scholars, has the highest degree, while T.W. Acheson was the most cited (he did not contribute an essay) and therefore closest to all nodes; John Reid, who wrote three chapters, connects most of the nodes together. Table 2 demonstrates the different ranking based on the variations in analysis.

Table 2: Degree, Closeness Centrality, and Betweenness Centrality

Degree	Closeness Centrality	Betweenness Centrality
Kenneth Donovan (82)	T.W. Acheson (0.391)	John Reid (0.279)
John Reid (71)	John Reid (0.384)	Kenneth Donovan (0.214)
Phillip Buckner (56)	Phillip Buckner (0.382)	T.W. Acheson (0.180)
David Frank (52)	David Frank (0.364)	Phillip Buckner (0.177)
Ernie Forbes (47)	Ernie Forbes (0.354)	David Alexander (0.167)
Rusty Bittermann (45)	Colin Howell (0.346)	David Frank (0.150)
Ralph Pastore (45)	S.A. Saunders (0.341)	Ernie Forbes (0.125)
Ian McKay (44)	A.H. Clark (0.341)	Ralph Pastore (0.112)
Patricia Thornton (42)	David Alexander (0.336)	Patricia Thornton (0.111)
David Alexander (41)	Gail Campbell (0.332)	Rusty Bittermann (0.109)

All three scholars remain prominent in the list, but Donovan does not rank high on closeness centrality, while Acheson does not "make the cut" for degree. What this suggests is that although Donovan cited the greatest number of scholars, he is not as well connected as Acheson and Reid. In contrast, as the scholar closest to all others, Acheson was the scholar most consistently cited even though he had significantly fewer connections than Donovan. And while Reid served as the most central point of connection between all of the scholars cited, bringing together disparate network components, he is followed by Donovan and Acheson because Donovan is the only point of connection for a large number of scholars and Acheson is cited in so many of the essays. Each indicator represents a different type of prominence.

Studying the top ten scholars in each of these three indexes demonstrates that five people appear on every list – David Alexander, Phillip Buckner, E.R. Forbes, David Frank, and John Reid – and thus appear to be the key figures within this network.[19] Indeed, if we align all of our lists (including those in footnote 19) and assume that being on two or more lists is an indicator of significance, then the most prominent historians of the *Acadiensis* generation appear to be, in alphabetical order, T.W. Acheson, David Alexander, Rusty Bittermann, Phillip Buckner, Margaret Conrad, Kenneth Donovan, Judith Fingard, Ernie Forbes, David Frank, Ian McKay, Ralph Pastore, John Reid, and Patricia Thornton.

Attentive readers will notice a clear gender bias in this analysis. The reasons for this reflect some of the drawbacks to SNA. Network analysis can never represent

---

19 It should be noted here that as editors Buckner, Campbell, and Frank would all top the list if their editorship was recognized within the graph. I have chosen not to represent this relationship because it is obvious and would obscure all other relationships. My decision, however, reflects the constructed nature of SNA. SNA never represents networks "as they really were," but rather they are always shaped by the decisions of the analyst.

As a more accurate measure of their contribution to Atlantic Canadian historiography, I have used Thompson Reuters' *Web of Science* and the Sci² Tool for citation analysis to look at specific contributions to *Acadiensis* between Fall 1983 and Spring 2014 (total = 427). In terms of the most contributed articles, the list of scholars is topped by Nicolas Landry (8), Ian McKay (7), Greg Marquis (6), Barry Cahill (5), Margaret Conrad (5), Judith Fingard (5), James Hiller (5), and John Reid (5). In order of most frequent citations, the list is topped by E.R. Forbes (121), Ian McKay (100), David Frank (82), Margaret Conrad (79), T.W. Acheson (73), John Reid (56), Graeme Wynn (56), Judith Fingard (50), Larry McCann (45), David Alexander (43), and Phillip Buckner (41).

The method for calculating the number of citations is somewhat problematic and needs to be explained in greater detail. Due to the sheer number of publications cited in this journal (16,835) and the frequency with which the software failed to group single citations together (requiring manual interventions), I pruned the list by taking the top number of scholars whose publications were cited twice or more and then added in only their individual citations to arrive at the totals. This is problematic for scholars whose multiple publications appear in the database as only cited once. Judith Fingard, for example, has 44 separate publication citations in the database but only six are cited more than once (she has 50 citations in total). In the initial list of the 25 top citations, Fingard ranked 23 and was almost not included in the first cut. She is, however, ranked eighth once the individual citations are included in the analysis. This suggests that some scholars might be underrepresented. Despite this methodological problem, whereby some single references might slip through the cracks, this analysis is still useful as a point of contrast with my more specific analysis of the *Acadiensis Readers*. By overlapping frequency and volume of citation in compiling this list, this approach gives us a sense of the key scholars cited in this journal's pages between 1983 and 2014. A more rigorous study is necessary, however, to fully confirm these conclusions.

networks exactly as they existed in the past. Like other forms of historical analysis, they are shaped by available sources and researcher decisions. By looking at citations written before 1998, this network favours historians whose publications pre-date the 1990s. The field as a whole was more male-dominated than it is today. Nonetheless, we can double-check to make sure this bias accurately reflects the source material and not an error in the software's analysis. If we take the top 34 people in each index, representing the number of essays, we can relate the gender bias of this network to the work as a whole. Of the 34 essays in the collection, women wrote seven; seven women are in the top 34 citations by degree; six women by closeness centrality; and six women by betweenness centrality. Given the similarity between how women ranked in the social network analysis and how they rank as contributors, this graph seems to be a fairly accurate depiction of gender relationships in the *Acadiensis Reader*.

It may not, however, adequately reflect the role of women in Atlantic Canadian historiography. A graph is only as strong as the data selected for analysis. Some important historians in the field, such as Rosemary Ommer, were not authors in the reader and are therefore completely left out of the analysis.[20] Similarly, as an editor of the volume, Gail Campbell is more influential than she appears. Along with the other two editors, Buckner and Frank, Campbell is connected to every node in the network by three degrees or less. In many ways, Figure 4 represents these scholars' own intellectual network in their role as editors. Relatedly, the volume of author citation, the index underpinning this network, does not adequately convey the relationships between and among scholars. None of the connections in this network have attributes, such as importance, direction of flow, and overall quality, associated with them, and we therefore know little about the actual nature of those relationships. The network above, based solely on the readers, for instance, does not adequately account for personal or collegial interactions that may have deep and lasting intellectual influence. Nor does it reflect whether a particular scholar's work has been influential or heavily critiqued. Finally, my preliminary analysis assumes that the number of unique citations reflects influence. Though I suspect few academics will disagree with this decision, I could have just as easily picked a more controvertible proxy, such as people mentioned in acknowledgements, scholars attending the same conferences, or graduate school cohorts and departmental composition.

What this means is that the *Acadiensis Reader* network provides some insight into scholarly influences, but without further analysis and critique many questions remain. In a more complete and robust study of social networks there needs to be follow-up with more qualitative analysis and the creation of comparative networks using different source material. Similarly, citation analysis would further our understanding of both the scholarly community that developed around *Acadiensis* as well as the broader historiographical and intellectual structures that underpin Atlantic Canadian studies. Would similar results be produced, it may be asked, by using the journal *Acadiensis*, or Atlantic Canada Studies conference proceedings, as

---

20 In the broader analysis of *Acadiensis* discussed in footnote 19, for example, Ommer ranks 12th in terms of overall citations (40), just one shy of Buckner, and she is tied with another female historian, N.E.S. Griffiths.

the source? The type of example outlined above, on its own, provides a highly constructed window into the past, helping reveal patterns that might otherwise be difficult to see. It does not, however, represent the past without its own sets of biases and assumptions.

Applying network analysis to history

This overview of some of this method's core components and how they can be applied to our research demonstrates considerable overlap with the types of questions and analysis that interest historians. Where network science and history tend to part ways – at least on a general level – is in network analysis's emphasis on formal methods, modeling, and theoretical development. Although formal methods remain important to the historical discipline – and central for some sub-disciplines – the nature of the archive and empirical data remain at the forefront of the historian's craft. Network science, however, hinges on formal methods, theoretical concepts about social relationships, and community-based models – approaches that resonate with historical studies but with which only specific historical sub-disciplines have engaged directly. Put most simply, and recognizing that there are many exceptions, the work of historians, as a discipline, tends to be more empirically and evidence-driven while that of network analysis, as a method rather than discipline, remains more theoretically focused.

As a consequence, historians have been accused of appropriating and misusing both network analysis's language and technique. According to Barry Wellman and Charles Wetherell, who urge historians to embrace social network analysis, the discipline has used social networking concepts and terms metaphorically instead of working with their more precise and technical definitions.[21] Concepts such as "social group" and "social role" have formal definitions that are often taken for granted by historians.[22] Wasserman and Faust elaborate on this point. Until the maturation of SNA, these terms could only serve as "sensitizing concepts." Though network analysts now use a more precise language, historians continue to use such terms in a less robust manner.[23]

Claire Lemercier, a French expert on SNA, suggests that these trends continue to the present. Echoing earlier calls for historians to use SNA terms and concepts more carefully, Lemercier encourages historians to be aware of their more specific academic meaning. There is intellectual merit to embracing these conceptual definitions, and she suggests we ignore them at our peril:

---

21 Barry Wellman and Charles Wetherell, "Social Network Analysis of Historical Communities: Some Questions from the Present for the Past," *The History of the Family* 1, no. 1 (January 1996): 97-121.

22 In an essay on SNA and mathematics Linton C. Freeman points to a deep literature refining these concepts that begins as early as 1949 in the case of "social group" and 1969 for "social role." Freeman suggests that the formal methods applied to SNA from mathematics and the social sciences have been critical in refining these definitions. SNA has been pivotal, he writes, in "turning intuitive 'folk' concepts into explicit research tools." See Linton C. Freeman, "Turning a Profit from Mathematics: The Case of Social Networks," *Journal of Mathematical Sociology* 10 (1984): 349-51.

23 Wasserman and Faust, *Social Network Analysis*, 11.

> Popular interest in social networking has recently led researchers in various sciences and social sciences to join "network studies" with no knowledge of – or interest in – the sociological and anthropological theories, methods and software developed on this topic during the last 35 years. They thus often reinvent old indicators; more worryingly, they tend to build an artificial "complexity" by mixing heterogeneous ties on long periods, thus adding to the mathematical interest of the study but obscuring its historical meaning.[24]

Historians interested in SNA need to familiarize themselves with the scholarship on this type of analysis. The common ground upon which we tread makes it all too easy to borrow haphazardly from network science.

Despite these critiques, all of the articles in which they were leveled nevertheless argue for historians to add SNA to their historiographical toolbox. Scholars trained in social history will no doubt know that movements towards integrating SNA date back to studies of community and family structure during the 1960s and 1970s.[25] Yet the complexity of these early studies and the relatively inaccessible nature of the technology they used made SNA more of a niche research field than anything more widespread. In their 1996 call for historians to apply SNA methods, Wellman and Wetherell suggest that SNA offers distinct advantages for social historians. They argue that SNA applies a well-developed set of quantitative and qualitative techniques for "discovering and describing the presence, composition, structure and contents of interpersonal networks" that transcend assumptions that people interact in tightly-knit local communities, and connects everyday life with social change on a large scale.[26] Lemercier was more explicit. "The point of formal network analysis," she writes, is "not to get to the conclusion that networks exist or are important, but, rather, taking their existence as a hypothesis, to describe their precise patterns, to understand how they were created and/or what their consequences are."[27] Bringing these two perspectives together, SNA is not about the networks themselves but rather about the precise analysis of relationships and structures within networks and how they may have changed over time. Analysis of the *Acadiensis Reader,* for example, did not set out merely to reveal an "*Acadiensis* generation" but also identified some of its broader dynamics and internal relationships, depicting the structures and intellectual underpinnings of the field as a whole during the 1990s.

While it seems to have taken nearly two decades, technological changes anchored in the development of the Internet and personal computing have made SNA much easier than it was in the past. Today a significant number of historians and

---

24 Claire Lemercier, "Formal Network Methods in History: Why and How?" *HAL: Sciences de l'Homme et de la Société,* version 2 (décembre 2011), http://halshs.archives-ouvertes.fr/halshs-00521527.

25 For example, see Stephan Thernstrom, *Poverty and Progress: Social Mobility in a Nineteenth-Century City*, (Cambridge, MA: Harvard University Press, 1964), and Michael Katz, *The People of Hamilton, Canada West: Family and Class in a Mid-Nineteenth Century City* (Cambridge, MA: Harvard University Press, 1975).

26 Wellman and Wetherell, "Social Network Analysis of Historical Communities," 98.

27 Lemercier, "Formal Network Methods in History."

archaeologists use this technique in their work, and the precision with which the tools and methods have been used has brought about some substantial historiographical reorientations. Robert Morrissey, a leader in applying SNA to the study of early modern North America, has recently changed our understanding of Indigenous-French relationships in Kaskaskia (Illinois Country). Using the SNA program UCINET, Morrissey reconstructed social networks based on godparenthood in the Kaskaskia parish registers.[28] He used these networks to add nuance to the extensive literature on Indigenous-French relationships by arguing that, in the French villages of the upper Mississippi, Indigenous women became an active part of French society rather than French men integrating through these women into Indigenous societies.[29]

Similarly, Émilie Pigeon, a doctoral candidate at York University, uses the open source SNA software Visone to build social networks of Métis buffalo-hunting brigades. As part of her work, Pigeon built the graphs that helped Brenda Macdougall and Nicole St-Onge conclude that kin groups were linked together by prominent women in buffalo-hunting brigades.[30] In her own research, Pigeon suggests – though her conclusions remain tentative – that SNA will yield new insights into our understanding of Métis community life during the 1885 Northwest Resistance.[31] The connection of both works to fur trade history should be no surprise. Research in this area lends itself well to such analysis. Anchored as they are in studying the fur trade relationships between Indigenous women and Euro-American men, the source material and relationships examined by scholars such as Jennifer Brown, Sylvia Van Kirk, and Susan Sleeper-Smith provide good fodder for SNA.[32] SNA need not, however, be limited to the fur trade and early modern relationships. Social scientists have used this approach to understand topics as diverse as trade networks and the Mesoamerican economy, the rise of the Medici family in 15th-century Florence, leadership in Islamic terrorist organizations, social

28 UCINET was developed in the early 1980s when Linton Freeman (see footnote 22 above) brought together the disparate programs being used by social network analysts. By the late 1980s these programs were brought together in a single program, which is currently in its sixth iteration. See "UCINET Software," https://sites.google.com/site/ucinetsoftware/. The formal citation for UCINET is S.P. Borgatti, M.G. Everett, and L.C. Freeman, *Ucinet for Windows: Software for Social Network Analysis* (Harvard, MA: Analytic Technologies, 2002).

29 Robert Michael Morrissey, "Kaskaskia Social Network: Kinship and Assimilation in the French-Illinois Borderlands, 1695-1735," *William and Mary Quarterly* 3rd ser., vol. 70, no. 1 (January 2013): 103-46.

30 Brenda Macdougall and Nicole St-Onge, "Rooted in Mobility: Metis Buffalo-Hunting Brigades," *Manitoba History* 71 (Winter 2013): 16-27. Visone is open source software developed in 1996 through a partnership of the Departments of Computer & Information Science and Politics & Management at the University of Konstanz. See http://visone.info/html/about.html.

31 Émilie Pigeon, "Visualizing the Buffalo Hunt: Social Networks, Metis Hunters and New Approaches in History," unpublished paper provided to the author.

32 See Jennifer Brown, *Strangers in Blood: Fur Trade Company Families in Indian Country* (Vancouver: UBC Press, 1980); Sylvia Van Kirk, *Many Tender Ties: Women in Fur-Trade Society, 1670-1870* (University of Oklahoma Press, 1983); Susan Sleeper-Smith, *Indian Women and French Men: Rethinking Cultural Encounter in the Western Great Lakes* (Amherst, MA: University of Massachusetts Press, 2001). Morrissey and Pigeon, in the papers cited above, respond directly to Sleeper-Smith's work.

relationships and voting patterns, organizational affiliation of women reform leaders, and the structure of the US Congress.[33]

Atlantic Canada's archival record is bursting with evidence and data sets that lend themselves to this type of approach. Through network analysis, source materials such as notarial records, parish registers, ship manifests, and diaries all promise to yield new insights into the region's past. In addition to developing themes comparable to those of Morrissey and Pigeon, which will help us better understand ideas about gender, class, religion and ethnicity in Atlantic Canada, there are also well-trodden areas of Atlantic Canadian historiography where this approach will likely prove useful. Many scholars, for example, have sought to use the pre-deportation Acadian parish registers to better understand Acadian daily life. Most recently, Gregory Kennedy used these documents to build his argument that the Acadian world was not all that different from the one left behind in France.[34] Kennedy's work builds on a long tradition of scholars who have used these sources. The work of Stephen White, Naomi Griffiths, Jacques Vanderlinden, Bona Arsenault, and Gisa Hynes demonstrates their richness and the historiographical command we have over this type of evidence. The work of these authors has taught us much about the specific relationships between and among Acadians during the 17th and 18th centuries. For the most part, though, the existing studies have been limited to genealogical methods or restricted by community or time period.[35]

Using SNA to understand more fully the Acadian parish and census records promises to answer new questions, moving away from the often-qualitative evidence of earlier work. In my own research on Acadian-Mi'kmaw relationships at Port Royal and Beaubassin, SNA has revealed specific patterns of relationships between specific groups of Acadians and Mi'kmaq, suggesting modifications to the more generalized historiography on this subject.[36] This approach also has the potential to help us better

33 Mark Golitko and Gary M. Feinman, "Procurement and Distribution of Pre-Hispanic Mesoamerican Obsidian 900 BC-AD 1520: A Social Network Analysis," *Journal of Archaeological Method and Theory* 22 no. 1 (March 2015): 206-47; John F. Padgett and Christopher K. Ansell, "Robust Action and the Rise of the Medici, 1400-1434," *American Journal of Sociology* 98, no. 6 (May 1993): 1259-319; Richard M. Medina, "Social Network Analysis: A Case Study of the Islamist Terrorist Network," *Security Journal* 27 (2014), 97-121; Nils Ringe, Jennifer Victor, and Justin Gross, "Keeping Your Friends Close and Your Enemies Closer?" *British Journal of Political Science* 43 no. 3 (July 2013): 601-28; Naomi Rosenthal et al., "Social Movements and Network Analysis: A Case Study of Nineteenth-Century Women's Reform in New York State," *American Journal of Sociology* 90, no. 5 (March 1985): 1022-54; Wendy Tam Cho and James Fowler, "Legislative Success in a Small World," *Journal of Politics* 72 no. 1 (January 2010): 124-35.

34 Gregory M.W. Kennedy, *Something of a Peasant Paradise? Comparing Rural Societies in Acadie and the Loudunais, 1604-1755* (Montreal and Kingston: McGill-Queen's University Press, 2014).

35 See Stephen White, *Dictionnaire généalogique des familles acadiennes* (Moncton : Centre d'études acadiennes, 1999); N.E.S. Griffiths, *From Migrant to Acadian* (Montreal and Kingston: McGill-Queen's University Press, 2005); Jacques Vanderlinden, *Se marier en Acadie française: XVIIe et XVIIIe siècles* (Moncton: Éditions d'Acadie, 1998); Bona Arsenault, *Histoire et généalogie des Acadiens*, vols. 1-6 (Montréal : Leméac, 1978); and Gisa Hynes, "Some Aspects of the Demography of Port Royal, 1650-1755," *Acadiensis* III, no. 1 (Autumn 1973): 3-17.

36 This research is ongoing. Earlier versions of it were delivered at the annual meeting of the Canadian Historical Association in Ottawa in 2009; Dalhousie University's Stokes Seminar in 2014; and the Atlantic Canada Studies Conference in Fredericton in 2014.

understand the nature of relationships between the British garrison and Acadian community at Annapolis Royal, as well as that between Acadian communities in French-held territory (especially at Louisbourg) and those living in what became Nova Scotia after 1713. In sum, and building on the relatively robust historiography on the Acadians, SNA promises a more refined window on the history of Acadie and relationships between and among Acadians before the deportation.

Wellman and Wetherell explicitly invoke migration studies as ripe for SNA analysis. Looking specifically at the large literature on social mobility in the United States in the 19th and early 20th centuries, they emphasize "the usefulness of not assuming group solidarity or local boundaries in the analysis of community-like networks."[37] Atlantic Canadian history is well suited for this type of approach. Maurice Basque's chapter in John Reid et al.'s *The 'Conquest' of Acadia, 1710* demonstrates the potential usefulness of SNA in deepening our understanding of migration and political alliance within the region and beyond. While he did not invoke SNA, Basque's work demonstrates the complex nature of relationships and community during the turbulent years between the British conquest of Port Royal and the Acadian Deportation. He argues that we need to understand Acadian neutrality as a political decision that enabled individual components of their communities to interact with either the French or English in ways beyond local interests.[38] His conclusions resonate with those advanced by SNA-influenced historians in the 1970s, who suggested "people formed far-flung networks containing a sizeable and varied number of ties with kith and kin that supplied sociability, support and information."[39] Network analysis could also be applied to work on the Acadian diaspora (especially examining community structure before and after the deportation), slave holding and trade, migration between New England and the Maritimes during the 19th and 20th centuries, or even to more recent studies on relationships between Atlantic Canadian communities and the Alberta oil fields.[40]

Similarly, Christopher Minty's work on the pre-Revolutionary lives of people in New York City who became Loyalists, and Bonnie Huskins's recent work with the journal of William Booth and the nature of sociability and community in Shelburne, Nova Scotia, draw explicitly on digital methodologies (Minty) and social network theory (Huskins) and therefore hold similar promise as models for future network analysis.[41] The fifth chapter of Minty's dissertation in particular provides a direct

---

37 Wellman and Wetherell, "Social Network Analysis of Historical Communities," 113.

38 Maurice Basque, "The Third Acadia: Political Adaptation and Societal Change," in Reid et al., *"Conquest" of Acadia*, 155-77.

39 Wellman and Wetherell, "Social Network Analysis of Historical Communities," 103.

40 Two recent dissertations that readers might find of use as a model for how network analysis can be applied to these types of topics are Emily Buchnea, "Bridging the Middle Atlantic: The Liverpool-New York Trading Community, 1763-1833" (PhD diss., University of Nottingham, 2013), and Katie McDade, "'A particular spirit of enterprise': Bristol and Liverpool Slave Trade Merchants as Entrepreneurs in the Eighteenth Century" (PhD diss., University of Nottingham, 2011). Both dissertations draw conclusions that will inform scholars interested in the history of shipping and shipbuilding in Atlantic Canada.

41 Bonnie Huskins, "'Remarks and Rough Memorandums': Social Sets, Sociability, and Community in the Journal of William Booth, Shelburne, 1787 and 1789," *Journal of the Royal Nova Scotia Historical Society* 13 (2010): 103-32. Minty has not published much of his dissertation research

application of SNA to the study of loyalty during the American Revolution. There he examines relationships revealed through three merchants' account books and journals. Using the SNA software Pajek, Minty demonstrates how the political and social community affiliated with "the Friends to Liberty and Trade" cemented into rigid partisan camps following New York's decision to recommence British imports in 1770.[42] In the face of local rivalries anchored in rising partisan sociability, rather than an overt affinity to Britain, white men allied with "the Friends to Liberty and Trade" increasingly came to be defined as Loyalists during the early 1770s in opposition to local rivals who had taken up the Congressional cause. Minty's overall point here is that with SNA we can see that political decisions during the mid-1770s were deeply anchored in local cleavages fostered by increasingly partisan social practices, rendering the binary division between "Patriot" and "Loyalist" problematic.[43]

Another rich area of Atlantic Canadian historiography where network analysis might be useful relates to the work of the Atlantic Canada Shipping Project.[44] The scholars who led this project produced a mountain of primary and secondary source material in the late 1970s and early 1980s. The shipping lists that they brought together, for example, seem ideal for both SNA and other types of network analysis (such as the study of commodity flows). These records include information about vessels' origins and destinations, where and when they were built, and what cargo they were carrying.[45] With this information readily at hand, we may be able to learn more through network analysis about trade routes, trading patterns, and the overall nature and extent of Atlantic Canada's shipping and shipbuilding industry during the 19th century.

yet, but a brief summary can by found on the Junto blog. See Christopher Minty, "The Problem of Loyalism Before the American Revolution," *The Junto*, http://earlyamericanists.com/2013/09/11/guest-post-the-problem-of-loyalism-before-the-american-revolution/.

42 Pajek, like Visone, is open source software for Windows. It was first designed in 1996 by Vladimir Batageli and Andrej Mrvar, from the Department of Mathematics and Faculty of Social Science at the University of Ljubljana in Slovenia. A good introduction can be found in their reference manual for version 2.05: http://vlado.fmf.uni-lj.si/pub/networks/pajek/doc/PajekMan.pdf.

43 Christopher F. Minty, "Mobilization and Voluntarism: The Political Origins of Loyalism in New York, c. 1768-1778" (PhD diss., University of Stirling, 2014), chap. 5.

44 "Atlantic Canada Shipping Project," *Maritime History Archive*, http://www.mun.ca/mha/holdings/acsp.php. See also Eric W. Sager and Gerald Panting, *Maritime Capital: The Shipping Industry in Atlantic Canada, 1820-1914* (Montreal and Kingston: McGill-Queen's University Press, 1990), and their various conference proceedings: "Ships and Shipbuilding in the North Atlantic Region" (St. John's: Maritime History Group, 1978); "The Enterprising Canadians: Entrepreneurs and Economic Development in Eastern Canada, 1820-1914" (St. John's: Maritime History Group, 1979); "Volumes not Values: Canadian Sailing Ships and World Trades" (St. John's: Maritime History Group, 1979); "Working Men Who Got Wet" (St. John's: Maritime History Group, 1980); "Merchant Shipping and Economic Development in Atlantic Canada" (St. John's: Maritime History Group, 1982); and "Change and Adaptation in Maritime History: The North Atlantic Fleets in the Nineteenth Century" (St. John's: Maritime History Group, 1985).

45 "Shipping Lists," *Maritime History Archive*, http://www.mun.ca/mha/holdings/shiplist.php.

The possibilities are further highlighted by considering the initiatives of an important and current Canadian-UK collaboration, the Trading Consequences project.[46] Focusing primarily on Canada, this multi-institutional project uses text-mining software to probe over ten million pages of documents related to 19th-century trade in the British Empire. The Location Cloud Visualization tool hints at the possibilities for network analysis. This tool picks from the historical record key locations associated with commodities and then visualizes them by decade. Though it does not provide information about the networks in which these places were embedded, by linking commodities to time and a diversity of places it points a way forward for future research – especially when combined with the resources compiled by the Atlantic Canada Shipping Project or already-digitized datasets such as the Port Royal parish registers.

Trading Consequences draws out an additional benefit of network analysis not yet fully discussed in this paper. Network analysis also allows us to study "big data." As Trading Consequences demonstrates, whereas historians in the past were limited to analyzing hundreds or thousands of pages of text, historians today can study millions of pages in less time. With the rise of personal computing, the size and type of source material available to historians has undergone substantial change.[47]

Tools for network analysis
Changes in the nature of historical evidence call for the development of new skills and approaches with which anyone interested in pursuing network analysis will need to become familiar. *The Programming Historian* and *The Historian's Macroscope* are two good places to start.[48] Knowledge of programming can be intimidating and is akin to learning a new language. Most of us do not need this level of detailed knowledge. Thankfully, the tools available for network analysis have become increasingly easy to use and – at least at the entry level – are readily available through open source software. For example, in the time it took you to read this article, you could have downloaded and begun using Cytoscape, Gephi, or NodeXL.[49]

Those are the three most user-friendly, freely available, and open-source network analysis programs. They function somewhat differently from one another, and it is important to understand both their strengths and weaknesses before making choices

---

46 Trading Consequences, http://tradingconsequences.blogs.edina.ac.uk/about/.

47 Ian Milligan has led the way in exploring how historians will need to confront these changes. See Ian Milligan, "Illusionary Order: Online Databases, Optical Character Recognition, and Canadian History, 1997-2010," *Canadian Historical Review* 94, no. 4 (December 2013): 540-69; and Milligan, "Mining the Internet Graveyard: Rethinking the Historians' Toolkit," *Journal of the Canadian Historical Association* 23, no. 2 (2012): 21-64. See also Milligan's blog http://ianmilligan.ca/ as well as his contributions to ActiveHistory.ca, http://activehistory.ca/author/ianmilligan/.

48 *The Programming Historian*, http://programminghistorian.org/, and *The Historian's Macroscope*, http://www.themacroscope.org/.

49 There are two other pieces of open-source software of which I am familiar: Visone and Pajek. I have not used either software extensively. In my correspondence with Christopher Minty, he suggests that Pajek is also fairly user friendly. Katie McDade's dissertation, "A particular spirit of enterprise," used Pajek to conduct SNA.

among them. As a plug-in for MS Excel (unfortunately only available on the Windows platform), NodeXL will likely appeal to most historians inexperienced in computing. Assuming familiarity with spreadsheets, it is the easiest piece of software to use. Briefly, it gives MS Excel the capability to create network visualizations and analysis. In *The Historian's Macroscope,* Shawn Graham, Ian Milligan, and Scott Weingart specify Gephi as the standard computer program for network analysts, recommending it for "historians undertaking serious network analysis research." I have had functionality issues running Gephi on my Mac and have therefore gravitated to Cytoscape.[50] Although it was originally created to analyze molecular interaction networks, I (and other social scientists) use Cytoscape because it easily imports tables from MS Excel and has a relatively intuitive user interface.[51] Although primarily anchored in the sciences, Cytoscape has broad institutional support. It is managed by a consortium of institutions that include the University of Toronto and the University of California as well as funding through the National Institutes of Health in the United States.[52] All of the network analyses and graphs in this paper were completed using Cytoscape 3.1.0.[53]

In addition to these three free packages, there are also commercial products. The two most popular pieces of software are UCINET and VennMaker, ranging in cost from $40 for students to $600 for a standard single user. Both are reputedly well adapted for SNA and are supposedly more powerful and better supported than their open-source cousins. VennMaker is built specifically for network analysis in the social sciences and humanities.[54]

---

50 Ian Milligan has recently written a blog post helping Mac users with this problem. See "Getting Gephi Running on OS X Mavericks," http://ianmilligan.ca/2014/07/15/getting-gephi-running-on-os-x-mavericks/. The University of Michigan runs a MOOC through Coursera on Social Network Analysis that uses Gephi. For more information, see https://www.coursera.org/course/sna .

51 Examples of other social science work using Cytoscape include Vikas Bahirwani, Doina Caragea, William H.Hsu, and Waleed Aljandal, "Ontology Engineering and Feature Construction for Predicting Friendship Links and Users' Interests in the Live Journal Social Network," *The 2nd SNA-KDD Workshop '08*, (2008), http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.147.1048&rep=rep1&type=pdf; Ingrid van Putten, Katell G. Hamon, and Caleb Gardner, "Network Analysis of a Rock Lobster Quota Lease Market," *Fisheries Research* 107 no. 1-3 (January 2011): 122-30; Will Bridewell and Amar Das, "Social Network Analysis of Physician Interactions: The Effect of Institutional Boundaries on Breast Cancer Care," *AMIA Annual Symposium Proceedings* (2011): 152-60; Hamparsum Bozdogan and Oguz Akbilgic, "Social Network Analysis of Scientific Collaborations Across Different Subject Fields," *Information Services & Use* vol. 33 no. 3-4 (2013): 219-33.

52 In fairness, Gephi too has brought together a rather large number of institutional partners including Google and SciencesPo. See Gephi Consortium, https://consortium.gephi.org/. The difference, though, is that Cytoscape developed directly through institutional support.

53 For a tutorial on using Cytoscape, see Tom Brughmans, "Network Analysis with Cytoscape Tutorial," http://archaeologicalnetworks.files.wordpress.com/2013/11/brughmans-2013-network-analysis-with-cytoscape-tutorial.pdf.

54 Marten Düring, Matthias Bixler, Martin Stark, and Michael Kronenwett, "VennMaker for Historians: Sources, Social Networks and Software," *Revista hispana para el análisis de redes sociales* 21, no. 8 (December 2011), http://revista-redes.rediris.es/html-vol21/vol21_8e.htm; Hanneman and Riddle's *Introduction to Social Network Methods* is written for use with UCInet. I have not used either of these programs.

Conclusion

Are the five degrees between Bloch and Buckner meaningful? Do they tell us something about Atlantic Canadian historiography – or about Phillip Buckner – that we did not know before? The answer, it must be admitted, is "no." We do not learn anything substantive from playing "Six Degrees to Phillip Buckner." As the popular work of Nicholas A. Christakis and James H. Fowler suggests, six degrees of separation are too many for a meaningful relationship to be depicted. Instead, these leading network theorists posit that three degrees marks the limits to social influence.[55] Bloch's and Buckner's influence might both reach as far as William Wicken, but neither would go beyond. Sadly then, at least along this vector, *Acadiensis* cannot claim an *Annaliste* foundation. The six degrees approach is also problematic because it focuses only on a single path rather than a network as a whole. All five scholars are embedded in broader networks, so that studying these relationships might even present a shorter path between Bloch and Buckner. Revealing alternative paths is what makes "six degrees" an enjoyable but analytically useless game; it is based more on guesswork than rigorous study.

Yet network analysis has far greater merits than demonstrating "six degrees." First, for historians, it allows us to create and visualize networks from primary sources. As with all interpretive endeavours in the discipline of history, it is impossible to recreate historical networks as they actually existed. Instead, applying network analysis tools to specific and well-defined source material can provide windows into these networks, revealing important relationships and helping us to understand more fully the inter-relationships within which people in the past lived. Network analysis also helps us to understand the structure of these networks, allowing us to identify their key components by volume of connections (degree), proximity of actors (closeness), and connectivity within the network (betweenness). Combining such insights, this approach helps us to form a more precise and specific vision of the past than earlier techniques have offered. Indeed, studies focused on community and group identity that do not employ network analysis are similar to our game of "six degrees." They run the risk of building their methods around key examples or small case studies, while not taking into account the possibility and importance of broader sets of relationships. By contrast, well thought-out network analyses can provide a more nuanced and complete picture of entire networks.

For those of us working in Atlantic Canada, network analysis holds much promise. In many instances, such analysis is compatible with subjects that have deep roots in Atlantic Canadian historiography. Scholars working on pre-deportation Acadia, 19th century shipping, and regional migration are ideally situated to put network analysis to work. In some cases, especially with the Atlantic Canada Shipping Project, it is likely that the data already exists in digital form and can be

---

55 Nicholas A. Christakis and James H. Fowler, *Connected: The Surprising Power of Our Social Networks and How They Shape Our Lives* (New York: Little, Brown, and Company, 2009), 26-30. Using the rule of three degrees of influence, I am indebted to my friend and colleague Ian Milligan (one degree) through whose connections with two leaders in historical SNA, Scott Weingart and Shawn Graham (second degree), I have learned much about SNA. The scholarship on which Weingart and Graham draw forms the third degree through which I have been influenced, although I suspect some of it we share in common.

easily repurposed. Network analysis also has the potential to create new research agendas. Creating networks reflective of our source material, network analysis helps us to formulate new questions about how individuals were situated within the region. In our analysis of the *Acadiensis Reader*, for example, we could see how the work of different scholars interacted. Careful study of this network, I suggest, would lead to unique insights about the state of the field and its key influences during the 1990s. The tools now available for network analysis make this type of research relatively easy. With a few days of study and practice, you could begin to employ network analysis with your own datasets and research questions.

THOMAS PEACE