



CHAPTER 37

Modeling Long Novels: Network Analysis and *A Brief History of Seven Killings*

Lindsay Thomas

Lately, it seems, critics have turned to the network as a heuristic for novelistic length. For example, scholars have described novels as varied as Mark Z. Danielewski's *House of Leaves*, Neal Stephenson's *Cryptonomicon*, Don DeLillo's *Underworld*, Charles Dickens's *Bleak House*, and Samuel Richardson's *Pamela* as “network novels” (Pressman 2006; Jagoda 2016; Levine 2015; Armstrong and Tennenhouse 2015).¹ While the designation of “network novel” is not exclusive to long novels—critics have also recently referred to shorter works like Jennifer Egan's *A Visit from the Goon Squad*, Juliana Spahr's *The Transformation*, and Jean Toomer's *Cane* as networks or as networked—the network is a model that scholars today summon when describing long novels across any period of literary history.²

This tendency is related to what Patrick Jagoda calls our contemporary “network imaginary,” the result of the historical convergence of interrelated scientific, technological, and geopolitical developments toward the end of the twentieth century that “imbued a generalized network concept with the explanatory power and reach that it has achieved in the early twenty-first century” (Jagoda 2016, p. 10). These scientific developments include the creation of what is now called network science, a field crossing many disciplines in the social and natural sciences that uses network models to study complex systems. The systems that researchers model are highly varied, including,

L. Thomas (✉)
University of Miami, Coral Gables, FL, USA

for example, communications technologies, relationships among people in groups, and the interactions among genes, proteins, and metabolites in cells. However, modeling these idiosyncratic phenomena as networks offers new insight into the properties of and relationships between elements constituting these systems. As Jagoda emphasizes throughout his book, thanks in part to network science, networks are our *de rigueur* form for understanding complex systems today.³

This chapter begins from this association of networks and long novels. Although length is widely used as a classification mechanism for prose fiction especially (short stories, novellas, novels), and although it often plays a structuring role in pedagogical practice (“How many pages can I ask students to read in two days?”), literary critics don’t have a great vocabulary for the concept.⁴ As Catherine Gallagher has observed, although a novel is defined at a basic level as “A lengthy fictional prose narrative,” “lengthy” is “the most thoroughly neglected word in the definition” (2000, p. 229). This chapter posits that one way of paying attention to length is through social network analysis. In other words, I take the critics who have called long novels networks seriously by seeing what happens when we model the connections between characters in novels as social networks. Moreover, I show how analyzing novelistic length through social network analysis can help us to understand what formal features tend to characterize long novels. This is a step toward developing a concept of length that moves beyond page- and word-counts. As I will suggest in the second section of this chapter, such a concept is valuable for literary studies because it could provide a way of connecting a seemingly innocuous fact about novels—their length—to how these novels are evaluated and read.

Using social network analysis to examine novels means employing quantitative methods. Such methods—and their attendant prestige—have long been associated with scientific inquiry, including network science. Historians of science and, more recently, scholars in literary and cultural studies have written compelling accounts of the rise of quantitative methods and their association with objectivity, and of the cultural practice of quantification as a way to accrue political power and dehumanize people.⁵ Similarly, critiques of the use of quantitative analysis in literary studies have often hinged on the perceived objectivity or “scientism” of quantitative methods and the recalcitrance of the discipline or even of literature itself to such modes of thought.⁶ While what follows is in part a quantitative analysis of several literary texts, I am less interested in objectivity or the production of facts than I am in experimentation. The experiment I play out here leads to the generation of a hypothesis; it does not test that hypothesis. Furthermore, our tendency to classify novels according to length demonstrates how our understanding of novelistic form is to some extent already quantitative. This chapter’s experiment lends some precision to this quantification.

In what follows, I use software developed by Markus Luczak-Roesch, Adam Grener, and Emma Fenton to algorithmically create networks of characters from a small sample set of six contemporary U.S. novels of varying lengths, and I then apply some basic metrics from social network analysis to compare the network models of these novels to one another. My sample set includes David Foster Wallace's *Infinite Jest* (1996), Neal Stephenson's *Cryptonomicon* (1999), Colson Whitehead's *The Intuitionist* (1999), Jennifer Egan's *A Visit from the Goon Squad* (2010), Marlon James's *A Brief History of Seven Killings* (2014), and Hanya Yanagihara's *A Little Life* (2015) (Table 37.1).⁷ I have chosen these novels because they include both long (*Infinite Jest*, *Cryptonomicon*, *A Little Life*, *A Brief History*) and short contemporary U.S. novels (*Goon Squad*, *The Intuitionist*), as well as novels that critics have described as "network novels" (*Cryptonomicon*, *A Brief History*, *Goon Squad*), and novels that have not been described this way (*Infinite Jest*, *The Intuitionist*, *A Little Life*). This sample set, while a toy example and obviously not representative of contemporary U.S. literature, gives me a starting point for making observations that suggest future avenues of exploration.⁸

As we will see, James's *A Brief History of Seven Killings* emerges as an outlier among this set because of the density of its repeated connections among characters. At approximately 688 pages and 242,397 words, James's novel is a long metamodernist work of historical fiction that is perhaps best described as networked. Radiating out from the attempted murder of Bob Marley in Kingston, Jamaica on December 3, 1976, and told from the perspectives of many different characters, it recounts the (fictional) stories of the eventual deaths of the seven men involved in the plot to kill Marley (or the Singer, as he is known in the novel). The novel involves 76 characters and takes place on five days spread out over the course of fifteen years, from 1976 to 1991, in Kingston, Montego Bay, New York, and Miami. When compared to the other long novels in the sample, characters in *A Brief History* interact with, talk to and about, and think about each other more than characters in the other novels I model, especially the long novels. I call the measurement of these connections character co-occurrence. I show how measuring character co-occurrence demonstrates the potential for using social network analysis to determine what aspects of novelistic form tend to correspond with length, as well as for tracing how length, understood in specific ways informed by social

Table 37.1 The sample set; word counts are from electronic editions, and page counts are from U.S. hardcover editions

Title	Year	Words	Pages
<i>Infinite Jest</i>	1996	557,859	1079
<i>Cryptonomicon</i>	1999	402,383	918
<i>A Little Life</i>	2015	305,713	814
<i>A Brief History of Seven Killings</i>	2014	242,397	688
<i>The Intuitionist</i>	1999	84,546	272
<i>A Visit from the Goon Squad</i>	2010	78,090	340

network analysis, inflects close readings of individual novels. While other critics have made the case for modeling literary texts as networks because doing so gives them conceptual purchase on the connections among large numbers of texts, I argue we can use this method to understand what characterizes novelistic length, both at a macro- and a micro-scale, beyond page- and word-counts.⁹

THE MODELS: MEASURING CHARACTER CO-OCCURRENCE

Modeling novels allows us to ask different kinds of questions of these texts, but every model is a simplification and therefore requires compromises. In order to understand the compromises involved in modeling a novel as a social network, it is important to understand how the tool I used to create network models works. The software requires two inputs: a plain-text version of the novel under consideration, and a list of characters in that novel.¹⁰ From those inputs, the program returns a variety of outputs, including a social network of the characters in the novel.¹¹ The software creates this network by breaking the novel into consecutive 1000-word slices and using the list of character names to identify all of the characters that appear in each slice. The social network then depicts those characters that appear together in any 1000-word slice as connected. The nodes of the network are the characters, and the edges—or the links between nodes—are weighted according to the number of co-occurrences of any two characters. For example, we can see in Fig. 37.1 that the number of links between the characters Josey Wales and the Singer in *A Brief History of Seven Killings*, the two characters with the highest number



Fig. 37.1 Detail from the social network of *A Brief History of Seven Killings*

of total connections, is 43. This means the names of these characters occur together in 43, 1000-word slices of the novel.

As is perhaps already apparent, choosing to model a novel as a social network entails certain assumptions about what exactly you are modeling. As the editorial board of the journal *Network Science* writes, performing network analysis requires an “ontological commitment” to a few basic features of network abstraction, including “individual elements; pair-wise relationships between those elements; and a global or macro-patterning that can be considered as network structure” (Brandes et al. 2013, p. 5). In order to model the connections between characters in these novels, for example, I must make decisions about who counts as a character. While such decisions were easier to make for some novels in the sample set, like *A Brief History of Seven Killings*, because of the availability of ready-made character lists, for other novels it was more difficult. In *Cryptonomicon*, for example, should we consider historical figures who appear in characters’ stories or memories to be characters themselves? Should we consider people who only appear once in *A Little Life*—at a dinner party, say—to be characters? How about those who appear only in the memories of other characters, or in flashback scenes?¹² Furthermore, as I will explain in more detail below, the software I used to create the social network for each novel incorporates certain decisions about how to measure connections between characters, decisions that have a profound effect on the resulting models but that by no means constitute the only way to measure such connections.

While we might assume that social networks of characters in novels would model the interactions among characters, this is not exactly true of the social networks created using Luczak-Roesch et al.’s software.¹³ Rather, these networks model something like proximity or closeness. But since characters count as “appearing” together in the same slice of the novel simply if their names occur in the same 1000-word slice of the novel, what this software produces is not a model of characters’ actual interactions, but rather a model of who characters think or talk about. Sometimes this includes people they are talking to at the moment, but sometimes characters think or talk about people who aren’t physically present in the scene. This becomes clear, for instance, when we examine the nodes in the social network for *A Brief History* with the highest degrees, or the most unique connections to other nodes. As we might expect, the node representing Josey Wales, a main character, has the highest degree at 44; more unexpected, perhaps, is the node with the second-highest degree: the Singer, at 41. The Singer is at the center of the novel insofar as his attempted murder structures it, but he only appears in a handful of the novel’s scenes and says a handful of lines. Although he isn’t often physically present, many characters talk and think about him throughout the novel (41 characters, to be exact); he is a highly connected character in this way.

Such observations become more revealing, however, when we compare the networks to one another. I call the method of comparison I introduce here character co-occurrence.¹⁴ It describes the average weight of an edge in a novel’s social network, or the average number of times any given character name appears with another character name in a 1000-word slice of the novel. It thus provides an indication of how often characters’ names appear close to one another throughout the novel, or the frequency of their co-occurrences. We can also think of this measurement as providing an abstraction of the overall closeness between characters in a novel. While “character co-occurrence” may sound like an overly technical way of talking about closeness, what I mean to draw our attention to here is precisely the proximity—whether physical, psychological, emotional, or textual—that closeness implies. Table 37.2 lists the total number of words and characters for each novel in the corpus, whether I’ve classified the novel as long, and the values for the size, total strength, and character co-occurrence of the social networks for each novel.¹⁵ The size column lists the total number of edges, or links between nodes, of each graph; each edge in a graph is only counted once, no matter its weight. This gives us the number of actual connections for each graph. The total strength column lists the sum of the weight of each edge in each graph (i.e., in a graph with three nodes, if the total weight of all the edges for $n_1=4$, $n_2=3$, and $n_3=2$, the total strength of the graph is $4+3+2$, or 9). Finally, the character co-occurrence, or the average weight of an edge in each graph, is derived by dividing the total strength of each graph by its size.¹⁶

Focusing on the character co-occurrence column, we can see that *A Brief History of Seven Killings* is an outlier when compared to the other long novels in this small corpus (*Infinite Jest*, *Cryptonomicon*, and *A Little Life*). At 6.967, its character co-occurrence—the average weight of any edge in its social network—is over three times as large as the same values for the other novels I’ve classified as long. As an average value, however, this number is somewhat misleading because it doesn’t give a good sense of the variation

Table 37.2 Social network metrics

Title	Words	Long novel	Characters	Size	Total strength	Character co-occurrence
<i>Infinite Jest</i>	557,859	yes	138	972	1944	2
<i>Cryptonomicon</i>	402,383	yes	128	835	1670	2
<i>A Little Life</i>	305,713	yes	196	1930	3860	2
<i>A Brief History of Seven Killings</i>	242,397	yes	76	424	2954	6.967
<i>The Intuitionist</i>	84,546	no	35	223	1632	7.318
<i>A Visit from the Goon Squad</i>	78,090	no	57	291	1924	6.612

between the nodes with the heaviest edges (lots of repeated connections) and those with lighter edges (fewer repeated connections). As we might expect of a social network model of a novel, there are a few nodes in the graph for *A Brief History* with adjacent edges that have very high weights and many more with adjacent edges that have very low weights. Figure 37.2 displays the strength distribution for all of the nodes in the network with a total strength greater than 10. The ten “heaviest” nodes—which themselves include a large range of strengths, from Josey Wales (387) to Alex Pierce (84)—account for 61.18% of the total strength of the graph, and the five heaviest nodes account for 42.86% of the total strength.

When we compare these values to those of other novels in the corpus and adjust for the number of characters in each novel, we see that the distribution of strength values among what we might call the main characters in *A Brief History*'s social network is also unique. Figure 37.3 displays the total strength for the heaviest 10, 15, and 20% of the nodes in each network; these nodes represent those characters in each novel that are most connected to other characters. The strength of the top seven nodes in the network for *A Brief*

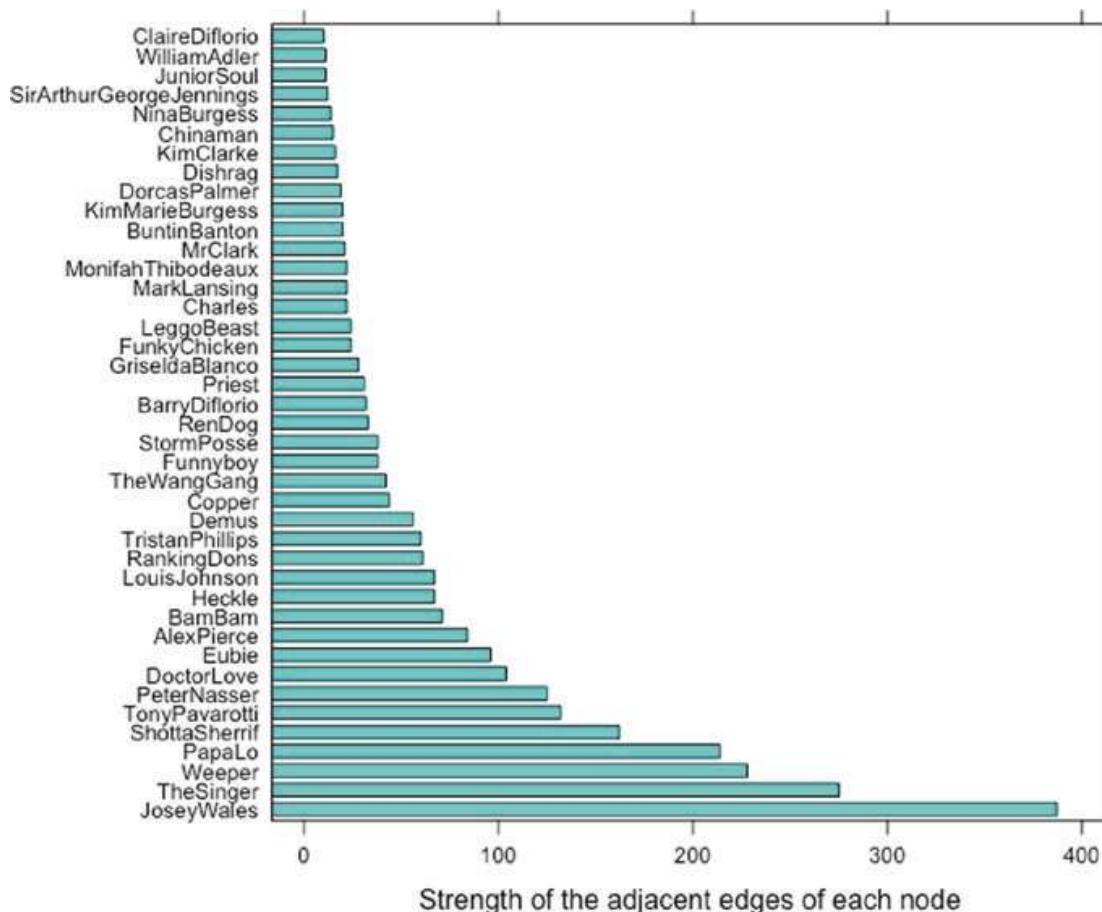


Fig. 37.2 The strength of the adjacent edges for each node with a strength value greater than 10 in the social network for *A Brief History of Seven Killings*

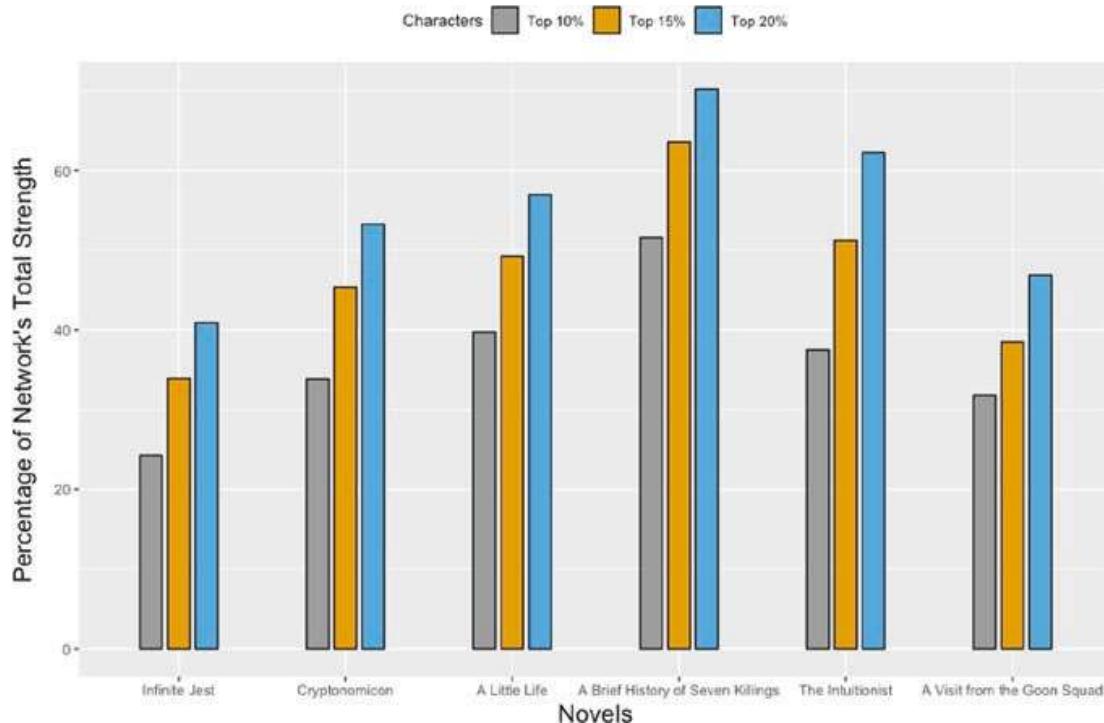


Fig. 37.3 Strength values for the top 10, 15, and 20% of the nodes in each network

History of Seven Killings, which constitute roughly 10% of its total number of characters, is 51.56% of the network's total strength; the strength of its top 15% of characters (11 nodes) is 63.57% of the network's total strength; and the strength of its top 20% of characters (14 nodes) is 70.18% of its total strength. As we can see in Fig. 37.3, no other network has such a high concentration of strength among its most heavily weighted nodes. This measure provides further information when interpreting the novel's character co-occurrence: not only do the characters in *A Brief History of Seven Killings* have, on average, more repeated co-occurrences, but the main characters in the novel have lots of repeated co-occurrences, more than other novels in the sample set.

DISCUSSION: WHY MEASURE CHARACTER CO-OCCURRENCE?

While we cannot draw definite conclusions from this small experiment, it does suggest character co-occurrence as a starting point for further analysis. We might continue such analysis in at least two directions. The first involves expanding the number of novels in the sample set by several orders of magnitude in order to achieve a more representative or meaningful sample of contemporary U.S. novels. While there are technical barriers to doing so, such an expanded sample set would allow us to understand exactly how atypical *A Brief History of Seven Killings*'s character co-occurrence value is.¹⁷ We could, for instance, use correlation metrics—statistical tests for determining likely degrees of relationship between two or more variables—to determine whether

and how the classification of a novel as long correlates with its total number of characters, the size of its social network, the network's total strength, and its character co-occurrence. Computing such metrics for a large sample set would help us better understand the relationship between novelistic length and character co-occurrence. Do long novels generally have low character co-occurrence values? If so, character co-occurrence may prove a useful "narratological building block," to use Dennis Tenen's vocabulary, for constructing a computational model of novelistic length (2018, p. 123). Such a model could also include other elements, including formal qualities such as word- or page-length, number of characters, and measurements of the amounts of "stuff" in a novel's world, as well as social qualities such as common words critics have used to describe the novels in the set and the literary prizes each have won or for which they have been nominated.¹⁸ With such a model in hand, we would be well-positioned to articulate an expanded concept of novelistic length that we could test against many texts; we could discover, for instance, if there are short novels that "behave" in certain ways like long novels. More importantly, we would also potentially better understand the social value of length in the context of the contemporary U.S. literary marketplace. Are long novels, or novels identified as "long" in some way by our model, more likely to be written by men? Are such novels written by men more likely to be nominated for literary prizes? And are certain long novels more likely to be described as "complex" or "difficult" than others, and if so, what might this indicate about the meaning of such evaluative terms? Answering such questions would help us develop a concept of length, a seemingly straightforward fact about a novel, that is instead, like the concept of genre, both formal and social, both intrinsic to a literary work itself and an index of a sociological phenomenon.

While the direction for future research described above uses social network analysis as a building block in constructing a larger computational model of novelistic length, a second direction would encourage us to connect the quantitative metrics derived from social networks of novels to the experience of reading these novels. For example, this direction would take the potential uniqueness of *A Brief History of Seven Killings*'s character co-occurrence value as its starting point to ask how this metric might relate to the novel itself. If *A Brief History* is, because of its high character co-occurrence, unusually concerned with closeness, how is this reflected in the novel?

By way of conclusion, I offer a brief example in answer to this question. As discussed earlier, the chapters in *A Brief History of Seven Killings* are each told from the first-person perspective of a specific character. On the whole, the novel is concerned with how the past haunts the present.¹⁹ Because each chapter is narrated from the first-person perspective of its central character, the past is often felt in this novel as a live presence, one that is, more often than not, embodied by this character themselves or by the other characters the central character in each chapter encounters or remembers.

This haunting happens literally in the novel through the character of Sir Arthur George Jennings, an actual ghost of Jamaica's white colonial past who appears to some characters throughout the novel before they die. Another character, Dorcas Palmer, attempts to evade this closeness of the past by outrunning it. Dorcas—the name is an allusion to Toni Morrison's *Jazz* (1992), another novel that occupies the perspectives of many different characters and that is concerned with how the past haunts the present—is the second pseudonym Nina Burgess, a witness to the Singer's attempted murder, takes on when, fearing for her life, she emigrates to the United States. In section four, "White Lines/Kids in America," which takes place in 1985, Dorcas is working in New York City as an in-home caregiver. She is hired to take care of Ken, a man who suffers from short-term memory loss and who can't remember more than a few hours at a time. No one tells Dorcas Ken has this condition when she shows up for her first day on the job, and so Dorcas agrees to follow Ken when he suggests leaving the house, and they travel from his home in Manhattan to hers in the Bronx. Their journey takes them through progressively smaller and more intimate spaces, from the spaciousness of Ken's Park Avenue apartment with its fake "slave-era furniture," to the crowded space of the train where "none of the groups [on the train] could resist looking at us," and finally to Dorcas's living room where they share a drink and listen to records (James 2014, pp. 504, 505). There, surrounded by her many books, they have a surprisingly personal conversation, one in which Dorcas responds to Ken's repeated cajoling to tell him about herself by revealing that Dorcas is not her real name. She tells him how she has assumed the identity of someone who was hit by a car in 1979, a feat she was able to pull off because she had "a story long enough and boring enough that they will do anything just to get you out of the line [at the social services office]" (James 2014, p. 560). After Dorcas reveals this fact to Ken, he begins to forget where he is and who she is. He goes into her bathroom, a smaller space still, and starts to panic, and she calls his family. They finally explain his condition to her, and while they offer to tell her agency to assign her to a different client, she agrees to continue taking care of Ken precisely because of his condition—because he won't ever be able to remember her.

What are we to make of this strange interaction between Dorcas and Ken? There are many moments throughout the afternoon we spend with them in which Dorcas questions why she so easily gets along with Ken, a wealthy white American who, as she puts it, instantly acts too "familiar" with her, but who she nevertheless invites inside her apartment. She is especially surprised with herself because she has always maintained that she isn't "like all these people he watch on *Donahue*. All these people with their private business that they dying to tell thirteen million people" (James 2014, pp. 557, 558). Yet she does reveal her "private business" to him. In fact, Ken is the only person to whom we see Dorcas, or Kim before her, or Millicent later, reveal that she is living under an assumed name. He can do what she wishes she, and the rest

of the world, could: forget her past. This is what attracts Dorcas to the job and what allows for the intimacy between them.

This fleeting intimacy is just one of the many models of closeness the novel offers, almost all of which fail or fade or end (or begin, for that matter) in violence. Not only do we spend pages and pages within the heads, as it were, of the characters who narrate the book's chapters, but these characters also spend a lot of time thinking about, talking to, having sex with, joking with, eating with, taking care of, walking with, driving with, and committing violence with and to one another. Much of the novel's plot, for example, involves following the seven men involved in the attempted murder of the Singer as they are then murdered in turn; the plot only advances in these sections through intimate scenes of violence, when one character murders another. For all of its sprawl, James's novel is surprisingly intimate in that its characters spend a lot of time in close physical, psychological, or emotional proximity to one another. In this way, the novel's unusually high character co-occurrence value provides an occasion for considering the role of closeness more closely. The feeling of closeness many characters experience in the novel is one of claustrophobia, of a too-closeness to other people, to our past, to ourselves—but it's also one of the desire for such closeness, at any cost. *Intimacy, James demonstrates, is about repetition.* The novel, like the measure of character co-occurrence I have explored here, models a variety of intimacy that maps not onto the depth of connection but onto iteration: the repetition of proximity, the return of trauma, the tendency of characters to haunt one another other as they haunt the same 1000 words.

NOTES

1. For a comprehensive bibliography of works that turn to the network to analyze texts of all kinds, see Jagoda (2017).
2. See Jagoda (2016), especially the introduction, “Network Aesthetics,” Ngai (2012), and Beal (2012).
3. For a concise summary of the development of network science in the latter half of the twentieth century, see the introduction to Jagoda (2016). The association between networks and complexity also holds for those studies that use the term “network” or “network novel” to analyze long novels. Jessica Pressman, for example, calls *House of Leaves* “substantial” and “complex” (2006, p. 107). Jagoda argues maximalist novels like *Cryptonomicon* and *Underworld* “animate complexity in order to both enable and limit knowledge” (2016, p. 44), and Caroline Levine emphasizes that *Bleak House* is “a novel that casts social relations as a complex heaping of networks” (2015, p. 115).
4. While discussion of the length of novels, and long novels in particular, is in many ways foundational to studies of the novel, critics have tended to focus on the experience of temporality or duration that reading lengthy novels affords while taking the fact that they are long for granted. See, for example, Lukács (1920), Genette (1979), and more recently, Dames (2007), Zemka (2012), and Thomas (2016). Critics have also emphasized the size and scale of long novels: see Mendelson (1976), Ercolino (2014), and Jagoda (2016).

5. Two well-known works on quantification and objectivity from the history of science are Porter (1996), Daston and Galison (2007). For more recent work on quantification from literary, cultural, and media studies, see Wilson (2016), Johnson (2018), and Wernimont (2018).
6. For a recent argument against the use of quantitative (or at least statistical) methods in literary studies on these terms, see Da (2019).
7. For more on this software see Luczak-Roesch et al. (2018).
8. In many disciplines, a “toy problem” or “toy model” is a simplified problem or physical model used to illustrate a particular component of a larger complex system or series of tasks. Researchers in artificial intelligence, for example, have used chess as a toy problem for teaching algorithms to learn different kinds of problem-solving and decision-making skills.
9. For an example of work that uses social network analysis to examine a large number of texts, see So and Long (2013).
10. This list can include character nicknames or alternate names. For example, the character who goes by Doctor Love in *A Brief History* is also called Luis Hernán Rodrigo de las Casas or just Luis. All of these names can be associated with one another so that they are all counted as Doctor Love.
11. The code is available on GitHub at <https://github.com/vuw-sim-stia/lit-cascades>.
12. I used ready-made character lists for *Infinite Jest*, *A Visit from the Goon Squad*, and *A Brief History of Seven Killings*, which I then cross-referenced with the text of each novel and edited to include missing characters, character nicknames, and alternate names (I found complete character lists for *Infinite Jest* and *Goon Squad* online, and *A Brief History* includes a “cast of characters” at the beginning of the novel). I was not able to find complete character lists for *The Intuitionist*, *Cryptonomicon*, or *A Little Life*. For these novels, I used Stanford’s Named Entity Recognizer (NER) to capture all of the proper names in each novel; I then cross-referenced these lists of people with the text of each novel, deleting names who I decided not to include as characters (historical figures who did not participate in the narrative or action of the plot, for example, or errors that the NER package had made), and combining and customizing some names on the list to include character nicknames and alternate names. See <https://github.com/lcthomas/network-analysis-novels> for this code. The software is also designed, however, to run in an unsupervised way, without a pre-defined list of characters, although capturing networks of characters specifically would still be difficult. For more on using the software in an unsupervised fashion, see Luczak-Roesch et al. (2018).
13. For a method of extracting social networks from novels that uses “character interaction” as its metric, see Elson et al. (2010).
14. Dennis Tenen has referred to such metrics as “narratological prime[s],” or “foundational building block[s]” we can use in building models of complex literary phenomena like length (2018, p. 123).
15. “Size,” and “strength” are standard metrics in social network analysis; “character co-occurrence,” as discussed above, is my own addition. See <https://github.com/lcthomas/modeling-long-novels> for the code I used to apply these metrics and create the following tables and figures.

16. Character co-occurrence is similar to the density of a network, a standard metric in network analysis, but with one important difference. The density of a network describes the ratio of its actual connections (the size of the network) to its potential connections, or how many links between nodes there could possibly be. Density, in other words, gives us a sense of how many connections exist between nodes compared to how many such connections could exist if every node were connected to every other node. It doesn't account for the *frequency* of connection, however, which is what the character co-occurrence value, as the average weight of each edge, measures.
17. Beyond securing tractable datasets of contemporary novels, the laborious process of creating character lists to use as input for Luczak-Roesch et al's software is the main impediment to scaling up this method for producing social networks of novels. There are automated ways of extracting character networks from literary texts, however. For a comprehensive survey of many of these methods and recommendations on the most promising methods, see Labatut and Bost (2019).
18. See Tenen (2018) for a discussion of how to measure the comparative density of fictional space and the stuff in it.
19. For more on the novel's hauntology and how it depicts the effects of violence and trauma especially, see Harrison (2017), and Walonen (2018). For more on the novel's interest in how past trauma informs the present, and in surviving this trauma, see Adams (2018).

BIBLIOGRAPHY

- Adams, Caryn Rae. 2018. Uncomfortable Truths: Lifewriting, Trauma and Survivance in Marlon James's *A Brief History of Seven Killings* (For Isabel Grosvenor). *Journal of West Indian Literature* 26: 96–109.
- Armstrong, Nancy, and Leonard Tennenhouse. 2015. The Network Novel and How It Unsettled Domestic Fiction. In *A Companion to the English Novel*, ed. Stephen Arata, Madigan Haley, Paul Hunter, and Jennifer Wicke, 306–20. Malden, MA: Wiley.
- Beal, Wesley. 2012. The Form and Politics of Networks in Jean Toomer's *Cane*. *American Literary History* 24: 658–79. <https://doi.org/10.1093/alh/ajs043>.
- Brandes, Ulrik, Garry Robins, Ann McCranie, and Stanley Wasserman. 2013. What Is Network Science? *Network Science* 1: 1–15. <https://doi.org/10.1017/nws.2013.2>.
- Da, Nan Z. 2019. The Computational Case Against Computational Literary Studies. *Critical Inquiry* 45: 601–39. <https://doi.org/10.1086/702594>.
- Dames, Nicholas. 2007. *The Physiology of the Novel: Reading, Neural Science, and the Form of Victorian Fiction*. Oxford, UK: Oxford University Press.
- Daston, Lorraine, and Peter Galison. 2007. *Objectivity*. New York, NY: Zone Books.
- Elson, David, Nicholas Dames, and Kathleen McKeown. 2010. Extracting Social Networks from Literary Fiction. In *Proceedings of the 48th Annual Meeting of the Association for Computational Linguistics*, 138–47. Uppsala, Sweden: Association for Computational Linguistics. <http://www.aclweb.org/anthology/P10-1015>.

- Ercolino, Stefano. 2014. *The Maximalist Novel: From Thomas Pynchon's Gravity's Rainbow to Roberto Bolaño's 2666*, trans. Albert Sbragia. New York, NY: Bloomsbury Academic.
- Gallagher, Catherine. 2000. Formalism and Time. *Modern Language Quarterly* 61: 229–51. <https://doi.org/10.1215/00267929-61-1-229>.
- Galloway, Alexander R., and Eugene Thacker. 2007. *The Exploit: A Theory of Networks*. Minneapolis, MN: University of Minnesota Press.
- Genette, Gérard. 1979 [2002]. Order, Duration, and Frequency. In *Narrative Dynamics: Essays on Time, Plot, Closure, and Frames*, ed. Brian Richardson, 25–34. Columbus, OH: Ohio State University Press.
- Harrison, Sheri-Marie. 2017. Global Sisyphus: Rereading the Jamaican 1960s Through *A Brief History of Seven Killings*. *Small Axe: A Caribbean Journal of Criticism* 21: 85–97. <https://doi.org/10.1215/07990537-4272013>.
- Jagoda, Patrick. 2016. *Network Aesthetics*. Chicago, IL: University of Chicago Press.
- . 2017. Networks in Literature and Media. In *Oxford Research Encyclopedia of Literature*, ed. Paula Rabinowitz. Oxford University Press. <https://doi.org/10.1093/acrefore/9780190201098.013.135>.
- James, Marlon. 2014. *A Brief History of Seven Killings*. New York, NY: Riverhead Books.
- Johnson, Jessica Marie. 2018. Markup BodiesBlack [Life] Studies and Slavery [Death] Studies at the Digital Crossroads. *Social Text* 36: 57–79. <https://doi.org/10.1215/01642472-7145658>.
- Labatut, Vincent, and Xavier Bost. 2019. Extraction and Analysis of Fictional Character Networks: A Survey. *ACM Computing Surveys* 52. <https://doi.org/10.1145/3344548>.
- Levine, Caroline. 2015. *Forms: Whole, Rhythm, Hierarchy, Network*. Princeton, NJ: Princeton University Press.
- Luczak-Roesch, Markus, Adam Grener, and Emma Fenton. 2018. Not-so-Distant Reading: A Dynamic Network Approach to Literature. *IT—Information Technology* 60: 29–40. <https://doi.org/10.1515/itit-2017-0023>.
- Lukács, Georg. 1920 [1971]. *The Theory of the Novel*, trans. Anna Bostock. Cambridge, MA: MIT Press.
- Mendelson, Edward. 1976. Encyclopedic Narrative: From Dante to Pynchon. *MLN* 91: 1267–75. <https://doi.org/10.2307/2907136>.
- Ngai, Sianne. 2012. Network Aesthetics: Juliana Spahr's *the Transformation* and Bruno Latour's *Reassembling the Social*. In *American Literature's Aesthetic Dimensions*, ed. Cindy Weinstein and Christopher Looby, 367–92. New York, NY: Columbia University Press.
- Porter, Theodore M. 1996. *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life*. Princeton, NJ: Princeton University Press.
- Pressman, Jessica. 2006. *House of Leaves*: Reading the Networked Novel. *Studies in American Fiction* 34: 107–28.
- So, Richard Jean, and Hoyt Long. 2013. Network Analysis and the Sociology of Modernism. *Boundary 2* (40): 147–82. <https://doi.org/10.1215/01903659-2151839>.
- Tenen, Dennis Yi. 2018. Toward a Computational Archaeology of Fictional Space. *New Literary History* 49: 119–47. <https://doi.org/10.1353/nlh.2018.0005>.

- Thomas, Lindsay. 2016. Forms of Duration: Preparedness, the *Mars* Trilogy, and the Management of Climate Change. *American Literature* 88: 159–84.
- Walonen, Michael K. 2018. Violence, Diasporic Transnationalism, and Neo-Imperialism in *A Brief History of Seven Killings*. *Small Axe: A Caribbean Journal of Criticism* 22: 1–12. <https://doi.org/10.1215/07990537-7249076>.
- Wernimont, Jacqueline. 2018. *Numbered Lives: Life and Death in Quantum Media*. Cambridge, MA: MIT Press.
- Wilson, Sarah. 2016. Black Folk by the Numbers: Quantification in Du Bois. *American Literary History* 28: 27–45. <https://doi.org/10.1093/alh/ajv062>.
- Zemka, Sue. 2012. *Time and the Moment in Victorian Literature and Society*. Cambridge, UK: Cambridge University Press.