EUTROPIUS AND THE EMPERORS OF ROME

Biennial Meeting of the Southern Section of the Classical Association of the Middle West and South (CAMWS-SS), Atlanta, Georgia, October 2016

Abstract

Eutropius in his *Breviarium Historiae Romanae* partakes in the tradition of compendia of Roman history. Other such abbreviated accounts of Roman history include Sextus Aurelius' *Historia Tripertita,* Festus' *Breviarium Rerum Gestarum Populi Romani,* and "Second Victor"'s *Epitome de Caesaribus*. While Livy's *Ab Urbe Condita* covers the entirety of Roman history from Rome's founding in 753 BC to c. 9AD, Eutropius' work covers almost three hundred more years of history, from its founding to the death of the emperor Julian in 364AD. Livy's work covers some 142 *libri* to the 10 *libri* of Eutropius'. The purpose of such an abbreviated version of history was to provide a "simple, succinct and readable account of Roman history" for the provincial leaders within the imperial Roman government, who were expected to have a decent understanding of Roman history and institutions (Bird 1993: xix).

Though H.W. Bird in his "Introduction" to his translation of Eutropius' *Breviarium* provides a survey of the way in which Eutropius assesses each of the Roman emperors, this paper intends to take a closer look at Eutropius' evaluation and to reconsider the belief that Eutropius provides a balanced history of Rome by providing a statistical analysis of the text (Bird 1993: xxxiv-xliv). Because Eutropius was restricted in terms of the length of his work, he had to make choices in terms of the events and individuals that he highlighted. While it is possible to observe through a surface reading of the text that Eutropius does not necessarily spend his time equally on each time period, calculating the normalized frequencies of words per book allows for a more precise understanding of how Eutropius is focusing his audience's attention.

Books 7 through 10 of the *Breviarium Historiae Romanae* focus on the imperial period of Roman history. For each emperor, Eutropius tends to include three key pieces of information: how long he ruled, how long he lived, and how he was related to his predecessor/successor. He

also often remarks on the nature of their death and their divine status – or lack thereof. Beyond these facts, Eutropius includes a mixture of both personal and military actions. Normalized frequencies of words per years of reign create a more exact picture of the emperors upon which Eutropius focuses. There is not a direct correlation between how long an emperor ruled and how long Eutropius' spends describing him. Through a closer reading of the texts, it becomes apparent that Eutropius focuses on the military efforts of the Roman emperors rather than the political. However, he also draws an important emphasis on the personal failings of the emperors. Through further statistical analysis, Eutropius' focus on their military conquests rather than their political successes becomes more clear. This focus on military successes with only brief asides into the character of the emperors provides insight on the educational purposes of Eutropius' *Breviarium* in his lifetime, and today.

In his *Breviarium Historiae Romanae,* Eutropius follows in the tradition of historical compendia. Including his own work, a total of four such shortened editions of history have been handed down from the fourth century CE. How short were these compendia? Whereas Livy's *Ab Urbe Condita* covers the entirety of Roman history from Rome's founding in 753 BCE to circa 9 CE, Eutropius' work covers almost three hundred more years of history, i.e., from its founding to the death of the emperor Jovian in 364 CE. Eutropius does so in just 18,000 words, while the *extant* work of Livy covers some 150,000 words. According to the English translator, H. W. Bird, the purpose of such an abbreviated version of history was to provide a "simple, succinct and readable account of Roman history" for provincial leaders within the imperial Roman government.[226] Such an abridged version meant that Eutropius had to make critical decisions about what was included. In this paper I use quantitative and qualitative analysis first of the *Breviarium* as a whole and then of Eutropius' account of the emperors in the latter half of his text to reevaluate the claim that Eutropius provides a "balanced" account of history.

The four compendia from the fourth century BCE, which have survived are Sextus Aurelius Victor's *Liber de Caesaribus* (*The Caesars*) (359/60), Eutropius' *Breviarium Historiae Romanae* (*Compendium of Roman History*) (c. 369/70), Festus' *Breviarium Rerum Gestarum Populi Romani* (*Compendium of the History of the Roman People*) (c. 369-370), and the anonymous *Epitome de Caesaribus* (*Epitome of the Caesars*) (c. 359).[227] To put the size of these

---

[226] H.W. Bird, Eutropius: *Breviarium – translated with an introduction and commentary* (Liverpool: Liverpool University Press, 1993), xix.

[227] H.W. Bird, "Further Observations on the Dating of Enmann's *Kaisergeschichte*," *Classical Quarterly* 23 (1973): 376. W. den Boer, *Some Minor Roman Historians* (Leiden: Brill, 1972), 114. J. W. Eadie, *The Breviarium of Festus: A Critical Edition with Historical Commentary* (London: Athlone, 1967), 6. Robert Browning, "History" in *The Cambridge History of Classical Literautre,* ed. E. J. Kenney and W. V. Clausen, vol. 2 (Cambridge: Cambridge University Press, 1982), 742. Also notably, the lost *Annales* of Virius Nicomachus Flavianus ought to be included. Bonamente, "Minor Latin Historians of the Fourth Century A.D." in *Greek and Roman Historiography in Late*

histories into perspective, as Daniel Erickson notes, Eutropius' *Breviarium* covers some 70 pages of printed text, Victor's *De Caesaribus* takes up some 50, the *Epitome* some 40 pages, and Festus' *Breviarium* some 20 printed pages.[228] These editions of Roman history were so abbreviated because, as noted earlier, these compendia were used as a kind of *CliffsNotes* edition to educate the new ruling class of the Roman Empire. The texts had to be brief, straightforward, and easy to comprehend.

Eutropius' audience included military men from the Danubian provinces and other educated provincial men, who had recently risen through the political ranks.[229] There were also upper-class men from the East, who now served as part of the new Senate at Constantinople.[230] Giorgio Bonamente reports that these four works, though differing in content and structure, are united in their purpose "to propose the continuity of the history of Rome in its ethical values, political institutions and military prestige as a model for the state of the empire and its future security."[231]

Eutropius covers a bit more than a millennium of history in the ten separate books of his compendium. Bonamente argues that there is an "evenly distributed development of the narration" and that there is not a "progressive expansion of the subject as it approaches the contemporary age."[232] Based on content and the sources used, Bonamente divides the

---

Antiquity: Fourth to Sixth Century A.D., ed. Gabriele Marasco (Leiden: Brill, 2003), 85. For more on the difference between *breviary* and *epitome*, see Bonamente, 91.

[228] Erickson, 4. Ibid., 6-8.

[229] Browning, 736. H.W. Bird. Eutropius: *Breviarium* – translated with an introduction and commentary. Liverpool: Liverpool University Press, 1993.

[230] Arnaldo Momigliano, "Pagan and Christian Historiography in the Fourth Century A.D.," *The Conflict between Paganism and Christianity in the Fourth Century*, ed. Arnaldo Momigliano (Oxford: Oxford University Press, 1963), 86.

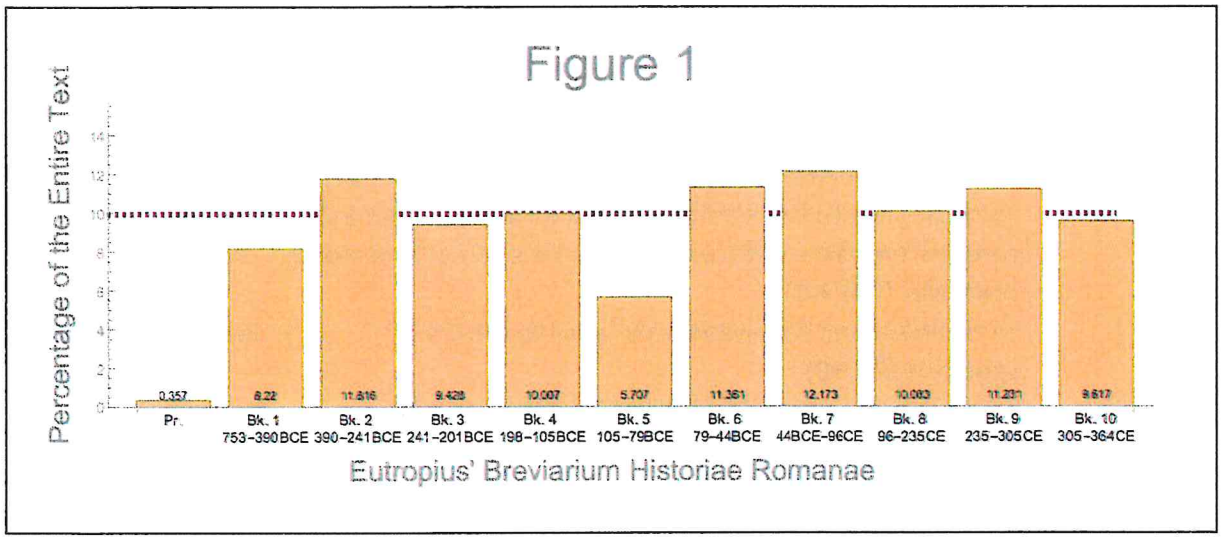
[231] Bonamente, 85.

[232] Bonamente, 107.

Breviarium into three parts: the Republican Age, the Julio-Claudian and the Flavian dynasties, and the rest of the Imperial Age. He further divides the historical layout of the *Breviarium*:

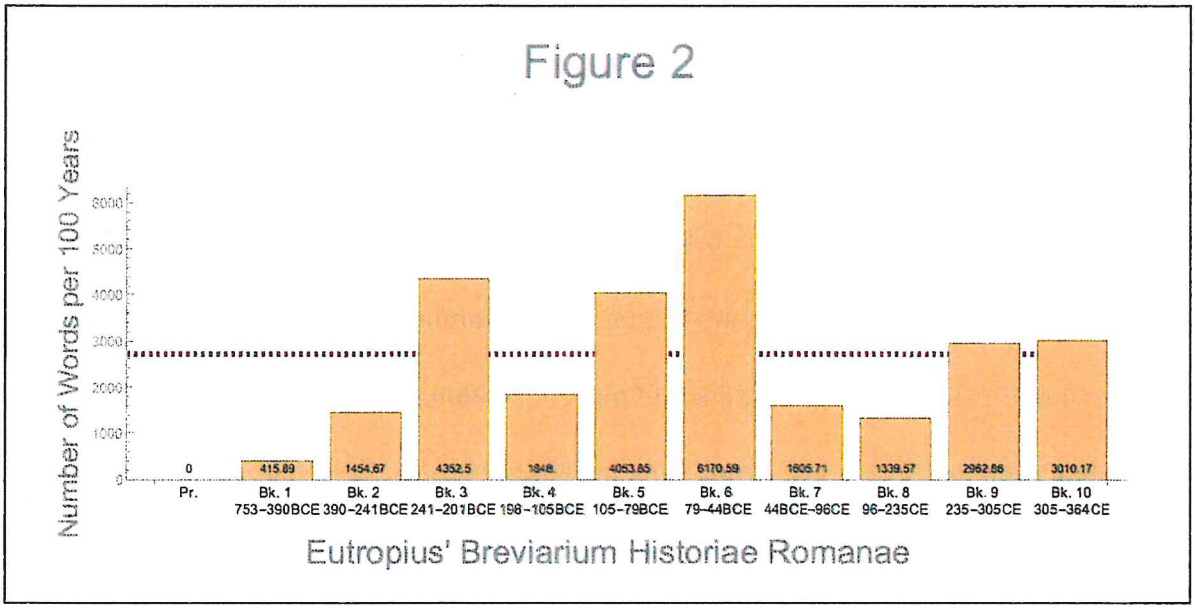
1	From the foundation to the pillage of Brennus (390 BC)	365 years
2	From Camillus to the end of the first Punic war (241 BC)	150 years
3	From the embassy of Ptolemy III to the end of the second Punic War (201 BC)	40 years
4	From the second Macedonian War to the death of Jugurtha (105 BC)	about 100 years
5	From the war against Cimbri and Teutones to the dictatorship of Sulla (79 BC)	26 years
6	From the war of Sertorius to the Ides of March (44 BC)	34 years
7	From Augustus to Domitian (96 AD)	140 years
8	From Nerva to Severus Alexander (235 AD)	139 years
9	From Maximius to Dicoletian (305 AD)	70 years
10	From the second tetrarchy to Jovian (364 AD)	59 years

It is possible to use the books of the *Breviarium* as a means of determining Eutropius' distribution of words across his text, though the size of the books may not have been necessarily intentional on the part of Eutropius. On the one hand, as seen in **Figure 1,** the distribution of words seems fairly equal across the different books of the *Breviarium*. In fact, as indicated by the dashed purple line on Figure 1, on average, each book takes 9.964% of the entire text, almost 10%. It seems as if Eutropius dedicates an equal number of words to each of his ten books as they are all relatively the same size in terms of the total number of words in each book. This equal distribution may be because the papyrus scrolls upon which the *Breviarium* was written were of the same size.



Using Bonamente's divisions, we can approach the *Breviarium* in a more quantitative manner. Considering **Figure 2**, it is possible to see the way in which Eutropius himself divided his *Breviarium,* in terms of a division of time and in terms of the number of words per 100 years. First, we need to delve into a brief mathematics lesson to explain the reasoning behind the quantitative analysis. In order to provide a cursory comparison across books, *normalized frequencies* must be calculated. The number of words per book — which is the *absolute frequency* or total number of words in this set range — must be divided by the (approximate) number of years covered. This division generates *relative frequencies*, which take into account the fact that each book does not cover an equal number of years. These relative frequencies must be normalized to a common scale — in this case, per 100 years. For example, if we take the 1,518 words in Book I and divide it by 365 years, we then know that there are 4.159 words per year or 415.890 words per 100 years. This allows for a rough comparison of how Eutropius uses words between the different books in the *Breviarium*.

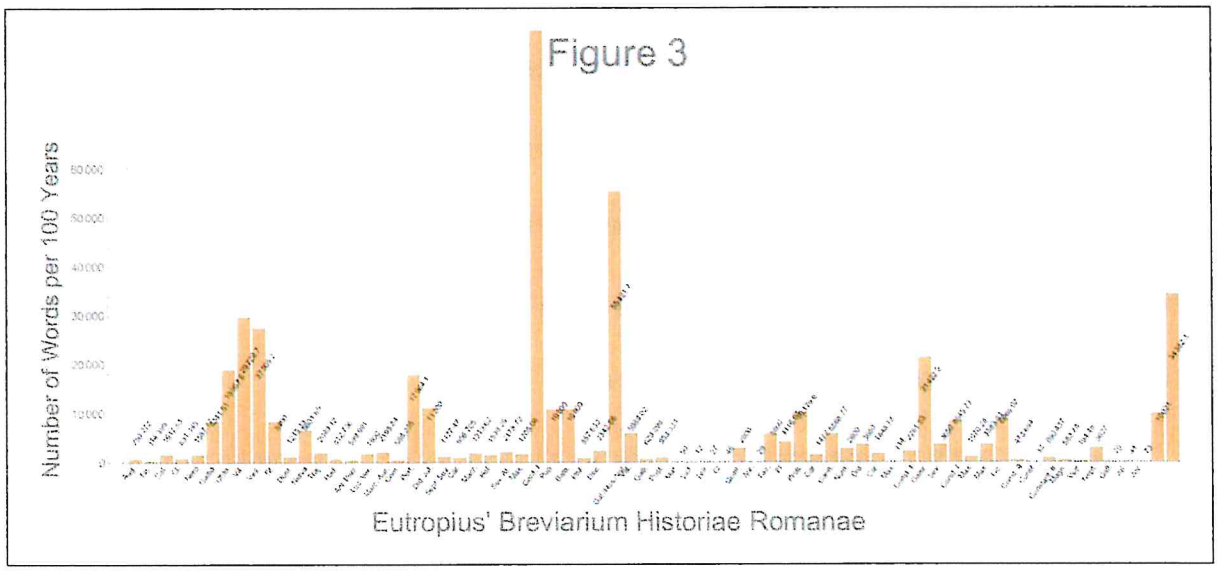
To put this in perspective, we can consider **Figure 2.** These relative frequencies reveal that Eutropius does not treat all spans of time equally. Instead, these numbers suggest that



Eutropius spends a rather large amount of time focusing on the early first century BC in Book VI as he recognized the important turn over from the Republic to the Empire at that time. He also focused on the mid-third century AD and the Second Punic War in Book III. While the latter numbers may demonstrate Eutropius' focus on military matters, the low number of words per 100 years in Book IV, which focused on the wars in Spain, Africa, and the East, suggests that Eutropius was still selective in terms of what wars and military endeavors he focused on. Moreover, frequencies in Book 9 and 10 indicate that Eutropius increased his focus on events and people as he approached his own time period.

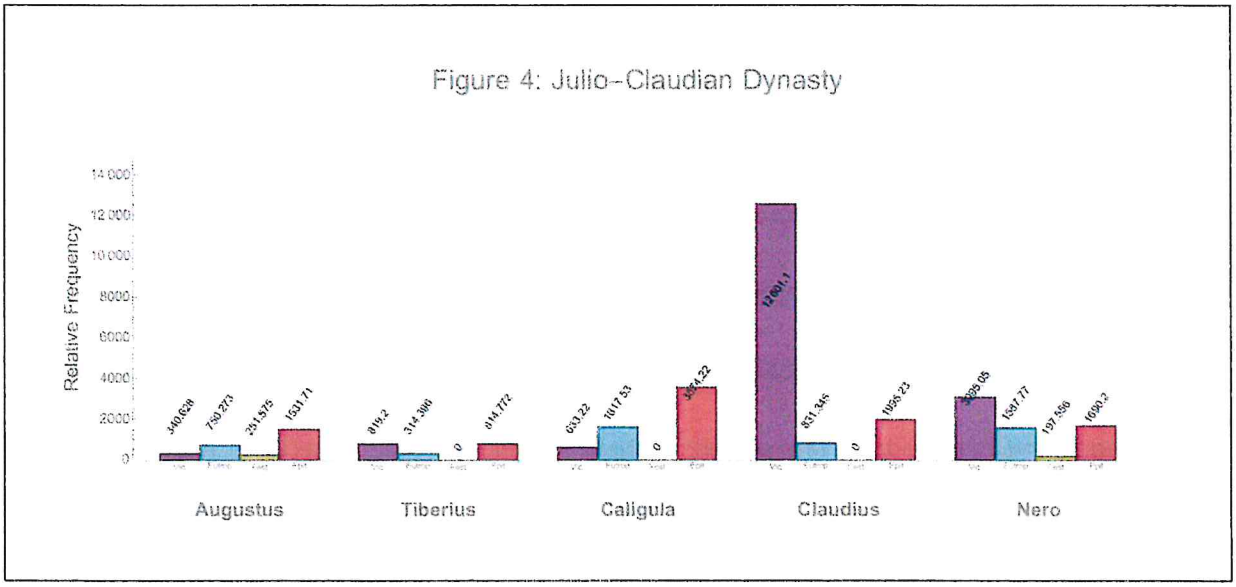
Turning now from the texts in their entirety to the portions focused on the Roman emperors, Books 7 through 10 of the *Breviarium Historiae Romanae* describe the imperial period of Roman history. For each individual emperor, as seen in **Figure 3,** the number of words used by Eutropius to describe the emperor in question was divided by the number of years in his reign to generate relative frequencies. These frequencies were then normalized to 100

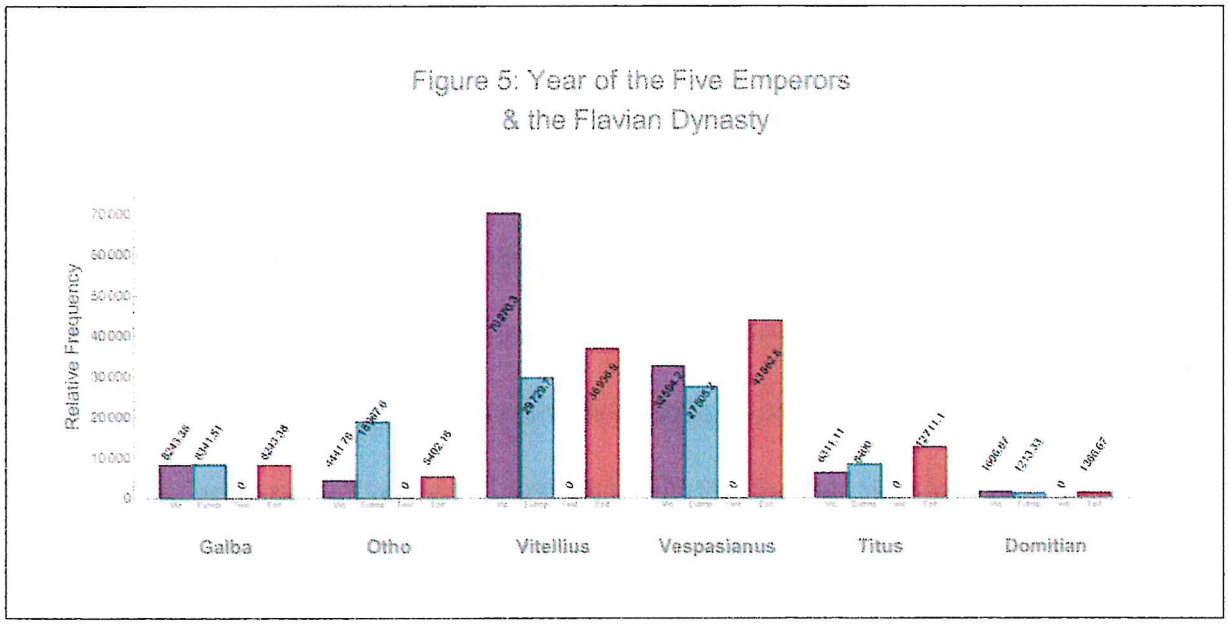
years. These frequencies, i.e., the number of words used to describe the emperor for every "100" years of his reign, demonstrate that the amount of the *Breviarium* dedicated to each emperor is not equal. It also shows that the amount of words dedicated to each emperor is not related to how long he had reigned. Instead, Eutropius tends to spend a surprisingly large amount of time on emperors who only reigned a short amount of time. For example, we can consider emperors of the Year of the Four Emperors – Galba, Otho, Vitellius, and Vespasian. Even though the first three only reigned for a matter of months, Eutropius spends an unusual amount of time describing their time as emperors. In fact, he spends almost the same amount of time describing Vitellius, who ruled only about four months, and Vespasian, who ruled ten years. This difference perhaps speaks to Eutropius' bias towards action. One exciting year outweighs the ten relatively stable years to file.



Zooming in and focusing on the Julio-Claudian and Flavian Dynasties helps to provide a more comparative view of the way in which these emperors were depicted. This uneven distribution is shared by the *Epitome de Caesaribus* and Victor's *Liber de Caesaribus* though not

by *Breviarium Rerum Gestarum Populi Romani,* in which Festus omits some emperors entirely from his account of Roman history. Figure 3 and 4 demonstrates how the four different authors of the surviving fourth century compendia tended to treat individual emperors equally, though occasionally an outlier appears. For example, they spend almost the same amount of words describing Galba and Domitian, though Sextus Aurelius Victor, whose work is indicated by the purple bars, does not treat different emperors with the same weight. These frequencies also demonstrate that these four authors often put different degrees of focus on the same emperor because of their own interest as authors. For example, Sextus Aurelius Victor's places an unusual focus on Claudius and Vitellius whereas the *Epitome de Caesaribus,* which is indicated by the red bars, draws a particular focus on Vespasian. Overall, these numbers demonstrate that Eutropius does not spend an equal amount of time describing each emperor and, more importantly, that he is not alone in his preferences and his uneven, unbalanced focus.





Looking now at Eutropius' *Breviarium* from a more qualitative perspective, one which requires a close reading of the text rather than the distant reading which we have taken in the former half of this paper, suggests that Eutropius' balanced view is not quite as balanced as it appears from far away. This close reading also reveals some of the motives driving Eutropius. In his preface, Eutropius states that he intends to gather the particulars of Roman history in a brief narrative from the foundation of the city to his own present day. Additionally, he recounts the things *quae in principum vita egregia extiterunt*, "which rose in the distinguished life of the emperors" so that Valens might rejoice in the deeds of these men and so that he might learn from them.[233] It is also important to keep in mind that, besides writing for Valens, he is, as mentioned at the beginning of this paper, writing for military men, who have recently gained political power. Bonamente praises Eutropius for the *Breviarium*'s "organic unity and equilibrium", in a closer reading of the texts combined with some quantitative analysis, this

[233] Eutropius, *Breviarium,* prologue.

becomes even clearer.[234]

For each emperor, Eutropius includes three key pieces of information, which read as well as a RBI's and home runs on the back of a baseball card: how long he ruled, how long he lived, and how he was related to his predecessor/successor. Even for those emperors whom he does not dwell long on, he always divulges these three pieces of information. For example, we may consider how Nero is related to his *Caligulae avunculo suo,* "his uncle Caligula," and how "he died in the thirty-second year of his age, and the fourteenth year of his reign." Besides these pieces of information, he also remarks on the nature of their death, when it proves exciting enough. Continuing with the same example, Eutropius reports that Nero was so tested by the city of Rome that he sought escape from punishment and ending up committing suicide in a suburban villa of one his freedmen. When necessary, Eutropius also notes when, upon death, an emperor is raised to a divine status.[235]

Despite Eutropius' intentions to describe events which arose *in negotiis vel bellicis vel civilibius,* "in civil and military business", his inclinations were clear. Bird notes that Eutropius seems to have cared less for the cultural attainments or education of the emperors and more for their moral qualities and imperial competence.[236] Similarly, Bonamente notes that the *Breviarium* has "the real structure of pragmatic history" with little attention being paid to social and economic themes. Moreover, in 1931 Arthur Hurst Moser created a concordance of Eutropius' *Breviarium*.[237] In that same year he presented his paper, "The Relative Importance of

[234] Bonamente, 103.
[235] For more on the elevation of emperors, see Den Boer, 151-154.
[236] Bird, "Eutropius," xliii. Bird, "The Roman Emperor's: Eutropius' Perspective," 150.
[237] A. H. Moser, *Index Verborum Eutropianus* (PhD dissertation, New York University, 1931).

Historical Facts in Breviaria," in which he discussed that word frequencies revealed Eutropius' predominant interests. The deductions he reached were:

1. Warfare is, by far, the predominant interest.
2. Of less importance, but prominent, is the interest in ruler and men of warfare who are closely combined with accounts of wars and territorial expansion (or contraction).
3. The personalities of the toga or of private life receive but passing mention.
4. The category of social and economic interests is very brief.
5. The most unimportant feature of all is that which comprises literature, men of letters, and philosophical or intellectual activities which may have had some bearing on national process.[238]

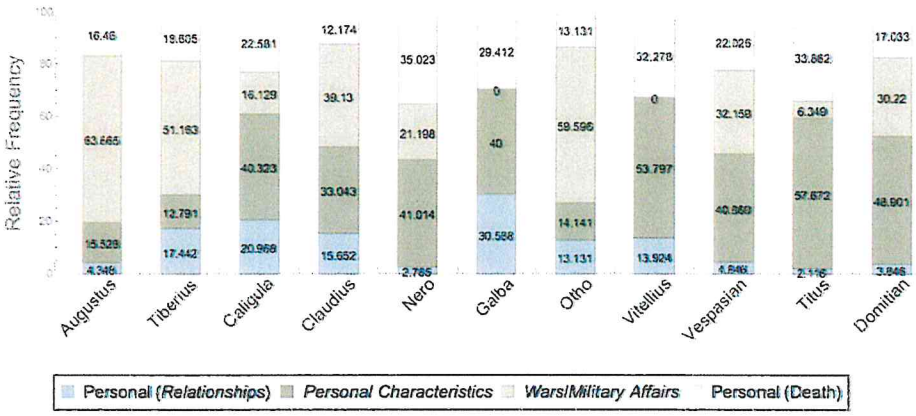
Den Boer points out, "the one thread which runs throughout the book ... is the dignity of war. War was always better than peace without honour."[239]

Looking at matters from a more macro perspective, it is possible to break down his descriptions a bit more quantitatively.[240] His descriptions can be broken down into four broad categories: Eutropius' establishment of the emperor's pedigree or relationship to his predecessor, personal characteristics, his military endeavors, and the details regarding his death and the length of his reign. These categories tend to follow one another sequentially except for when he is describing the more muddied Constantine dynasties. Figure 6 shows, emperor by emperor from Augustus to Domitian, the percentage of words dedicated to each category. For each emperor, Eutropius tends to choose a focus, whether it be military or personal. The chart below shows the way in which Eutropius would paint a stilted image of the emperor so that he served either as a model of good or poor emperorship. This chart provides a

[238] A. Hm. Moser, "The Relative Importance of Historical Facts in Breviaria," *Transactions and Proceedings of the American Philological Association* 62 (1931): xxxviii.
[239] W. den Boer,
[240] .[240] For a deeper analysis of Eutropius' depiction of individual emperors, one should turn to Bird's article, "The Roman Emperor's: Eutropius' Perspective."

breakdown of the depiction of these emperors in terms of their relationship or family history, personal characteristics, military affairs, and the nature of their death. Through his language and word choice, he elevates the status of emperors such as Augustus for the benefit of both members of his audience: his emperor and his main audience, the provincial leaders.

Figure 6



While an understanding of Eutropius' and Imperial Age can be derived without any quantitative analysis, this type of analysis helps to provide a more precise image of the way in which Eutropius depicts the Roman emperors. Quantitative analysis was able to demonstrate that Eutropius does not spend his time equally throughout his books of his *Breviarium*. Moreover, he does not spend an equal amount of words describing each emperor. This amount is not related to the emperor's reign. Eutropius dwells longer on some emperors than the sheer length of their reign would seem to merit considering the length of their reign. This tendency is demonstrative both of what some emperors accomplished in their short reign as well as the value assigned to this emperor by Eutropius. Because Eutropius had to write such a condensed version of history, he had to make choices on what information was included and whom he dwelt upon so that he could provide an example of leadership for both Valens and for the

provincial military leaders. This quantitative analysis provides new insight into his product, his *Breviarium Historiae Romanae*, and demonstrates that, though scholars have focused on Eutropius' depiction of military affairs and his "balanced" view of history, this type of methodology helps to add new evidence and challenge these views.

Figure 7.		
PERIOD II: JULIO-CLAUDIAN AND FLAVIAN DYNASTIES		
Emperor	**Positive Comments**	**Negative Comments**
Augustus	resembled a divinity, successful in war or prudent in peace, conducted himself with greatest courtesy, most liberal to all, most faithful to friends, placed friends to an equal level of dignity (7.8); flourishing Roman state, unconquered in civil war, expanded Roman empire, restored lost standards (7.9); Roman state in most prosperous condition (7.10)	
Tiberius		greatly indolent, excessively cruel, unprincipled avarice, abandoned licentiousness, never fought in person, died to the joy of all men (7.11)
Caligula		most wicked, most cruel, effaced memory of Tiberius' enormities, incest with sisters, raging, great greed, licentiousness, cruelty (7.12)
Claudius	of no striking character, gentleness and moderation, added to empire, civil, consecrated and deified (7.13)	cruelty and folly (7.13)
Nero	built the Neronian (Alexandrian) hot baths in Rome (7.15)	disgraced and weakened empire, extraordinary luxury and extravagance, enemy to all good men, disgracefully exposed himself, guilty of murders, attempted nothing in military affairs, set fire to Rome (7.14); detestable, declared an enemy (7.15)
Galba	of a very ancient and noble family, distinguished by military and civil exploits, promising commencement (7.16)	inclined to excessive severity (7.16)
Otho	noble maternal descent, not obscure on either, no evidence of public disposition (7.17)	effeminate and intimate of Nero (7.17)
Vitellius	honorable rather than noble family (7.18)	reigned most disgracefully, greatest cruelty, gluttony and voraciousness, anxious to resemble Nero, killed

		with great ignominy (7.18)
Vespasianus	of obscure birth, comparable to best emperors, in his private life greatly distinguished, greatest forbearance with	too eager for money (7.19)
Emperor	**Positive Comments**	**Negative Comments**
Vespasianus (cntd.)	government, collected money with greatest diligence and anxiety, distribute money readily especially to indigent, great and judicious liberality, mild and amiable, no severer penalty than banishment, expanded empire (7.19); not mindful of offenses and animosities, bore reproaches with indulgence, enforcer of military discipline, object of love and favor, enrolled among the gods (7.20)	
Titus	remarkable for every species of virtues, the favorite and delight of mankind, eloquent, warlike, temperate, pleaded causes in Latin, composed in Greek, lenity towards citizens, good-nature and generosity, no one left in discontent, built amphitheater (7.21); beloved for conduct with much affection, great public lamentation, expressions of good will and commendation by senate, enrolled among gods (7.22)	
Domitian	used power with moderation, erected public monuments	more like Nero, Caligula, or Tiberius, greatest excesses of licentiousness, rage, cruelty, and avarice, universal detestation, effaced remembrance of father/brother, put to death many of senate, addressed as Lord and God, execrable pride, disasters in wars, universally odious, buried ignominiously (7.23), a most murderous tyrant (8.1)

Bibliography

Baldwin, Barry. "Festus the Historian." *Historia: Zeitschrift für Alte Geschichte* 27.1 (1978): 197-217.

Banchich, Thomas. "The Epitomizing Tradition in Late Antiquity." In *A Companion to Greek and Roman Historiography*, edited by John Marincola, 305-312. Malden: Blackwell Publishing Ltd, 2007.

Burke, Peter. "A Survey of the Popularity of Ancient Historians, 1450-1700." *History and Theory* 5.2 (1966): 135-152.

Croke, Brian. "Late Antique Historiography, 250-650 CE." In *A Companion to Greek and Roman Historiography*, edited by John Marincola, 567-581. Malden: Blackwell Publishing Ltd, 2007.

Gilmartin, Kristine. "A Rhetorical Figure in Latin Historical Style: The Imaginary Second Person Singular." *Transactions of the American Philological Association (1974-)* 105 (1975): 99-121.

Matthews, John. "The Emperor and his Historians." In *A Companion to Greek and Roman Historiography*, edited by John Marincola, 290-304. Malden: Blackwell Publishing Ltd, 2007.

Momigliano, Arnaldo. "Some Observations on the 'Origo Gents Romanae." *Journal of Roman Studies* 48.1-2 (November 1958): 56-73.

Rich, John. "Velleius' History: Genre and Purpose." 73-92.

Rohrbacher, David. *The Historians of Late Antiquity*. London: Routledge, 2002.

Sage, Michael M. "The De Viris Illustribus: Chronology and Structure." *Transactions of the American Philological Association* 108 (1978): 217-241.

Starr, R. J. "The Scope and Genre of Velleius' History." *The Classical Quarterly* 31.1 (May 1981): 162-174.

Ward, Geoffrey C., and Ken Burns. The War: An Intimate History, 1941–1945. New York: Knopf, 2007.

Woods, David. "Late Antique Historiography: A Brief History of Time." In *A Companion to Late Antiquity,* edited by Philip Rousseau, 357-372. Malden: Blackwell Publishing Ltd, 2009.

Zecchini, G. "Latin Historiography: Jerome, Orosius and the Western Chronicles." In *Greek and Roman Historiography in Late Antiquity,* edited by Gabriele Marasco, 317-345. X: Brill, 2003.

Eutropius and the Emperors of Rome

Figure 1: Division of Eutropius' *Breviarium*

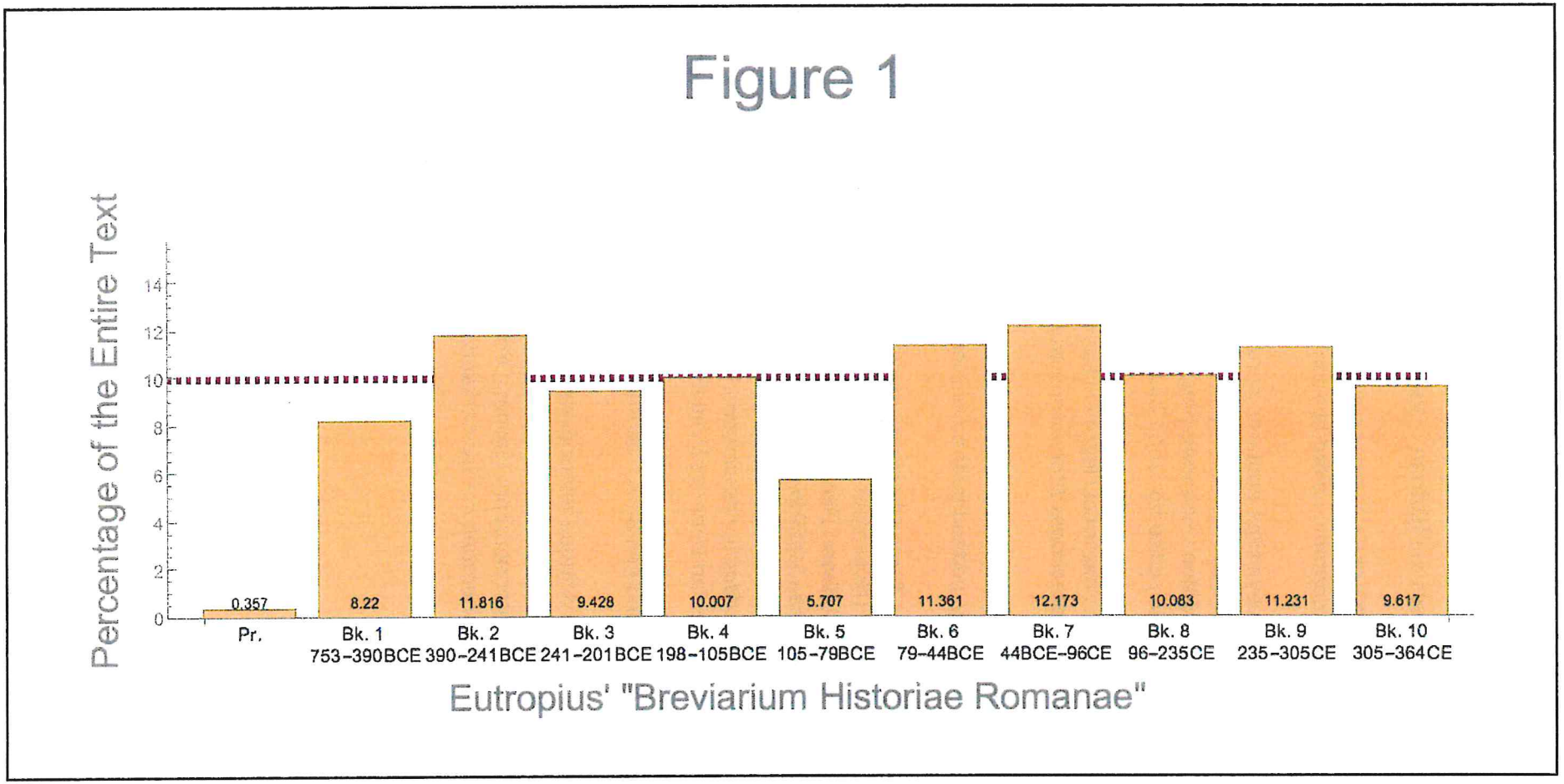


Figure 2: Time Division of the *Breviarium*

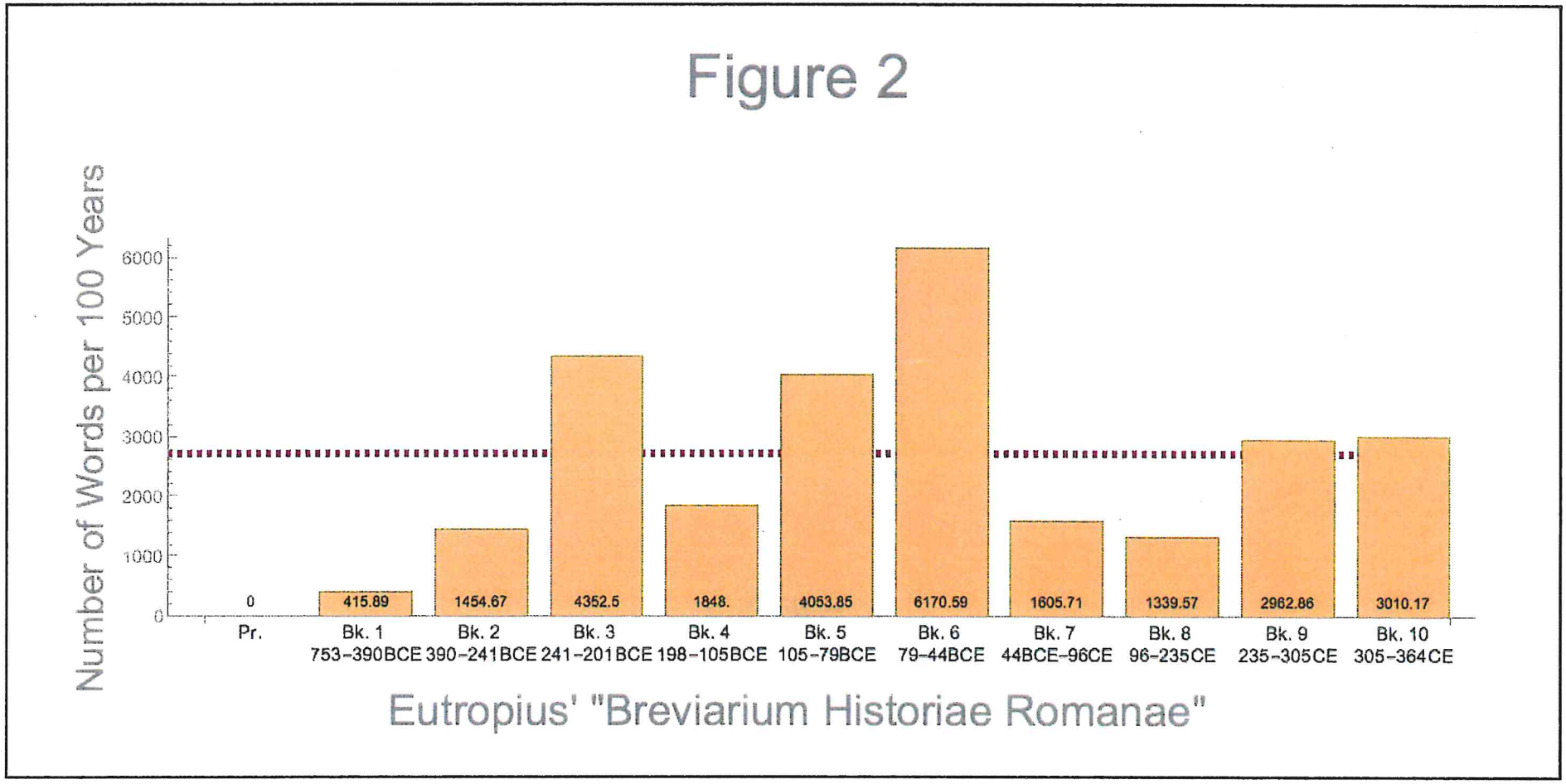


Figure 3: Eutropius' Emperors

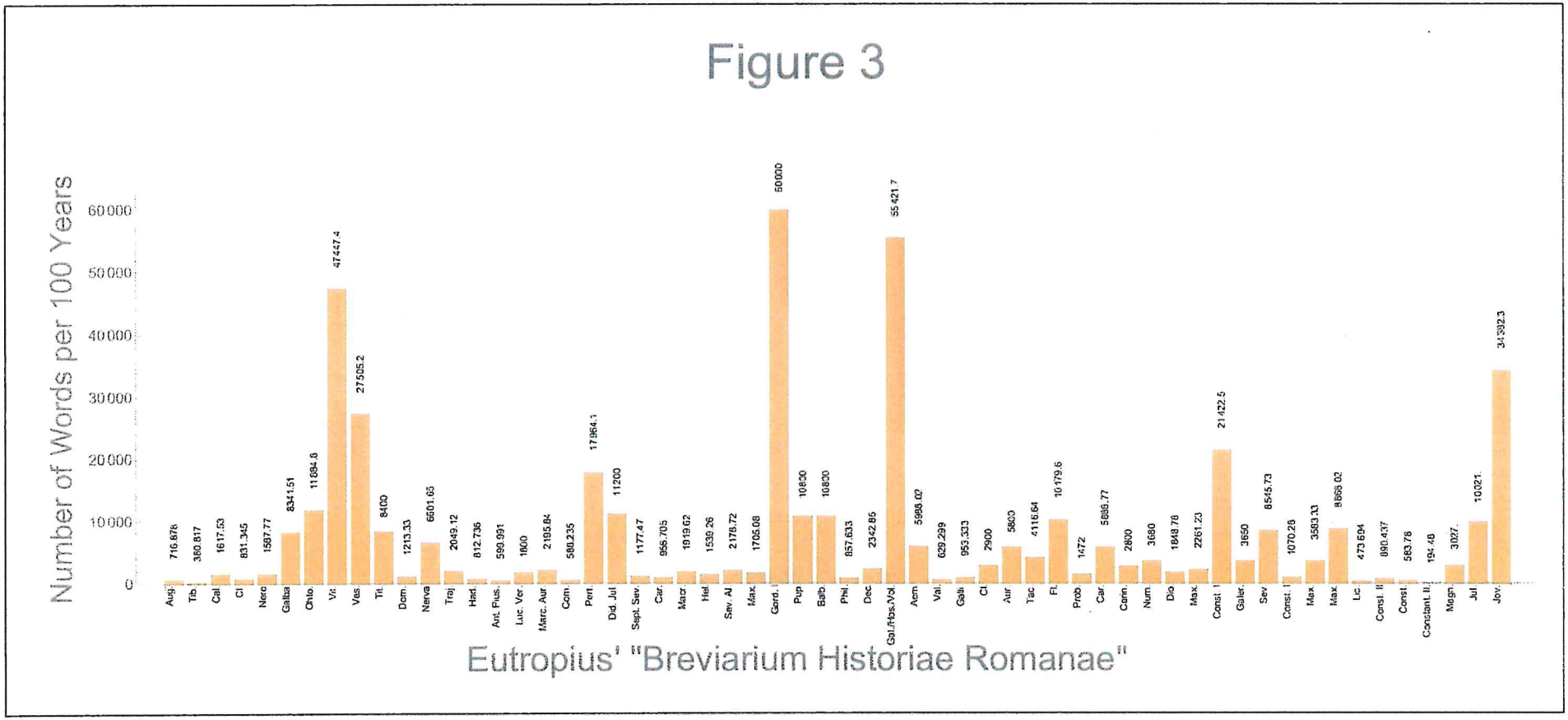


Figure 4: Julio-Claudian Dynasty

Figure 4

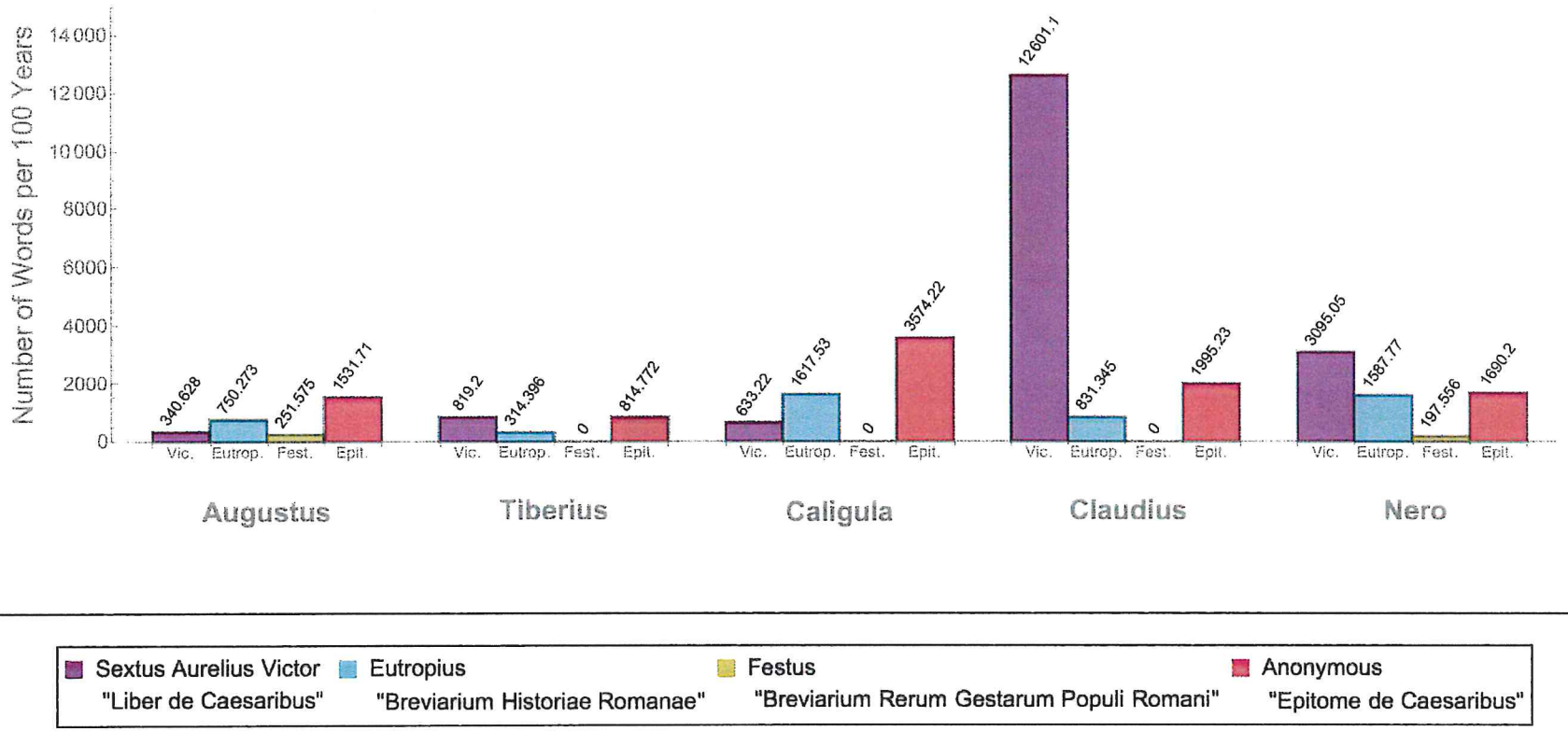

Number of Words per 100 Years
14000
12000
10000
8000
6000
4000
2000
0
340.628
750.273
251.575
1531.71
819.2
314.396
0
814.772
633.22
1617.53
0
3574.22
12601.1
831.345
0
1995.23
3095.05
1587.77
197.556
1690.2
Vic.
Eutrop.
Fest.
Epit.
Augustus
Tiberius
Caligula
Claudius
Nero
Sextus Aurelius Victor "Liber de Caesaribus"
Eutropius "Breviarium Historiae Romanae"
Festus "Breviarium Rerum Gestarum Populi Romani"
Anonymous "Epitome de Caesaribus"

Figure 5: Year of the Four Emperors & the Flavian Dynasty

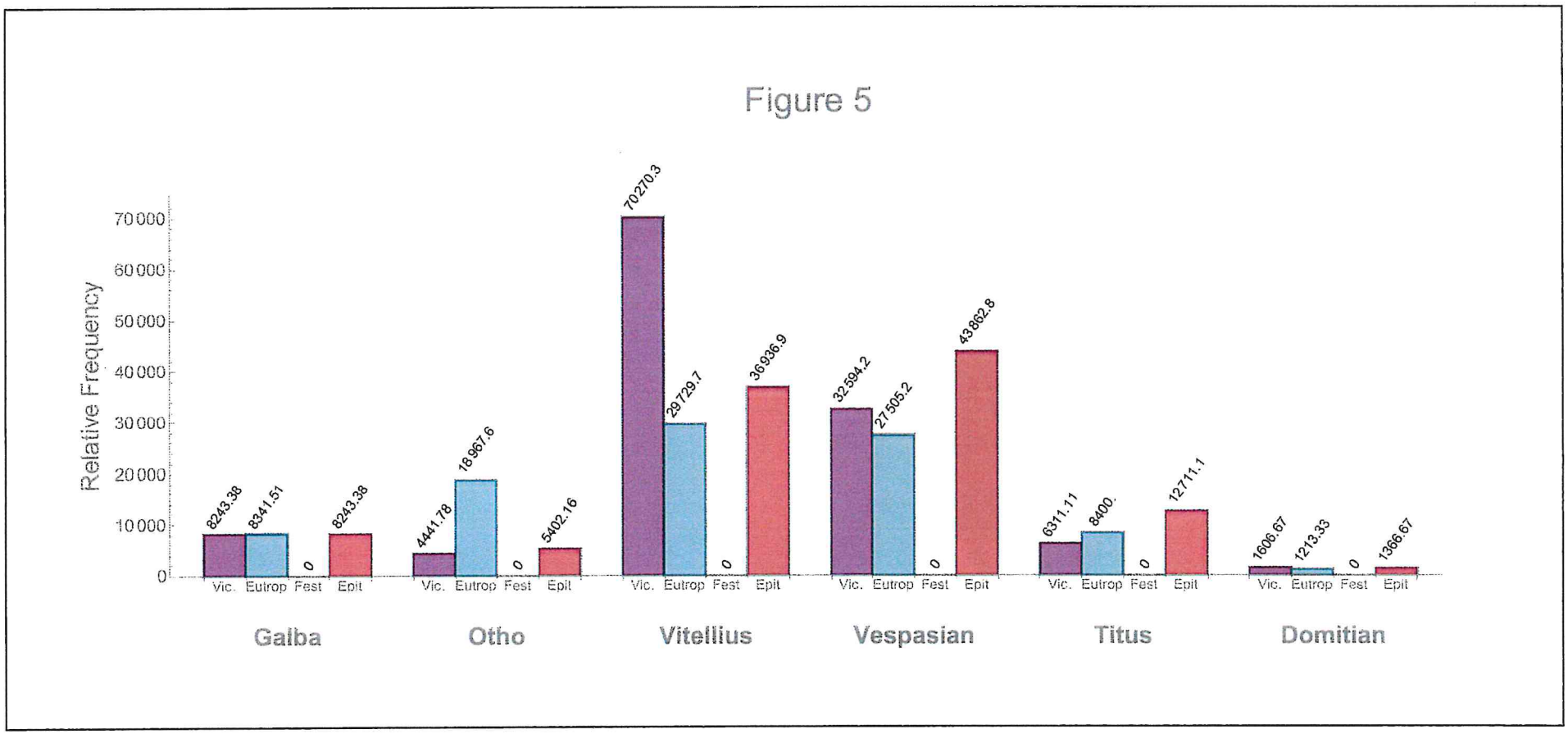


Figure 6: Breakdown of Imperial Descriptions

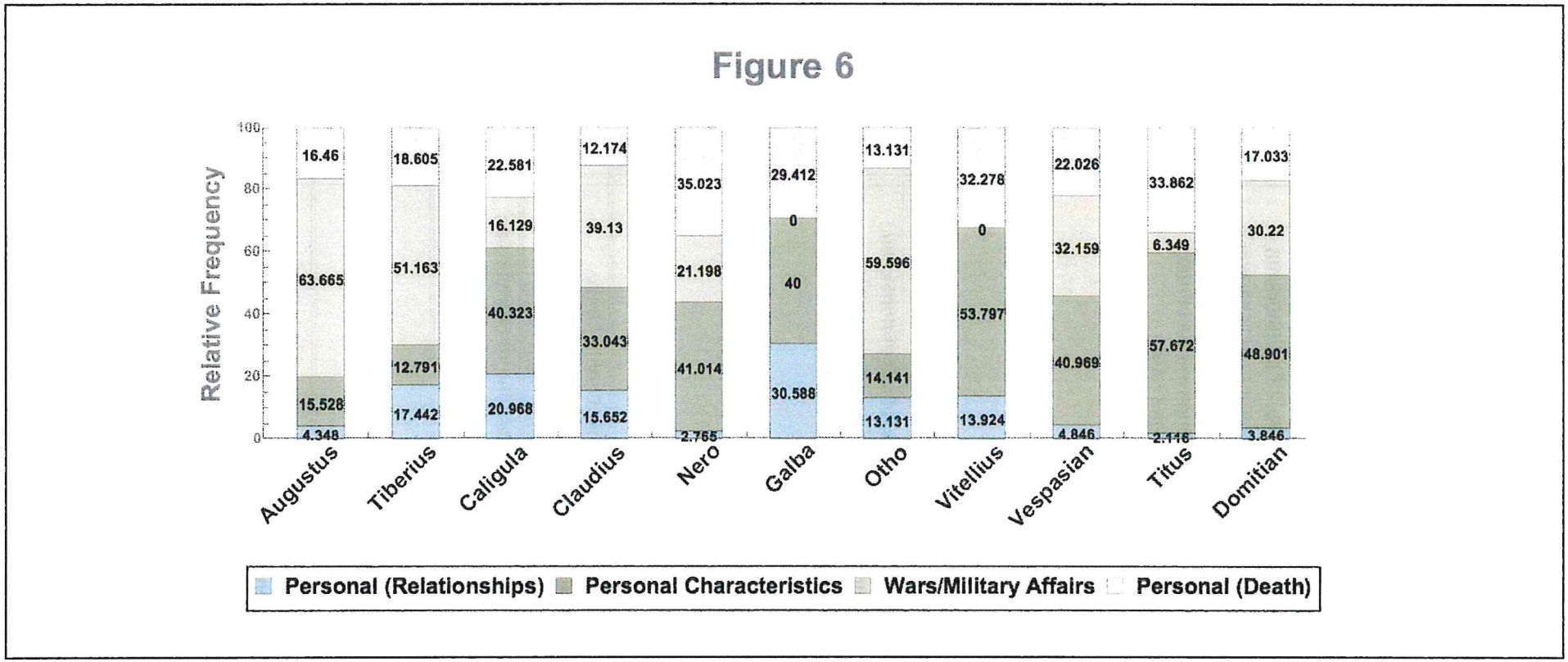


Figure 7: Positive & Negative Comments (Julio-Claudian and Flavian Dynasties)		
Emperor	**Positive Comments**	**Negative Comments**
Augustus	resembled a divinity, successful in war or prudent in peace, conducted himself with greatest courtesy, most liberal to all, most faithful to friends, placed friends to an equal level of dignity (7.8); flourishing Roman state, unconquered in civil war, expanded Roman empire, restored lost standards (7.9); Roman state in most prosperous condition (7.10)	
Tiberius		greatly indolent, excessively cruel, unprincipled avarice, abandoned licentiousness, never fought in person, died to the joy of all men (7.11)
Caligula		most wicked, most cruel, effaced memory of Tiberius' enormities, incest with sisters, raging, great greed, licentiousness, cruelty (7.12)
Claudius	of no striking character, gentleness and moderation, added to empire, civil, consecrated and deified (7.13)	cruelty and folly (7.13)
Nero	built the Neronian (Alexandrian) hot baths in Rome (7.15)	disgraced and weakened empire, extraordinary luxury and extravagance, enemy to all good men, disgracefully exposed himself, guilty of murders, attempted nothing in military affairs, set fire to Rome (7.14); detestable, declared an enemy (7.15)
Galba	of a very ancient and noble family, distinguished by military and civil exploits, promising commencement (7.16)	inclined to excessive severity (7.16)
Otho	noble maternal descent, not obscure on either, no evidence of public disposition (7.17)	effeminate and intimate of Nero (7.17)
Vitellius	honorable rather than noble family (7.18)	reigned most disgracefully, greatest cruelty, gluttony and voraciousness, anxious to resemble Nero, killed with great ignominy (7.18)
Vespasianus	of obscure birth, comparable to best emperors, in his private life greatly distinguished, greatest forbearance with government, collected money with greatest diligence and anxiety, distribute money readily especially to indigent, great	too eager for money (7.19)
	and judicious liberality, mild and amiable,	

	no severer penalty than banishment, expanded empire (7.19); not mindful of offenses and animosities, bore reproaches with indulgence, enforcer of military discipline, object of love and favor, enrolled among the gods (7.20)	
Titus	remarkable for every species of virtues, the favorite and delight of mankind, eloquent, warlike, temperate, pleaded causes in Latin, composed in Greek, lenity towards citizens, good-nature and generosity, no one left in discontent, built amphitheater (7.21); beloved for conduct with much affection, great public lamentation, expressions of good will and commendation by senate, enrolled among gods (7.22)	
Domitian	used power with moderation, erected public monuments	more like Nero, Caligula, or Tiberius, greatest excesses of licentiousness, rage, cruelty, and avarice, universal detestation, effaced remembrance of father/brother, put to death many of senate, addressed as Lord and God, execrable pride, disasters in wars, universally odious, buried ignominiously (7.23), a most murderous tyrant (8.1)

Select Bibliography

Banchich, Thomas. "The Epitomizing Tradition in Late Antiquity." In *A Companion to Greek and Roman Historiography*, edited by John Marincola, 305-312. Malden: Blackwell Publishing Ltd, 2007.

Bird, H.W. The Breviarium Ab Urbe Condita of Eutropius. Liverpool: Liverpool University Press, 1993.

Bonamente, Giorgio."Minor Latin Historians of the Fourth Century A.D." in *Greek and Roman Historiography in Late Antiquity: Fourth to Sixth Century A.D.,* ed. Gabriele Marasco. Leiden: Brill, 2003.

Burke, Peter. "A Survey of the Popularity of Ancient Historians, 1450-1700." *History and Theory* 5.2 (1966): 135-152.

den Boer, W. *Some Minor Roman Historians.* Leiden: Brill, 1972.

Croke, Brian. "Late Antique Historiography, 250-650 CE." In *A Companion to Greek and Roman Historiography*, edited by John Marincola, 567-581. Malden: Blackwell Publishing Ltd, 2007.

Matthews, John. "The Emperor and his Historians." In *A Companion to Greek and Roman Historiography*, edited by John Marincola, 290-304. Malden: Blackwell Publishing Ltd, 2007.

Woods, David. "Late Antique Historiography: A Brief History of Time." In *A Companion to Late Antiquity,* edited by Philip Rousseau, 357-372. Malden: Blackwell Publishing Ltd, 2009.

THE AENEID *AND SOCIAL NETWORK ANALYSIS*

Annual Meeting of the Classical Association of New England Exeter, New Hampshire, March 2017

Abstract

In the summer of 2012, popular media made note of Pádraig Mac Carron and Ralph Kenna's article, "Universal Properties of Mythological Networks," and news of new literary evidence of the plausibility of Homer's *Iliad* quickly spread. This claim to plausibility was based not on archaeological evidence but on social network analysis (i.e. the quantitative study of social relations between a set of actors). Such techniques have been used to reevaluate Homer's *Iliad* and *Odyssey*, Greek tragedy, Cicero's letters, and the relationships of Alexander the Great; however, current studies have neglected Vergil's *Aeneid.*

In this paper, I develop four different social networks from Vergil's *Aeneid*. Static and dynamic conversational networks examine relationships between characters based on dialogue. Static and dynamic co-occurrence networks examine relationships based on the simultaneous appearance of two characters in a scene. The static networks provide a look at the *Aeneid* in its entirety. The dynamic networks look at the individual books of the *Aeneid* and the various roles that a character may play at different points in the narrative. I argue that the mathematical calculations involved with the generation of these networks and the accompanying visual representations can provide a more quantitative perspective on the *Aeneid* as well as on Classical literature as a whole. Combined with the qualitative, close reading of Gilbert Highet, these two approaches can provide a more holistic *Aeneid*. Moreover, I argue that the "small-world" characteristics of these networks suggest that Vergil's narrative mirrors real-world networks in a way that effectively moves his audience.

Just as relationships between people can be traced on networking sites such as Facebook, Google Plus, LinkedIn, and Twitter, relationships between characters can be considered in the context of literature. This kind of quantitative analysis has been applied to standard pieces of western literature such as nineteenth-century British novels as well as more popular pieces of fiction such as the Marvel Comic Universe and George R.R. Martin's *Game of Thrones*.[1] In this paper, I analyze Vergil's *Aeneid* using basic social network analysis metrics in order to quantitatively reconsider and visualize the relationships of characters in this epic. First, I briefly discuss some basic metrics and calculations involved with their analysis. Then, I discuss how calculations based on these networks can be used to judge whether or not Vergil was able to accurately mirror real world relationship structures. Due to the time constraints today, I will be glossing over the specifics of the mathematics, though for those you, who are interested, these details will be soon uploaded online for your perusal.

What is social network analysis? Social networks comprise of nodes, i.e., actors or vertices, which are connected by ties, i.e., edges or links. Together, these nodes and these ties or links form distinct patterns. Analysis of these networks can be used to study the structural variables and the relationship structures of these groups, how information can be shared and how characters can interact.[2] This type of analysis has been applied to classical literature

---

[1] David K. Elson, Nicholas Dames, and Kathleen R. McKeown, "Extracting Social Networks from Literary Fiction," in *Procedures of the 48th Annual Meeting of the Association for Computational Linguistics*, Uppsala Sweden, July 11-16, 2010: 138-147. Prashant Arun Jayannavar, Apporv Agarwal, Melody Ju, and Owen Rambow. "Validating Literary Theories Using Automatic Social Network Extraction," *Proceedingss of NAACL-HLT Fourth Workshop on Computational Linguistics for Literature*. Denver, Colorado, June 4, 2015: 32-41. R. J. Alberich, R. J., Miro-Julia, and F. Rosselló. "Marvel Universe looks almost like a real social network," preprint, submitted Feb. 11, 2002. http://arxiv.org/pdf/cond-mat/0202174.pdf. Andrew Beveridge and Jie Shan, "Network of Thrones," *Math Horizons* 23.4 (April 2016): 18-22.

[2] Franco Moretti, "Network Theory, Plot Analysis," *New Left Review* 68 (2011): 80-102. Stanley Wasserman and Katherine Faust, *Social Network Analysis: Methods and Applications* (Cambridge: Cambridge University Press, 1994), 9.

before, most notably by Padraig Mac Carron and Ralph Kenna in 2012, when they argued that the realistic relationship structures in Homer's *Iliad* were indicative of the historical foundations for the epic. These techniques have also been variably applied to the letters of Cicero, Greek tragedies, Homer's *Odyssey*, and Herodotus' *Histories*. Despite the attention paid to Homer, Vergil has been, unfortunately, left to the wayside until this point.

While much work has been done in the automatic detection of characters and dialogue by computers, for this study, the annotation of the text was done by hand. Though shifting this distance reading to a closer reading of this text, this type of annotation allowed for a finer analysis of relationships. When the text was analyzed, four different types of networks were created. First static and dynamic *conversational networks* were generated. In these networks, two nodes are connected by an edge when there is explicit dialogue exchanged between two characters. The networks are *directed*, i.e., who is addressing whom is noted. There are *weighted nodes*, which are relative to the total number of words spoken by that character, and *weighted edges*, which are relative to the total number of words exchanged between the two characters.[3] Following the example of Elson, Dames, and McKeown, the length of the quote is added to the edge weight because it is hypothesized that the number of words exchanged between characters is related to the strength of their relationship.[4] In other words, characters who are closer and have more meaningful relationships tend to exchange more words with one another. There are 334 exchanges in the *Aeneid*, counting direct quotations within dialogue[5]

---

[3] Ardanuy, 13.
[4] Elson, Dames, and McKeown, "Extracting Social Networks,"
[5] Depending on how speech is defined, these numbers can vary. Highet found that there were 333 speeches Highet, 19.

Within the *Aeneid*, there are 63,719 words.[6] Of these words, 24,572 or 38.56% are quoted text.[7] While this type of network is limited in that it omits non-spoken interactions, it guarantees that the relationships recorded between characters are meaningful and quantitatively so.[8]

Co-Occurrence Networks in which two characters are connected by an edge when they co-occur in the same "scene" and interact in some way. Since there are no defined scenes as in Greek tragedies or the plays of Shakespeare, where similar networks were created, these shifts were defined by changes in location and/or in time because these connections are reliant on a mutual awareness of the characters. While the nodes and edges remained weighted as in the conversational networks, the edges are now undirected so they type of relationship and the reciprocity of the relationship – or lackthereof – is not acknowledged.

For both conversational and co-occurrence networks, static and dynamic networks were derived. The *static network* does not consider the factor of time, rather it looks at the *Aeneid* in its entirety. The *dynamic networks* look at the *Aeneid* not holistically but rather in terms of its individual books.[9] By considering the factor of time, it allows one to consider the development of characters and their varying roles throughout the epic.

---

[6] This number is derived from an analysis of the edition of the *Aeneid* provided for through the Classical Latin Texts prepared by the Packard Humanities Institute. Total word counts were generated from the machine-generated analysis of the *Perseus Project* under ACTFL's *PhiloLogic*.
[7] Elson, Dames, and McKeown, "Extracting Social Networks," 144.
[8] Marjona Coll Ardanuy and Caroline Sporleder, "Clustering of Novels Represented as Social Networks," *Linguistic Issues in Language Technology (LiLT)* 12, no. 4 (Oct. 2015): 12.
[9] Ardanuy, 13 and 16.

Basic Network Metrics

Having established the networks that we will be looking at today we can consider some basic network metrics that help to broadly and quantitatively define our networks. For the sake of time, I will be focusing on the static and dynamic conversational networks, though this should further drive home the difference between static and dynamic networks and the importance in considering both varieties. The first feature that is clearly evident is the number of nodes, i.e., characters, and the number of edges., i.e., relationships. There are 132 speakers in the *Aeneid* and there are 226 unique pairings between them, though as I mentioned earlier there are 334 exchanges of dialogue total. Predictably, as the dynamic networks looks at the individual books of the *Aeneid*, the number of characters total is greatly reduced as is the number of pairings.

Just as an example of the difference between the conversational and co-occurrence networks, we can look at the number of nodes and the number of pairings in the static co-occurrence networks. The number of characters and the number of relationships included in this analysis is far more inclusive.

- In terms of other metrics, the ***average degree*** represents the average number of characters with whom a person as spoken with or interacted with.[10]

  For example, in Book 1, each character on average speaks to just 1 other.

- The ***average weighted degree*** represents the average of the sum of the weights of all the links attached to a node. This value helps to determine not only how many people a node may be connected to but also how much dialogue, on average, is exchanged between two people.

[10] Alberich, 7. Wasserman, 100-101. Apporv Agarwal, Augusto Corvalan, Jacob Jensen, and Owen Rambow, "Social Network Analysis in *Alice in Wonderland*," in *Workshop on Computational Linguistics for Literature*, Montréal, Canada, June 8, 2012: 91. Elson, Dames, and McKeown, "Extracting Social Networks," 144. Kydros, 120-121. Beveridge, 20. Wasserman, 100-101.

Looking again at Book 1, on average, 179 words are exchanged, just a few moments of conversation. In a book such as Book 5 where the average is lower, we see that there is a greater emphasis on action over extended exchanges of dialogue.

- The ***connectance*** (or ***link or graph density***) measures the proportion of possible links between characters.[11] This measurement considers not only what relationships exist but also what relationships could possibly exist.

  Overall, the number of possible relationships are not taken advantage of in terms of dialogue exchanges.

- The ***giant component*** is the largest subset of nodes with their corresponding links and thus shows how connected a set number of characters are.[12]

  Despite this and their small size, the networks in the *Aeneid* remain well-connected.

- The ***average path length*** is the shortest path from a node to all other nodes within the graph.[13] This measure is referred more popularly to as "degrees of separation" as it shows how quickly information could be passed around.[14]

  As shown by this value, it is easy to communicate between people based on the well-connected nature of the network.

- The ***clustering coefficient*** measures the probability that two acquaintances of a given person mostly likely know one another.[15] This value helps to determine how likely characters are to group together and converse with one another. The average clustering coefficient is a value between 0 and 1 with 0 representing a more fractured group and 1 resembling more of a clique.

  Despite these connections, the low clustering coefficient suggests that people were not likely to know one another.

---

[11] Stiller, James, Daniel Nettle, and Robin I. M. Dunbar. "The Small World of Shakespeare's Plays." *Human Nature* 14 no. 4 (2003): 399. Wasserman, 101-103. Elson, Dames, and McKeown, "Extracting Social Networks," 144. Kydros, 120. Stiller, James and Matthew Hudson. "Weak Links and Scene Cliques within the Small World of Shakespeare." *Journal of Cultural and Evolutionary Psychology* 3 no. 1 (2005): 61. Wasserman, 101-102 and 129.

[12] Alberich, 8. Carron and Kenna, "Universal Properties of Mythological Networks," 2.

[13] Alberich, 9. Stiller, "Weak Links and Scene Cliques," 61. Stiller, "The Small World of Shakespeare's Plays," 399. Miranda, 4).

[14] Stiller, "The Small World of Shakespeare's Plays," 399.

[15] Alberich, 10. Sebastian Gil, Laney Kuenzel, and Caroline Suen, "Extraction and Analysis of Character Interaction Networks from Plays and Movies," Technical Report, Stanford University, December 11, 2011: 4. Kydros, 121. Stiller, "Small Scenes and Cliques," 61. Stiller, "The Small World of Shakespeare's Plays," 399-400. Carron and Kenna, "Universal Properties of Mythological Networks," 1.

In considering the centrality of an individual character further metrics can be calculated:

- The ***degree*** represents the total number of points that have edges connected to a specific character node.[16]

  For example, we can see that Ascanius has a degree of 10 so he talks to 10 separate characters throughout the *Aeneid.* However, though he speaks to a relatively large number of individuals, he ranks 20th in terms of his weighted degree, the number of words that he speaks.

- The ***eccentricity,*** which measures how far a character is from the furthest actor also helps to demonstrate a character's centrality.[17]

  His eccentricity number is quite low suggesting that he remains quite central to the plot.

- The ***betweenness centrality*** is the proportion of all distances between the pairs of characters including one particular character.[18] This value which can be used to determine the central actor that acts as a bridge for conversation between individuals.

  Similarly, the high betweenness centrality also supports the centrality of Ascanius.

Finally, we can end by considering the difference that the co-occurrence and conversational network would play on our understanding of the *Aeneid*. When taking into account not only the dialogue but the actions of the characters, their seeming centrality varies. Though Aeneas is still the protagonist and the central character, characters such as Achates gain more importance when actions are considered over words.

Using these metrics as a basis, we can determine if the relationships in the *Aeneid* mirrors the relationships of the real world

- Small world if...
  - Average Path Length $\approx$ Average Path of the Random Graph
  - Clustering Coefficient $\gg$ Clustering Coefficient of the Random Graph

[16] Scott, 69. Agarwal, 91.
[17] Kydros, 121.
[18] Kydros, 123. Carron and Kenna, "Universal Properties of Mythological Networks," 2. Beveridge, 21. Miranda, 5-6. Wasserman 188-191.

- Hierarchy depending on the degree distribution
- Scale free if
    - Hierarchical structure
    - Targeted target (vulnerable)
    - Random attack (robust)
- Giant component (connected nodes) <90%
- Assortativity Coefficient – positive linear relationship

Though Vergil was not documenting a history word-for-word, his ability to accurately emulate the real world structure of relationships represents his skill as an author and his ability to use structures familiar and natural to humans to carry along his epic.

Franco Moretti remarks, "I did not need network *theory*; but I probably needed *networks*" as he believes that visualizations help to further display the relationship structures of the network.[19] I would argue that network theory and the calculations that come from this help to marry quantitative and qualitative analysis and to provide objective perspectives on the roles of characters and their relationship.[20] Having considered the important difference between static and dynamic networks, we can have also seen the general, quantitative characteristics that can arise as well as the comparison of character relationships. Moreover, an author's ability to accurately emulate relationship structures is very much possible. Future work remains, for example, in the refining of the types of relationships in the co-occurrence networks. This paper serves as an introduction to the possibilities of social network analysis and a look towards the value of this type of quantitative analysis and visualization on a text like the *Aeneid*. From these metrics and graphs, the relationships and roles of characters can become more exciting, more meaningful, and more significant to readers.

---

[19] Moretti, 11

[20] Jeff Ryberg-Cox, "Social Networks and the Language of Greek Tragedy," *Journal of the Chicago Colloqium on the Digital Humanities and Computer Science* 1, no. 3 (2011): 10-11.

Bibliography

Agarwal, Apporv, Augusto Corvalan, Jacob Jensen, and Owen Rambow. "Social Network Analysis in *Alice in Wonderland*." In *Workshop on Computational Linguistics for Literature*, Montréal, Canada, June 8, 2012: 88-96.

Alberich, R. J., Miro-Julia, and F. Rosselló. "Marvel Universe looks almost like a real social network." Preprint, submitted Feb. 11, 2002. http://arxiv.org/pdf/cond-mat/0202174.pdf.

Alexander, Michael C. and James A. Dankowski. "Analysis of an Ancient Network: Personal Communication and the Study of Social Structure in a Past Society." *Social Networks* 12, no. 4 (December 1990): 313-335.

Ardanuy, Marjona Coll and Caroline Sporleder. "Clustering of Novels Represented as Social Networks." *Linguistic Issues in Language Technology (LiLT)* 12, no. 4 (Oct. 2015): 1-28.

Beveridge, Andrew and Jie Shan. "Network of Thrones." *Math Horizons* 23.4 (April 2016): 18-22.

Bohannon, John. "Deciphering myths into legends." Last modified July 25, 2012. http://www.stuff.co.nz/science/7346191/Deciphering-myths-into-legends.

Borgatti, Stephen P., Martin G. Everett, and Jeffrey C. Johnson. *Analyzing Social Networks*. Los Angeles: Sage Publications Ltd., 2013.

Carron, Padraig Mac and Ralph Kenna. "If Achilles Used Facebook..." Last modified Sept. 8, 2012. http://www.nytimes.com/2012/09/09/opinion/sunday/the-social-networks-of-myths.html?_r=0

Carron, Pádraig Mac and Ralph Kenna. "Universal Properties of Mythological Networks." *Europhysics Letters (EPL)* 99 (2012): 1-6.

Celikyilmaz, Asli, Dilek Hakkani-Tur, Hua He, Greg Kondrak, and Denilson Barbosa. "The Actor-Topic Model for Extracting Social Networks in Literary Narrative." *Proceedings of the NIPS 2010 Workshop – Machine Learning for Social Computing*.

Cline, Diane H. "Social Network Analysis and Ancient History." Paper presented at annual meeting for the American Philological Association (APA), Chicago, Illinois, January 3, 2014.

Collins, Nick. "Beowulf and Iliad 'more plausible than Shakespeare.'" Last modified July 25, 2012. http://www.telegraph.co.uk/culture/9423516/Beowulf-and-Iliad-more-plausible-than-Shakespeare.html.

Elson, David K. and Kathleen R. McKeown. "Automatic Attribution of Quoted Speech in Literary Narrative." In *Proceedings of the Twenty-Fourth Association for the Advancement of Artificial Intelligence (AAAI) Conference on Artificial Intelligence*. Atlanta, Georgia, 2010.

Elson, David K., Nicholas Dames, and Kathleen R. McKeown. "Extracting Social Networks from Literary Fiction." In *Procedures of the 48th Annual Meeting of the Association for Computational Linguistics*, Uppsala Sweden, July 11-16, 2010: 138-147.

Emerging Technology from the airXiv. "The Remarkable Properties of Mythological Social Networks." Last modified June 13, 2013. https://www.technologyreview.com/s/516081/the-remarkable-properties-of-mythological-social-networks/.

Gil, Sebastian, Laney Kuenzel, and Caroline Suen. "Extraction and Analysis of Character Interaction Networks from Plays and Movies." Technical Report, Stanford University, December 11, 2011.

Highet, Gilbert. *The Speeches in Vergil's Aeneid*. Princeton, New Jersey: Princeton University Press, 1972.

Jayannavar, Prashant Arun, Apporv Agarwal, Melody Ju, and Owen Rambow. "Validating Literary Theories Using Automatic Social Network Extraction." *Proceedingss of NAACL-HLT Fourth Workshop on Computational Linguistics for Literature*. Denver, Colorado, June 4, 2015: 32-41.

Kadushin, Charles. *Understanding Social Networks: Theories, Concepts, and Findings.* Oxford: Oxford University Press, 2012.

Kydros, Dimitrios, Panagiotis Notopoulos, and Georgios Exarchos. "Homer's Iliad – A Social Network Analytic Approach." *International Journal of Humanities and Art Computing* 9 no. 1 (2015): 115-132.

Malkin, Irad, Christy Constantakopoulou, and Katerina Panagopoulou. *Greek and Roman Networks in the Mediterranean* (New York: Routledge, 2009).

Meadows, David. "On the 'Plausibility' of the Iliad and Social Networks?" Last modified July 25, 2012. https://rogueclassicism.com/2012/07/25/on-the-plausibility-of-the-iliad-and-social-networks/.

Miranda, P.J., M.S. Baptista, and S.E. de Souza Pinto. "Analysis of communities in a mythological social network." Preprint, submitted June 19, 2013, http://arxiv.org/abs/1306.2537.

Moretti, Franco. "Network Theory, Plot Analysis." *New Left Review* no. 68 (2011): 80-102.

Park, Gyeong-Mi, Sung-Hwan Kim, Hye-Reon Hwang, and Hwan-Gue Cho. "Complex System Analysis of Social Networks Extracted from Literary Fictions." *International Journal of Machine Learning and Computing* 3 no. 1 (Feb. 2013): 107-111.

Ryberg-Cox, Jeff. "Social Networks and the Language of Greek Tragedy." *Journal of the Chicago Colloquium on the Digital Humanities and Computer Science* 1, no. 3 (2011): 1-11.

Science 2.0. "What the Iliad Can Tell Us About Science 2.0 And Networks." Last modified July 25, 2012. http://www.science20.com/news_articles/what_iliad_can_tell_us_about_science_20_and_networks-92450.

Scott, John. *Social Network Analysis: A Handbook*. 2nd ed. London: Sage Publications, 2000.

Stiller, James and Matthew Hudson. "Weak Links and Scene Cliques within the Small World of Shakespeare." *Journal of Cultural and Evolutionary Psychology* 3 no. 1 (2005): 57-73.

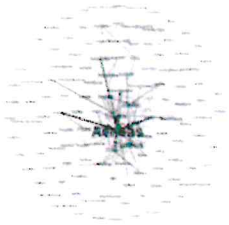
Stiller, James, Daniel Nettle, and Robin I. M. Dunbar. "The Small World of Shakespeare's Plays." *Human Nature* 14 no. 4 (2003): 397-408.

Shurkin, Joel. "Using Social Networks to Analyze the Classics." Last modified July 24, 2012. https://www.insidescience.org/news/using-social-networks-analyze-classics

Sutherland, John. "Beowulf, Shakespeare and the plausibility of fiction." last modified July 25, 2012, https://www.theguardian.com/commentisfree/2012/jul/25/beowulf-shakespeare-plausible-fiction?newsfeed=true#comment-17351783.

Wasserman, Stanley and Katherine Faust. *Social Network Analysis: Methods and Applications.* Cambridge: Cambridge University Press, 1994.

The Aeneid and Social Network Analysis

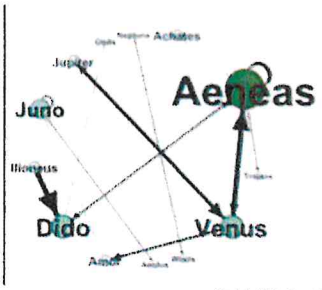


Emma Vanderpool
Monmouth College '17
evanderpool@monmouthcollege.edu

Annual CANE Meeting
March 18, 2017
Exeter, New Hampshire

What is Social Network Analysis?

Networks comprise of
nodes
(i.e., "actors" or "vertices")
connected by **edges**
(i.e., "ties" or "links")
that form distinct **patterns** or **relationships**



Book 1 of *The Aeneid*

Applications of Social Network Analysis

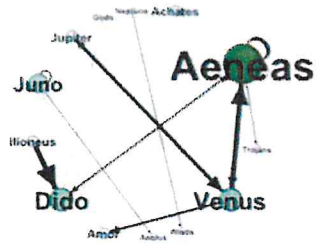
- **Letters of Cicero** (Michael C. Alexander & James A. Danowski, 1990)
- **Greek Tragedies** (Jeff Ryberg-Cox, 2011)
- **Homer's *Iliad*** (Padraig Mac Carron and Ralph Kenna, 2012)
  - (Rydros, Dimitrios, Panagiotis Natopoulos, and Georgios Evanchos, 2015)
- **Homer's *Odyssey*** (P.J. Miranda, M.S. Baptista, and S.E. de Souza Pinto, 2013)
- **Herodotus' *Histories*** (Hestia Project, 2014)

Types of Networks

Dynamic and Static
Conversational Networks

two character nodes are connected by an edge when there is **explicit** dialogue between the two

- directed edges
- weighted nodes
- weighted edges



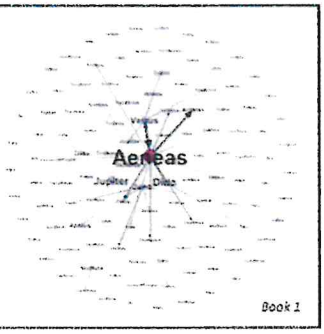
Book 1

Types of Networks

Dynamic and Static
Co-Occurrence Networks

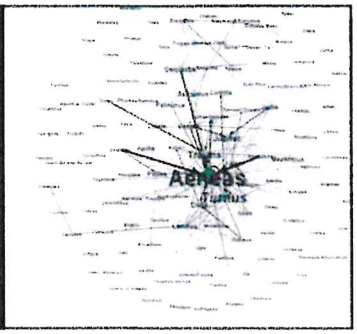
in which two characters are connected by an edge when they co-occur in the same "scene" and interact in some way

- undirected edges
- weighted nodes
- weighted edges



Book 1

Basic Network Metrics



Basic Metrics: Nodes & Links

CONVERSATIONAL NETWORK

STATIC NETWORK

Number of Nodes	Number of Links
132	226

DYNAMIC NETWORKS

Number of Nodes											
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
13	20	14	11	25	14	14	12	44	25	23	21
Number of Links											
18	20	15	13	30	20	17	14	28	34	25	26

Basic Metrics: Nodes & Links

CO-OCCURRENCE NETWORK

STATIC NETWORK

Number of Nodes	Number of Links
455	803

DYNAMIC NETWORKS

Number of Nodes											
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
121	199	175	123	137	126	134	123	185	136	132	138
Number of Links											
152	213	193	105	152	143	142	131	197	148	144	152

Metrics: Average Degree

the average number of characters
with whom a character has spoken or interacted

CONVERSATIONAL NETWORK

STATIC NETWORKS

1.70

DYNAMIC NETWORKS

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1.39	1	1	1.35	1.2	1.5	1.21	1.17	1.27	1.36	1.09	1.24

Metrics: Average Weighted Degree

represents the average of the sum of the weights of
all the relationships attached to a character

CONVERSATIONAL NETWORK

STATIC NETWORKS

184.752

DYNAMIC NETWORKS

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
178.92	94.45	139	197.36	62.2	226.73	95.07	194.41	79.18	74.44	119.04	93.52

Metric: Graph Density

the proportion of possible links between characters

CONVERSATIONAL NETWORK

STATIC NETWORKS

.013

DYNAMIC NETWORKS

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
.12	.05	.1	.12	.05	.12	.10	.11	.06	.06	.02	.06

Metrics: Giant Component

the largest subset of characters with their corresponding links

CONVERSATIONAL NETWORK

STATIC NETWORKS

Number of Nodes	Percentage
118	89.39

DYNAMIC NETWORKS

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
#	11	11	-	9	14	-	-	8	-	23	21	18
%	84.62	55	-	81.82	56	-	-	66.67	-	92	91.3	85.71

Metrics: Average Path Length

the shortest path from a node to all other nodes within the graph

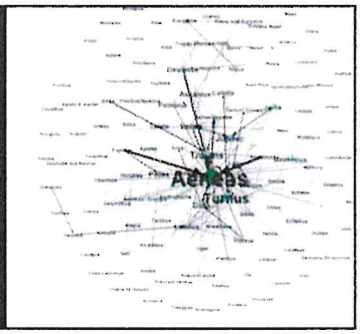
	1	2	3	4	5	6	7	8	9	10	11	12
CONVERSATIONAL NETWORK												
STATIC NETWORKS												
						3.28						
DYNAMIC NETWORKS												
	2.12	1.77	1.88	2.24	2.11	2.12	1.95	1.78	4.05	1.844	2.89	2.28

Metric: Average Clustering Coefficient

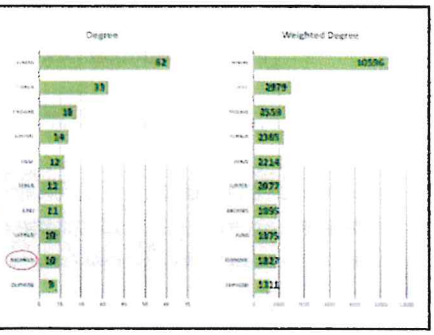
the probability that two acquaintances of a given character mostly likely know one another

	1	2	3	4	5	6	7	8	9	10	11	12
CONVERSATIONAL NETWORK												
STATIC NETWORKS												
						.10						
DYNAMIC NETWORKS												
	.10	.01	0	.03	.09	.091	.06	.12	.01	.10	.02	.01

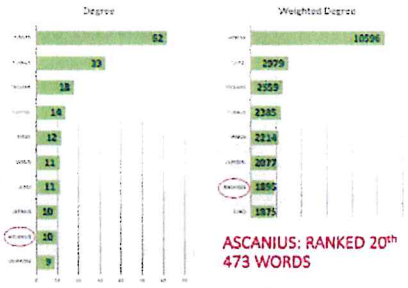
Character Roles



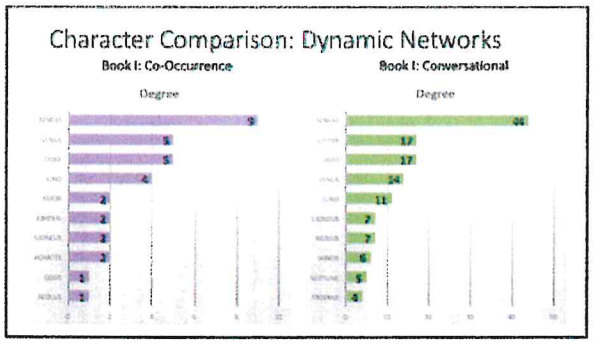
Character Comparison: Static Conversational

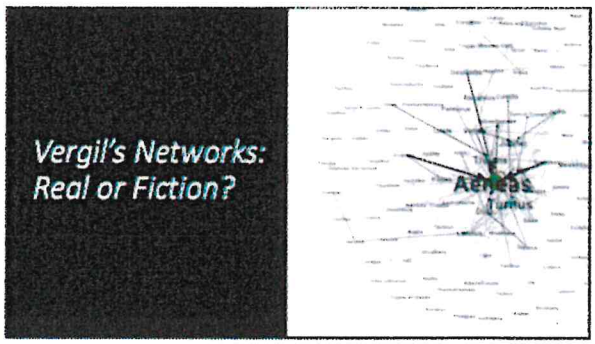


Character Comparison: Static Conversational



ASCANIUS: RANKED 20th
473 WORDS





Characteristics of Networks in the Real World

	Social	Static Conversational	Static Co-Occurrence
Small World	Yes	Yes	Yes
Hierarchy	Yes	Yes	Yes
P(k)	Power Law	Power Law	Power Law
Scale Free	Yes	Yes	Yes
Targeted Attack	Vulnerable	Vulnerable	Vulnerable
Random Attack	Robust	Robust	Robust
Giant Component	<90%	<90%	<90%
Assortative	Yes	Yes	Yes

Conclusion

- Static vs. Dynamic Networks
- Characteristics of Networks
- Character Comparison
- Real World Characteristics of *Aeneid*

Facebook-ing Vergil's *Aeneid*: Social Network Analysis of a Classical Epic

Classics Department
Emma Vanderpool '17, Adviser: Dr. Thomas J. Sienkewicz

WHAT IS SOCIAL NETWORK ANALYSIS (SNA)?

the study of a set of actors and the relationships between them with the hypothesis that what happens to a group is a function of the structure of connections between them

WHY USE SNA?

- it provides a vocabulary to label and denote many different types of social structural properties
- it gives us mathematical operations and ideas with which many of these properties can be quantified and measured
- it provides for visualizations that allow for new perspectives on well-studied relationships

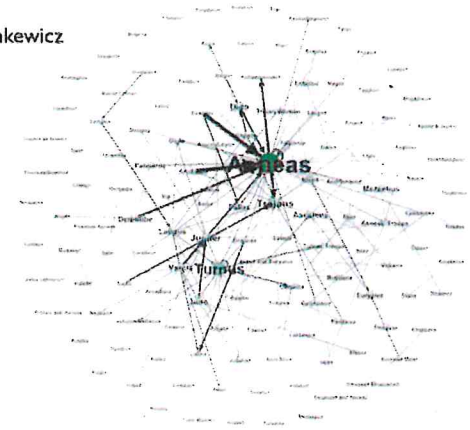
132 NODES (characters)
226 LINKS (unique conversation pairs)

AVERAGE DEGREE = 1.7
average number of conversation partners

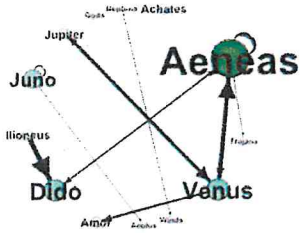
AVERAGE WEIGHTED DEGREE = 184.75
average number of words exchanged

AVERAGE PATH LENGTH = 3.28
"degrees of separation"

CLUSTERING COEFFICIENT = .10
how fractured or clique-like a network is
0 = fractured 1 = clique



STATIC CONVERSATIONAL NETWORK
looking at the entire *Aeneid*



DYNAMIC CONVERSATIONAL NETWORK
BOOK I OF THE *AENEID*

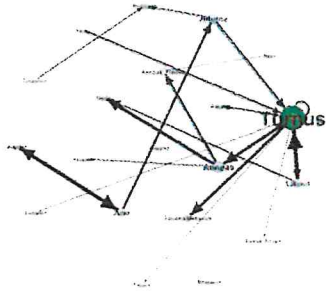
13 NODES (characters)
18 LINKS (unique conversation pairs)

AVERAGE DEGREE = 1.39

AVERAGE WEIGHTED DEGREE = 178.92

AVERAGE PATH LENGTH = 2.12

CLUSTERING COEFFICIENT = .10



DYNAMIC CONVERSATIONAL NETWORK
BOOK XII OF THE *AENEID*

21 NODES (characters)
26 LINKS (unique conversations)

AVERAGE DEGREE = 1.24

AVERAGE WEIGHTED DEGREE = 93.52

AVERAGE PATH LENGTH = 2.28

CLUSTERING COEFFICIENT = .01

TYPE OF NETWORK STUDIED

- **conversational networks** in which two character nodes are connected by an edge when there is explicit dialogue between the two and when a character mentions another in dialogue;
- **directed links:** who is addressing whom is noted
- **weighted nodes:** the size of the node is relative to the total number of words spoken by each character
- **weighted edges:** the width of the links are relative to the total number of words exchanged between two characters

CONCLUSION

Plenty remains to be studied in this analyze of the networks of the *Aeneid*. However, even the introductory results shown here demonstrate the usefulness of social network analysis and its application to literature. It provides a language for these relationships to be explored with, and it also provides a quantitative way in which relationships and character roles can be measured. The visualizations alone offer tantalizing opportunities for both beginning and advanced readers of the texts.

Select Bibliography:
Barabási, Albert-László. *Network Science.* Cambridge: Cambridge University Press, 2016.
Carron, Pádraig Mac and Ralph Kenna. "Universal Properties of Mythological Networks." *Europhysics Letters (EPL)* 99 (2012). DOI: 10.1209/0295-5075/99/28002.
Wasserman, Stanley and Katherine Faust. *Social Network Analysis: Methods and Applications.* Cambridge: Cambridge University Press, 1994.

Acknowledgements: Thanks to Dr. Thomas J. Sienkewicz, Matthew Katsenes M.A.T., M.S. (Moultonborough Academy, NH) and Matt Albert M.A. (Doral Academy – Red Rock HS, NV) for their invaluable feedback and critique. **A version of this presentation was given at the 2017 meeting of the Classical Association of the North East (CANE).**

THE MEDIEVAL TRANSFORMATION OF CAESAR'S INVASION OF BRITAIN

National Convention of Eta Sigma Phi (The National Classics Honor Society)
Ann Arbor, Michigan, April 2017

Abstract

In 55 and 54 BCE, Gaius Julius Caesar twice invaded Britain, and his endeavors were first recorded in his *Commentaries on the Gallic Wars* and later incorporated into the later English Chronicles. Medieval authors such as Orosius, Bede, Nennius, and Geoffrey of Monmouth gradually altered and ultimately transformed Caesar's *Commentaries* and his invasion into Britain into an early expression of English nationalism. While the concept of nationalism is traditionally considered in relation to Benedict Anderson's seminal work, *Imagined Communities*, medievalists such as Thorlac Turville-Petre, Lesley Johnson, Adrian Hastings, and Katherine McLoone have pushed back against the establishment of nations in the nineteenth centuries and seen seeds of nationalism in Medieval England. In this paper, I focus on the evolution of the Battle of the Thames during Caesar's second invasion across the centuries as not only the language changed but also the very events and the outcome of the battle was consciously altered by medieval authors. The transformation of the story of this pseudo-Caesar culminates in Geoffrey of Monmouth's national epic, *History of the Kings of Britons*. The Britons were elevated to rivals worthy of the Roman Republic and its legendary leader and the embryonic seeds of nationalism were planted in this representational labor.

Caesar's account of his invasions into Britain in 55-54 BCE were gradually altered and ultimately transformed by medieval English chroniclers into an early expression of English nationalism. Early authors such as Orosius, a Christian theologian and historian from the 5th century, and Bede the Venerable, an English monk and historian from the 8th century, seemed to have had based their account on classical sources, including Caesar himself. Their abridgement of the invasion opened the way to gradual innovations on the part of Nennius, a Welsh monk from the 9th century, and Geoffrey of Monmouth, a Welsh cleric and historian from the 12th century. The latter of whom still had a clear knowledge of these sources, yet in the tradition of his contemporary Henry of Huntingdon. Geoffrey embellished the story to such a degree that there is no doubt that he made these changes consciously and purposefully. In this paper, I focus on the development of the Battle of the Thames during Caesar's second invasion because it stands as a representative demonstration of the changing of the narrative. Furthermore, its continuing significance and presence in the records allows for a comparison of the changing language across the centuries.

Orosius and the Venerable Bede both give a significantly abridged version of Caesar's invasion of Britain. Bede takes the passage almost verbatim from Orosius. Orosius in his *Historia Adversus Paganos* (*History Against the Pagans*) cites Suetonius as one of his sources of information; however, because he draws explicitly upon the language of Caesar, scholars have hypothesized that Orosius had access to an edition of Suetonius with Caesar's *Commentaries*. He also clearly had access to the *Kaisergeschichte* as well as Livy, Florus, Eutropius, Caesar, Sallust, Tacitus, and Suetonius as he often takes material explicitly from these authors or with minor alterations. Though Geoffrey of Monmouth in his *Historia Regum Britonum* (*The History*

of the Kings of Briton) focused on the work of Henry of Huntingdon, one also finds the "errors of Bede and the fiction of Nennius embodied and amplified."[261] In order to illustrate this transformation, Caesar's account of the Battle of the Thames will be compared to the later accounts by these chroniclers.

Only several months after his first "successful" invasion, Caesar returned once again to Britain.[262] He led his army into the territory of Cassivellaunus to the Thames river, where he saw that the enemy had gathered on the opposite bank. He was not caught completely unaware by the British as in previous engagement. Despite this awareness, the Romans had plenty of other obstacles to face during this battle. Caesar remarks, *Ripa autem erat* ***acutis sudibus praefixis*** *munita, eiusdemque generis sub aqua defixae sudes flumine tegebantur* ("However the bank was fortified **with fixed, sharp stakes**, and stakes of the same sort, which had been fixed under the water, were concealed by the river"). Caesar was not deterred by these measures as, he reports, he had learned of them from prisoners and deserters.[263]

He praises his men for advancing *ea celeritate atque eo impetu,* "with such speed and such vigor" as, on foot, they made their way to the opposite bank with only their heads above water. Moreover, Caesar subtly reveals that cavalry and foot soldiers alike were able to make their way through the Thames, and the enemy could not stand the assault of these combined

---

[261] Frederic Stanley Dunn, "Julius Caesar in the English Chronicles," *The Classical Journal* 14, no. 5 (February 1919): 288. Homer Nearing, Jr., "The Legend of Julius Caesar's British Conquest," *PMLA* 64, no. 4 (September 1949): 893. Oriosus explicitly states that he is drawing upon Suetonius's *Lives*. Orosius *Seven Books of History against the Pagans* 7.1. He also draws upon Caesar, Sallust, Tacitus, and Suetonius. Orosius, *Seven Books against the Pagans,* vol. 54 of *Translated Texts for Historians,* trans. A. T. Fear (Liverpool: Liverpool University Press, 2010), 15; Nearing, "The Legend of Julius Caesar's British Conquest," 893-894. For more on the historical dialogue between Bede, Orosius, and Gildas, see Diarmuid Scully, "Bede, Orosius, and Gildason the early history of Britain," in *Bède le Vénérable entre tradition et postérité,* eds. Stéphane Lebecq, Michel Perrin, and Olivier Szerwiniack, 31-42 (Lille, France: Ceges, 2002).

[262] Oriosus takes the liberty of noting that the invasion took place in the spring. Orosius 6.9.4. Nennius 19.

[263] Caes. Gal. 5.18.

forces. Despite the disadvantages faced by the Romans, they forced the Britons to abandon the shores and flee. Caesar uses this Battle of the Thames as a demonstration of his abilities as a leader as well as his troops' ability to face the underhandedness of the Britons in order to emerge victorious.[264]

While both Orosius and Bede note that Cassivellaunus had encamped on the opposite bank, they provide a little bit more detail than Caesar. Furthermore, the slight changes in language show the beginning changes to the narrative. Orosius writes *ripamque fluminis ac paene totum sub aqua uadum* ***acutissimis sudibus*** *praestruxerat* ("and he [Cassivellaunus] had fortified the bank of the river and almost all of the ford beneath the water **with the sharpest stakes**").[265] Rather than the Britons merely planting *actae sudes,* they have planted *actissimae sudes,* "the sharpest stakes." Additionally, Caesar does not know of the stakes ahead of time. Instead, the Romans are forced to first find the stakes and then avoid them. Despite these added advantages, Orosius reports that the Britons, whom calls *barbari*, could not bear the attack of the legions, and they were forced to hide themselves in the woods. Perhaps more realistically in this narrative, only the soldiers – and not the cavalry – successfully journeyed across the Thames to meet the Britons. From this privileged, forested position, the Britons then *crebris eruptionibus*, "with swift attacks," wounded the Romans seriously and often. This battle, which Caesar had claimed as a victory for the Romans, in the narrative of Orosius and Bede had become more of a victory for the Britons, even though the Romans had faced greater difficulties, or, at least, difficulties that were described in greater detail.[266]

---

[264] Ibid. 5.18.
[265] Orosius 6.9.4.
[266] Ibid.

Bede, writing his *Historia Ecclesiastica* (*Ecclesiastical History*) two centuries later, diverges in only two sections from Orosius when accounting the invasion of Caesar. Most notably is when Bede provides further detail on the nature of the *acutissimae sudes*. Bede further describes these stakes:

> *... quarum vestigia sudium ibidem usque hodie visuntur, et videtur inspectantibus, quod singulae earum ad modum humani femoris grossae, et circumfusae plumbo inmobiliter erant in profundum fluminis infixae.*
>
> The remains of these stakes are seen there today, and it seems to onlookers, that each of these are about the thickness of a man's thigh, and, encased in lead, had been immovably fixed in the bottom of the river.[267]

Though no archaeological evidence to date has been found for Caesar's invasion, Bede's remarks on the stakes' continuing presence some nine centuries later, if accurate, clearly attest to the stakes' robustness.[268] By focusing on the material of the stakes, Bede confirms their seeming sturdiness. The additional detail also further dramatizes the moment for Caesar and the Romans and additionally raises the "stakes" for Caesar.

Nennius writing his *Historia Britonum* (*History of the Britons*) provides a different account.[269] He falsely states that the Battle of the Thames was the first battle of Caesar's second invasion rather than the fourth. He then proceeds to remark that the Britons had placed *sudes ferreos et semen bellicosum, id est Cetilou, in vada fluminis*, "iron stakes and the seeds of war, which are called 'cetilou,' in the shallows of the river." He further refers to these stakes as *ars invisibilis*, "an invisible art," which were a *discrimen magnum,* "a great crisis" to the Roman

---

[267] Bede 1.2.
[268] Guy de la Bédoyère, *The Finds of Roman Britain* (London: B. T. Batsford Ltd., 1989), 22.
[269] The exact authorship of the *Historia Britonum* is suspect; however, for the sake of this paper, it will be attributed to Nennius.

troops. This change in language puts a different perspective on the quality of the stakes. They are no longer sharp, but iron. Their placement is seen more as an ingenious act, and not as an act of deceitfulness. Such an act of skill on the part of the Britons forces Caesar to leave *sine pace*, "without peace." Rather than explicitly declaring a winner, Nennius rather obliquely states that the two sides left again *sine pace*, "without peace."[270] There has been a change from a battle which served as a definitive victory for Caesar and a demonstration of the Roman capability to a battle whose results are unclear.

Building upon these other stories, the final "translation" of the myth by Geoffrey of Monmouth in his *Historia Regum Britanniae* (*History of the Kings of Britain*) further cements the British effort to transform the story into an expression of shared identity. His account of this scene deviates from previous accounts as well as Caesar's. Like Nennius, he skips over the initial engagements between the Romans and Britons as accounted by Caesar. This Battle of the Thames is the first battle of the second invasion. Focusing on the perspective of the Britons, he writes that, as news of Caesar's arrival reached Cassivellaunus, the *rex Britonum,* "king of the Britons," actively prepared for the Romans.[271] He fortified his cities, repaired the broken walls, and placed armed garrisons in every port. Geoffrey of Monmouth writes

> *Praeterea alveo Tamensis fluminis ... palis ferreis atque plumbatis et ad modum humani femoris grossis subtus amnem infixit ut naves Iulii superventurae illiderentur*
>
> Moreover, in the bed of the Thames ... he planted under the river iron and lead stakes, as thick as a man's thigh, to drive into the approaching ships of Julius.[272]

[270] Nennius 20.
[271] Geoffrey of Monmouth 4.55.18.
[272] Ibid. 4.60.

On the one hand, by using the word *palus* rather than *sudis*, he implies that the stakes might have been of a thinner nature, but by focusing on the materiality of the stakes, he speaks more to their durability than their mere sharpness as Caesar did. Geoffrey of Monmouth attributes the success of the Britons to the placement of the stakes.[273]

Following these preparation, Cassivellaunus lays in wait for Caesar. Rather than hearing of the stakes from deserters, rather than finding the stakes and avoiding them, Caesar's ships struck the stakes and were wrecked. Geoffrey of Monmouth reports that thousands drowned in the ships. The survivors, including Caesar, managed to land on the shore. Once on the shore, Geoffrey of Monmouth praises the Romans for their *audatia,* "boldness," as they inflicted heavy losses. They also suffered significant losses. The Britons outnumbered them thirty to one with more joining them. Caesar, seeing that he had been beaten, quickly fled with his troops.[274] Geoffrey of Monmouth alters not only the events of the battle as he condenses the initial landing of Caesar and the battle on the Thames into one battle, but he also alters the outcome as the Britons now emerge victorious because of their numbers and because of their ingenuity.

Thus, through these various historical accounts, there is consistent movement away from the account of Caesar in his *Commentaries on the Gallic Wars* to a narrative that focuses more on English ingenuity and influence. This shift is evident in the gradual change in language, specifically in the description of the stakes in the Thames, Caesar's greatest obstacle in this battle. While Caesar first refers to them as *actuae sudes,* they become *acutissimae sudes,* then *circumfusae plumbo*, "encased in lead," then simply *ferreae sudes*, and then *ferreae et*

[273] OLD *s.v. palus* 1.1. OLD *s.v. sudis* 1.
[274] Geoffrey of Monmouth 4.60.

plumbatae pales, which are capable of piercing and sinking the Roman ships. This shift is also evident in the change in focus from the Roman perspective to that of the Britons and in the blatant revision of history as the battle moves from a definitive Roman victory to a British victory. Such a victory acts as a valuable rallying point as a sense of shared identity and early nationalism is formed.

Benedict Anderson in *Imagined Communities* argues that nations and nationalism began during the Enlightenment. Anderson defines a nation as such:

> It is an imagined political community – and imagined as both inherently limited and sovereign. It is imagined because the members of even the smallest nation will never know most of their fellow-members, meet them, or even hear of them, yet in the minds of each lives in the image of their communion.[275]

Medieval historians have argued that English nationalism appeared much sooner than the 1800s. Thorlac Turville-Petre and Diane Speed have pushed the date back to the romances of the thirteenth and fourteenth centuries, Adrian Hastings as far back as Bede and his *Ecclesiastical History*.[276] This adjustment has been, in part, because Lesley Johnson has clarified the concept of nationalism and adds on to the argument of Anderson by saying that "the nation is a construct which requires representational labour, is produced in and by representational work of some kind because this notion of community must be larger than any individual could experience directly."[277] John Gillingham sees this kind of representational work in Henry of

---

[275] Benedict Anderson, *Imagined Communities,* rev. ed. (London: Verso, 2006), 6.
[276] Adrian Hastings. *The Construction of Nationhood: Ethnicity, Religion, and Nationalism.* (Cambridge: Cambridge University Press, 1997), 36. Robert Rees Davies, *The First English Empire: Power and Identities in the British Isles, 1093-1343* (Oxford: Oxford University Press, 2002), 4-30.
[277] Lesley Johnson, "Imagining Communities: Medieval and Modern," in *Concepts of National Identity in the Middle Ages*, vol. 14 of *Leeds Texts and Monographs,* ed. Simon Forde, Lesley Johnson, and Alan V. Murray (Leeds: School of English, University of Leeds, 1995), 6.

Huntingdon's *History of the English*.[278]

Geoffrey of Monmouth's *History of the Kings of Britain* can also be perceived as a representational work as he capitalized upon the interactions between Britain and famed Rome and transformed them. Halvadan Koht argues that Geoffrey of Monmouth's history became "the most nationalistic historiography in the Middle Ages."[279] Edmond Faral calls it a *sorte d'épopée natoinale*, "a sort of national epic."[280] Geoffrey of Monmouth creates a representational labor that serves as an embryonic form of a nation. As Katherine McLoone argues, he takes the language and tropes of what has now become a myth of Rome and of Caesar to create a national space.[281]

As Classicist Frederic Stanley Dunn argues, the English Chronicles "bequeathed to us this pseudo Caesar."[282] A culmination of this development appears in Geoffrey of Monmouth's *History of the Kings of Britain*, which builds upon the foundation of Orosius, Bede, and Nennius, through the in-depth discussion of Caesar's invasion of Britain. By closely examining this one episode, it is possible to see from the Caesar of the medieval accounts diverges from the Caesar in the *Commentaries* and how the historical portrayal of Caesar's invasion becomes more mythographic in nature. Beyond merely examining or retelling Caesar's account or the account of his predecessors, Geoffrey of Monmouth ultimately transforms the event by changing the language as well as the outcome of the battle. He draws the narrative away from the hands of

---

[278] John Gillingham, *The English in the Twelfth Century: Imperialism, National Identity, and Political Values* (Woodbridge, England: Boydell Press, 2000), 123-144.
[279] Halvadan Koht, "The Dawn of Nationalism in Europe," *The American Historical Review* 52, no. 2 (Jan. 1947): 270.
[280] Edmond Faral, *La Légende Arthurienne* (Paris: Champion, 1929), 394.
[281] Katherine McLoone, "Caesar's Sword, Proud Britons, and Galfridian Myths of Discontinuity" in *Writing Down Myths*, ed. Joseph Falaky Nagy, 181-200 (Turnhout: Brepols, 2013), 186.
[282] Dunn, 280.

the Romans and into the hands of the Britons. To examine the transformation of Battle of Thames demonstrates the way in which Geoffrey of Monmouth has carved out a space for a nation which could trace its earliest displays of might against Julius Caesar himself, a *metator imperii*, "an architect of empire."

Bibliography

Adkins, Lesley and Roy A. Adkins. *Handbook to Life in Ancient Rome.* Oxford: Oxford University Press, 1998.

Anderson, Benedict. *Imagined Communities.* Rev. ed. London: Verso, 2006.

Bales, Bret. *Julius Caesar and Alexander the Great: Tracing the Literary* Zeitgeist *from the Middle Ages to the Renaissance* (master's thesis, Oklahoma State University, 2010).

Bede. *Ecclesiastical History of the English People*. Edited by Betram Colgrave and R. A. B. Mynors. Oxford: Clarendon Press, 1992.

Bell, Brenda M. "The contribution of Julius Caesar to the vocabulary ethnography." *Latomus* 54, no. 4 (Oct.-Dec. 1995): 753-767.

Bhabha, Homi. "DissemiNation: time, narrative, and the margins of the modern station." In *Nation and Narration*. Edited by Homi Bhabha. New York: Routledge, 1990.

Brady, S. G. "Caesar and Britain." *The Classical Journal* 47, no. 8 (May 1952): 305-348.

Braund, David. *Ruling Roman Britain: Kings, Queens, Governors and Emperors from Julius Caesar to Agricola*. London: Routledge, 2013.

Brown, Virginia. "Portraits of Julius Caesar in Latin Manuscripts of the *Commentaries*." *Viator* 12 (1981): 319-354.

Clausen, Wendell. "Bede and the British Pearl." *The Classical Journal* 42, no. 5 (Feb. 1947): 277-281.

Cottrell, Leonard. *The Great Invasion*. New York: Coward-McCann, Inc., 1958.

Davies, Robert Rees. *The First English Empire: Power and Identities in the British Isles, 1093-1343*. Oxford: Oxford University Press, 2002.

de la Bédoyère, Guy. *The Finds of Roman Britain*. London: B. T. Batsford Ltd., 1989.

---. *Roman Britain: A New History*. New York: Thames & Hudson, Inc., 2006.

Dessau, Hermann. *Inscriptiones Latinae Selectiones*. Vol. 1. Berlin: Weidmann, 1892.

Deutsch, Monroe E. "Caesar and the Pearls of Britain." *The Classical Journal* 19, no. 8 (May 1924): 503-505.

Dudley, Donald R. and Graham Webster. *The Roman Conquest of Britain A.D. 43-57*. Chester Springs, Pennsylvania: Dufour Editions, Inc., 1965.

Dunn, Frederic Stanley. "Julius Caesar in the English Chronicles." *The Classical Journal* 14, no. 5 (Feb. 1919): 280-294.

Dyson, Stephen L. "Caesar and the Natives." *The Classical Journal* (May 1968): 341-346.

Eutropius. *Abridgement of Roman History*. Translated and edited by Rev. John Selby Watson. London: Henry G. Bohn, 1853.

Faral, Edmond. *La Légende Arthurienne.* Vol. 4. Paris: Champion, 1929.

Fry, Plantagenet Somerset. *Roman Britain: History and Sites*. Towtowa, NJ: Barnes & Noble Books, 1984.

Geary, Patrick J. *The Myth of Nations: The Medieval Origins of Europe*. Princeton: Princeton University Press, 2002.

Geoffrey of Monmouth. *The History of the Kings of Briton*. Edited by Michael D. Reeve. Translated by Neil Wright. Woodbridge, UK: Boydell Press, 2007.

Giles, J.A, trans. *Six Old English Chronicles*. London, George Bell & Sons, 1896.

Gillingham, John. *The English in the Twelfth Century: Imperialism, National Identity, and Political Values*. Woodbridge, England: Boydell Press, 2000.

Greenfield, Liah. *Nationalism: Five Road Roads to Modernity.* Cambridge, MA: Harvard University Press, 2001.

Hardwick, Lorna and Christopher Stray. "Introduction: Making Conceptions." In *A Companion to Classical Receptions*, edited by Lorna Hardwick and Christopher Stray, 1-10. Oxford: Blackwell Publishing, 2008.

Hastings, Adrian. *The Construction of Nationhood: Ethnicity, Religion, and Nationalism.* Cambridge: Cambridge University Press, 1997.

Hawkes, Charles Francis Christopher. *Britain and Julius Caesar*. Oxford: Oxford University Press, 1978.

Henry of Huntingdon. *The Chronicle of Henry of Huntingdon.* Translated and edited by Thomas Forester. London: George Bells & Sons, 1909.

Holmes, T. Rice. *Ancient Britain and the Invasions of Julius Caesar.* Oxford: Clarendon Press, 1907.

Ingledew, Francis. "The Book of Troy and the Genealogical Construction of History: The Case of Geoffrey of Monmouth's *Historia Regum Britanniae*." *Speculum* 69, no. 3 (Jul. 1994): 665-704.

Johnson, Lesley. "Imagining Communities: Medieval and Modern." In *Concepts of National Identity in the Middle Ages*. Vol. 14 of *Leeds Texts and Monographs*. Edited by Simon Forde, Lesley Johnson, and Alan V. Murray, 1-19. Leeds: School of English, University of Leeds, 1995.

Koht, Halvadan. "The Dawn of Nationalism in Europe." *The American Historical Review* 52, no. 2 (Jan. 1947): 265-280.

Nearing, Homer, Jr. "Caesar's Sword (*Faerie Queen* II.x.49; *Love's Labour's Lost* v.ii.615). *Modern Language Notes* 63, no. 6 (Jun. 1948): 403-405.

---. "The Legend of Julius Caesar's British Conquest." *PMLA* 64, no. 4 (Sept. 1949): 889-929.

---. "Local Caesar Traditions in Britain." *Speculum* 24, no. 2 (Apr. 1949): 281-227.

Nennius. *History of the Britons*. Translated by A. W. Wade-Evans. London: Society for Promoting Christian Knowledge, 1938.

Newell, William Wells. "Doubts concerning the British History Attributed to Nennius." *PMLA* 20, no. 3 (1905): 622-672.

McLoone, Katherine. "Caesar's Sword, Proud Britons, and Galfridian Myths of Discontinuity." In *Writing Down Myths*, edited by Joseph Falaky Nagy, 181-200. Turnhout: Brepols, 2013.

Olson, Donald W., Russell L. Doescher, and the Texas State Honors Students. "Caesar's Invasion of Britain." *Sky & Telescope* 116 (2008): 18-23.

Orosius. *Seven Books against the Pagans*. Vol. 54 of *Translated Texts for Historians*. Translated by A. T. Fear. Liverpool: Liverpool University Press, 2010.

Pollard, Nigel and Joanne Berry. *The Complete Roman Legions*. New York: Thames & Hudson, Ltd., 2012.

Riggs, A. G. *A History of Anglo-Latin Literature 1066-1422.* Cambridge: Cambridge University Press, 1992.

Rouse, Robert Allen. *The Idea of Anglo-Saxon England in Middle English Romance*. Suffolk: D.S. Brewer, 2005.

Salway, Peter. *The Oxford Illustrated History of Roman Britain*. Oxford: Oxford University Press, 1993.

Scully, Diarmuid. "Bede, Orosius, and Gildason the early history of Britain." In *Bède le Vénérable entre tradition et postérité*, edited by Stéphane Lebecq, Michel Perrin, and Olivier Szerwiniack, 31-42. Lille, France: Ceges, 2002.

Speed, Diane. "The Construction of the Nation." In *Readings in Medieval English Romance*, edited by Carol M. Meale, 135-157. Cambridge: D.S. Brewer, 1994.

Shakespeare. *Julius Caesar*. Edited by W. J. Rolfe. New York: American Book Company, 1903

Stewart, P.C.N. "Inventing Britain: The Roman Creation and Adaptation of an Image." *Britannia* 26 (1995): 1-10.

Todd, Malcom. *Roman Britain, 55 B.C.-A.D. 400: The Province Beyond Ocean.* London: Fontana History of England, 1971.

Turville-Petre, Thorlac. "Afterword: The Brutus Prologue to *Sir Gawain and the Green Knight*." In *Imagining a Medieval English Nation*, edited by Kathy Lavezzo, 340-346. Volume 37 of *Medieval Cultures.* Minneapolis: University of Minneapolis, 2004.

---. *England the Nation: Language, Literature, and National Identity, 1920-1340.* Oxford: Oxford University Press, 1996.

---. "Havelok and the History of the Nation." In Readings in Medieval English Romance, edited by Carol M. Meale, 121-134. Cambridge: D.S. Brewer, 1994.

Tyers, Paul. "Roman Amphoras in Britain." Council for British Archaeology. http://intarch.ac.uk/journal/issue1/tyers_index.html (accessed December 15, 2016).

---. *Roman Pottery in Britain.* London: Routledge, 1996.

Whitelock, Dorothy, David C. Douglas, and Susie I. Tucker, trans. and ed. *The Anglo-Saxon Chronicle.* New Brunswick, NJ: Rutgers University Press, 1961.

The Medieval Transformation of Caesar's Invasion of Britain

Summary of Differences:

Caesar	Orosius	Bede the Venerable	Nennius	Geoffrey of Monmouth
De Bello Gallico	Historia Adversus Paganos	*Historia Ecclesiastica*	*Historia Britonum*	*Historia Regum Britonum*
1st cent. BCE	5th cent. CE	8th cent. CE	9th cent. CE	12th cent. CE
***acutis** sudibus praefixis* "fixed with **sharp** stakes"	***acutissimis** sudibus praestuxerat* "forded with **the sharpest** stakes"	*ad modum humani femoris grossae* "about the thickness of a man's thigh" *circumfusae plumbo* "encased in lead"	***sudes ferreos** et **semen bellicosum**, id est Cetilou* "iron stakes and the seeds of war, which are called Cetilou" *ars invisibilis* "an invisible art"	*ad modum humani femoris grossis* "as thick as a man's thigh" *palis ferries atque plumbatis* "iron and lead stakes"
Roman Victory	Roman Victory	Roman Victory	Mutual Defeat	British Victory

Changing Definitions of Nationalism:

Lesley Johnson
Geoffrey of Monmouth of 12th c.

→

John Gillingham
Henry of Huntingdon of 12th c.

→

Thorlac Turville-Petre & Diane Speed
Romances of 13th-14th c.

→

Benedict Anderson
Enlightenment of the 18th c.

Bibliography

Anderson, Benedict. *Imagined Communities.* Rev. ed. London: Verso, 2006.
Bales, Bret. *Julius Caesar and Alexander the Great: Tracing the Literary* Zeitgeist *from the Middle Ages to the Renaissance* (master's thesis, Oklahoma State University, 2010).
Bell, Brenda M. "The contribution of Julius Caesar to the vocabulary ethnography." *Latomus* 54, no. 4 (Oct.-Dec. 1995): 753-767.
Bhabha, Homi. "DissemiNation: time, narrative, and the margins of the modern station." In *Nation and Narration*. Edited by Homi Bhabha. New York: Routledge, 1990.
Brady, S. G. "Caesar and Britain." *The Classical Journal* 47, no. 8 (May 1952): 305-348.
Braund, David. *Ruling Roman Britain: Kings, Queens, Governors and Emperors from Julius Caesar to Agricola*. London: Routledge, 2013.
Cottrell, Leonard. *The Great Invasion*. New York: Coward-McCann, Inc., 1958.
Davies, Robert Rees. *The First English Empire: Power and Identities in the British Isles, 1093-1343*. Oxford: Oxford University Press, 2002.
de la Bédoyère, Guy. *The Finds of Roman Britain*. London: B. T. Batsford Ltd., 1989.
---. *Roman Britain: A New History*. New York: Thames & Hudson, Inc., 2006.
Deutsch, Monroe E. "Caesar and the Pearls of Britain." *The Classical Journal* 19, no. 8 (May 1924): 503-505.
Dunn, Frederic Stanley. "Julius Caesar in the English Chronicles." *The Classical Journal* 14, no. 5 (Feb. 1919): 280-294.
Dyson, Stephen L. "Caesar and the Natives." *The Classical Journal* (May 1968): 341-346.
Geary, Patrick J. *The Myth of Nations: The Medieval Origins of Europe*. Princeton: Princeton University Press, 2002.
Geoffrey of Monmouth. *The History of the Kings of Briton*. Edited by Michael D. Reeve. Translated by Neil Wright. Woodbridge, UK: Boydell Press, 2007.
Gillingham, John. *The English in the Twelfth Century: Imperialism, National Identity, and Political Values*. Woodbridge, England: Boydell Press, 2000.
Greenfield, Liah. *Nationalism: Five Road Roads to Modernity.* Cambridge, MA: Harvard University Press, 2001.
Hastings, Adrian. *The Construction of Nationhood: Ethnicity, Religion, and Nationalism.* Cambridge: Cambridge University Press, 1997.
Hawkes, Charles Francis Christopher. *Britain and Julius Caesar*. Oxford: Oxford University Press, 1978.
Holmes, T. Rice. *Ancient Britain and the Invasions of Julius Caesar.* Oxford: Clarendon Press, 1907.
Ingledew, Francis. "The Book of Troy and the Genealogical Construction of History: The Case of Geoffrey of Monmouth's *Historia Regum Britanniae*." *Speculum* 69, no. 3 (Jul. 1994): 665-704.
Johnson, Lesley. "Imagining Communities: Medieval and Modern." In *Concepts of National Identity in the Middle Ages*. Vol. 14 of *Leeds Texts and Monographs*. Edited by Simon Forde, Lesley Johnson, and Alan V. Murray, 1-19. Leeds: School of English, University of Leeds, 1995.
Koht, Halvadan. "The Dawn of Nationalism in Europe." *The American Historical Review* 52, no. 2 (Jan. 1947): 265-280.
Nearing, Homer, Jr. "Caesar's Sword (*Faerie Queen* II.x.49; *Love's Labour's Lost* v.ii.615). *Modern Language Notes* 63, no. 6 (Jun. 1948): 403-405.
---. "The Legend of Julius Caesar's British Conquest." *PMLA* 64, no. 4 (Sept. 1949): 889-929.
---. "Local Caesar Traditions in Britain." *Speculum* 24, no. 2 (Apr. 1949): 281-227.
McLoone, Katherine. "Caesar's Sword, Proud Britons, and Galfridian Myths of Discontinuity." In *Writing Down Myths*, edited by Joseph Falaky Nagy, 181-200. Turnhout: Brepols, 2013.
Rouse, Robert Allen. *The Idea of Anglo-Saxon England in Middle English Romance*. Suffolk: D.S. Brewer, 2005.
Salway, Peter. *The Oxford Illustrated History of Roman Britain*. Oxford: Oxford University Press, 1993.
Speed, Diane. "The Construction of the Nation." In *Readings in Medieval English Romance*, edited by Carol M. Meale, 135-157. Cambridge: D.S. Brewer, 1994.
Stewart, P.C.N. "Inventing Britain: The Roman Creation and Adaptation of an Image." *Britannia* 26 (1995): 1-10.
Turville-Petre, Thorlac. "Afterword: The Brutus Prologue to *Sir Gawain and the Green Knight*." In *Imagining a Medieval English Nation*, edited by Kathy Lavezzo, 340-346. Volume 37 of *Medieval Cultures.* Minneapolis: University of Minneapolis, 2004.
---. *England the Nation: Language, Literature, and National Identity, 1920-1340.* Oxford: Oxford University Press, 1996.
---. "Havelok and the History of the Nation." In Readings in Medieval English Romance, edited by Carol M. Meale, 121-134. Cambridge: D.S. Brewer, 1994.

HILDEBRAND, VIRGIL, AND BRUTUS THE TROJAN

Annual Meeting of the Classical Association of the Middle West and South (CAMWS) Kitchener, Ontario, April 2017

Abstract

First appearing in the ninth-century CE, *Historia Britonum,* Brutus, a descendant of the famous Aeneas, was purported as the legendary founder and first king of Britain. His popularity was further cemented in Geoffrey of Monmouth's *Historiae Regum Britanniae*, after which Brutus remained the *de facto* founder of Britain through the Early Modern Period to the chroniclers of British history. *Holinshed's Chronicles of England, Scotland, and Ireland,* published in 1577, for example, treats the myth as fact. As Brutus' status as myth or man came into question around the sixteenth century, he still continued to be celebrated for the next two hundred years in works like John Milton's incomplete *History of Britain* and Alexander Pope's fragmented *Brutus*. In the late seventeenth century, British poet and playwright, Jacob Hildebrand created a five-book epic poem about Brutus' journey. Though never finished, Hildebrand traces the beginning of Brutus' journey in a detailed manner, which follows the outline set forth by Geoffrey of Monmouth. A deep study of this particular text, however, has been mostly overlooked by other scholars, perhaps due to the incomplete nature of the text.

From the first page of his piece, Hildebrand makes clear the connection between his own work and that of the *Aeneid*. On the front page of his work, *Brutus The Trojan: Founder of the British Empire*, Jacob Hildebrand remarks *Tanta molis erat condere Gentem!* — "Such a great burden to found this race!" His remark is a clear reference to Vergil's *Aeneid* (1.33), *tantae molis erat Romanam condere gentem!* — "of such a great burden was it to found the Roman race!" Hildebrand's work details the journey of Brutus, founder of not the Roman race but the British, yet the references to the *Aeneid* are evident.

In this paper, I offer a brief summary of the English literary and historical tradition of Brutus that Hildebrand is building upon from authors such as Geoffrey of Monmouth, Milton, and Pope. I focus primarily upon the way in which Hildebrand expands upon the epic tradition of Vergil through his language. For example, he opens Book I with the phrase, "I sing the Founder of the *British* Throne.... Say, *Muse!* what Toils he bore, e'er eh attain'd to fix the *lasting Seat* of *Albion's* Kings" a clear echo of *Aeneid* I.1, *arma virumque cano*, and I.8-11, *Musa, mihi causas memora ... tot adire labores impulerit*. In this paper, I also consider Hildebrand's references to the plot of the *Aeneid*. In Book I of Hildebrand's text, Aeolus is called upon to calm the seas for Brutus, and in Book V, Fame flies around with an imagery reminiscent of Vergil's. Through these subtle and slightly more oblique references, Hildebrand was able to create a British heritage founded upon a past shared by the ancient Greeks and Romans. Through this imaginary, eponymous founder, Medieval authors gave their country connections to the Classical world and breathed further life into this figure, shadowed in myth. Hildebrand built upon this lengthy tradition through his references to the *Aeneid* which deserve a closer examination.

Arma virumque cano... so begins the opening lines of Vergil's epic poem, the *Aeneid*. Quite similarly, so too do we hear the opening lines of Hildebrand Jacob's *Brutus the Trojan: Founder of the British Empire: An Epic Poem* –

> I sing of the Founder of the British Throne,
> Renowned Brutus, of the Race of Troy.

This eponymous founder of Britain, first emerges in the ninth century work of the historian, the so-called Nennius. Not the Brutus who overturned the Republic nor the Brutus who was instrumental in the death of Caesar, this Brutus was a supposed descendant of the famed Trojan Aeneas. Driven from Italy following his act of patricide, he goes on to found a supposed new Troy on the island, which in the classical mind lay beyond the *οἰκοθμένη*, the "inhabited world" and thus he emerges as the founder of the race of Britons.[283] This story though greatly fleshed out by the Welsh cleric, Geoffrey of Monmouth, in the twelfth century was firmly returned to the verse of Vergil in Hildebrand Jacob's epic.[284] As Anthony Adolph writes,

> Vergil's *Aeneid* is the story of a journey, modeled on Homer's *Odyssey*, followed by the story of a war, echoing Homer's *Iliad*. In telling his story of Brutus, Geoffrey adopted a similar model, but in reverse order. An epic journey to Britain lies ahead of Brutus. But first comes a war (58).

In the course of this paper, I am going to briefly address the literary tradition that Jacob Hidebrand is both building upon and partaking in so that I can provide some broader context for his work. To further emphasize Jacob's unique take on the *Aeneid*, I will be discussing the allusions to classical epics as well as the overall structure of his poem.

---

[283] *De Signis* 5.29-36. See also Vell. Pat. 2.46.1 and Flor. 1.45.16. Similarly, Geoffrey of Monmouth writes that Briton is *nos infra pericula oceani extra orbem positos pati*, "we live at the world's edge amid the perils of the ocean." Geoffrey of Monmouth *History of the Kings of England* 4.55.20.

[284] Anthony Adolph, *Brutus of Troy and the Quest for the Ancestry of the British* (Pen & Sword Books Ltd., 2015), 129.

Brutus the Trojan first appears in the *Historia Brittonum* (*History of the Britons*), written in the ninth century by the supposed Nennius (c. 809-829). Though the exact order of events is rather convoluted, two different accounts emerge concerning the origins of Brutus. On the one hand, Nennius reports that Brutus was a consul, who subdued the island of Britain and thus gave it his name. On the other hand, he reports that Brutus was the son of Ascanius, who, driven from Italy, eventually made his way to the island, which would bear his name.[285] From this literay piece, Brutus remains the *de facto* founder of the current people of the island.

This myth was later taken up – and greatly elaborated upon – by the Welsh cleric, Geoffrey of Monmouth, in his twelfth century history, *Historia Regum Brittonum* (*History of the Kings of Briton*). His account truly served as the literary foundations for those who came after him in terms of the story of Brutus. From Geoffrey's work on Brutus came several other pieces: Alfred of Beverley's *Historia* (1154), Layamon's *Brut* (c. 1200) and John Hardyng's *Chronicle* (c. 1437).[286] Wace went so far as to retell Geoffrey's *History* in verse in his *Roman de Brut* (c. 1155), thus further spreading the work of Geoffrey.[287] These stories helped to carry on the myth of Brutus and to further establish him in the very fabric of the foundations of the Britons. By the sixteenth and seventeenth centuries, however, skepticism about the authenticity of Brutus' story had set in. Most notably, the Italian humanist, Polydore Virgil (c. 1470-1555) firmly dismissed the myth as "silly fiction" and Scottish theologian and historian, John Major, put to page an attack on the myth in his *Historia Maioris Brittanniae* (1512).[288] It was primarily

[285] Nennius 10.
[286] Adolph 101.
[287] Adolph 102.
[288] Adolph 109-110.

Polydore's skepticism that removed any serious belief in Brutus as a historical figure.[289]

Despite his loss of authenticity, Brutus remained a source of inspiration for many stories through the sixteenth century.[290] Rather notably, his story was almost taken up by John Milton (1608-1674). The famed author of *Paradise Lost* understood that Brutus was probably "first devised to bring us from some noble" **(citation)**. Instead of *Paradise Lost*, he considered writing a *Brutiad* to rival Vergil's *Aeneid*.[291] This work never came to fruition. In the 1700s, Romantics elevated Homer and critiqued Vergil as a mere imitative work, but Brutus, a descendant of the Vergilian canon, still remained an important emotional link between Troy and Britain.[292] This connection to Britain was most markedly realized by Elkanah Settle, *The New History of the Trojan Wars*.[293] His work was "only loosely based on its sources, chiefly Homer, Virgil, and Geoffrey, though Settle did not name them, and took huge liberties with what they said."[294] Writing for the common reader, he sought to

> revive antiquity out of the dust, and give those that shall peruse this elaborate work, a true knowledge of what passed in ancient times, so that they may be able readily to discourse of things that had been obliterated from the memories of most people **(citation)**

and to do so through the tale of Brutus and the new Troy that rose on the island of Britain.

Hildebrand Jacob (1692/3-1739), an educated, well-off writer of plays and essays, found his inspiration in Nahum Tate and Elkanah Settle, who had set an example by carefully weaving Brutus' story with that of Aeneas, and in John Milton, who had thought to create an epic poem

---

[289] Adolph 117.
[290] Adolph 114-115.
[291] Adolph 119.
[292] Adolph 122-123.
[293] Adolph 123-124.
[294] Adolph 127.

about this early British hero.[295] In 1735, amidst a sea of negativity faced by Vergil, Hildebrand Jacob published his work, *Brutus the Trojan, Founder of the British Empire: an Epic Poem*. He was so moved to focus on Brutus because he was so remote and because he could take poetic license with the story.[296] Anthony Adolph praises Jacob for "rooting the story of Brutus firmly back into the world of the *Aeneid*" while Geoffrey's Brutus occupies a different literary world.[297] Jacob returns Brutus into the world of poetry rather than prose. Anthony Adolph praises him for "retelling of the story... uniting Geoffrey's medieval tale with the high-flown language of Vergil."[298]

Turning to the epic in question, Jacob, like Vergil, takes for granted that his audience understands the backstory of his protagonist, as he begins *in medias res*, though Brutus has been forced to leave his homeland for a far more dubious reason than Aeneas – patricide. As I noted earlier, Jacob begins his epic poem in a way that is undeniably in imitation:

I sing the Founder of the British Throne,	*Arma virumque cano...*	(I.1)
Renowned Brutus, of the Race of Troy.		
Say, Muse what Toils he bore, e'er he attain'd	*Musa, mihi causas memora...*	(I.8)
To fix the lasting Seat of Albion's Kings.[299]		

Just like Aeneas who was *et terris iactatus et alto*, Brutus was also "thrown about on both the land and sea."[300] Moreover, Brutus and the Trojan navy has been "driven," "dispersed," and "scattered" from shore to shore.[301] He is drawing very explicitly from the language of Vergil's *Aeneid,* and this conscious mirroring of language occurs through all five books of Jacob's work.

---

[295] Adolph 128.
[296] Adolph 129. Jacob 3-4.
[297] Adolph 129.
[298] Adolph 143.
[299] Jacob 1.
[300] Verg. *A.* I.3. Jacob 1.
[301] Jacob 1.

Besides this close examination of the opening lines, we can see that, even broadly speaking, the language of Jacob's striking emulation of Homer and Vergil. Just as Homer used Ilion as a name for Troy, so too did Vergil and so too does Jacob.[302] Moreover, just as Homer called the Trojans Dardanians, so too did Vergil and so too does Jacob. For example, while Homer uses variations of Δάρδᾰνος some 37 times, Vergil uses the Latinate forms 20 times and Jacob the English forms 22.[303] Jacob also emulated the language of Homer and Vergil through his usage of patronymics as he refers to Brutus as the "Son of Silvius."[304] To further establish Brutus' ancestry, Jacob also refers to him as the "offspring of Ascanius" and as third from King Aeneas.[305] He also ventured into the use of epithets as he refers to Brutus as a "wanderer" as a well as a "traveler."[306] To further connect Brutus and his men to Troy rather than to Italy, he refers to them as "Sons of Troy" on 12 separate occasions and as "Trojan Youth" on 5 separate occasions. Through his word choice, Jacob is consistently drawing his readers' attention back to the fundamental Trojan roots of Brutus and his followers. In doing so, he is further driving home the distinguished pedigree, though compared to Vergil, he pays far less attention to the appraisal of future generations with only brief, vague mentions of the rising of an "Empire of the Ocean."[307]

---

[302] For "Sons of Troy," see Jacob 3, 4, 7, 8, 15, 21, 48, and 51. For "Trojan Youth," see Jacob 37, 50, 59, 107, and 109.
[303] Dardan and its various forms appear in Homer's *Iliad* 2.189, 3.303, 3.456, 5.159, 5.789, 7.348, 7.368, 7.366, 7.414, 8.154, 8.173, 8.497, 11.166, 11.286, 11.372, 13.150, 13.376, 15.425, 15.486, 21.34, 18.122, 18.339, 20.216, 22.194, 22.352, 22.413, 24.171, 24.354, 24.629, and 24.631. In Vergil's *Aeneid* 2.240, 2.615, 2.785, 3.165, 3.500, 4.365, 4.660, 5.115, 5.620, 6.55, 6.650, 7.205, 7.215, 7.240, 8.130, 10.1, 10.130, 11.285, and 12.585.
[304] Adolph 130. See Jacob 10, 14, 25, 28, 55, 85, and 104.
[305] Jacob 2, 28, and 29.
[306] For "wanderer," see Jacob 13 and 26. For "traveler," see Jacob 20, 42, and 76.
[307] Jacob 77.

The outline of Brutus' story – or, at the very least, the extant portion of Jacob's epic – is also very indicative of the classical models that Jacob is drawing upon. Following Diana's intercession on his behalf, at the beginning of Book I, Brutus is then allowed to land on the Tyrrhenian coast, where they meet Corineus, another leader of the Trojans.[308] Corineus acts in the role of Dido, as Jacob uses this character as a way for to provide the necessary backstory for his protagonist. In Book 2 and 3 of the epic, Brutus relates to Corineus – and the audience – how he was cast from Latium because he killed his father and how he was made to roam through Illyria and Thrace before reaching Troy itself and eventually Sicily, where he visits the tomb of Anchises and hosts funeral games, in a truncated affair similar to Book V of the *Aeneid*.[309] Having recounted his journey, Somnus then comes to him, at the urging of Diana. The god encourages Brutus to continue on his journey. Brutus lands briefly in the territory of the Carthaginians, a clear call back to Aeneas' Dido. When they attempt to press forward, Neptune, angered that Brutus travels on the ocean without his consent, forces them to land in Gaul. In the final extant book, Brutus lands in Gauls and so begins a war with the Pictavians and King Goffarius. Compared to the outline of Geoffrey of Monmouth's account, Jacob's efforts to follow the *Aeneid* are clear.

Geoffrey of Monmouth's journey is far more straightforward – Brutus travels from Italy to Greece to Gaul and then to Britain. Jacob makes a greater point of including sites that were important in the *Aeneid*. For example, as seen in Book II on your handout, Brutus touches upon Thrace and Crete. Though Geoffrey's Brutus avoids Sicily, an island of great importance to

---

[308] Jacob 7
[309] Vergil V.42-103.

Aeneas, Jacob rectifies this mistake and has Brutus land there to pay homage to his great-great-grandfather and to host another set of funeral games. Jacob also has Brutus stop on the island Menynx and meet the Lotus Eaters, a famous stop in Homer's *Odyssey*.

Besides familiar places, Brutus also meets characters who are a clear call back to those in the *Aeneid.* While Venus watches over her son Aeneas, Diana takes it upon herself to guide and protect Brutus. Fame flies once more with her thousand tongues spread.[310] As further example, Brutus, after he is exiled, first goes to Evander's Pallanteum, where he meets Nicostron, Evander's son, and he is welcomed with great hospitality because of his lineage and because of the history of friendship. Jacob also dares to explore relationships as when Brutus meets Laertes, a descendant of Ulysses, and is also welcomed. Moreover, when the Trojans and Greeks clash over the accidental death of the young Greek, Aretes, there is an interesting instance of clemency. Laertes forgives Turnus' nephew for killing Aretes. Brutus presents Laertes with the sword that Aeneas used to kill Turnus, and Laertes gives Brutus the shield that Nestor gave to Telemachus.[311]

Unfortunately, the final books of Jacob's poem, if written, were never published, and so we never see Brutus reach Britain in Jacob's epic. Adolph hypothesizes that this failure to publish the final books may have been due to a lack of money, ill health, or discouragement as it was reported that the latter part was being prepared for the press. Whatever the cause of delay, Jacob died just four years after the publication of the first five books of his epic.[312] As noted on the *Oxford Dictionary of National Biography*, Jacob's epic could be critiqued was

---

[310] Jacob 99.
[311] Jacob 50-51.
[312] Adolph 142.

"forgettable."[313] Despite the innocuous nature of the text, Jacob is followed most immediately by the likes of Alexander Pope (1688-1744), William Blake (1757-1827), John "Estimate" Brown (1715-1766), and Scot Reverend Blake (1757-1827), so perhaps as Jacob hoped, his story emerged as a true epic.[314] More than merely being another bend in the stream, Jacob, through his subtle and slightly more oblique references, is able to create a British heritage founded upon a past shared by the ancient Greeks and Romans in the manner of Vergil himself. Medieval authors via this imaginary, eponymous founder gave their country connections to the Classical world and breathed life into this figure, shrouded in myth. Hildebrand built upon this lengthy tradition through his references to the *Aeneid* which deserve a closer examination.

[313] Adolph 143.
[314] Adolph 145-147; 152-153; 157; 167.

Bibliography

Adolph, Anthony. Brutus of Troy: And the Quest for the Ancestry of the British. South Yorkshire, England: Pen & Sword Family History, 2015.

Archer, Ian W., Felicity Heal, Paulina Kewes, and Henry Summerson. "The Holinshed Project." The Holinshed Project. http://english.nsms.ox.ac.uk/holinshed/ (accessed September 20, 2016).

Geoffrey of Monmouth. The History of the Kings of Britain. Translated and edited by Michael A. Faletra. Plymouth: Broadview, 2008.

Hildebrand, Jacob. "The Trojan: Founder of the British Empire. An Epic Poem." London: William Lewis, 1735.

Milton, John. The History of Britain. London: John Martyn, 1677.

Torchiana, Donald T. "Brutus: Pope's Last Hero." The Journal of English and Germanic Philology 61.4 (October 1962): 853-867.

Vergil. *Aeneid*. Translated by H. Rushton Fairclough. Loeb Classical Library 63. Cambridge, MA: Harvard University Press, 1999.

---. *Aeneid*. Translated by H. Rushton Fairclough. Loeb Classical Library 64. Cambridge, MA: Harvard University Press, 2001.

Hildebrand, Virgil, and Brutus the Trojan

Nennius
Historia Brittonum
9th century

→

Geoffrey of Monmouth
Historia Regum Brittonum
12th centruy

→

John Milton
Brutiad
17th century

→

Hildebrand Jacob
Brutus the Trojan
17th century

Geoffrey of Monmouth	Jacob's *Brutus the Trojan*	Allusions
	Book I: a) Conversations by the Gods b) Aeolus and the Winds c) Corinaeus & the Trojans d) Assembly of the Trojan Chieftains e) Sacrifice & the Fixing of the Ships	a) Intercession of Venus (*A.* I.223-296) b) Aeolus' Storm (*A.* I.81-123)
a) Brutus is fated to kill his father (I.3) b) Brutus is exiled from Italy (I.3) c) Sails to Greece and faces Pandrasus (I.4-11) d) Fate from Diana (I.11) e) Reaches Gaul (Aquitaine) and meets Corineus (I.12) f) Faces Goffarius, King of the Picts (I.12-15) g) Albion divided between Brutus and Corineus (I.16) h) Brutus builds "New Troy" upon the river Thames (I.17-18)	**Book II: Recounting the Journey** a) Lineage b) Evander's Pallanteum & Nicostron c) Thrace d) Asia & Troy e) Greece f) (The Passing of) Crete g) Africa & Carthaginians h) Sicily & Leogecia i) Syrtes & Carthaginian Conflict j) Menynx & Lotus Eaters	b) Evander's Alliance (*A.* VIII.152-183) c) Sailing to Thrace (*A.* III.1-18) f) Seeking Crete (*A.* III.121-171) h) Approaching Sicily (*A.* III.548-587) i) Time in Carthage (*A.* IV) j) Odysseus (*O.* IX.63-104)

Geoffrey of Monmouth	Jacob's *Brutus the Trojan*	Allusions
	Book III: Recounting the Journey a) Ithaca & Laertes b) Turonus vs. Aretes c) Ogygia & Calypso o Burning of the ships d) (The Passing of) Charybdis o & Cyclops e) Sicily & the Tomb of Anchises	 b) Boxing match (*A.* V.362-484) Aeneas vs. Turnus (*A.* XII.887-952) c) Odysseus & Calpyso Trojan Women Burn Ships (*A.* V.604-663) d) Scylla & Charybdis (*A.* III.420) Polyphemus (*A.* III.655-691) e) Death of Anchises (*A.* III.692-718)
	Book IV: a) Diana and Somnus' Aid b) Travelling between Italy and Sicily c) Arrival in Spain d) Urging of Diana (via Hermes) e) Hamilcar vs. Trojans f) Rage of Neptune	 a) Ghost of Hector (*A.* 270-297) b) Aeneas visit to Sicily (*A.* V.1-41) d) Mercury's visit (*A.* IV.554-583)
	Book IV: a) Landing near Loire in Gaul b) Rumor flies to Goffarius, King of the Gauls c) Corinaeus vs. Imbertus, Herald d) Diana Encourages Brutus e) Pantheus vs. Goffarius	 b) Mercury's visit (*A.* IV.554-583) d) Venus Speaks to Aeneas (*A.* I.297-371)

FACEBOOK-ING VERGIL'S AENEID: *SOCIAL NETWORK ANALYSIS OF A CLASSICAL EPIC*

A thesis submitted in partial fulfillment of the requirements for Departmental Honors of the Monmouth College Classics Department
May 2017

DR. THOMAS J. SIENKEWICZ
MATTHEW KATSENES

Table of Contents

ABSTRACT 326

1. INTRODUCTION 328

2 BACKGROUND 330

2.1 INTRODUCTION 330
2.2 WHAT IS SOCIAL NETWORK ANALYSIS? 330
2.3 BENEFITS OF SOCIAL NETWORK ANALYSIS 333
2.3.1 USE OF GRAPH THEORY & SOCIAL NETWORK ANALYSIS 333
2.3.2 WHY USE SOCIAL NETWORK ANALYSIS? 334
2.4 SOCIAL NETWORK ANALYSIS & LITERATURE 336
2.5 SOCIAL NETWORK ANALYSIS & ITS APPLICATIONS FOR CLASSICS 339

3 METHOD 343

3.1 INTRODUCTION 344
3.2 TERMINOLOGY 344
3.3 CONSTRUCTION OF NETWORKS 347
3.4 SOCIAL NETWORK ANALYSIS METRICS 352
3.4.1 DEGREE, AVERAGE DEGREE, AND DEGREE DISTRIBUTION 352
3.4.2 DISTANCES, AVERAGE PATH LENGTH, DIAMETER 354
3.4.3 CONNECTEDNESS 356
3.4.4 CLUSTERING COEFFICIENT 357
3.4.5 GIANT COMPONENT 358

4 NETWORK PROPERTIES 358

4.1 INTRODUCTION 358
4.2 CONVERSATIONAL NETWORKS: STATIC & DYNAMIC 358

5 "REAL WORLD" RELATIONSHIPS 364

5.1 INTRODUCTION 364
5.2 METRICS 365
5.2.1 RANDOM NETWORKS 365
5.2.2 SMALL WORLD 366
5.2.2A AVERAGE PATH LENGTH 366
5.2.2B CLUSTERING COEFFICIENT 366
5.2.3 HIERARCHICAL STRUCTURE 367
5.2.4 GIANT COMPONENT 368
5.2.5 ATTACKS: TARGETED & RANDOM 368
5.3 RESULTS & ANALYSIS 369

6 CHARACTER ROLES & RELATIONSHIPS IN THE AENEID 370

6.1 INTRODUCTION 371

6.2 METRICS **371**
6.2.1 CONNECTIVITY: DEGREE CENTRALITY 371
6.2.2 CONNECTIVITY: EIGENVECTOR CENTRALITY 372
6.2.3 CONNECTIVITY: PAGERANK 373
6.2.4 CONNECTIVITY: CLOSENESS CENTRALITY 373
6.2.5 CONNECTIVITY: BETWEENNESS CENTRALITY 374
6.2.7 GIANT COMPONENT 374
6.3 RESULTS & ANALYSIS **375**
6.3.1 CONVERSATIONAL NETWORK 375

7 CONCLUSION **381**

8 APPENDICES **385**

APPENDIX 1: CONVERSATIONAL NETWORK BREAK-DOWN: **385**
APPENDIX 2: DYNAMIC CONVERSATIONAL NETWORK METRICS **436**

9 ANNOTATED BIBLIOGRAPHY **450**

10. REFLECTION **464**

ABSTRACT

In the summer of 2012, popular news media made note of Pádraig Mac Carron and Ralph Kenna's academic article, "Universal Properties of Mythological Networks." News of innovative – and, moreover, quantitative – evidence supporting the plausibility of Homer's *Iliad* quickly spread.[315] This claim to authenticity was based not on archaeological evidence but on *social network analysis*. This type of quantitative study of social relations between a set of actors, in terms of classical literature, has been used to reevaluate Homer's *Iliad* and *Odyssey*, various Greek tragedy, and Cicero's letters. Unfortunately, Vergil's *Aeneid* has been left to the wayside by current scholarship.

In this paper, I develop four different social networks from Vergil's *Aeneid*, a Roman epic from the first century AD about the journey of the founder of Rome, Aeneas. Static and dynamic conversational networks examine relationships between characters based on dialogue. Static and dynamic co-occurrence networks examine relationships based on the simultaneous appearance of two characters in a scene. The static networks provide a look at the *Aeneid* in its

[315] Pádraig Mac Carron and Ralph Kenna. "Universal Properties of Mythological Networks." *Europhysics Letters (EPL)* 99 (2012): 1-6. Nick Collins. "Beowulf and Iliad 'more plausible than Shakespeare,'" last modified July 25, 2012, http://www.telegraph.co.uk/culture/9423516/Beowulf-and-Iliad-more-plausible-than-Shakespeare.html. Emerging Technology from the airXiv, "The Remarkable Properties of Mythological Social Networks," last modified June 13, 2013, https://www.technologyreview.com/s/516081/the-remarkable-properties-of-mythological-social-networks/. David Meadows. "On the 'Plausibility' of the Iliad and Social Networks?" Last modified July 25, 2012. https://rogueclassicism.com/2012/07/25/on-the-plausibility-of-the-iliad-and-social-networks/. Science 2.0. "What the Iliad Can Tell Us About Science 2.0 And Networks," last modified July 25, 2012, http://www.science20.com/news_articles/what_iliad_can_tell_us_about_science_20_and_networks-92450. Joel Shurkin, "Using Social Networks to Analyze the Classics," last modified July 24, 2012, https://www.insidescience.org/news/using-social-networks-analyze-classics. John Sutherland, "Beowulf, Shakespeare and the plausibility of fiction," last modified July 25, 2012, https://www.theguardian.com/commentisfree/2012/jul/25/beowulf-shakespeare-plausible-fiction?newsfeed=true#comment-17351783.

entirety. The dynamic networks look at the individual books of the *Aeneid* and the various roles that a character may play at different points in the narrative.[316]

With these four networks in hand, four major questions are explored throughout the course of this paper.

1) What are the benefits of using quantitative social network analysis metrics and visualizations to study classical texts such as the *Aeneid*?

2) What are the benefits of using *both* static and dynamic networks to study a piece of literature?

3) Does the network in Vergil's *Aeneid* possess real-world characteristics that help to create a more convincing narrative?

4) What kind of insight can this type of analysis reveal about the roles and relationships in this epic?

Overall, I argue that the mathematical calculations involved with the generation of these networks and the accompanying visual representations can provide a more quantitative perspective on the *Aeneid*. Combined with the qualitative, close reading by scholars such as Gilbert Highet, these two approaches can provide a more holistic reading of this well-read and well-studied text.[317]

---

[316] Marjona Coll Ardanuy and Caroline Sporleder, "Clustering of Novels Represented as Social Networks," *Linguistic Issues in Language Technology (LiLT)* 12 no. 4 (Oct. 2015): 13.
[317] Gilbert Highet, *The Speeches in Vergil's Aeneid* (Princeton, New Jersey: Princeton University Press, 1972.

1. INTRODUCTION

In the beginning of the 21st century, scholars began to take advantage of the large digitized corpora of text and apply social network analysis metrics to these new aggregates of data in order to gain new perspectives. While there have been studies on Homer's *Iliad* and *Odyssey*, Vergil's classical epic, the *Aeneid* has been overlooked.[318] On the one hand, the application of social network analysis allows for new interpretations of and perspectives on character roles and relationships. On the other hand, texts such as Vergil's *Aeneid* offers the interesting opportunity to explore how a "purely artificial social network" might resemble real-life collaboration as Homer's *Iliad* and *Odyssey* have been shown to resemble.[319] A work of literature's ability to properly engage in a kind of mimesis allows the audience, who is limited in their ability to understand social cognition and how people relate to one another, to best follow the story.[320] In this paper I aim to offer quantitative analysis and visualizations of Vergil's *Aeneid* through social network analysis. Several questions drive the course of this paper, including

[318] Pádraig Mac Carron and Ralph Kenna, "Universal Properties of Mythological Networks." Ralph Kenna and Pádraig Mac Carron, "Math Meets Myths: Network Investigations of Ancient Narratives," *Journal of Physics: Conference Series* 681 (2016): 1-12, accessed April 16,2 017, doi: 10.1088/1742-6596/681/1/012002. Pádraig Mac Carron, "A Network Theoretic Approach to Comparative Mythology" (PhD diss., Coventry University, 2014). Ralph Kenna and Pádraig Mac Carron, "A Networks Approach to Mythological Epics," in *Maths Meets Myths: Quantitative Approaches to Ancient Narratives,* ed. Ralph Kenna, Máirín MacCarron and Pádraig MacCarron. (Cham, Switzerland: Springer International Publishing, 2017). Dimitrios Kydros, Panagiotis Notopoulos, and Georgios Exarchos, "Homer's Iliad – A Social Network Analytic Approach," *International Journal of Humanities and Art Computing* 9 no. 1 (2015): 115-132. P.J. Miranda, M.S. Baptista, and S.E. de Souza Pinto, "Analysis of communities in a mythological social network," preprint. http://arxiv.org/abs/1306.2537.

[319] R. Alberich, J. Miro-Julia, and F. Rosselló, "Marvel Universe looks almost like a real social network," preprint. http://arxiv.org/pdf/cond-mat/0202174.pdf, 3.

[320] James Stiller, Daniel Nettle, and Robin I. M. Dunbar, "The Small World of Shakespeare's Plays," *Human Nature* 14 no. 4 (2003): 397-398.

1) What are the benefits of using quantitative social network analysis metrics and visualizations to study classical texts such as the *Aeneid*?

2) What are the benefits of using *both* static and dynamic networks to study a piece of literature?

3) Does the network in Vergil's *Aeneid* possess real-world characteristics that help to create a more convincing narrative?

4) What kind of insight can this type of analysis reveal about the roles and relationships in this epic?

The rest of the paper is organized as follows. In Section 2, I provide background information on social network analysis, including a survey of recent scholarship. In Section 3, I present the methods used, including key terminology, metrics, and the construction of the different types of networks. In Section 4, using these basic metrics, I define the structure of the networks used. In Section 5, I explore the question of whether or not Vergil accurately captures the real world relational characteristics in his epic by providing the necessary metrics, their results, and a close analysis and discussion of these results. In Section 6, I explore the insight that this type of analysis can provide on roles and relationships in the narrative by again providing the relevant metrics, their results, and a close analysis and discussion of these results. In Section 7, I summarize the conclusions reached as well as discuss future work.

2 BACKGROUND

2.1 Introduction

Social network analysis is based upon the mathematical foundations of graph theory. In brief, this type of analysis studies individuals and their relationships. Through the study of these relationships, it is possible to trace the flow of information or resources. In this portion of the paper, there is a brief history of what social analysis is (section 2.2), a survey of the beneficial applications of these techniques (section 2.3), and lastly how it has been used with literature (section 2.4) and within the field of classics (section 2.5).[321] Lastly, there is a brief introduction to the works of Homer and, more specifically, the text at hand, Vergil's *Aeneid* (section 2.6).

2.2 What is Social Network Analysis?

Graph theory, a wide-spanning mathematical field, and *graphs* are pure mathematical tools that have been employed by social scientists in a utilitarian manner in order to produce a useful product. In the case of its application to social network analysis, the product is a new understanding of relationships. Graph theory can date its origins back to Leonhard Euler's 1735 paper on the bridges of Königsberg. By studying how one could traverse through the German city the quickest with the six bridges available, he laid the foundations for graph theory.[322] The earliest application of graph theory to social systems first appears in Jacob Moreno's 1934 book, *Who Shall Survive?: A New Approach to the Problem of Human Interrelations*. In this

[321] Diane Harris Cline, "Six Degrees of Alexander: Social Network Analysis as a Tool for Ancient History," *Ancient History Bulletin* 26 (2012): 59.
[322] Barabási, Albert-László, *Network Science*, sec. 2., p. 3. Pádraig Mac Carron, "A Network Theoretic Approach to Comparative Mythology" (PhD diss., Coventry University, 2014), 2.

book, he maps out the friendships of school children.[323] He lays down the foundations for *sociometry*, the precursor to social network analysis and the measurement of relationships in small groups, as well as for *sociograms*, basic visual depictions of relationships.[324] According to Albert-László Barabási, "rapid" growth in network science began only in the first decade of the 21st century. He credits the origins of this growth with papers by Paul Erdös and Alfréd Rényi in 1959 and Mark Granovetter's paper in 1973.[325]

Arguably the most culturally popular example of the application of social network analysis comes from psychologist Stanley Milgram. He attempted to measure the average number of steps separating two people, i.e., he attempted to discern how likely it was that, when two strangers met, they would find that they had a common friend. The average number came to six.[326] His results led to the expression, *six degrees of separation*.[327] This value can to be representative of how seemingly well-connected the world had become.

Social network analysis is also related to *network theory,* which distances itself from graph theory in terms of its empirical nature and its focus on data, function, and utility.[328] This analysis allows for the visualization and quantification of data. Network theory argues that "what happens to a group of actors is in part a function of the structure of the connections among them."[329] In other words, the relationships shared between people have an impact on

---

[323] Pádraig Mac Carron, "A Network Theoretic Approach to Comparative Mythology," 2. J. L. Moreno, *Who Shall Survive?: Foundations of Sociometry, Group Psychotherapy and Sociodrama*. Beacon, NY: Beacon House, 1953.
[324] Stanley Wasserman and Katherine Faust, *Social Network Analysis: Methods and Applications* (Cambridge: Cambridge University Press, 1994), 11-12.
[325] Barabási, Albert-László, *Network Science*, sec. 2., p. 3.
[326] Stanley Milgram, "The Small World Problem," *Psychology Today* (1967) 2: 60–67.
[327] Pádraig Mac Carron, "A Network Theoretic Approach to Comparative Mythology," 3.
[328] Barabási, Albert-László, *Network Science*, 1.4
[329] Stephen P. Borgatti, Martin G. Everett, and Jeffrey C. Johnson, *Analyzing Social Networks* (London: SAGE Publications Ltd., 2013), 1.

the day-to-day events of their lives.

> The underlying argument of network science is that
>
> > the architecture of networks emerging in various domains of science, nature, and technology are similar to each other, a consequence of being governed by the same organizing principles. Consequently we can use a common set of mathematical tools to explore these systems.[330]

Underlying patterns have been extensively studied in order to create parameters for "real world" systems.[331] Besides being used to discover some sort universal system, this type of analysis is also used

> to express rationally defined theoretical concepts by providing formal definitions, measures and descriptions, to evaluate models and theories in which key concepts and propositions are expressed as relational processes or structural outcomes, or to provide statistical analyses of multirelational systems.[332]

Measures such as the degree of the network (see section 3.4.1) and the clustering coefficient (see section 3.4.4) help to describe not only the network as a whole but also the characters that make up the network. Moreover, they help us to test hypotheses concerning how these relationship structures allow for conversation. In short, network theory therefore provides a set of common definitions and measurements to describe and test these systems.

Social networks specifically refer to the "set of actors and the ties among them," and analysis of these networks can be used to study the structural variables and the relationship structures of these groups.[333] Furthermore, social network analysis focuses "on *relationships*

---

[330] Barabási, Albert-László, *Network Science*, sec. 1.3
[331] Luís A. Nunes Amaral, Antonio Scala, Marc Barthélémy, and H. Eugene Stanley, "Classes of behavior of small-world networks," *Proceedings of the National Academy of Sciences U.S.A.* 97 (2000): 111-149. Duncan J. Watts and Steven H. Strogatz, "Collective dynamics of 'small-world' networks," *Nature* 393 (June 1998): 440-442.
[332] Wasserman and Faust, 5.
[333] Wasserman and Faust, 9.

among social entities, and on the patterns and implications of these relationships."[334] It is the deliberate application of graph theory to the study of social relationships.

2.3 Benefits of Social Network Analysis

2.3.1 Use of Graph Theory & Social Network Analysis

There are a variety of different types of networks, and this is often decided by who makes up the networks and what relationships are measured.[335] As such, social network analysis has been used across a wide variety of disciplines to study an even wider variety of networks.[336] There have been network studies on

- World-Wide Web[337]
- Internet[338]
- Movie actor collaboration network
- Science collaboration graphs[339]
- Human sexual contacts[340]
- Cellular networks
- Ecological networks

---

[334] Wasserman and Faust, 3.

[335] Carron and Kenna, "Universal Properties of Mythological Networks," 1. Jukka-Pekka Onnela, Daniel J. Fenn, Stephen Reid, Mason A. Porter, Peter J. Mucha, Mark D. Fricker, and Nick S. Jones, "Taxonomies of networks from community structure," arXiv:1006:573lv3 (May 18, 2012). L. A. Amaral, Barthélémy A. Scala, and H.E. Stanley. "Classes of small world networks." *Proceedings of the National Academy of Science USA* 97, no. 21 (Oct. 10, 2000): 11149-11152.

[336] For more examples see, Wasserman and Faust 5-6. S.N. Dorogovstev and J.F.F Mendes, "Evolution of Networks," *Physics Review E.* 65, no. 066122 (2002). Costa, Luciano da Fontoura, Osvaldo N. Oliveria Jr., Gonzalo Travieso, et al. "Analyzing and modeling real-world phenomena with complex networks: a survey of applications." *Advances in Physics* 60, no. 329 (2011): 329-412.

[337] Lawrence, S. and C. L. Giles, 1999, *Nature* 400, 107. Xeong, H., B. Tombor, R. Albert, Z. N. Oltvai and A.-L. Barabási, 2000, *Nature* 407, 651. Jéka Albert, Hawoong Jeong, and albert-László Barabási, "Internet: Diameter of the World-Wide Web," *Nature* 401 (Sept. 1999): 130-131. Lada A. Adamic and Bernardo A. Huberman, "Power-Law Distribution of the World Wide Web," *Science* 287, no. 5461 (March 2000): 2115. Andrei Broder et al., "Graph structure in the Web," *Computer Networks* 33, no. 1-6 (June 2000): 309-320.

[338] Faloutsos, Michalis, Petros Faloutsos, and Christos Faloutsos. "On power-law relationships of the internet topology." In *ACM SIGCOMM computer communication review*, vol. 29, no. 4, pp. 251-262. ACM, 1999.

[339] A. L. Barabási, H. Jeong, Z. Néda, E. Ravaz, A. Schubert, and T. Vicsek, "Evolution of the social network of scientific collaborations," *Revised Modern Physics* (2002): 47-61. Pádraig Mac Carron and Ralph Kenna, "Universal Properties of Mythological Networks," 1. Onnela et. al., "Taxonomies of networks from community structure. L. A. Amaral, Barthélémy A. Scala, and H.E. Stanley, "Classes of small world networks," *Proceedings of the National Academy of Science USA* 97, no. 21 (Oct. 10, 2000): 11149-11152.

[340] F. Liljeros et al., "The Web of Human Sexual Contacts," *Nature* 411 (2001) 907-908.

- Phone-call networks
- Citation networks[341]
- Networks in linguistics
- Power and neural networks
- Protein folding
- Public Transportation[342]
- History[343]

Though the research questions and the exact methodologies may vary, "network science offers a language through which different disciplines can seamlessly interact with each other."[344] As such, social network analysis naturally allows for interdisciplinary opportunities as an intersection between mathematics and other disciplines, such as literature.

2.3.2 Why Use Social Network Analysis?

Wasserman outlines several reasons why graph theory is useful in social network analysis.

Graph theory

1) provides a vocabulary which can be used to label and denote many social structural properties
2) gives us mathematical operations and ideas with which many of these properties can be quantified and measured
3) gives us the ability to provide theorems about graphs, and hence about representations of social structures.[345]

---

[341] M.E.J. Newman. "Scientific collaboration networks." *Proceedings of the National Academy of Sciences U.S.A* 98, no. 2 (January 2001): 404-409. For a key example on mathematician Paul Erdös' 15000 papers with 492 coauthors, see R. De Castro and J.W. Grossman. "Famous trails to Paul Erdös." *The Mathematical Intelligencer* 22, no. 2 (1999): 173-186. V. Batagelj and A. Mrvar. "Some Analyes of Erdös collaboration network." *Social Networks* 22, no. 2 (2000): 173-186.

[342] C. von Ferber, T. Holovatch, Yu. Holovatch, and V. Palchykov, "Public transport networks: empirical analysis and modeling," arXiv:0803.3514v1 (March 25 2008). Christian von Ferber, Taras Holovatch, and Yurij Holovatch, "Attack Vulnerability of Public Trasnport Networks," arXiv:0709.3206v1 (September 20, 2007). Christian von Ferber, Taras Holovatch, and Yurij Holovatch, and Vasyl Palchykov, "Modeling Metropolis Public Transport," arXiv:0709.3203v1 (September 20, 2007)

[343] J.F. Padgett and C.K. Ansell," Robust Action and the Rise of the Medici, 1400-1434" *American Journal of Sociology* 98, no. 6 (1993): 1259-1319.

[344] Barbasi, Section 1.4.

[345] Wasserman and Faust, 93.

Besides these advantages, graph theory also allows for a representation of a network as a "model of a social system."[346] This model shows a representation of the elements of a situation. Moreover, combining the approaches of a computer scientist and a literary scholar, i.e., quantitative and qualitative analyses, allow for the benefits of both to be used in the study of literature.[347]

While the quantitative analysis is certainly helpful, humanist academics have also praised the visual representations that result from the application of graph theory. Franco Moretti praises social network analysis for allowing the past to become as visible as the present by considering the relationships in their entirety.[348] He goes so far as to remark that while he did not necessarily need network theory, he probably needed networks and the accompanying visualizations. These visualizations allowed him to see "at a glance in a two-dimensional space" characters and their interactions."[349] Similarly, Jeff Rydberg-Cox praises social network diagrams for their ability to represent characters and relationships in Greek tragedies.[350] Opponents of the application of this type of methodology to literature have argued that the quantification of literature actually does little to aid our understanding of texts.[351]

---

[346] Wassmeran and Faust, 93.
[347] Sebastian Gil, Laney Kuenzel, and Caroline Suen, "Extraction and Analysis of Character Interaction Networks from Plays and Movies," Technical Report, Stanford University, 1. Jeff Ryberg-Cox, "Social Networks and the Language of Greek Tragedy," *Journal of the Chicago Colloquium on the Digital Humanities and Computer Science* 1, no. 3 (2011): 1. Prashant Arun Jayannavar, Apporv Agarwal, Melody Ju, and Owen Rambow, "Validating Literary Theories Using Automatic Social Network Extraction," *Proceeds of NAACL-HLT Fourth Workshop on Computational Linguistics for Literature*. Denver, Colorado, June 4, 2015: 32.
[348] Moretti, Franco. "Network Theory, Plot Analysis." *New Left Review* no. 68 (2011): 4. This stands more true for static networks (see section X).
[349] Moretti, 11.
[350] Ryberg-Cox, 1.
[351] Maria Konnikova, "Humanities Aren't a Science. Stop Treating Them Like One," *The Creativity* Post, last modified January 9, 2013, http://www.creativitypost.com/arts/humanities_arent_a_science._stop_treating_them_like_one. Richard Carrier, "Bad Science Proves Demigods Exist!," *Richard Carrier Blogs*, last modified July 27, 2012, http://www.richardcarrier.info/archives/2008.

2.4 Social Network Analysis & Literature

Though the number of studies involving social network analysis and literature has gradually increased, the application of these techniques and metrics have been limited. Kydros suggests that the reasons that these techniques have not been extensively utilized is in part because of the barrier that still prevails between different disciplines. The other difficulty arises because only texts with a large sample size of characters works best for "readable and credible results."[352] This qualification therefore limits the number of texts available for study.

The earliest piece of scholarship that implements these techniques to study literature is R. Alberich, J. Miro-Julia, and F. Rosselló's 2002 examination of the Marvel Universe. Their paper considers the relationships between different characters that have appeared in the decades-old comic book publishing company, Marvel Comics.[353] They study collaboration networks because of how meaningful these relationships are. The relationships in these networks are not only quantitative, but they are also meaningful in that characters, who work together, often genuinely know one another. Their study was a departure from previous network analysis in that it studied fictitious networks rather than those in the real world.

Moved by the work of Alberich et al., David K. Elson, Nicholas Dames, and Kathleen R. McKeown worked to automatically extract social networks from 60 nineteenth-century novels and serials from 31 different authors. These networks are based on dialogue interactions.[354]

---

[352] Kydros, 116.

[353] R. Alberich, J. Miro-Julia, and F. Rosselló, "Marvel Universe looks almost like a real social network," preprint. http://arxiv.org/pdf/cond-mat/0202174.pdf.

[354] Elson, David K. and Kathleen R. McKeown, "Automatic Attribution of Quoted Speech in Literary Narrative," in *Proceedings of the Twenty-Fourth Association for the Advancement of Artificial Intelligence (AAAI) Conference on Artificial Intelligence.* Atlanta, Georgia, 2010, 138. It should be noted that the authors define dialogue as when "(1) The characters are in the same place at the same time; (2) The characters take turns speaking; and (3) The

Looking at various properties of the various networks, they test the correlation of properties based on dialogue with general aspects such as setting and the number of characters. Moreover, they use these networks to test the prevailing literary theories concerning this possible literary relationship.

Five years later, Prashant Arun Jayannavar, Apoorv Agarwal, Melody Ju, and Owen Rambow revisited the work of Elson et al. They present a nuanced interpretation of their results by reconsidering the literary theories underlying their hypotheses. They base their study not on dialogue but rather on *observations* – "unidirectional social events in which *only one* entity is cognitively aware of the other – and *interactions* – "bidirectional social events in which *both* entities are cognitively aware of each other *and* of their mutual awareness."[355] Focusing more on the literary theory, they argue against the initial conclusions of Elson et al. Their paper demonstrated the need for strong perspectives from both sides of an interdisciplinary study.

Working on an even larger scale, Sebastian Gil, Laney Kuenzel, and Caroline Suen built networks from 580 movie scripts and 173 plays from *The Internet Movie Script Database* and *Project Gutenberg*. For these wide-sweeping projects, computational methods are relied upon as humans are limited by their ability to simultaneously analyze and compare hundreds or thousands of works.[356]

While Alberich et al. as well as Elson et al. have worked on large amounts of texts, others have worked to analyze individual texts or smaller groups of texts. M.E.J. Newman and

---

characters are mutually aware of each other and each character's speech is mutually intended for the other to hear. Elson 141.

[355] Jayannavar et al. 36.

[356] Gil, 2. For more on computational analysis, see: Geyong-Mi Park, Sung-Hwan Kim, Hye-Reon Hwang, and Hwan-Gue Cho, "Complex System Analysis of Social Networks Extracted from Literary Fictions," *International Journal of Machine Learning and Computing* 3 no. 1 (Feb. 2013): 107-111. DOI: 10.7763/IJMLC.2013.V3.282.

M. Girvan briefly analyzed *Les Miserables* in their study of network structure. Franco Moretti used character interaction networks to analyze *Hamlet*, whereas James Stiller, Daniel Nettle, and Robin I. M. Dunbar and Stiller and M. Hudson focuses different Shakespearean plays and find that the networks were reflective of small-world properties. George R. R. Martin's *A Storm of Swords*, the third book in his popular *Game of Thrones* series, has been analyzed in this text to provide insight in the relationships in the novel and the impact they may have on the future.[357] Apoorv Agarwal, Augusto Corvalan, Jacob Jensen, and Owen Rambow, focusing on *Alice in Wonderland*, were interested in the use of an automatic annotation scheme in the analysis of literary texts and the derivation of social networks from the gathered data set.[358] Most notably, they introduced the concept of dynamic network analysis for literature since static networks can alter the seeming importance of characters.

Mariona Coll Ardanuy and Caroline Sporleder looked at 238 novels obtained from *Project Gutenberg* and examine both static and dynamic networks.[359] Using the derived networks and data, they consider if the character structure of a novel can be indicative of its genre and/or the style of the author.[360] Their preliminary findings found that the representation of novels through social networks carried the "author fingerprints."[361]

---

[357]

[358] Apporv Agarwal, Augusto Corvalan, Jacob Jensen, and Owen Rambow, "Social Network Analysis in *Alice in Wonderland*," in *Workshop on Computational Linguistics for Literature, Montréal, Canada, June 8, 2012*: 88.

[359] Ardanuy and Sporleder, 1 and 19.

[360] Ardanuy and Sporleder, 1.

[361] Ardanuy and Sporleder, 24.

Table 1: Summary of SNA Scholarship on Literature				
Author	**Year**	**Topic**	**Network Type**	**Hypothesis**
Alberich, Miro-Julia, & Rosselló	2002	Marvel Universe	Static Co-Occurrence	I
M.E.J. Newman and M. Girvan	2003	*Les Misérables*	Static Co-Occurrence	I
Stiller, Nettle, and Dunbar	2003	Shakespeare	Static Co-Occurrence	II
Stiller and Hudson	2005	Shakespeare	Static Co-Occurrence	II
Elson, Dames, McKeown	2010	Nineteenth-Century British Novels	Static Conversational	III
Gil, Kuenzel, and Suen	2011	Plays & Movies		III
Franco Moretti	2011	Shakespeare's *Hamlet*	Static Conversational	I
Agarwal, Corvalan, Jesen, and Rambow	2012	*Alice in Wonderland*	Static Interaction & Observation	II
Jayannavar, Agarwal, Ju, and Rambow	2015	Nineteenth-Century British Novels	Static Interaction & Observation	III
Ardanuy and Sporleder	2015	American & British Novels	Dynamic & Static Conversational	III
Beveridge and Shan	2016	*Game of Thrones*	Static Co-Occurrence	III

These articles also show that that social network analysis is a means to an end as it is used to answer different questions and test different types hypotheses (Table 1). Generally, there are three different types of questions that are pursued. The first type (I) studies the roles of characters. The second type (II) studies whether or not the networks in the literature mirror those in the real world. The third type (III) are more focused on the discovery of an "authorial fingerprint."

2.5 Social Network Analysis & its Applications for Classics

Classics have always been at the forefront of the integration of text and technology. Roberto Busa's *Corpus Thomisticum* is often credited as the first project of "humanities computing," the predecessor of the digital humanities.[362] Begun in the 1940s and published finally in 1956, he

[362] For example, see Willard McCarty, "What Is Humanities Computing? Toward a Definition of the Field," (paper presented in Liverpool, 20 February 1998; Reed College (Portland, Oregon, US) and Stanford University (Palo Alto,

had begun work on a comprehensive concordance of the works of St. Thomas Aquinas.[363] While many classical texts and their translations are saved in electronic storehouses such as Google Books and Project Gutenberg, libraries of classical texts have also been carefully curated. Though the discussion of the discussion of classics and computers should wait for another paper, it should not be denied that the relationship between the two disciplines has been strong from the beginning.

Network theory has been used in the study of ancient material culture and archaeology. Scholars such as Tom Brughmans have written broadly on the use of this type of analysis in archaeology.[364] Network theory has also been tentatively applied to ancient history, most

---

California, US), March 1998; and Wüzburg (Germany), July 1998), December 15, 2015. http://www.mccarty.org.uk/essays/McCarty,%20Humanities%20computing.pdf. Willard McCarty, "Humanities Computing" in *Encyclopedia of Library and Information Science* (New York: Marcel Dekker, 2003), 1226. Svensson, "Humanities Computing as Digital Humanities."

[363] For more on Busa's work see Robert Busa, *Index Thomisticus* (Stuggart: Frommann-Holzboog, 1974); Robert Busa, "The Annals of Humanities Computing: The Index Thomisticus," *Computers and the Humanities* 14 (1980): 83-90. Robert Busa, "Complete *Index Verborum* of Works of St Thomas," *Speculum* 25, no. 3 (1950): 424–5; Robert Busa, "Half a Century of Literary Computing: Towards a 'New' Philology. Literary and Linguistic Computing," *Historical Social Research / Historische Sozialforschung* 7, no. 1 (1992): 69–72; Robert Busa, *La terminologia tomistica dell'interiorita; saggi di metodo per un'interpretazione della metafisica della presenza* (Milano: Fratelli Bocca, 1949).

[364] T. Brughmans, "Facebooking the past: a critical social network analysis approach for archaeology." In *Thinking beyond the Tool: Archaeological Computing and the Interpretative Process*, A. Chrysanthi, M.P. Flores, and C. Papadopoulos (eds). Oxford: Archaeopress, forthcoming; see previously idem, "Connecting the Dots: Towards Archaeological Network Analysis," *Oxford Journal of Archaeology* 29/3 (2010) 277–303; idem, "Thinking through networks: a review of formal network methods in archaeology," *Journal of Archaeological Method and Theory* (20 April 2012; available online at: http://dx.doi.org/10.1007/s10816-012-9133-8). Also look at T. Evans, R. Rivers, and C. Knappett, "Physical and Relational Networks in the Aegean Bronze Age." In *European Conference of Complex Systems - ECCS '06*. 2006 (available online at: http://theory.imperial.ac.uk/~time/TSEpaper/AegeanECCS06.pdf); C. Knappett, *An archaeology of interaction: network perspectives on material culture and society*. New York: Oxford University Press, 2011; C. Broodbank, *An Island Archaeology of the Early Cyclades*. Cambridge, UK: Cambridge University Press, 2002. F. Coward, "Small Worlds, Material Culture and Ancient Near Eastern Social Networks." In *Social Brain, Distributed Mind*, Robin Dunbar, Clive Gamble, and John Gowlett (eds.), 449-479. Oxford University Press, 2010. S. Graham, *EX FIGLINIS: The network dynamics of the Tiber Valley brick industry in the hinterland of Rome*. Oxford: Archaeopress, 2006; see also idem, "The Space Between: The Geography of Social Networks in the Tiber Valley." In *Mercator Placidissimus. The Tiber Valley in Antiquity. New Research in the Upper and Middle River Valley*, Filippo Coarelli and Helen Patterson (eds.), 671-686. Rome: Edizioni Quasar, 2009; idem, "Converting 2-mode Networks to 1-mode Networks," Electric Archaeology (8 Feb 2012; available online at: http://electricarchaeologist.wordpress.com/2012/02/08/converting-2-mode-networks-to-1-mode- networks/).

predominantly by Ian Malkin.[365] The first book-length treatment of the subject was Giovanni Ruffini's *Social Networks in Byzantine Egypt*.[366] Social network analysis has also driven the studies of Diane Cline. Though she has focused on the application of the visualizations rather than the mathematics, she has used the resulting images with great success in her studies of Pericles and Alexander the Great.[367]

As far as the use of social network analysis and literature, in 1990, Michael C. Alexander and James A. Dankowski examined 280 letters of Cicero in order to better discern the communication and social structure during the Roman Republic. They specifically focused on the interactions between patricians and equites.[368] Their study first appeared in a Dutch journal dedicated to social networks, and its publication went virtually unnoticed.[369] In 2011, Jeff Rydberg-Cox analyzed the Greek tragedies available through the *Perseus Digital Library* to study the underlying relationship structures of the plays.[370]

In terms of the application of social network analysis theories and methodologies to pieces of epic literature, there has been a particular focus on the epics of Homer, which loom more vividly in the minds of popular culture than that of Vergil. As noted above, in 2012, Pádraig Mac Carron and Ralph Kenna published an article, "Universal Properties of Mythological

---

[365] I. Malkin, C. Constantakopoulou, and K. Panagopoulou (eds.), *Greek and Roman Networks in the Mediterranean*. London: Routledge, 2009; I. Malkin, *A Small Greek World: Networks in the Ancient Mediterranean*. Oxford: Oxford University Press, 2011. Josiah Ober, *Democracy and Knowledge: Innovation and Learning in Classical Athens* (Princeton: Princeton University Press, 2008).
[366] Giovanni Ruffini, *Social networks in byzantine Egypt* (Cambridge: Cambridge University Press, 2008).
[367] Diane Harris Cline, "Six Degrees of Alexander: Social Network Analysis as a Tool for Ancient History," *Ancient History Bulletin* 26 (2012): 59-69. Diane H. Cline, "Social Network Analysis and Ancient History," paper presented at annual meeting for the American Philological Association (APA), Chicago, Illinois, January 3, 2014.
[368] Michael C. Alexander and James A. Dankowski, "Analysis of an Ancient Network: Personal Communication and the Study of Social Structure in a Past Society," *Social Networks* 12, no. 4 (December 1990): 313-335.
[369] Diane Harris Cline, "Six Degrees of Alexander: Social Network Analysis as a Tool for Ancient History," 60
[370] Ryberg-Cox, 1-11.

Networks." They explore Joseph Campbell's claim that mythological narratives share the same fundamental structure, i.e., the *monomyth*, by analyzing the Anglo-Saxon epic *Beowulf,* Homer's *Iliad*, and the Irish epic *Táin Bó Cuailnge* as well as four fictional narratives – Hugo's *Les Misérables,* Shakespeare's *Richard III*, Tolkein's *Fellowship of the Ring*, and Rowling's *Harry Potter*.[371] They find that the social network in the *Iliad* had properties that were related to real social networks. The seeming veracity of their relationships seemed to support the archaeological evidence that supported the historicity of some of the events in the *Iliad.* Expansions of this study appeared from the same authors in subsequent years.[372]

Appearing soon thereafter in 2013, P.J. Miranda, M.S. Baptista, and S.E. de Souza Pinto, analyzed Homer's *Odyssey* as a static network, based on co-occurrence relationships. They discovered that the *Odyssey's* social network was "small world, highly clustered, slightly hierarchical and resilient to random attacks" and thus reflective of real world networks.[373] Similar to Carron and Kenna they found that, in social topological terms, the *Odyssey* was more reflective of reality, and they concluded that the *Odyssey* may be a mixture of myth- and historically-based societies. In 2015, Dimitrios Kydros, Panagiotis Notopoulos, and Georgios Exarchos focused only on Homer's *Iliad.* Utilizing a static network, based off of co-occurrence relationships, where "corresponding actors *interact* in some way," this paper reaches a similar conclusion to Carron and Kenna.[374]

---

[371] Mac Carron and Kenna, "Universal Properties of Mythological Networks," 1-6. Joseph Campbell, *The Hero with a Thousand Faces* (Princeton: Princeton University Press, 1949).
[372] Pádraig Mac Carron, "A Network Theoretic Approach to Comparative Mythology." Ralph Kenna and Pádraig Mac Carron, "Math Meets Myths: Network Investigations of Ancient Narratives." Ralph Kenna and Pádraig Mac Carron, "A Networks Approach to Mythological Epics.
[373] Miranda, Baptista, and de Souza Pinto, "Analysis of communities in a mythological social network."
[374] Kydros, Notopoulos, and Exarchos, "Homer's Iliad – A Social Network Analytic Approach," 118.

Table 2: Summary of SNA Scholarship on Classical Literature				
Author	**Year**	**Topic**	**Network Type**	**Hypothesis**
Alexander and Dankowski	1990	Letters of Cicero	Static Co-Occurrence	III
Rydberg-Cox	2011	Ancient Greek Tragedy	Static Co-Occurrence	II
Carron and Kenna	2012	*Iliad* etc.	Static Co-Occurrence	I
Miranda, Baptistsa, and de Souza Pinta	2015	*Odyssey*	Static Co-Occurrence	I
Carron	2014	*Iliad* etc.	Static Co-Occurrence	I
Kydros	2015	*Iliad*	Static Co-Occurrence	I
Kenna and Carron	2016	*Iliad* etc.	Static Co-occurrence	I
Kenna and Carron	2017	*Iliad* etc.	Static Co-Occurrence	I

Following in the tradition of scholarship that focuses on the application of social network analysis to literature, the types of hypotheses asked and answered differ from one another (Table 2). Using the same notation from section 2.4, there is a distinct preference for an examination of whether or not classical epics are able to copy real-world models.[375] There is less of an examination of character roles and relationships. Overall, however, the application of this methodology to classical literature and, more generally, the classical world is limited in scope, far more so than in literature in general. This limitation may be because of the mathematical foundations of social network analysis well as the difficulties involved with analyzing Latin and Greek texts in their original languages, though all studies so far have relied on English translations.

[375] Hypothesis Type I ... Type II... Type III.

3 METHOD

3.1 Introduction

In this section of the paper, there is discussion of key terms that serve as the basis for the discussion of networks, in particular, what constitutes a "node" and a "link" (section 3.2). There is then a focus on how the networks were constructed for this study and a detailed description of the networks that were created (section 3.3). Lastly, social network analysis metrics that describe the general properties of these networks are provided in greater detail (3.4).

3.2 Terminology

In mathematical terms, a *graph, G,* consists of an ordered pair $G = (V, E)$ with a set of vertices V and a set of edges E.[376] As noted by Kydros and MacCarron, in recent scholarship, the two terms, graph and network, have become almost indistinguishable in nature (see Table 3).[377] A *network,* which is more often referred to as a *graph* in mathematical literature, possesses a certain

- *number of nodes*, indicated by *N,* which represents the number of components in the system, as well as a certain number of [378]
    -
- *number of links*, indicated by *L,* which represents the total number of interactions between these nodes.[379]

[376] Mac Carron, "A Network Theoretic Approach to Comparative Mythology," 5. Jayannavar et al. 37. Kydros, Notopoulos, and Exarchos, 118. Agarwal, Corvalan, Jensen, and Rambow, 91. Wasserman and Faust, 71 and 95.
[377] Kydros, Notopoulos, and Exarchos, 118. MacCarron, "A Network Theorietc Approach to Comparative Mythology," 5.
[378] Barabási, 2.2.
[379] Barabási 5. M. E. J. Newman. *Networks: An Introduction* (Oxford: Oxford University Press, 2010), 109. Wasserman and Faust, 95.

Table 3: Terminology[380]			
Graph Theory	**Network Science**	**Physics**	**Sociology**
Graph	Network		
Vertex	Node	Sites	Actors
Edge	Link	Bonds	Ties

In terms of types of graphs, a *simple network* or *simple graph* has only a single link between a pair of nodes (see figure 1). A *multigraph* contains *multiedges*, which contain more than one link between a pair of nodes.[381] For the purpose of this paper, if multiple links existed between a pair of nodes, they have been condensed down to one and *self-edges* or *self-loops* were created. In these self-loops, nodes are connected to themselves, are present.[382] Nodes are representative of the characters in the *Aeneid* as well as collective groups that act as one. Links are representative of the different relationships, though the issues of what constitutes a node and a link is discussed in greater detail in **section 3.2**.

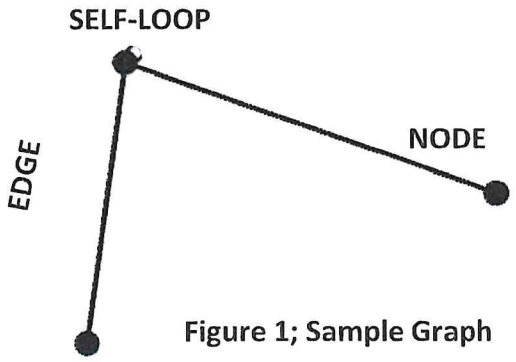


Figure 1; Sample Graph

[380] Barabási 6. Newman, 109.
[381] Newman, 110.
[382] Newman, 110. Examples of these self-loops represent soliloquies for the conversational network.

When considering simple networks, there is a further breakdown of types:

(1) When links connect individuals that regularly interact with one another at work, *organizational* or *professional networks* are derived
(2) When links connect friends to each other, *friendship networks* are derived
(3) When links connect individuals that have an intimate relationship, *sexual networks* are derived.
(4) When links connect individuals that email or call one another, *acquaintance networks* are derived.

○

The type of networks helps to determine the types of questions that may be asked of the data as well as the type of questions that can be answered.

(1) For professional networks, it is possible to use the present networks to discern the success – or failures – in the structure of the organization.
(2) For friendship networks, it is possible to see how ideas, products, and habits can be spread.
(3) For sexual networks, it is possible to study the spread of sexually transmitted diseases
(4) For acquaintance networks, it is possible to capture a mix of professional, friendship, or intimate links in the context of communication and marketing.[383]

○

For this study, the networks derived from the *Aeneid* are most similar to friendship networks.[384]

In many networks, the question of whether or not a link between two nodes is simply a "yes" or "no" question. A connection exists or there does not. When this situation arises, the network is said to be *unweighted*. Alternatively, networks can be *weighted*, in which the links have a strength, weight, or value to them.[385] The weight of the network may interact with the directionality, but these are two characters that can be included or excluded. A *directed network,* or *digraph*, is a network in which each link has a direction, pointing *from* one node *to*

---

[383] Barabási 6. Links can also be used in different types of network analysis. For example, they can be used in the "evaluation of one person by another," "transfers of material resources," "association or affiliation," "behavioral interaction," "movement between places or statuses", "physical connection," "formal relations," and "biological relationships." Wassermann and Faust, 18 and 37.
[384] Compare to Elson and McKeown, "Automatic Attribution of Quoted Speech in Literary Narrative."
[385] Newman, 112. Ardanuy and Sporleder, 13. In graph theory, these figures are known as *valued graphs* or *valued directed graphs* Wasserman and Faust, 140-141.

another. These links are referred to as *directed links*.[386] In figures, the direction is indicated by arrows.[387]

To represent the network mathematically, an *adjacency matrix,* otherwise known as a *sociomatrix*, can be created. The adjacency matrix A of a simple graph with elements A_{ij}. Note that, when network is undirected, this matrix is symmetric, i.e., if there is an edge between *i* and *j*, then there is an edge between *j* and *i*.[388] When a network is weighted, the elements in the adjacency matrix values equal the weights of the corresponding connections (see appendix I).[389]

3.3 Construction of Networks

The analysis of each book of the Aeneid was executed through the close analysis of the printed Latin text. Conversations and appearances of characters were not generated by computer, rather they were done by hand through a close reading of the text and all references and word counts have been generated by hand.[390] These by-hand annotations allow for a more certainty in terms of the importance of the relationships discovered. Graphs were generated through the open-source program, Gephi.[391] Stanley Lombardo's translation of the Aeneid and the Packard Humanities Institute text were used as points of reference. Word counts were derived from the text in the original language as presented in the Loeb Classical Library edition of the Aeneid.[392]

---

[386] Newman, 112-114. Wasserman and Faust, 121-122.
[387] Newman, 112-114.
[388] Newman, 111. Kydros, 120. Wasserman and Faust, 150-152.
[389] Newman, 110-113. Barabási, 11-12; 15.
[390] For the purpose of this analysis, the edition of the Latin text and its corresponding English translation was that of the *Loeb Classical Library*. Additionally, Stanley Lombardo's translation of the text was also closely examined. Other authors such as Agarwal and others, who executed studies of single texts or small groups of text, have also annotated texts by hand.
[391]
[392]

As noted by Kydros, two critical questions when constructing networks: (116)[393]

a) How is a character defined?
- The answer yields the set of nodes in the network.

b) How is the relationship between characters defined?
- The answer yields the set of links in the network.
-

With these two questions in mind, when examining Vergil's Aeneid a conversational network in which two character nodes are connected by an edge when there is explicit dialogue between the two was created.[394]

Each network comprises of nodes, which normally denote individual social entities and here represent the characters of the Aeneid.[395] Social entities may be individual, corporate, or collective social units.[396] As observed by Alberich and their study of the Marvel comic universe, some difficulties may arrive in the identification of characters – and therefore the labelling of nodes – due to the fact that the same person in the Marvel Universe make take on different personalities. Therefore, every "person" is assigned a node, independently of the nickname or personality under which it appears.[397] Similar issues arise in terms of the Aeneid because characters often masquerade as others. For example, in Book 12 of the Aeneid, Juturna, the sister of Turnus, assumes the guise of Metiscus in order to defend of her brother. In these situations, the awareness of those around the disguised were taken into account by listing the conversation as by the person and not the disguised identity. The question of who constitutes a character is also surprisingly difficult for, as Kydros notes, a character can represent a group of

[393] Wasserman and Faust, 5-12.
[394] Ardanuy and Sporleder, 12. Cf. Jayannvar et al., 36.
[395] Wasserman and Faust, 17.
[396] Wasserman and Faust, 17.
[397] Alberich, Miro-Julia, and Rosselló, 4. Elson and McKeown, 142.

humans, "especially when the group acts and reacts as a whole" (117). For example, when Aeneas addresses his troops, they are listed as a collective, "The Trojans."

In the case of the conversational networks, the networks are directed, i.e., who is addressing whom is noted.[398] There are weighted nodes, which are relative to the total number of words spoken by that character, and weighted edges, which are related to the total number of words exchanged between the two characters.[399] Following the example of Elson, Dames, and McKeown, the length of the quote is added to the edge weight because it is hypothesized that the number of words exchanged between characters is related to the strength of their relationship.[400] This edge weight is then normalized by the length of the Aeneid, which contains some 64,000 words. Appendix I lists all of the conversations within the Aeneid, sorted by book and then by line number. Appendix I also provides an adjacency matrix (see section 3.2) in which the rows and columns represent nodes and an entry in row i and column j represent a tie from i to j. The values correspond to the amount of words exchanged between characters.

Elson et al. define a dialogue interaction as such when they meet three criteria:

1. The characters are in the same place at the same time;
2. The characters take turn speaking; and
3. The characters are mutually are aware of each other and each character's speech is mutually intended for the other to hear.[401]

In order to define "speech" or "dialogue," let us turn to Gilbert Highet's definition:

---

[398] Gil et al. made use of an algorithm, which "considers an interaction to have occurred between two characters whenever the characters speak nearby lines in the same scene (4). "Nearby" means when two characters exchanged lines in the same scenes within a certain number of lines between one another. In this case, it was within 10 lines.[398]

[399] In interaction networks, interactions can be directly observed or reported on and examples of such activities such as who people talk to, watch movies with, hang out with , or communicate with. 31

[400] Elson, Dames, and McKeown, 143

[401] Elson, Dames, and McKeown, 141.

> A speech is one or more sentences supposed to be the actual words of a character, framed together on one single occasion – either spoken aloud, or directly reported as being spoken, or shaped in the mind without utterance.

Highet measures speech by line numbers because incomplete lines are not statistically equivalent to whole lines and because incomplete lines are not equal to one another.[402] Highet's speech lengths can be found in **Appendix I**. For the sake of this paper, there was a focus on the word length of speeches. There are 24,381 words of dialogue in the Aeneid, which represents only about 40% of the text. As such, the conversational networks, because they only focus on spoken interactions, fail to capture a huge part of the interactions in the epic.[403]

There are 334 speeches in the Aeneid, including dialogue quoted within the context of other speeches.[404] For example, in Book 2 and 3 where Aeneas is recounting his journeys to the Carthaginian queen Dido, reported speeches are treated as entities separate from Aeneas' overarching speech. If these speeches were not counted separately, there would only be 290 speeches. Figure 2 shows the distribution of speeches across the books of the Aeneid, and there is "variety in the ratio of speech to action, as in every other important structural principle."[405] On average, there are about 28 speeches per book. There are 98 characters who participate in conversation either as a receiver or transmitter.[406] Figure 3 also shows the distribution of the number of speakers in each book of the Aeneid. These distributions provide

---

[402] Gilbert Highet, *The Speeches in Vergil's Aeneid* (Princeton, New Jersey: Princeton University Press, 1972), 18-19.
[403] Ardanuy and Sporleder, 12.
[404] Depending on the calculations of speech, these numbers can vary. For example, Highet found that there were 333 speeches.
[405] Highet, 20.
[406] Highet reports 90 different *speaking* characters (20).

a new kind of insight into each book of the Aeneid as "Vergil conceived each book as an artistic unit, with its own special structural line."[407]

Figure 2:
Distribution of Speeches

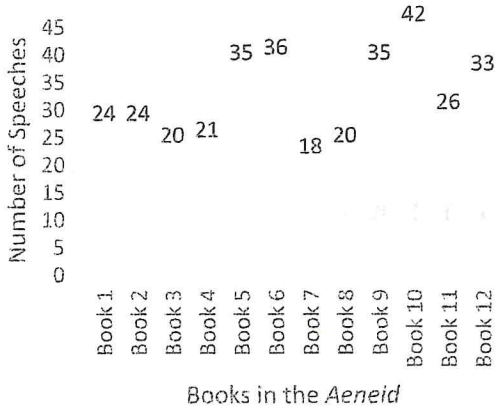
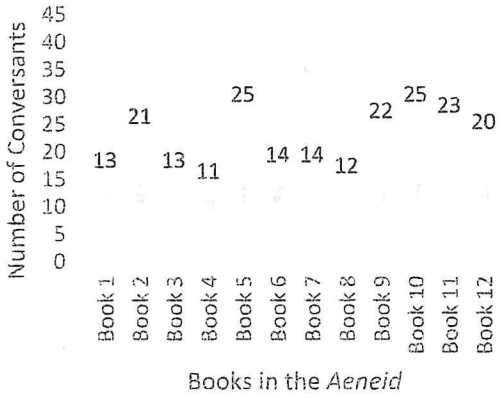


Figure 3:
Distribution of Conversants



From the conversational network, static and dynamic networks have also been derived. The static networks do not consider the factor of time, rather they look at the Aeneid in its entirety. As such they allow for insight into the relationship structures in the novel as a whole.[408] The dynamic networks in literature relatively recent developments, and they look at the Aeneid not holistically but rather in terms of its individual books.[409] By considering the temporal dimension of novels, it allows one to consider the development and the varying roles of characters.[410] For example, although Turnus only emerges as a big player in the latter half of the Aeneid, his role can seem to out shadow others when the Aeneid is considered in its entirety. On the other hand, by breaking down the Aeneid book by book, it becomes clearer

[407] Highet, 20.
[408] Ardanuy and Sporleder, 13.
[409] Agarwal, Corvalan, Jensen, and Rambow, 90.
[410] Ardanuy and Sporleder, 13-14.

that while Aeneas is a very active character, there are still moments when he is more inactive compared to others.[411] It is possible to build a fuller picture of the role played by a character (Argarwal 88). With the development of the dynamic and static networks, a total of two networks were constructed during the course of this paper. Subsequently, they are referred to as the **Static Conversational Network** (N_{ASC}) and the **Dynamic Conversational Network** (N_{ADC}).

3.4 Social Network Analysis Metrics

3.4.1 Degree, Average Degree, and Degree Distribution

The *degree, k*, is a key property of the node. It represents the number of links that a node has to other neighboring nodes.[412] In other terms, the degree of a node measures the "activity" of the actor.[413] The degree of the i^{th} node is denoted by k_i. For example, in the *Static Conversational Network*, the degree of a node represents the number of characters with whom that specific character converses with throughout the *Aeneid*.

In an undirected network, the *total number of links, L*, is expressed as the sum of the node degrees. It is calculated as:

$$L = \frac{1}{2}\sum_{i=1}^{N} k_i$$

While the degree is an important property of an individual node, the *average degree* is an important property of an entire network. It denotes the average number of links that a node

[411] Agarwal, Corvalan, Jensen, and Rambow, 94.
[412] Barabási 8-10. Alberich, Miro-Julia, and Rosselló, 7. Kydros, Notopoulos, and Exarchos, 120-121.
[413] Wasserman and Faust, 100.

has to other nodes.[414] In an undirected network, the *average degree* is calculated as:

$$\langle k \rangle = \frac{1}{N}\sum_{i=1}^{N} k_i = \frac{2L}{N}$$

To see the variability of nodal degrees, to find the variance of the degrees, S_D^2, is calculated as:

$$S_D^2 = \frac{\sum_{i=1}^{N} k_i - \langle k \rangle^2}{N}$$

A high variance suggests that the characters represented by the nodes differ in "activity," as demonstrated by the number of links to each character.[415]

In directed networks, such as the conversational networks, a node's *total degree,* k_i, is made up of the *incoming degree* or *indegree*, k_i^{in}, and the *outgoing degree* or *outdegree*, k_i^{out}. The incoming degree represents the links that point *towards* node *i* while the outgoing degree represents the links that point *away from* node *i*.[416] The in-degree is a measurement of *receptivity* or *popularity*, while the out-degree is a measurement of *expansiveness.* For example, in the conversational network, the in-degree shows how many speakers addres this certain character while the out-degree shows how many listeners this same character has. The total degree is calculated as:

$$k_i = k_i^{in} + k_i^{out}$$

Based on the values of the degree, there is a particular vocabulary for labeling these four kinds of nodes. A node is a(n):

a) *Isolate* if $k_i^{in} = k_i^{out} = 0$

[414] Alberich, Miro-Julia, and Rosselló, 7. Wasserman and Faust, 100-101. Agarwal, Corvalan, Jensen, and Rambow, 91. Elson, Dames, and McKeown, 144. Kydros, Notopoulos, and Exarchos, 120-121. Beveridge, 20. Wasserman and Faust, 100-101.

[415] Wasserman and Faust 101.

[416] Barabási 8-10. Newman, 133-136. Scott, 69. Agarwal, Corvalan, Jensen, and Rambow, 91. Wasserman and Faust, 125-126.

b) *Transmitter* if $k_i^{in} = 0$ and $k_i^{out} > 0$
c) *Receiver* if $k_i^{in} > 0$ and $k_i^{out} = 0$
d) *Carrier* or *ordinary* if $k_i^{in} > 0$ and $k_i^{out} > 0$
o

The difference between a carrier and an ordinary node is that the carrier has an in-degree and out-degree precisely equal to one whereas an ordinary node has in-degree and/or out-degree greater than one, though these values are specifically for unweighted networks.[417] In a directed network, the *total number of links, L*, is calculated as:

$$L = \frac{1}{2}\sum_{i=1}^{N} k_i^{in} = \frac{1}{2}\sum_{i=1}^{N} k_i^{out}$$

In a directed network, the *average degree* is calculated as:

$$\langle k^{in} \rangle = \frac{1}{N}\sum_{i=1}^{N} k_i^{in} = \langle k^{out} \rangle = \frac{1}{N}\sum_{i=1}^{N} k_i^{out} = \frac{L}{N}$$

These values are equal because the same set of arcs are considered but simply from different "directions."[418] In others words, for a directed network, the number of links and average degree are calculated using either the in-degree or out-degree. One may choose either measure (but not both) because the in-links and out-links make up the same set of connections in the network, but simply are viewed from different nodes' perspectives.

3.4.2 Distances, Average Path Length, Diameter[419]

It is often important to know whether it is possible for one node to be able to reach another via a link. From there, the question is the number of ways two nodes can be connected

[417] Wasserman and Faust, 128.
[418] Wasserman and Faust, 127.
[419] Alberich, Miro-Julia, and Rosselló, 9.

and which way may work best.[420] In a network, a *path* is a route that moves from one node to another through various links in a network.[421] The *length* of a path represents the precise number of links along that path. The *distance, d* or d_{ij}, is the shortest path between nodes *i* and *j,* i.e., it possesses the fewest number of links.[422] The distance is also referred to simply as the *shortest path* or the *geodesic path.*[423] In undirected networks, the distance between nodes *i* and *j* and between nodes *j* and *i* are the same. In directed networks, that distance is not always the same nor does a reciprocal relationship always exist.[424]

While the shortest path is often called the distance, the maximum shortest path in the network is referred to as the *diameter* of the network, denoted by d_{max}. In other words, it is the largest distance between any pair of nodes within the network.[425] Similarly, the *eccentricity* or *association number* of the node is the largest distance from one particular node to any other node in the network. The *average eccentricity* of the network is obtained by averaging the eccentricity of all nodes in the network.[426]

The *average path length*, denoted by $\langle d \rangle$, is the average distance between all node pairs in the network.[427] This measurement is most popularly referred to as the "degrees of separation." A small value means that the information is passed along quickly between

---

[420] Wasserman and Faust, 105.
[421] More generally, a path may be referred to as a *walk*, which is a sequence of incident nodes and links. A *trail* is a walk in which all links are distinct while the nodes may be used more than once. A *path* is a walk in which all links and nodes are unique. Wasserman 105-107.
[422] Barabási 20. Newman, 139. Alberich, Miro-Julia, and Rosselló, 9. John Scott. *Social Network Analysis: A Handbook*. 2nd ed. (London: Sage Publications, 2000), 68. Kydros, Notopoulos, and Exarchos, 120.
[423] Barabási 21. Newman, 140. Kydros, Notopoulos, and Exarchos, 121. Wasserman and Faust, 110.
[424] Barabási 20.
[425] Barabási 22. Alberich, Miro-Julia, and Rosselló, 9. Kydros, Notopoulos, and Exarchos, 120. Miranda, 4-5. Wasserman and Faust, 110-111 and 134.
[426] Kydros, Notopoulos, and Exarchos, 121. Wasserman and Faust, 111.
[427] Alberich, Miro-Julia, and Rosselló, 9. Stiller and Hudson, 61. Stiller, Nettle, and Dunbar, 399. Miranda, Baptista, de Souza Pinto, 4.

different nodes, while a large value means that it must pass through more intermediaries to spread throughout the network.[428] For a directed network, the average path length is calculated as:[429]

$$\langle d \rangle = \frac{1}{N(N-1)} \sum_{\substack{i,j=1,N \\ i \neq j}} d_{i,j}$$

3.4.3 Connectedness

In an undirected network, nodes are *connected* if there is a path between nodes. They are *disconnected* if no such path exists. A network is *connected* if all pairs of nodes are connected. A network is *disconnected,* if at least one pair or connection does not exist. When such disconnects occur, *components* or *clusters,* which are subsets of nodes within a network, appear. When clusters of nodes exist in a network, they can be connected by a critical link, which is referred to as a *bridge*.[430] Such links, however, do not always exist nor do they have to. Furthermore, the removal of a bridge leaves more components than when the bridge is included.[431] A measure of the overall connected nature of the network, is the *connectance*, which measures the proportion of possible links that are realized. At the character level, *Connectance* is calculated as

$$\frac{L_i}{(N-1)}$$

where Li represents the links from a particular character, and for the entire work as

---

[428] Stiller, Nettle, and Dunbar, "The Small World of Shakespeare's Plays," 399.
[429] Barabási 22-23.
[430] Barabási 24. Wasserman and Faust, 109-110.
[431] Wasserman and Faust, 114.

$$\frac{L}{N(N-1)}$$

The results range from 0 for a group of completely unlinked nodes to 1 for a fully connected set in which every character interacts with one another.[432]

3.4.4 Clustering Coefficient[433]

The clustering coefficient measures the probability that two nodes, which are linked to a third common node, have a higher probability of knowing one another through this common node.[434] Alternatively, this measurement is referred to as the link density.[435] For a node i with degree k, the local clustering coefficient for undirected networks is calculated as:

$$C_i = \frac{2L_i}{k_i(k_i-1)}$$

where L_i represents the number of nodes in the neighborhood of node i. This coefficient measures the fraction of neighbors of node i that are linked directly to one another as $0 \leq C_i \leq 1$. C_i represents the probability that two neighbors link to one another.

- $C_i = 0$ if none of the neighbors of node i link to each other
- $C_i = 1$ if the neighbors of node i all link to one another to form a complete graph

If all links are present, the graph is said to be complete.[436] Characters with a high clustering coefficient tend to stay with the same group of people and will seem to have strong links with a

---

[432] Stiller and Hudson, 399).
[433] Alberich, Miro-Julia, and Rosselló, 9-10
[434] Alberich, Miro-Julia, and Rosselló, 9-10. Carron and McKenna 28002.1. Gil, Kuenzel, and Suen, 4. Kydros, Notopoulos, and Exarchos, 121. Stiller and Hudson, 61. Stiller, Nettle, and Dunbar, 399-400. Carron and Kenna, "Universal Properties of Mythological Networks," 1.
[435] Stiller, Nettle, and Dunbar, 399. Wasserman and Faust, 101-103. Elson, Dames, and McKeown, 144. Kydros, Notopoulos, and Exarchos, 120. Stiller, James and Matthew Hudson, 61. Wasserman and Faust, 101-102 and 129.
[436] Wasserman and Faust, 102.

select few.[437]

3.4.5 Giant Component

Nodes are connected when there is at least one path that connects them. Nodes can also be connected through intermediate collaborators or partners. The *giant component* represents the largest subset of nodes that are connected.[438] The *center* of the giant component is the node that minimizes this distance through its connections.[439]

4 NETWORK PROPERTIES

4.1 Introduction

Extracting social networks from novels allows the novel to be transformed into a "schematic representation of its core structure, taken from the interactions of its characters."[440] In other words, a character-system arises from character-spaces.[441] In this section, using the network metrics established in section 3.4, the static and dynamic conversational and co-occurrence networks are explored. General properties of the networks are established.

4.2 Conversational Networks: Static & Dynamic

The most readily apparent property of a network is the number of nodes, N, and the number of links, L, and this helps to demonstrate the overall size of the network. In total, there are 132

[437] Stiller and Hudson, 70.
[438] Alberich, Miro-Julia, and Rosselló, 8. Carron and Kenna, "Universal Properties of Mythological Networks," 2.
[439] Alberich, Miro-Julia, and Rosselló,9. Moretti, 4.
[440] Ardanuy and Sporleder, 14.
[441] Moretti, 3.

TABLE 1: NODES & LINKS

STATIC NETWORKS											
Number of Nodes								**Number of Links**			
132								226			
DYNAMIC NETWORKS											
Number of Nodes											
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
13	20	14	11	25	14	14	12	44	25	23	20
Number of Links											
18	20	15	13	30	21	17	14	28	34	25	26

participants, whether speakers or listeners, or in the language of network theory, whether they are isolates, transmitters, receivers, or carriers/ordinary (see section 3.4.1). Contrast that with the numbers in the dynamic network. Understandably in the individual books of the *Aeneid*, the number of participants is significantly smaller – as is the number of speeches – per individual book. Furthermore, compared to the total number of characters in the *Aeneid*, more than 700 characters, the conversational network is significantly more limited in its scope, though it is more precise in terms of how relationships are identified.[442] Also, remember that the links represent not the total number of speeches in this unit of the *Aeneid* but rather the number of unique pairings of speakers/listeners. While Aeneas and Venus speak to one another on multiple occasions in Book 1, this relationship has been condensed to one link. This condensing has occurred because it is easier to deal with two-dimensional matrices rather than the three-dimensional matrices that would be needed for networks with multiedges. This explains why, though there are some 334 speeches in the *Aeneid*, the number of links is only 226.

[442] In comparison, Knuth reports that there are 561 nodes in Homer's *Iliad*. MacCarron and Kenna calculate 716. Kydros, Notopoulos, and Exarchos, 117. D. Knuth, *The Stanford GraphBase, A Platform for Combinationatorial Optimiaaiton (ACM Press, Addison-Wesley, 1993),* 12-14, 45-46.

The *average degree* represents the average number of characters with whom a person as spoken with or interacted with.[443] Remember that the conversational network is directed, i.e., that who speaks to whom and who is spoken to is taken into account. With this in mind, the average degree maintains those patterns of speech. In the entire *Aeneid*, a character interacts on average with almost two characters.

TABLE 2: AVERAGE DEGREE

STATIC NETWORKS											
1.70											
DYNAMIC NETWORKS											
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1.39	1	1.15	1.18	1.2	1.5	1.21	1.17	1.23	1.36	1.09	1.3

The *average weighted degree* reflects how much dialogue, on average, is exchanged between two people, in contrast to the *average unweighted degree* which shows only how many people to whom a character may be connected and does not give weight to the relationships. The weight of the nodes was also normalized to show the percentage of words spoken by the character in that specific book of the *Aeneid*. This calculation allows for a comparison between books and between character pairings (see Appendix I).

The underlying theory behind the weighting of the degree is that characters that speak with one another are more likely to have a stronger, and arguably a more meaningful, relationship. For example in Book 5 of the *Aeneid*, characters, on average, exchange only 60 words with another. This is similar to only about thirty seconds of conversation. When Aeneas hosts various funeral games in honor his father, Anchises, this book is heavier on action rather

[443] Alberich, Miro-Julia, and Rosselló, 7. Wasserman and Faust, 100-101. Apporv Agarwal, Augusto Corvalan, Jacob Jensen, and Rambow, 91. Elson, Dames, and McKeown, "Extracting Social Networks," 144. Kydros, Notopoulos, and Exarchos, 120-121. Beveridge, 20. Wasserman and Faust, 100-101.

than dialogue. With the boat races, foot races, boxing contest, archery contest, and exhibition of horsemanship, Vergil allocates far more words to describing the scene and the actions of his characters rather than to the exchange of dialogue between the Trojans.

TABLE 3: AVERAGE WEIGHTED DEGREE

STATIC NETWORKS											
184.752											
DYNAMIC NETWORKS											
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
178.92	84.45	139	197.36	62.2	226.79	95.07	184.42	79.18	74.44	119.04	93.52

TABLE 3: AVERAGE WEIGHTED DEGREE (Normalized)

STATIC NETWORKS											
184.752											
DYNAMIC NETWORKS											
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
7.692	5	7.692	9.09	4	7.14	7.14	8.33	4.55	4.00	4.35	5.00

The *connectance* (or *link density*) measures the proportion of possible links between characters.[444] This measurement considers not only what relationships exist but also what relationships could possibly exist. For example, in Book 9, there are an unusual number of speakers, 44 characters to be precise, and 28 unique pairings (table **X**). Yet despite this large number of characters, only 6% of the relationships possible are realized. Simply, this number suggests that more dialogue had the potential to happen – and may have happened without the record of Vergil – and this is true throughout the Static and Dynamic Conversational Networks.

[444] Stiller, Daniel Nettle, and Dunbar, 399. Wasserman, 101-103. Elson, Dames, and McKeown, "Extracting Social Networks," 144. Kydros, Notopoulos, and Exarchos, 120. Stiller and Hudson, 61. Wasserman and Faust, 101-102 and 129.

TABLE 4: CONNECTANCE

STATIC NETWORKS											
.013											
DYNAMIC NETWORKS											
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
.12	.05	.10	.12	.05	.12	.09	.11	.06	.06	.05	.07

Similar to the connectance, the *giant component* is the largest subset of nodes with their corresponding links and thus shows how connected a set number of characters are.[445] The center of the giant component is Aeneas as he minimizes the sum of the distances from himself to all other nodes in this connected grouping. This central character has been considered the protagonist of the story.

TABLE 5: GIANT COMPONENT

STATIC NETWORKS												
	Number of Nodes							**Percentage**				
	118							89.39				
DYNAMIC NETWORKS												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
						Nodes						
#	11	11	-	9	14	-	-	8	-	23	21	18
%	84.62	55	-	81.82	56	-	-	66.67	-	92	91.3	90
						Links						
#	17	14	-	11	21	-	-	12	-	33	24	25
%	94.44	70	-	84.62	70	-	-	85.71	-	97.06	96	96.15

The *average path length* is the average distance between all node pairs in the network.[446] This measure is referred more popularly to as "degrees of separation" as it shows how quickly information could be passed around.[447] Understandably, in the Static Conversational Network, the average path length is the largest as there are significantly more

[445] Alberich, Miro-Julia, and Rosselló, 8. Carron and Kenna, "Universal Properties of Mythological Networks," 2.
[446] Alberich, 9. Stiller and Hudson, 61. Stiller, Nettle, and Dunbar, 399. Miranda, Baptista, de Souza Pinto, 4.
[447] Stiller, Nettle, and Dunbar, 399.

characters. Overall, the amount of separation between characters is limited. Related to this measure, the *diameter*, the greatest distance between two connected nodes, can be calculated.[448] Like the average path length, the diameter shows that the networks are small. This conclusion makes sense because of the limited nature of the conversational network, which only considers characters who exchange explicit dialogue.

TABLE 7: AVERAGE PATH LENGTH

STATIC NETWORKS											
3.28											
DYNAMIC NETWORKS											
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
2.59	1.77	1.88	2.24	2.11	2.12	1.82	1.78	2.05	1.84	2.89	2.28

TABLE 6: DIAMETER

STATIC NETWORKS											
8											
DYNAMIC NETWORKS											
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
6	3	4	5	5	4	3	4	5	3	8	5

The *clustering coefficient* measures helps to determine how likely characters are to group together and converse with one another. The average clustering coefficient is a value between 0 and 1, with 0 representing a more fractured group and 1 resembling more of a clique. While the networks constructed from the *Aeneid* tend to be smaller in size, they are also more fractured in nature.

TABLE 8: AVERAGE CLUSTERING COEFFICIENT

STATIC NETWORKS											
.10											
DYNAMIC NETWORKS											
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
.03	.01	0	.03	.09	.09	.06	.12	.02	.10	.02	.01

[448] Alberich, Miro-Julia, and Rosselló, 9. Kydros, Notopoulos, and Exarchos, 120. Miranda, Baptista, de Souza Pinto, 4-5.Wassmerman and Faust, 110-111 and 134.

5 "REAL WORLD" RELATIONSHIPS

5.1 Introduction

While with written text, readers have the ability to easily reference points at the beginning and end, they still arguably face the same difficulties as play-goers in terms of keeping track of characters.[449] An author's ability to simulate real world relationship structures therefore can lend to the reader's ability to follow a story's plot and to thus understand the storyline. Real world networks are first seen...[450] In the case of these networks, several defining features come to the forefront. In order to be considered as having "real world" properties, networks must be

- Small World[451]
- Hierarchical Structure[452]
- Assortatively Mixed by Degree
- Scale Free
- Vulnerable to Targeted Attack
- Robust to Random Attack

In this section of the paper, first metrics important to the evaluation of these real world characteristics are discussed, including an introduction to random networks. Then, these

[449] Stiller, Nettle, and Dunbar, 397-399.
[450] Carron and Kenna, "Universal Properties of Mythological Networks,"3.
[451] D.J. Watts. *Small* Worlds. Princeton: Princeton University Press (1999). D.J. Watts and S.H. Strogatz. "Collective dynamics of 'small-world' networks." *Nature* 393 (1998): 440-442. Luís A. Nunes Amaral, Antonio Scala, Marc Barthélémy, and H. Eugene Stanley, "Classes of behavior of small-world networks," *Proceedings of the National Academy of Sciences U.S.A.* 97 (2000): 111-149. H.R. Bernard, P.D. Killworth, M.J. Evans, C. McCarty, and G.A. Shelly. "Studying Social Relations Cross-Culturally." *Ethnology* 27 (1988): 155-179. F.R. Christopher Liljeros, C.R. Edling, L.A. Nunes Amaral, H. Eugen Stanley, and Y. Aberg, "The Web of Human Sexual Contacts," *Nature* 411 (2001): 907-908. M.E.J. Newman, "The Structure of Scientific Collaboration Networks." *Proceedings of the National Academy of the Sciences of the USA* 98 (2001): 404-409. S.H. Strogatz, "Exploring Complex Networks," *Nature* 401 (2001): 268-276.
[452] Carron and Kenna, "Universal Properties of Mythological Networks," 1. Erzsébet Ravasz and Albert-László Barabási, "Hierarchical organization in complex networks," *Physics Review E* 67, no. 026112 (2003): -1-7. Albert-László Barabási and Réka Albert, "Emergence of Scaling in Random Networks," *Science* 286, no. 509512 (1999): 1-11. arXiv:cond-mat/9910332v1 (Oct. 21, 1999)

calculations are applied to the conversational and co-occurrence networks, and the networks are evaluated on their own in terms of their ability to imitate these characteristics.

5.2 Metrics

5.2.1 Random Networks

While real world networks have been studied to discern the properties that naturally occur in relationships, such networks can be reproduced through the creation of random networks. These networks also can be juxtaposed against the existing networks and can help to discern if the networks do in fact portray real world properties. These properties will be discussed soon thereafter.[453]

A *random network* consists of *N* nodes with the links pairing sets of nodes generated randomly with probability *p*.[454] In a random network, the expected number of links takes into account the probability *p* that two nodes are connected as well as the number of pairs that we aim to generate as $L_{max} = \frac{N(N-1)}{2}$. We can denote the average number of links as

$$\langle L \rangle = \sum_{L=0}^{\frac{N(N-1)}{2}} Lp_L = p\frac{N(N-1)}{2}$$

Based off of this calculation, the average degree of a random network is the product of the probability *p* that two nodes are connected and L_{max}, the maximum number of links in a network with *N* nodes[455]

---

[453] Barabási 4.
[454] Barabási 4. Alberich, Miro-Julia, and Rosselló, 6-7.
[455] Barabási 6-7.

$$\langle k \rangle = \frac{2\langle L \rangle}{N} = p(N-1)$$

The degree distribution in a random network[456]

$$p_k = \binom{N-1}{k} p^k (1-p)^{N-1-k}$$

5.2.2 Small World

In order to be considered small world, two properties must be satisfied. The clustering coefficient of the network should be significantly larger than that of the random network. The average path length should also be significantly larger than that of the random network.

5.2.2a Average Path Length

The *average path length*, denoted by $\langle d \rangle$, is the average distance between all node pairs in the network.[457] For a directed network, the average path length is calculated as:[458]

$$\langle d \rangle = \frac{1}{N(N-1)} \sum_{\substack{i,j=1,N \\ i \neq j}} d_{i,j}$$

The network is said to be small world if $d = d_{rand}$.[459]

---

[456] Barabási 9. Alberich, Miro-Julia, and Rosselló, 11.

[457] Alberich, Miro-Julia, and Rosselló, 9. Stiller and Hudson, 61. Stiller, Nettle, and Dunba, 399. Miranda, Baptista, de Souza Pinto, 4.

[458]

[459] Carron and Kenna, "Universal Properties of Mythological Networks," 1.

5.2.2b Clustering Coefficient

The *clustering coefficient* measures the probability that two neighbors of a node are linked (see section 3.4.4). In general, collaboration networks have large clustering coefficients.[460] This large clustering as well as a low average distance creates *small-world* networks. Moreover, if the clustering coefficient of the network is significantly greater than the clustering coefficient of the random network *and* if the average path length of the network is significantly larger than that of the random network, $C \gg C_{rand}$, the network is small world.[461] The C_{rand} is the clustering coefficient of a random network of the same size, i.e., the same number of nodes, and the same average degree.[462]

$$C_i = \frac{2L_i}{k_i(k_i - 1)}$$

5.2.3 Hierarchical Structure

By calculating all the degrees form all the nodes and backfilling the percentages, we can derive p(k), the probability that a given node has the degree k.[463] In collaboration networks, the distribution P(k) has a tail that follows either a power law, $P(k) \sim k^{-t}$. For some constant, positive exponent t, or a power law with an exponential cutoff, $P(k) \sim k^{-t} * 10^{\wedge -k/c}$. In these situations, *t* and *c* are two positive constants and *c* is large. The power law allows for the existence of a small number of nodes with a very high degree. The cutoff prevents the existence of nodes with high degrees. The cutoff exists because of the finite amount of time allowed for interactions.

---

[460] Alberich, Miro-Julia, and Rosselló, 10. Barabási Complex 25.
[461] Miranda, Baptista, de Souza Pinto, 5.
[462] Carron and Kenna, "Universal Properties of Mythological Networks," 1.
[463] Miranda, Baptista, de Souza Pinto, 4.

Due to this limitation, it is impossible for a node to interact with a certain number of individuals within an upper bound.[464] If it follows the power law, the network is considered scale-free.[465] As seen in these graphs, assortative mixing by degree is the idea that vertices of high degree associate with other highly connected vertices, while vertices of lower degree associated with less linked.[466] To obtain the best fit of the distribution of degrees, we have logarithmically binned the data and performed a linear regression of log(P(r)) on log(r).[467]

5.2.4 Giant Component

The *giant component* represents the largest subset of nodes with their corresponding links. In large collaboration networks, a very large subset of nodes are connected to one another and thus the giant component is quite large. In fact, it is around 80% to 90% of all nodes in the network.[468] Another possible calculation is that the *average degree* is consistently smaller than the theoretical average degree calculated by the random model.[469]

5.2.5 Attacks: Targeted & Random

With the betweenness centrality (section 6.2.5), it is possible to remove the most important nodes to see how the giant component behaves after the removal of these nodes. This type of removal is referred to as a *targeted attack*. If the network begins to break down quickly and the giant component greatly decreases when the top 5% of nodes with the highest betweenness

---

[464] Alberich, Miro-Julia, and Rosselló, 11.
[465] Miranda, Baptista, de Souza Pinto, 4.
[466] Carron and Kenna, "Universal Properties of Mythological Networks," 2.
[467] Alberich, Miro-Julia, and Rosselló, 5.
[468] Alberich, Miro-Julia, and Rosselló, 8. Carron and Kenna, "Universal Properties of Mythological Networks," 1.
[469] Carron and Kenna, "Universal Properties of Mythological Networks," 1. Alberich, Miro-Julia, and Rosselló, 8.

centrality are removed, the network is said to be *vulnerable to targeted attack* and to lack robustness. If the network remains connected, it is said to be *robust*.[470] On the other hand, the *random attack* is when nodes are chosen at random to be removed.[471] In other words, if a few key characters are still present after a random attack, the flow of information can be perceived. It would not affect the plot nor the audience's perception.[472] A lack of robustness suggests that a network is overly reliant on a few people.[473] Moreover, vulnerability to targeted attack but robustness to random attack hint that these networks may be scale-free, one of our essential characteristics of real-world social networks.[474]

5.3 Results & Analysis

According to the approximate path lengths and clustering coefficients of the randomly generated graphs in Gephi, the networks in the *Aeneid* appear to not be real. However, when the distribution of the degrees is taken into account, we see that they do indeed follow a power-law distribution and therefore are mixed assortatively. Moreover, the large giant component also indicates that many books of the *Aeneid* are the correct size for real world networks; however, some do not quite fit the bill such as Book 2 and Books 3 and 7 contain no giant component initially. When the giant component is subject to targeted and random attacks the networks prove that they are vulnerable to targeted attack but are robust to random attacks. Therefore, they seem to have characteristics of a real world network. Here, the

---

[470] Carron and Kenna, "Universal Properties of Mythological Networks," 3.
[471] Miranda, Baptista, de Souza Pinto, 6. R. Albert, H. Jeong, and A-L Barabási, "error and attack tolerance of complex networks," *Nature* 406 (2000) 378.
[472] Stiller and Hudson, di70.
[473] Pádraig Mac Carron, "A Network Theoretic Approach to Comparative Mythology," 7.
[474] Carron and Kenna, "Universal Properties of Mythological Networks," 3.

presence of the dynamic networks come into use because it shows the varying ability of Vergil to truly capture real world relationships. It also shows the varied character of the books as it suggests that books heavy on exposition may provide too small a sample of speech to analyze and to reflect real world principles.

Giant Component for a Targeted Attack of N_{ADC}												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
#	13	20	14	11	25	14	14	12	44	25	23	20
%	84.62	55	-	81.82	56	-	-	66.67	-	92	91.3	90
5%	**41.6**	**15.7**	*66.6*	**50**	**20.8**	*46.1*	*69.2*	**27.2**	*76.1*	**62.5**	**54.55**	**31.5**
10%	-	16.6	-	-	22.7	-	-	-	*70*	31.8	52.3	33.33
15%	27.2	17.6	*45.4*	33.3	23.8	*16.6*	*50*	30	*73.68*	19.05	50	11.76
20%	-	18.7	-	-	15	*9.09*	*45.4*	-	*77.78*	10	27.78	12.5
25%	30	20	*50*	25	-	-	*30*	22.22	*52.94*	-	23.5	13.33

Giant Component for a Random Attack of N_{ADC}												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
#	13	20	14	11	25	14	14	12	44	25	23	20
%	84.62	55	-	81.82	56	-	-	66.67	-	92	91.3	90
5%	83.33	57.89	-	80	54.17	-	-	65.43	-	90.1	89.86	88.52
10%		55.56	-		54.45	-	-	63.22	-	88.21	85.01	87.72
15%	81.82	52.59	-	77.78	52.11	-	-	61.59	-	85.21	83.62	85.99
20%		56.25	60		49.43	-	-	58.2	-	83.99	79.12	84.32
25%	80	53.33	44.44	75	46.32	-	-	55.21	-	82.1	76.2	81.36

6 CHARACTER ROLES & RELATIONSHIPS IN THE *AENEID*

6.1 Introduction

A prevailing question in social network analysis has been the identification of the "most important" actors in a social network.[475] In the context of literature, it is not necessarily difficult to identify the main characters. Social network analysis allows for an opportunity to discern the *importance* or *prominence* of an actor means and to discuss the properties of the actor's location in the network in question. Further, social network analysis metrics allows for an opportunity to *quantify* the prominence of individuals.[476] It should be noted that there is no "right" centrality measure.[477] Rather, each measurement gives complementary information and further dimensions to the role of a character. In this section of the paper, I discuss the metrics involved with considering the role of a character in a network (section 6.2) before looking at specific characters in the *Aeneid* and their roles depending on the type of network (section 6.3).

6.2 Metrics

6.2.1 Connectivity: Degree Centrality

One of the major questions is "which are the most important or most central vertices in a network?"[478] Several different measurements may be used to this end. The simplest centrality measure is the *degree* of a node, which, as mentioned in section 3.4.1, is the total number of

[475] Wasserman and Faust, 169.
[476] Wasserman and Faust 14-15 and 169. For more on character holes, see R.S. Burt, *Structural Holes: The Social Structure of Competition.* Cambridge: Harvard University Pres, 1995.
[477] Beveridge, 21.
[478] Newman, 168.

edges connected to a node. This measurement is sometimes called the *degree centrality*.[479] Though simple, Newman (2010) argues that this measurement can be very illuminating. For at the most basic level, in a social network, it can demonstrate who has the most or least connections with the assumption being that people with many connections have "more influence, more access to information, or more prestige than those who have fewer connections."[480]

At the most basic level, especially in undirected networks, prominent actors are those that are involved with many actors. Their involvement defines them as a *central* character.[481] A character with a high centrality value is "where the action is" and thus directs the attention to the most visible actors in the network in terms of its contact with others. Due to the actor's connections, it can be perceived as a "major channel of relational information, indeed, a crucial cog in the network, occupying a central location."[482] Meanwhile, actors with a low degree can be considered "peripheral."[483]

6.2.2 Connectivity: Eigenvector Centrality

While the degree centrality treats all links as equal, the *eigenvector centrality* acknowledges the fact that not all neighbors are equivalent by awarding nodes a score that is proportional to the sum of the scores of its neighbors. Because some neighbors are more important than others, the importance of their neighbors therefore has an impact on those linked to them.[484] In terms

---

[479] Wasserman, 178-179.
[480] Newman, 169. Beveridge, 20. Agarwal, Corvalan, Jensen, and Rambow, 91.
[481] Wassermann and Faust, 173.
[482] Wasserman and Faust, 179.
[483] Wasserman and Faust, 180.
[484] Newman, 169. Beveridge, 20

of its score, therefore, a node gets a boost for begin connected to important people. The eigenvector centrality is the weighted sum of the importance of its neighboring nodes and is calculated as

$$x_i = \sum_{j \in V} w_{ji} x_j$$

for each $i \in V$. Solving the resulting linaer system gives the eigenvector centrality.[485]

6.2.3 Connectivity: PageRank

Similar to the eigenvector centrality, the *pagerank* also takes into account the importance that a node gains from being connected to other important nodes. Unlike the eigenvector centrality, however, a node does not get full credit for the total importance of its neighbor. For example, the influence of a character is shared by those connected to him/her. The importance is divided amongst its direct connections. The pagerank is calculated as

$$y_i = \alpha \sum_{j \in V} \frac{w_{ji}}{k_j} y_j + \beta$$

where $\alpha + \beta = 1$ and $\alpha, \beta \geq 0$ and with $\beta = .15$[486]

6.2.4 Connectivity: Closeness Centrality

Unrelated to the eigenvector centrality (and the Katz centrality and PageRank) is the *closeness centrality*, which measures the mean (average) distance from one node to others.[487] Closeness

[485] Beveridge, 20.
[486] Beveridge, 21.
[487] Newman, 171. Kydros, Notopoulos, and Exarchos, 123. Beveridge, 21. Wasserman and Faust, 183-187.

reflects the compactness of a network, and actors with a lower score are more important than others.[488] It is based on how *close* an actor is to others, and this closeness allows for one to interact quickly with others.[489]

6.2.5 Connectivity: Betweenness Centrality

The *betweenness centrality* measures how much a node lines on paths between other nodes.[490] The higher the score, the more a node is used to pass along information, and nodes with high scores can be seen as a "brokers in communication." It reflects the "facilitation of circulation" of information.[491] Interactions between two nonadjacent nodes might depend on others who lie on the paths between these two. The others potentially have control or influence over these interactions. This location *in between* many actors lends to a large "betweenness centrality."[492] It is calculated as

$$z_i = \sum_{j,k \in V} \frac{\sigma_{jk}(i)}{\sigma_{jk}}$$

where σ_{jk} is the number of (j,k) shortest paths and $\sigma_{jk}(i)$ is the number of these (j,k) shortest paths that go through vertex i.

---

[488] Kydros, Notopoulos, and Exarchos, 123. Beveridge 21
[489] Wassermann and Faust, 183-184.
[490] Newman, 185. Kydros, Notopoulos, and Exarchos, 123. Carron and Kenna, "Universal Properties of Mythological Networks," 2. Beveridge, 21. Miranda, 5-6. Wasserman 188-191. Miranda 5. L.C. Freeman, "A set of Measurements of Centrality Based on Betweenness," *Sociometry* 40 (1997) 35.
[491] Kydros, Notopoulos, and Exarchos, 123.
[492] Wasserman and Faust, 188-189.

6.2.7 Giant Component

Two nodes in a network are *connected* when there is at least one path in the network. The *giant component* is the largest subset of nodes with corresponding links.[493] The individual at the center of the *giant component* is often seen as the protagonist.

6.3 Results & Analysis

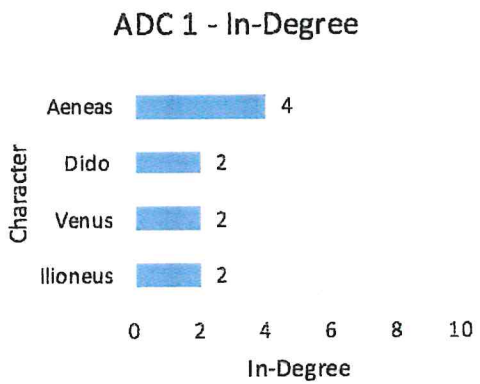
6.3.1 Conversational Network

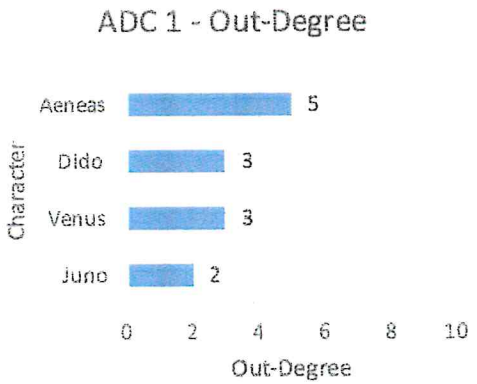
Looking at the static conversational network first provides a broad overview of the characters in the *Aeneid* (see Appendix II). When sorted by degree, it is rather unsurprising to see who rises to the top. However, when sorted by weighted degree, Ascanius disappears and is replaced by the likes of Evander. So while Ascanius may talk to many people, he still does not speak many words. While this static network provides an excellent overview of the characters in the *Aeneid*. It is still limited in that it may skew the importance of some characters over the others as, for example, Deiphobe, though she only appears in two books of the *Aeneid* and thus is not necessarily physically present throughout, maintains such a high ranking.

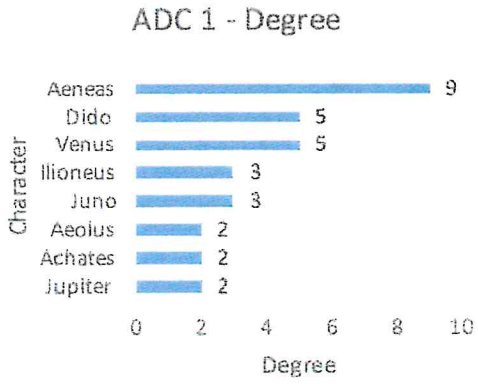
As an example, let us look at the results of the relationships in Book I of the *Aeneid*. Aeneas has the highest degree centrality as he converses with the most number of people. Moreover, as indicated by his in-degree, which shows how many people talk to him, and his out-degree, which shows how many people he himself talks to, he is both a transmitter and a receiver node. Moreover, he can be considered a carrier of information. The weighted degree shows the number of words exchanged by a character. Ilioneus, though he does not have a high

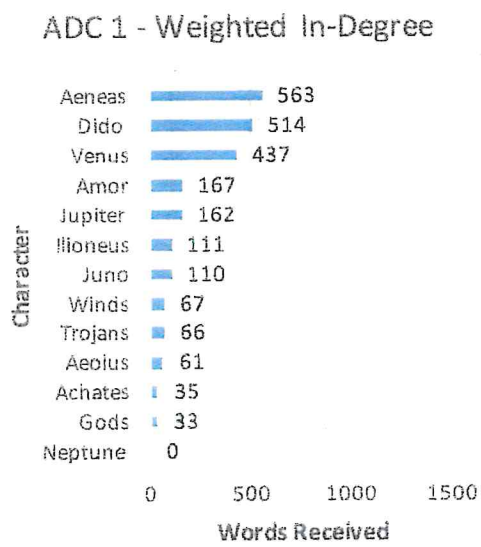
[493] Alberich, Miro-Julia, and Rosselló, 8.

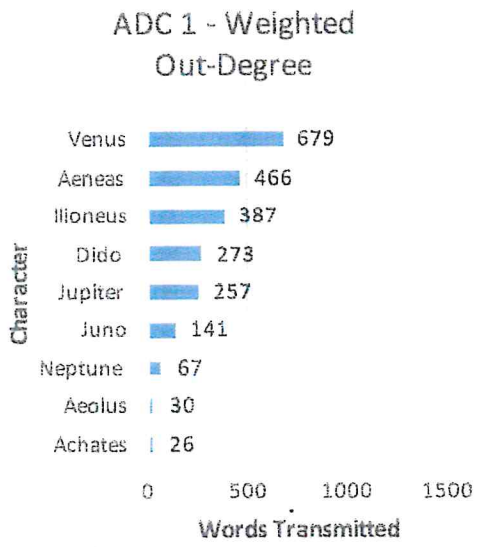
Figure 4: Top Ranking Characters in the ADC 1
(Dynamic Conversational Network in Book 1 of the *Aeneid*)

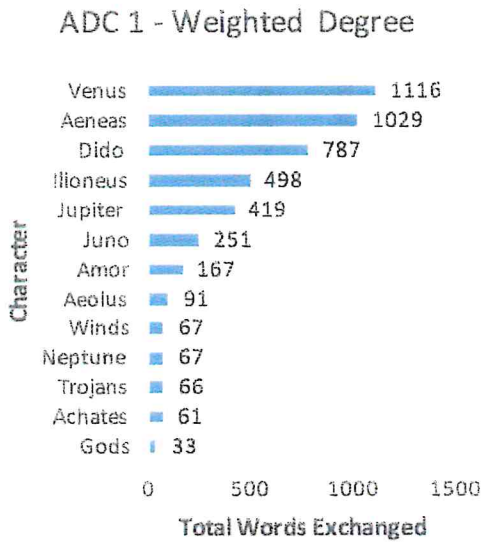


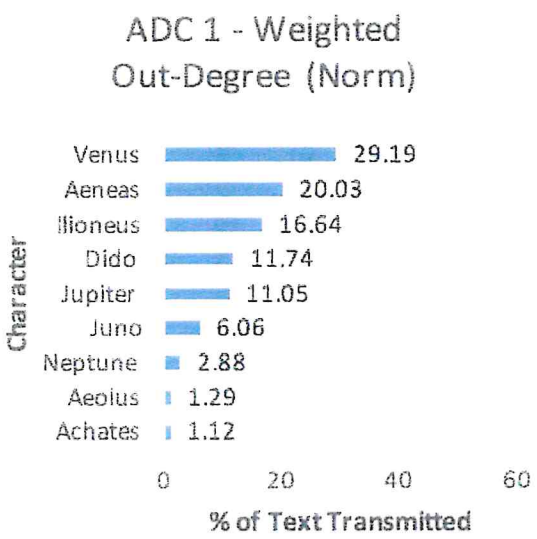


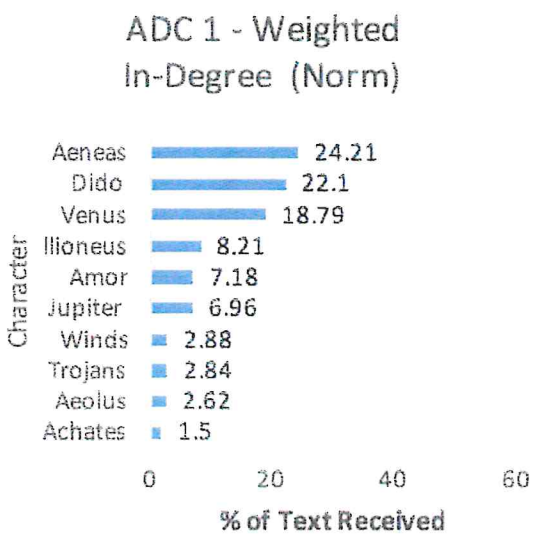


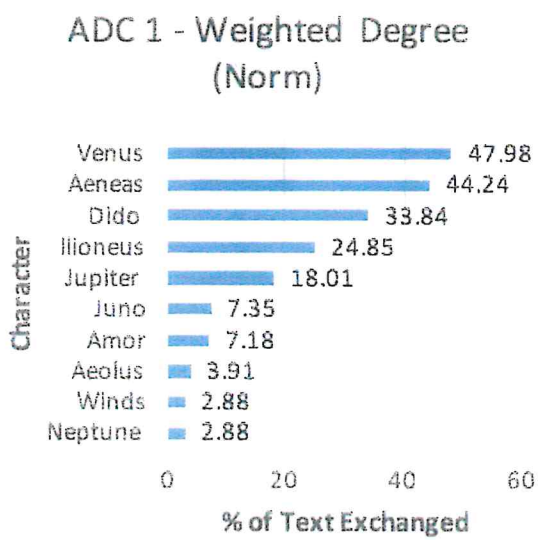


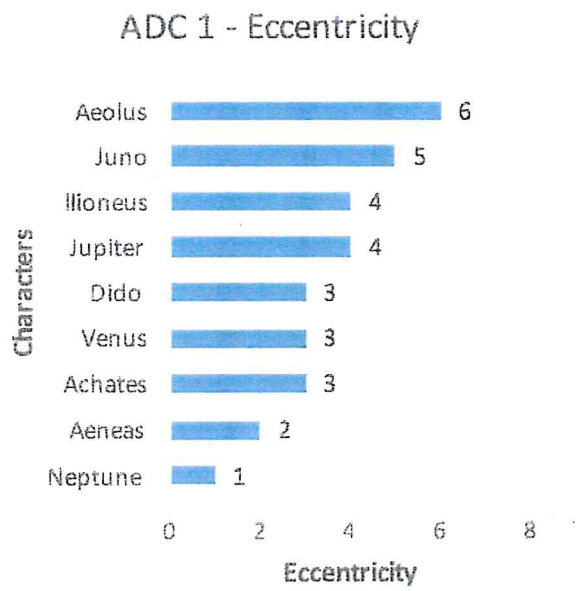


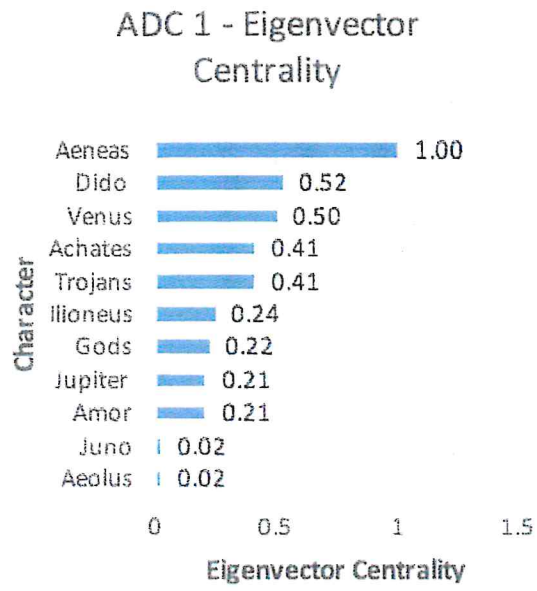


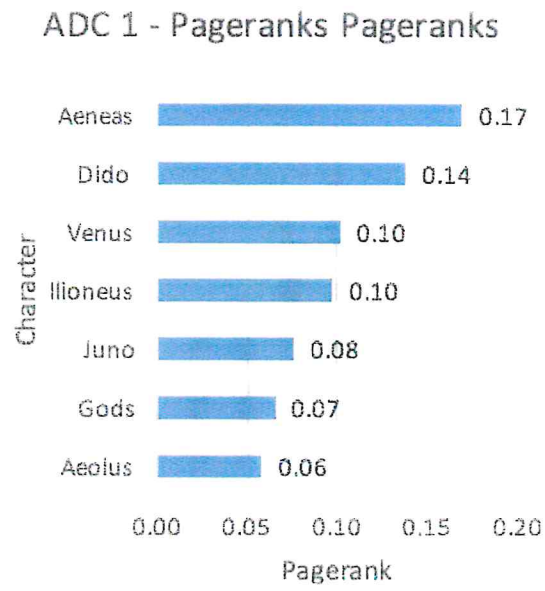

ADC 1 - Weighted Out-Degree (Norm)
Character
Venus 29.19
Aeneas 20.03
Ilioneus 16.64
Dido 11.74
Jupiter 11.05
Juno 6.06
Neptune 2.88
Aeolus 1.29
Achates 1.12
0 20 40 60
% of Text Transmitted

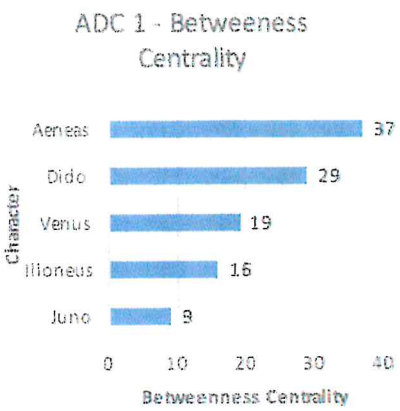

ADC 1 - Weighted In-Degree (Norm)
Character
Aeneas 24.21
Dido 22.1
Venus 18.79
Ilioneus 8.21
Amor 7.18
Jupiter 6.96
Winds 2.88
Trojans 2.84
Aeolus 2.62
Achates 1.5
0 20 40 60
% of Text Received

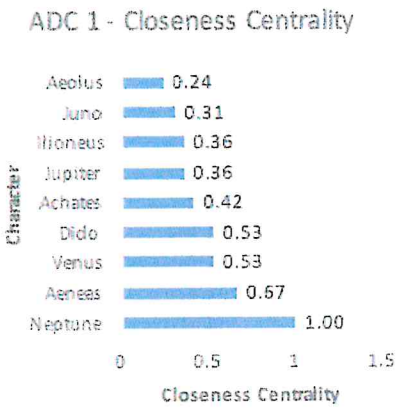

ADC 1 - Weighted Degree (Norm)
Character
Venus 47.98
Aeneas 44.24
Dido 33.84
Ilioneus 24.85
Jupiter 18.01
Juno 7.35
Amor 7.18
Aeolus 3.91
Winds 2.88
Neptune 2.88
0 20 40 60
% of Text Exchanged

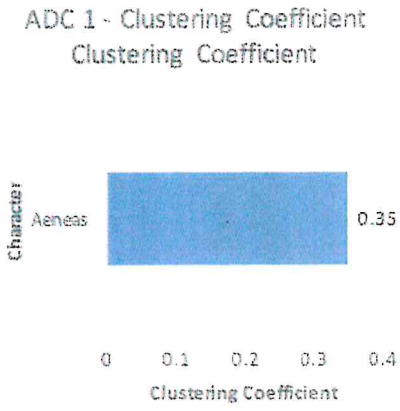

ADC 1 - Eccentricity
Characters
Aeolus 6
Juno 5
Ilioneus 4
Jupiter 4
Dido 3
Venus 3
Achates 3
Aeneas 2
Neptune 1
0 2 4 6 8
Eccentricity


ADC 1 - Eigenvector Centrality
Character
Aeneas 1.00
Dido 0.52
Venus 0.50
Achates 0.41
Trojans 0.41
Ilioneus 0.24
Gods 0.22
Jupiter 0.21
Amor 0.21
Juno 0.02
Aeolus 0.02
0 0.5 1 1.5
Eigenvector Centrality


ADC 1 - Pageranks Pageranks
Character
Aeneas 0.17
Dido 0.14
Venus 0.10
Ilioneus 0.10
Juno 0.08
Gods 0.07
Aeolus 0.06
0.00 0.05 0.10 0.15 0.20
Pagerank



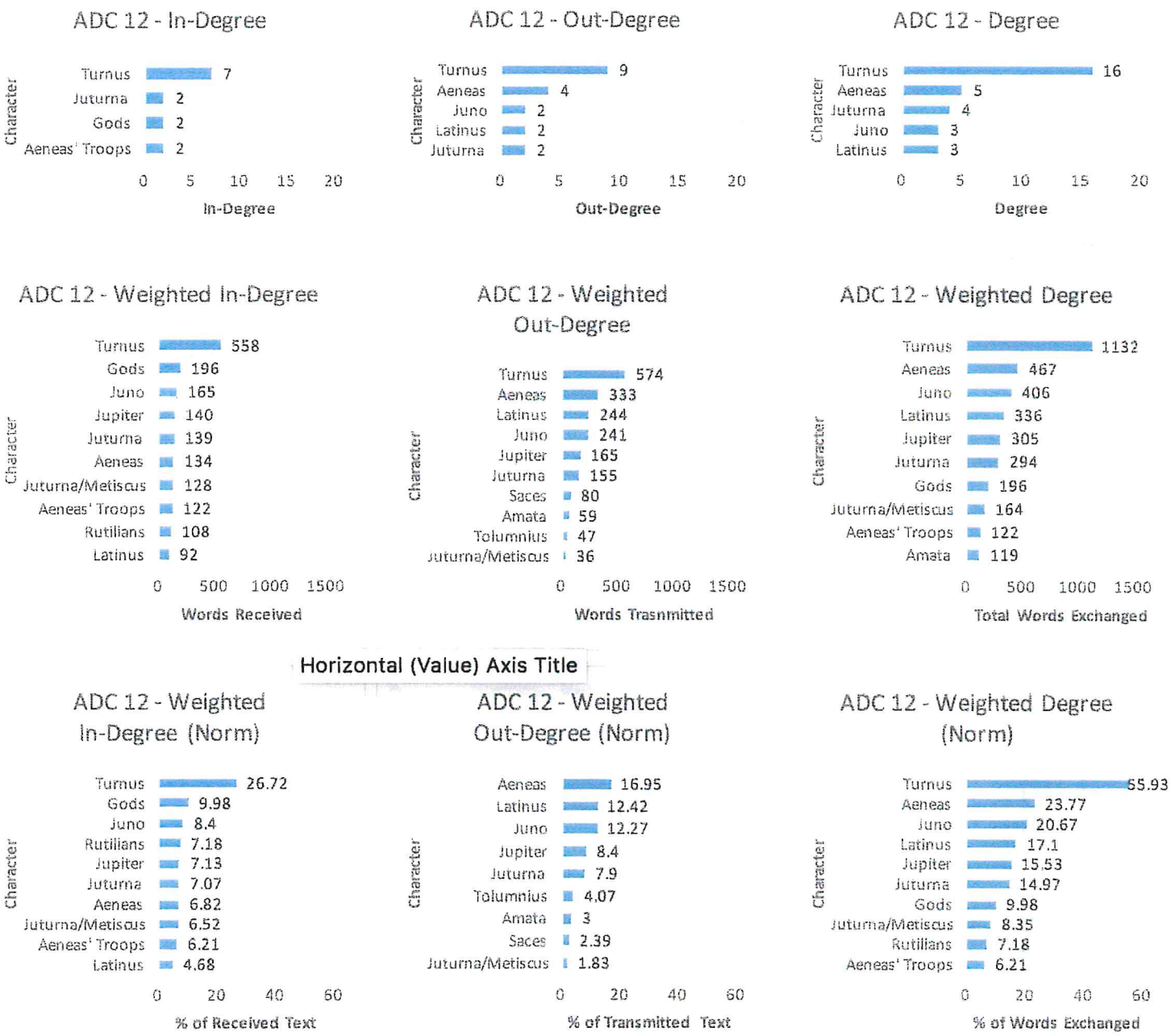


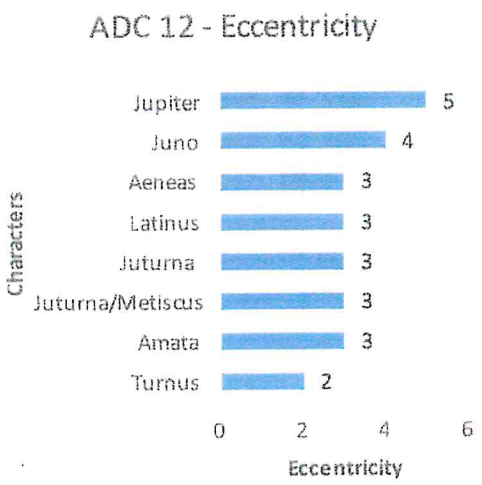


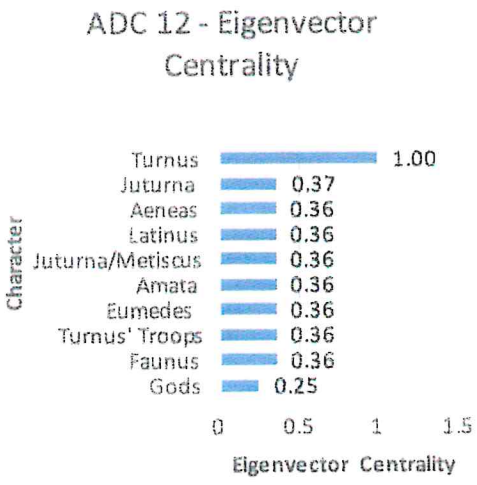
degree since he only converses with two people, does have a high weighted degree with almost 500 words exchanged. Amor with his high closeness centrality, though he does not converse with many people as indicated by his degree of two, is shown to be important to others and his role in the transference of information. Similarly, his high betweenness centrality value further indicates that he acts as a broker of information and as a bridge for conversation. It should be noted that the clustering coefficient is often a value of zero with only Aeneas and Juno showing values above this amount. Due to the rather disconnected nature of the network, there areonly limited opportunities for cliques to arise when the patterns of conversation, i.e., who is talking and who is receiving, are maintained.

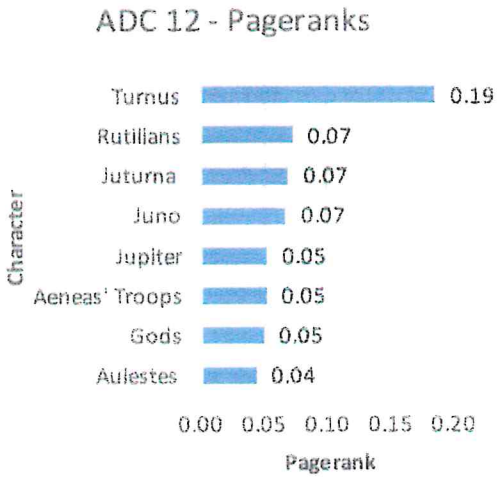
The benefits of the creation of a dynamic network are further realized when we consider the results from Book 12 of the *Aeneid* and compare them to those in Book 1. Immediately evident is the sheer number of characters present compared to Book 1 as well as the change in who is present. Because of the dynamic networks, it becomes easier to track the evolving roles and relationships of characters. For example, Turnus, a character who is not present in Book I of the *Aeneid* now has the highest degree centrality with a degree of 16, and Aeneas has become far more of a transmitter of information rather than a receiver with an in-

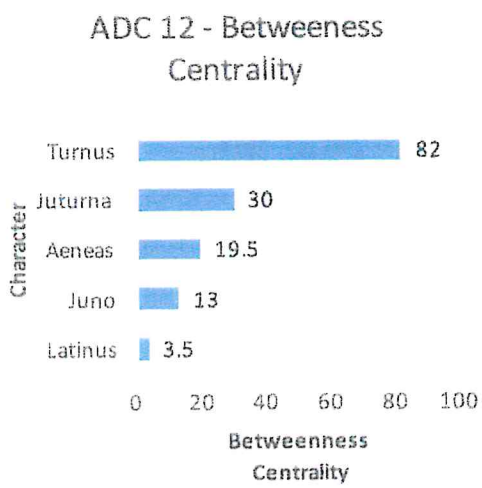
Figure 5: Top Ranking Characters in the ADC 1 (Dynamic Conversational Network in Book 1 of the *Aeneid*)

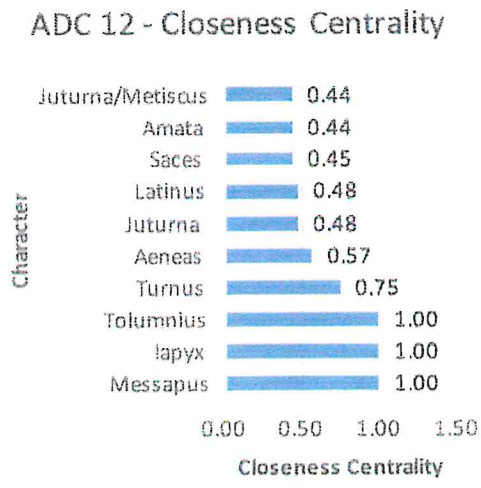


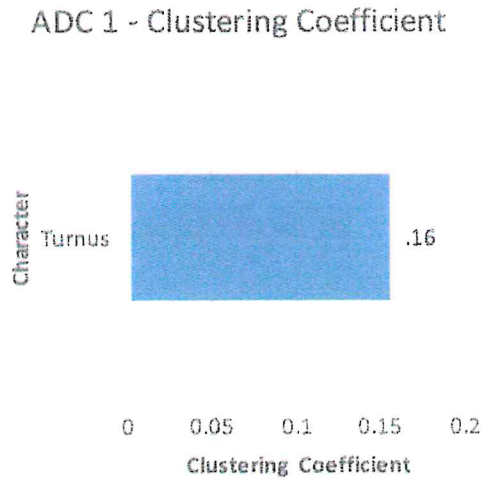

ADC 12 - Eccentricity
Jupiter 5
Juno 4
Aeneas 3
Latinus 3
Juturna 3
Juturna/Metiscus 3
Amata 3
Turnus 2
Characters
0 2 4 6
Eccentricity


ADC 12 - Eigenvector Centrality
Turnus 1.00
Juturna 0.37
Aeneas 0.36
Latinus 0.36
Juturna/Metiscus 0.36
Amata 0.36
Eumedes 0.36
Turnus' Troops 0.36
Faunus 0.36
Gods 0.25
Character
0 0.5 1 1.5
Eigenvector Centrality


ADC 12 - Pageranks
Turnus 0.19
Rutilians 0.07
Juturna 0.07
Juno 0.07
Jupiter 0.05
Aeneas' Troops 0.05
Gods 0.05
Aulestes 0.04
Character
0.00 0.05 0.10 0.15 0.20
Pagerank


ADC 12 - Betweeness Centrality
Turnus 82
Juturna 30
Aeneas 19.5
Juno 13
Latinus 3.5
Character
0 20 40 60 80 100
Betweenness Centrality


ADC 12 - Closeness Centrality
Juturna/Metiscus 0.44
Amata 0.44
Saces 0.45
Latinus 0.48
Juturna 0.48
Aeneas 0.57
Turnus 0.75
Tolumnius 1.00
Iapyx 1.00
Messapus 1.00
Character
0.00 0.50 1.00 1.50
Closeness Centrality


ADC 1 - Clustering Coefficient
Turnus .16
Character
0 0.05 0.1 0.15 0.2
Clustering Coefficient

degree of 1 and an out-degree of 4. Although Aeneas exchanges far fewer words than Turnus, in terms of his relationships to others, as indicated by the closeness centrality and his betweenness centrality, he remains a key player. Interestingly, however, Saces, who has such a low degree and a low weighted degree because of who he so selectively talks to, has such a high closeness centrality and thus a strong relationship to key players in the network.

The dynamic networks can also be used to consider the developing roles of characters throughout the novel. For example, we can examine the changing roles of characters that are steadily present in the *Aeneid*. Aeneas unsurprisingly speaks in eleven out of the twelve books of the *Aeneid* (see Figure 6). His role still varies across books as indicated by the different degrees and therefore the different partners. When he tends to be a receiver such as in Book 6, he does not transmit as much information and vice versa. Furthermore, as indicated by his high betweenness centrality values, he consistently remains a key figure in the transmission of information. As the protagonist, his information is not necessarily as interesting as when other key characters are taken into consideration. Venus plays a very prominent role in Book 1 as indicated by her weighted degree (Figure 7). Her high betweenness centrality value also suggests that she held a role as a broker of communication. Through the dynamic network, it is easy to explore the roles of the main characters of the *Aeneid* and to look at the network holistically.

7 CONCLUSION

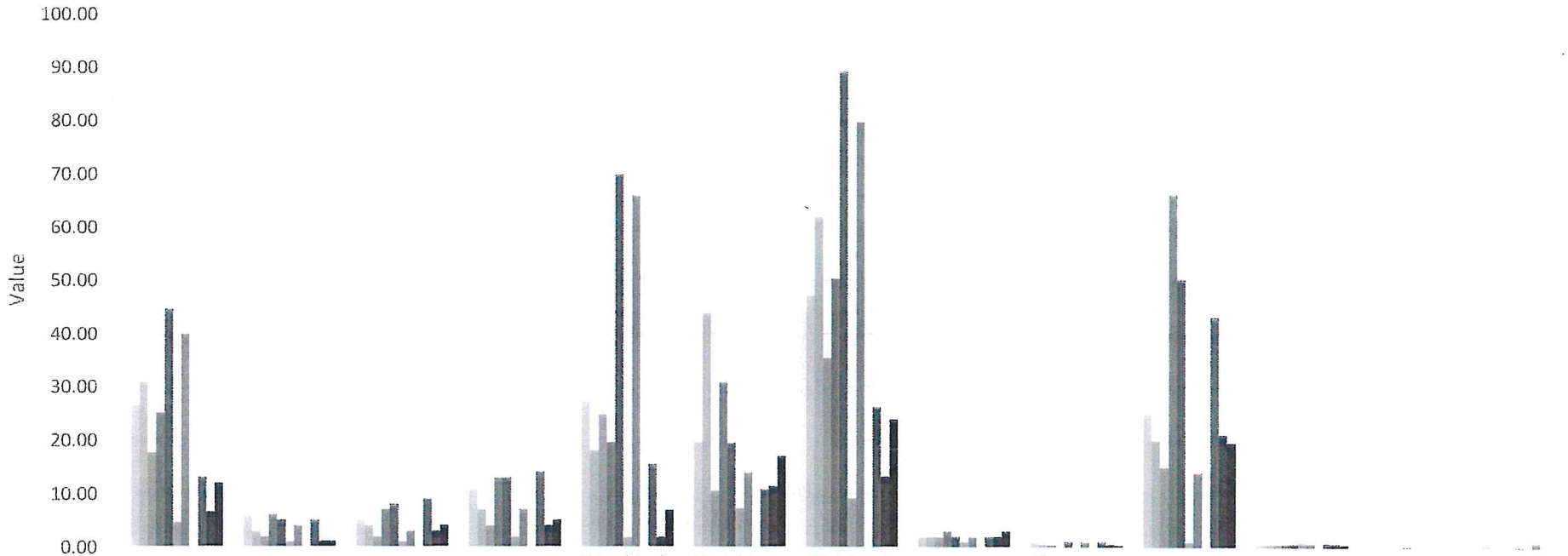
Franco Moretti remarks, "I did not need network *theory*; but I probably needed *networks*" as he believes that visualizations, such as those seen in Appendix I, help to further

display the relationship structures of the network.[494] I argue however that the mathematical foundations of social network analysis make this interdisciplinary study of a familiar text so interesting. Moreover, these calculations allow for us to reinterpret and reanalyze a classical epic. Just as noted by Kydros is the case for the *Iliad*, so too the *Aeneid* can also be read in different ways and interpreted in different levels.[495] Social network analysis allows for new perspectives on such a well-read text to be devised. More importantly, it provides a vocabulary with which to describe these networks and the quantitative calculations needed to objectively – or, at least, more objectively – contrast the roles of characters and the relationship structure of the epic. Being able to quantitatively state the importance of a character is quite powerful. Reading a text in this manner is also helpful in that "the success of an audience's interaction with a dramatic performance ultimately depends on the accurate mimesis of natural human social groups within the diegetic world."[496] As demonstrated through the real world calculations, Virgil overall captures the spirit of real world relationships, thus making a more compelling story for to be able to understand whether or not a text such as Vergil's *Aeneid* is able to capture these familiar relationship structures and to be able to study the roles of characters with greater depth.

---

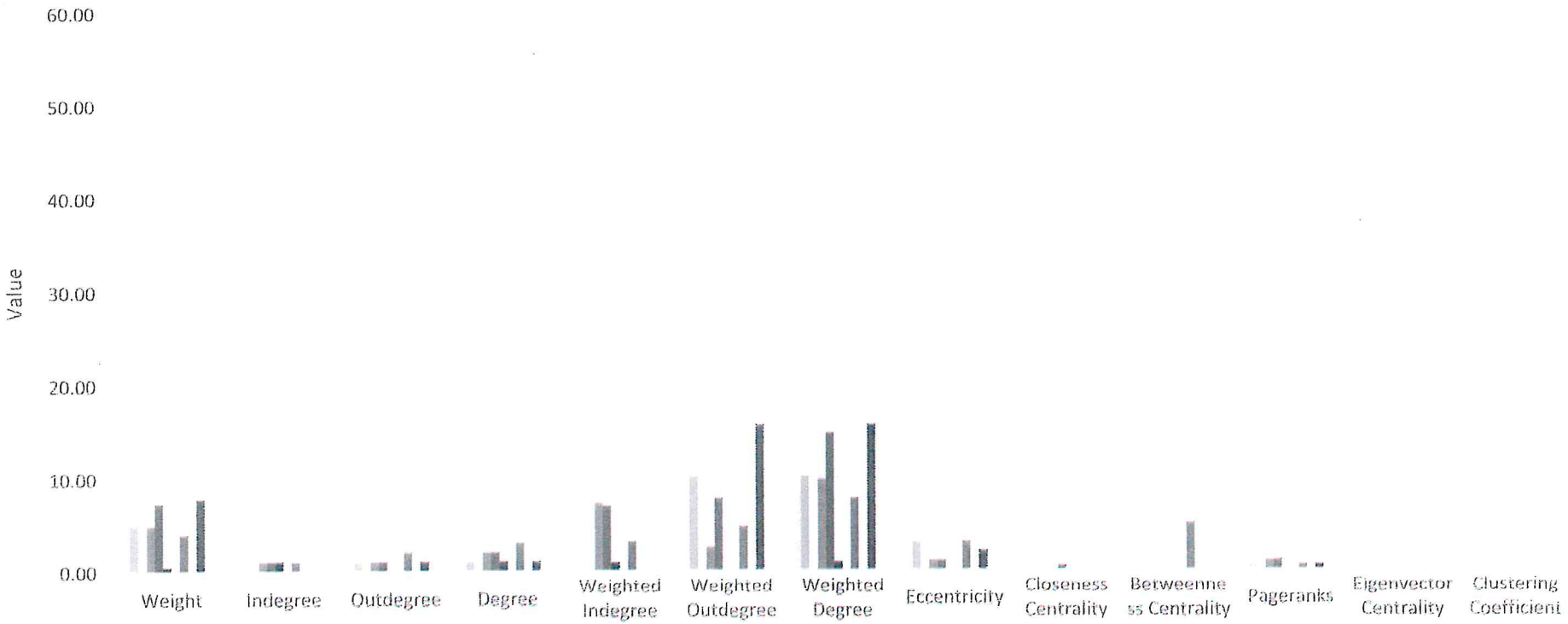
[494] Moretti, 11.
[495] Kydros, Notopoulos, and Exarchos, 130.
[496] Stiller and Hudson, 60.

Figure 6: Role of Aeneas



	Weight	Indegree	Outdegree	Degree	Weighted Indegree	Weighted Outdegree	Weighted Degree	Eccentricity	Closeness Centrality	Betweenness Centrality	Pageranks	Eigenvector Centrality	Clustering Coefficient
Book 1	22.12	4.00	5.00	9.00	24.21	20.03	44.24	2.00	1.00	37.00	0.67	0.35	0.35
Book 2	26.41	6.00	5.00	11.00	27.35	19.72	47.07	2.00	1.00	25.00	0.75	0.21	1
Book 3	30.91	3.00	4.00	7.00	18.03	43.77	61.80	2.00	0.62	20.00	0.75	0.00	0
Book 4	17.66	2.00	2.00	4.00	24.78	10.55	35.33	2.00	0.52	15.00	0.67	0.00	0
Book 5	25.11	6.00	7.00	13.00	19.54	30.68	50.22	3.00	0.00	66.00	0.71	0.03	0
Book 6	44.54	5.00	8.00	13.00	69.73	19.34	89.07	2.00	1.00	50.00	0.71	0.21	0.21
Book 7	4.58	1.00	1.00	2.00	1.88	7.29	9.17	1.00	0.01	1.00	1.00	0.00	0
Book 8	39.83	4.00	3.00	7.00	65.84	13.82	79.66	2.00	1.00	14.00	0.80	0.08	1
Book 9	0	0	0	0	0	0	0	0	0	0	0	0	0
Book 10	13.03	5.00	9.00	14.00	15.37	10.68	26.05	2.00	1.00	43.00	0.79	0.14	0.14
Book 11	6.56	1.00	3.00	4.00	1.83	11.28	13.11	2.00	0.51	21.00	0.71	0.00	0
Book 12	11.89	1.00	4.00	5.00	6.82	16.95	23.77	3.00	0.36	19.50	0.57	0.00	0

Figure 7: Role of Venus



	Weight	Indegree	Outdegree	Degree	Weighted Indegree	Weighted Outdegree	Weighted Degree	Eccentricity	Closeness Centrality	Betweenness Centrality	Pageranks	Eigenvector Centrality	Clustering Coefficient
Book 1	23.99	2.00	3.00	5.00	18.79	29.19	47.98	3.00	0.50	19.00	0.53	0.00	0
Book 2	5.06	0.00	1.00	1.00	0.00	10.12	10.12	3.00	0.00	0.00	0.47	0.00	0
Book 3	0	0	0	0	0	0	0	0	0	0	0	0	0
Book 4	4.86	1.00	1.00	2.00	7.28	2.44	9.72	1.00	0.04	0.00	1.00	0.00	0
Book 5	7.33	1.00	1.00	2.00	6.95	7.72	14.67	1.00	0.00	0.00	1.00	0.00	0
Book 6	0.43	1.00	0.00	1.00	0.85	0.00	0.85	0.00	0.36	0.00	0.00	0.00	
Book 7	0	0	0	0	0	0	0	0	0	0	0	0	0
Book 8	3.86	1.00	2.00	3.00	3.07	4.65	7.72	3.00	0.05	5.00	0.54	0.00	0
Book 9	0	0	0	0	0	0	0	0	0	0	0	0	0
Book 10	7.79	0.00	1.00	1.00	0.00	15.58	15.58	2.00	0.00	0.00	0.57	0.00	0
Book 11	0	0	0	0	0	0	0	0	0	0	0	0	0
Book 12	0	0	0	0	0	0	0	0	0	0	0	0	0

8 APPENDICES

Appendix 1: Conversational Network Break-Down:

For each book of the *Aeneid*, several key points of data. First, there is a full list of the speeches within the book. This table includes not only who speaks to whom but also who they are speaking about (when applicable) as well as the length and type of speech. The abbreviations for the types of speeches are as follows.

Abbreviations:[497]
A = Apostrophe to one unable or unwilling to hear or reply
C = Command from a superior to an inferior or inferiors
D = Diplomatic or political speech
E = Encouragement or *cohortatio*, a speech by a commander to his men
F = Farewell
G = Greeting
L = Legalistic speech of self-defense or rebuttal
N = Narrative, explanation, description
O = Oracle, prophecy, or interpretation of omen or oracle
P = Persuasion
Pra = Prayer
Q = Question
R = Response to persuasion, question, or command
S= Soliloquy either thought or spoken
T = Taunt, challenge, threat
V = Vituperation

Next, there is the graph network that has been derived from the conversational network. Following then are the adjacency matrices with the first being the absolute values and the second being the normalized values. The rows represent the transmitters or speakers, and the columns represent the receivers or listeners. For example, in Book 1, Achates speaks a total of 26 words of Aeneas (or Aeneas hears 26 words from Achates). In other words, Achates speaks 1.12% of the dialogue in Book 2.

[497] Highet, 291.

Table of Contents for Appendix:

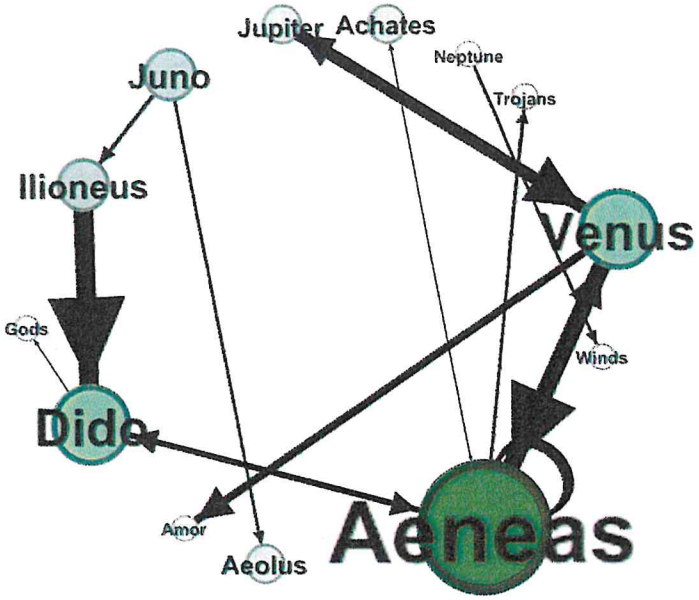
Appendix I

Book 1 387
Book 2 390
Book 3 393
Book 4 396
Book 5 399
Book 6 403
Book 7 408
Book 8 412
Book 9 416
Book 10 420
Book 11 425
Book 12 430

Appendix II

Book 1 436
Book 2 436
Book 3 437
Book 4 438
Book 5 439
Book 6 439
Book 7 440
Book 8 440
Book 9 441
Book 10 442
Book 11 443
Book 12 444
Static Network 445

BOOK 1							
	SPEAKER	RECEIVER	SUBJECT	WORDS	LINES	# OF LINES	TYPE
1	Juno	NONE	Pallas, Ajax, Oileus, Jupiter	80	37-49	12.75	S1
2	Juno	Aeolus	Jupiter, Deiopea	61	65-75	11	P1
3	Aeolus	Juno	Jupiter	30	76-80	4.58	R1
4	Aeneas	NONE	Tydeus, Diomedes, Aeacides, Hector, Sarpedon	52	94-101	7.58	S2
5	Neptune	Winds	Eurus, Aeolus	67	132-141	10	C1
6	Aeneas	Trojans	Scylla, Cyclopes	66	198-207	10	E1
7	Venus	Jupiter	Aeneas, Teucer, Antenor	162	229-253	24.67	P2
8	Jupiter	Venus	Aeneas, Ascanius, Hector, Mars, Ilia, Mars, Romulus, Remus, Assaracus, Caesar, Julius, Faith, Vesta, Quirinus, Rage	257	257-296	40	O1
9	Venus	Aeneas/Achates	NONE	23	321-324	3.58	C2
10	Aeneas	Venus	Phoebus	66	326-334	9	PRA1
11	Venus	Aeneas/Achates	Dido, Sychaeus, Pygmalion, Dido	226	335-370	35.25	N1
12	Aeneas	Venus	Jupiter	93	372-385	13.58	N2
13	Venus	Aeneas/Achates	Jupiter	101	387-401	15	O2
14	Aeneas	Venus	NONE	21	407-409	3	Q1
15	Aeneas	NONE	NONE	6	437	1	S3
16	Aeneas	Achates	Priam	35	459-463	4.58	P3
17	Ilioneus	Dido	Jupiter, Orion, Aeneas, Acestes, Iulus, Acestes	387	522-558	37	D1
18	Dido	Ilioneus	Saturn, Acestes, Aeneas	111	562-578	17	R2
19	Achates	Aeneas	(Venus)	26	582-585	4	P4
20	Aeneas	Dido (Trojans)	Aeneas, Dido	127	595-610	15.17	G1
21	Dido	Aeneas	Venus, Anchises, Teucer, Belus	103	615-630	16	G2
22	Venus	Amor	Typhoeus, Aeneas, Juno, Dido, (Ascanius)	167	664-688	25	P5
23	Dido	Jupiter and Others	Bacchus, Juno	33	731-735	5	PRA2
24	Dido	Aeneas	NONE	26	753-756	3.83	Q2

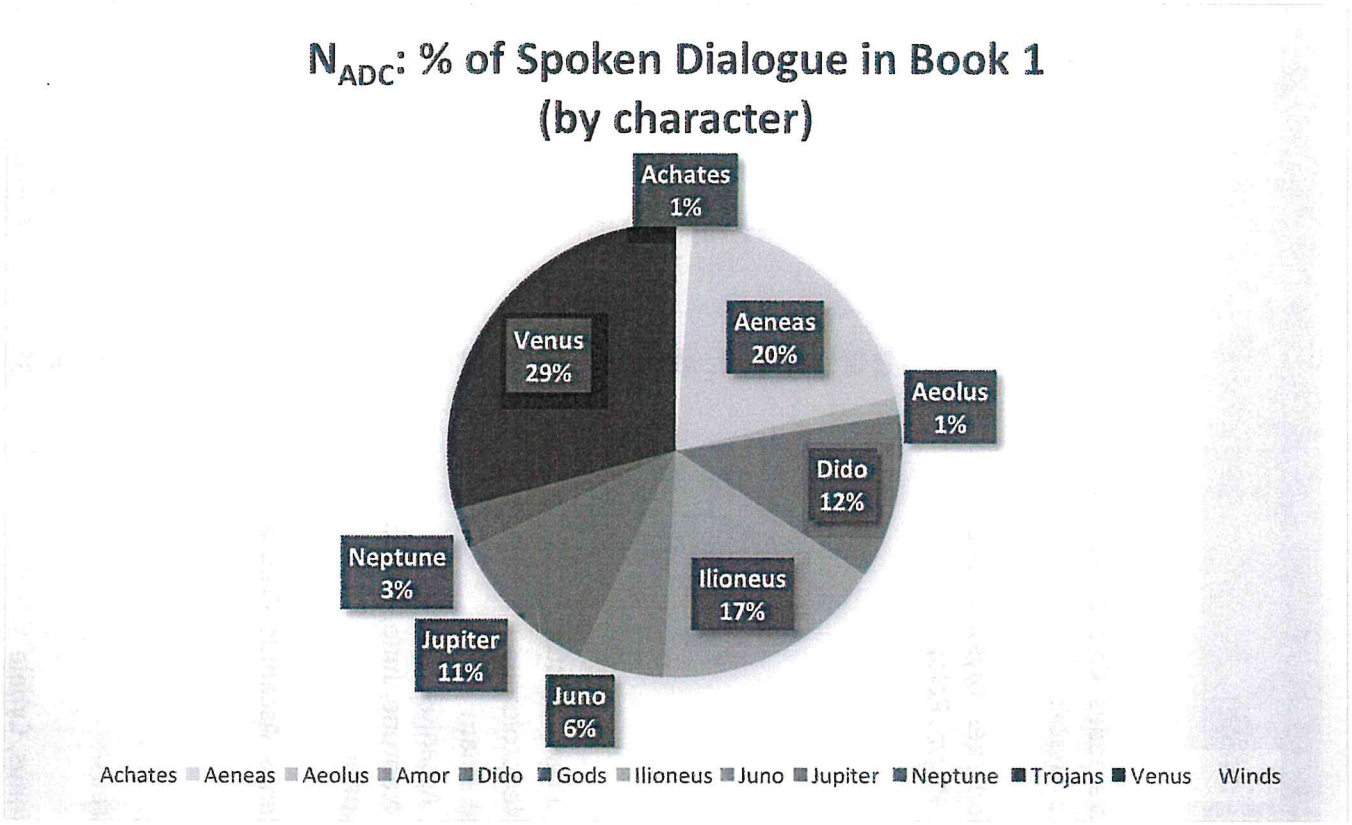


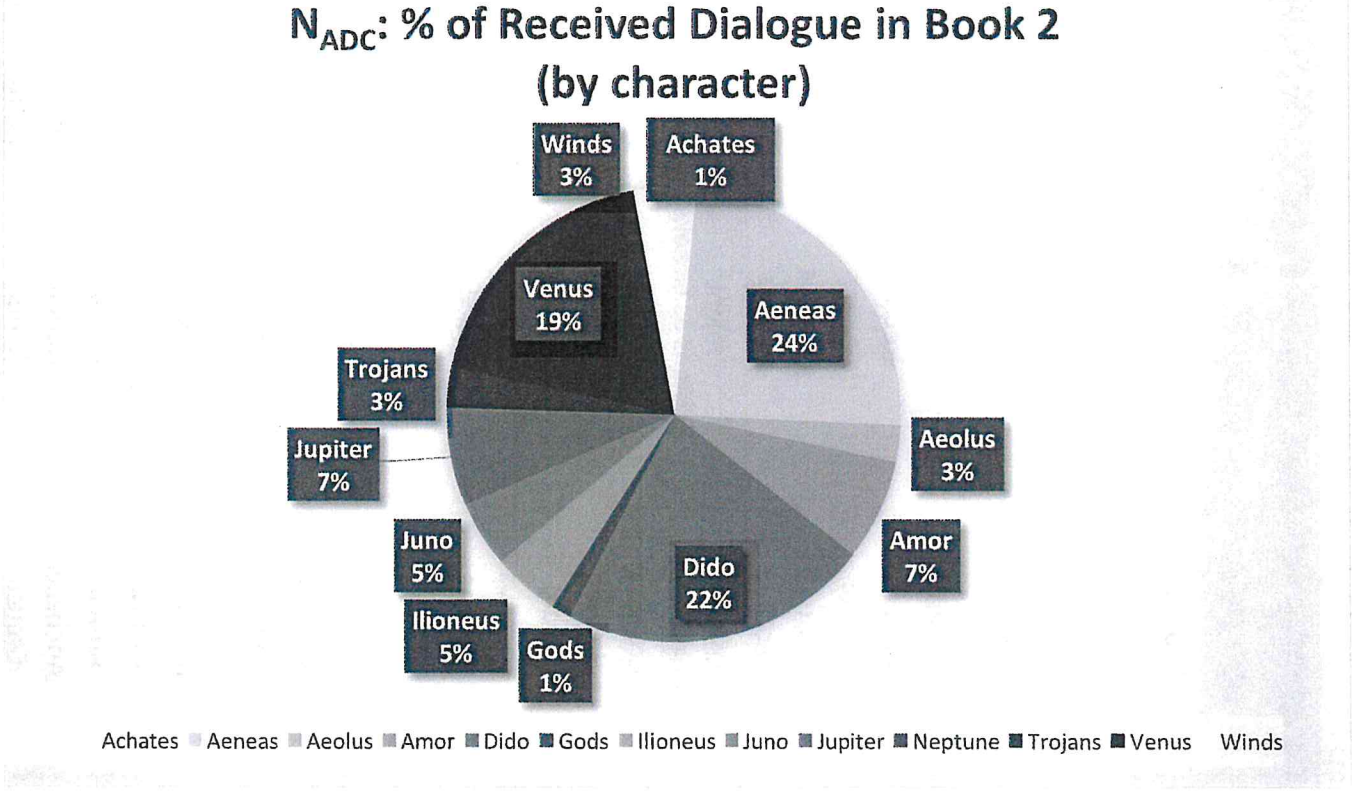
Book 1: Conversation Matrix

CHARACTERS	Achates	Aeneas	Aeolus	Amor	Dido	Gods	Ilioneus	Juno	Jupiter	Neptune	Trojans	Venus	Winds	TOTAL	%
Achates	0	26	0	0	0	0	0	0	0	0	0	0	0	26	1.12
Aeneas	35	58	0	0	127	0	0	0	0	0	66	180	0	466	20.03
Aeolus	0	0	0	0	0	0	0	30	0	0	0	0	0	30	1.29
Amor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Dido	0	129	0	0	0	33	111	0	0	0	0	0	0	273	11.74
Gods	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Ilioneus	0	0	0	0	387	0	0	0	0	0	0	0	0	387	16.64
Juno	0	0	61	0	0	0	0	80	0	0	0	0	0	141	6.06
Jupiter	0	0	0	0	0	0	0	0	0	0	0	257	0	257	11.05
Neptune	0	0	0	0	0	0	0	0	0	0	0	0	67	67	2.88
Trojans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Venus	0	350	0	167	0	0	0	0	162	0	0	0	0	679	29.19
Winds	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
TOTAL	35	563	61	167	514	33	111	110	162	0	66	437	67	2326	100.00
%	1.50	24.20	2.62	7.18	22.10	1.42	4.77	4.73	6.96	0.00	2.84	18.79	2.88	100.00	

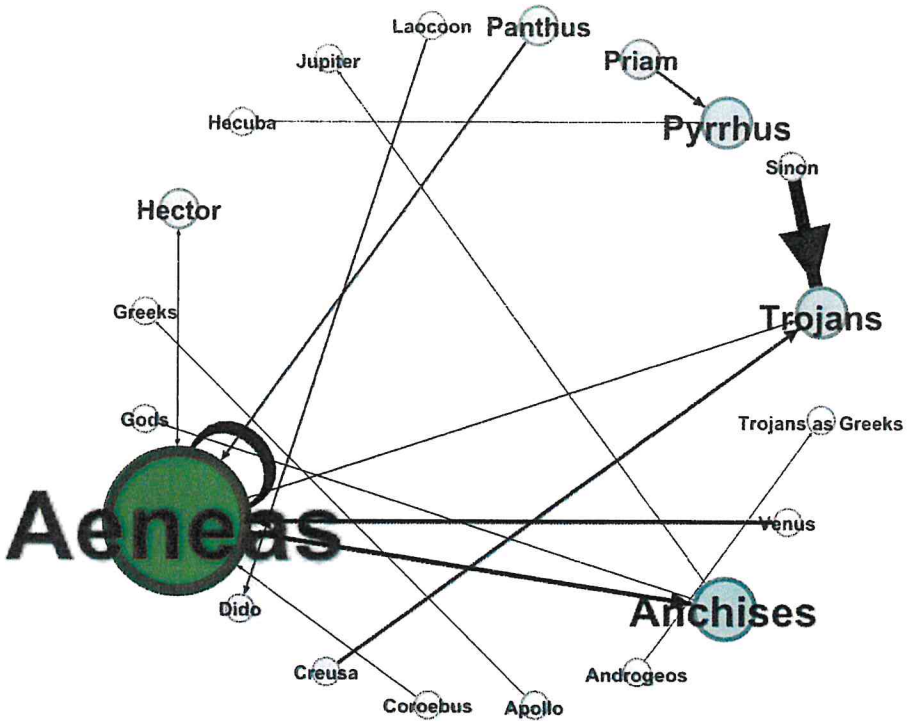
Book 1: Conversation Matrix (Normalized)

CHARACTERS	Achates	Aeneas	Aeolus	Amor	Dido	Gods	Ilioneus	Juno	Jupiter	Neptune	Trojans	Venus	Winds	TOTAL
Achates	0.00	1.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.12
Aeneas	1.50	2.49	0.00	0.00	5.46	0.00	0.00	0.00	0.00	0.00	2.84	7.74	0.00	20.03
Aeolus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.29	0.00	0.00	0.00	0.00	0.00	1.29
Amor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dido	0.00	5.55	0.00	0.00	0.00	1.42	4.77	0.00	0.00	0.00	0.00	0.00	0.00	11.74
Gods	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ilioneus	0.00	0.00	0.00	0.00	16.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.64
Juno	0.00	0.00	2.62	0.00	0.00	0.00	0.00	3.44	0.00	0.00	0.00	0.00	0.00	6.06
Jupiter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.05	0.00	11.05
Neptune	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.88	2.88
Trojans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Venus	0.00	15.05	0.00	7.18	0.00	0.00	0.00	0.00	6.96	0.00	0.00	0.00	0.00	29.19
Winds	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	1.50	24.20	2.62	7.18	22.10	1.42	4.77	4.73	6.96	0.00	2.84	18.79	2.88	100.00


N_{ADC}: % of Spoken Dialogue in Book 1 (by character)
Achates 1%
Aeneas 20%
Aeolus 1%
Dido 12%
Ilioneus 17%
Juno 6%
Jupiter 11%
Neptune 3%
Venus 29%
Achates Aeneas Aeolus Amor Dido Gods Ilioneus Juno Jupiter Neptune Trojans Venus Winds


N_{ADC}: % of Received Dialogue in Book 2 (by character)
Winds 3%
Achates 1%
Venus 19%
Aeneas 24%
Trojans 3%
Jupiter 7%
Aeolus 3%
Juno 5%
Amor 7%
Dido 22%
Ilioneus 5%
Gods 1%
Achates Aeneas Aeolus Amor Dido Gods Ilioneus Juno Jupiter Neptune Trojans Venus Winds

BOOK 2							
	SPEAKER	RECEIVER	SUBJECT	WORDS	LINES	# OF LINES	TYPE
1	Laocoon	Dido	Ulysseus	54	42-49	7.830	P6
2	**Sinon**	Trojans (Priam)	Fortune, Belus, Palamedes, Calchas, Atridae, Eurypylus, Phoebus, Apollo	561	69-72 + 77-104 + 108-144 + 154-194	109.58	N3
3	Apollo	Greeks	NONE	19	116-119	3.25	O3
4	Priam	Sinon (Trojans)	Pallas, Tydeus, Diomedes, Ulysses, Tritonia, Calchas, Minerva, Priam, Pelops	30	148-151	4	Q3
5	Aeneas	Hector	NONE	30	281-286	6	Q4
6	Hector	Aeneas	Priam, Penates	41	289-295	6.92	C3
7	Aeneas	Panthus	Sinon	8	322	109.58	Q5
8	Panthus	Aeneas	NONE	72	324-335	12	N4
9	Aeneas	Trojans	NONE	41	348-354	6.58	E2
10	Androgeos	Trojans as Greeks	NONE	20	373-375	3	C4
11	Croebus	Trojans	NONE	30	387-391	4.25	P7
12	Hecuba	Priam	Hector	13	519-524	5	P8
13	Priam	Pyrrhus	(Polites), Achilles, Priam, Hector	63	535-543	8.75	T1
14	Pyrrhus	Priam	Peleus, Achilles, Neoptolemus	18	547-550	2.92	T2
15	Aeneas	NONE	Helen, (Menelaus), Priam	65	577-587	11	S4
16	Venus	Aeneas	Anchises, Creusa, Ascanius, Helen, Tyndareus, Paris, Neptune, Juno, Tritonian Pallas, Gorgon, Jupiter	171	594-620	27	N5
17	Anchises	Aeneas	Jupiter	73	638-649	11.5	C5
18	Aeneas	Anchises	Pyrrhus, Priam, Venus, Ascanius, Creusa	99	657-670	14	R3
19	Creusa	Aeneas	Iulus, Anchises	32	675-678	4	P9
20	Anchises	Jupiter	NONE	22	689-691	3	PRA3
21	Anchises	Gods	Ascanius, Aeneas	32	701-704	4	PRA4
22	Aeneas	Anchises	Iulus, Anchises, Creusa	90	707-720	14	C6
23	Anchises	Aeneas	NONE	10	733-734	1.5	C7
24	Creusa	Aeneas	Jupiter, Creusa, Venus, Cybele	95	776-789	14	O4

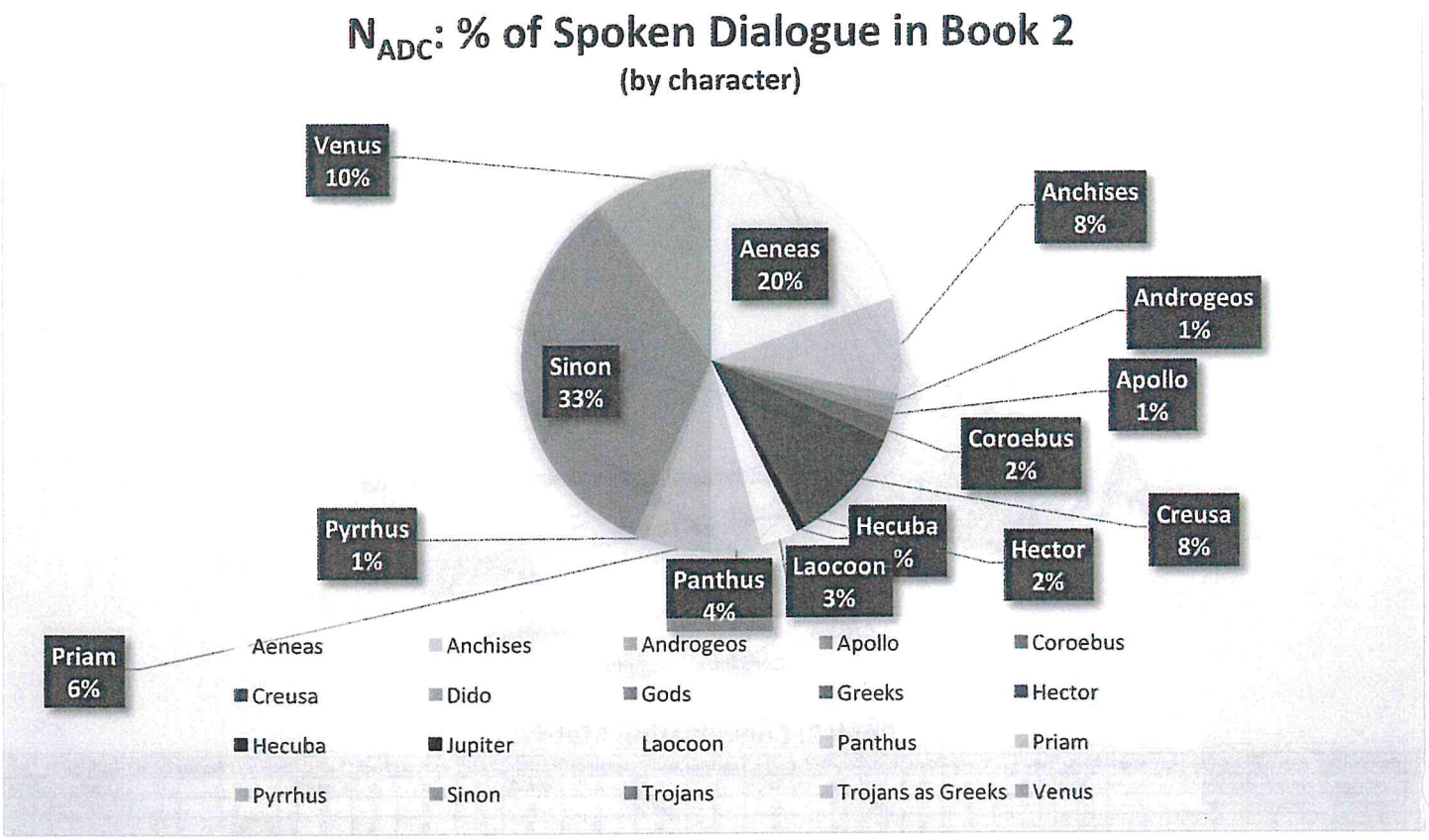


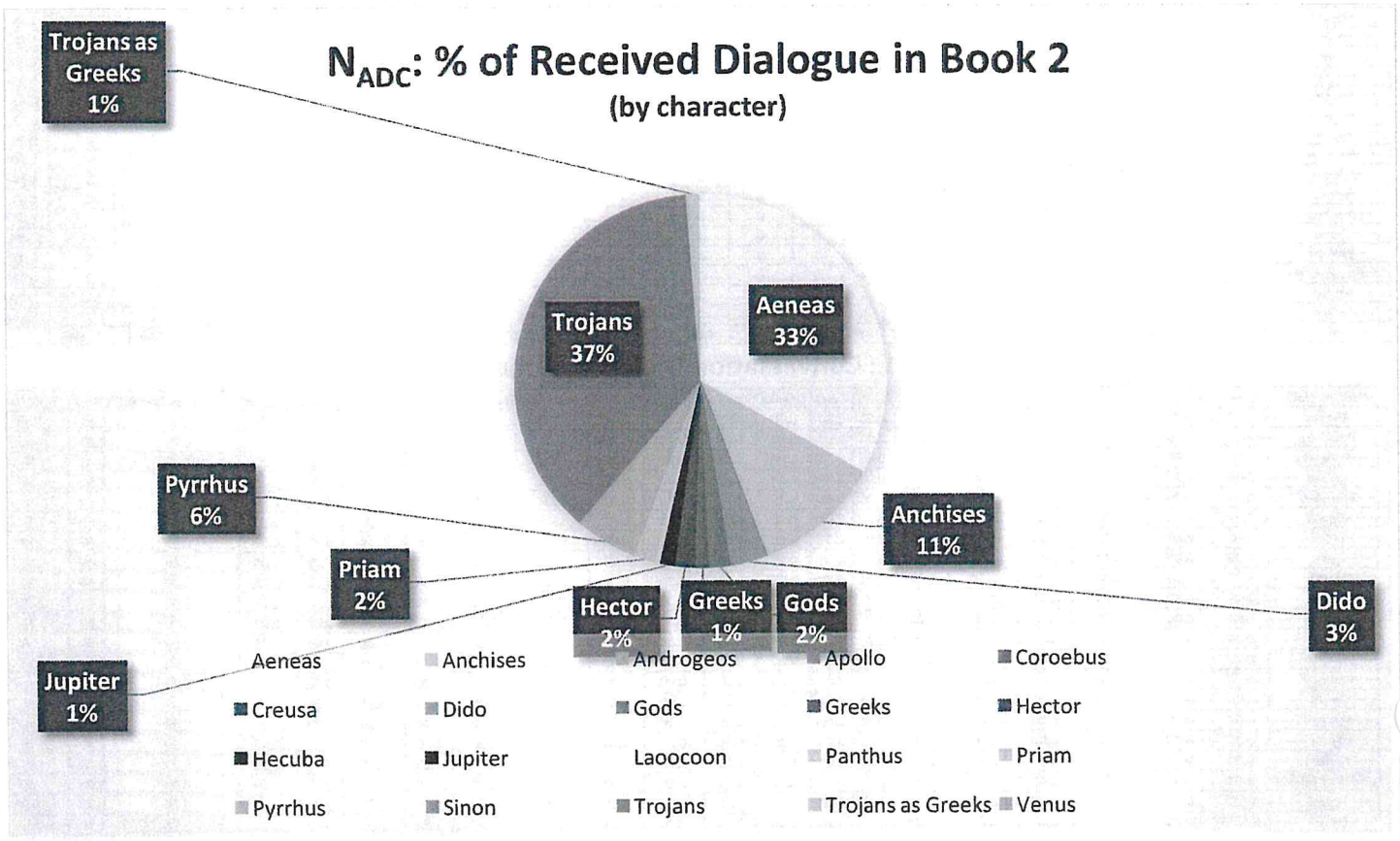
Book 2: Conversation Matrix

CHARACTERS	Aeneas	Anchises	Androgeos	Apollo	Coroebus	Creusa	Dido	Gods	Greeks	Hector	Hecuba	Jupiter	Laocoon	Panthus	Priam	Pyrrhus	Sinon	Trojans	Trojans as Greeks	Venus	TOTALS	%
Aeneas	65	189	0	0	0	0	0	0	30	0	0	0	8	0	0	0	0	41	0	0	333	19.72
Anchises	83	0	0	0	0	0	0	32	0	0	0	22	0	0	0	0	0	0	0	0	137	8.11
Androgeos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	20	1.18
Apollo	0	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	0	19	1.12
Coroebus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	30	1.78
Creusa	127	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	127	7.52
Dido	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Gods	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Greeks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Hector	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	2.43
Hecuba	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	13	0.77
Jupiter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Laocoon	0	0	0	0	0	0	54	0	0	0	0	0	0	0	0	0	0	0	0	0	54	3.20
Panthus	72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	4.26
Priam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	0	0	0	0	93	5.51
Pyrrhus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	18	1.07
Sinon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	561	0	0	561	33.21
Trojans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Trojans as Greeks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Venus	171	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	171	10.12
TOTAL	559	189	0	0	0	0	54	32	19	30	0	22	0	8	31	93	0	632	20	0	1689	100.00
%	33.10	11.19	0.00	0.00	0.00	0.00	3.20	1.89	1.12	1.78	0.00	1.30	0.00	0.47	1.84	5.51	0.00	37.42	1.18	0.00	100.00	

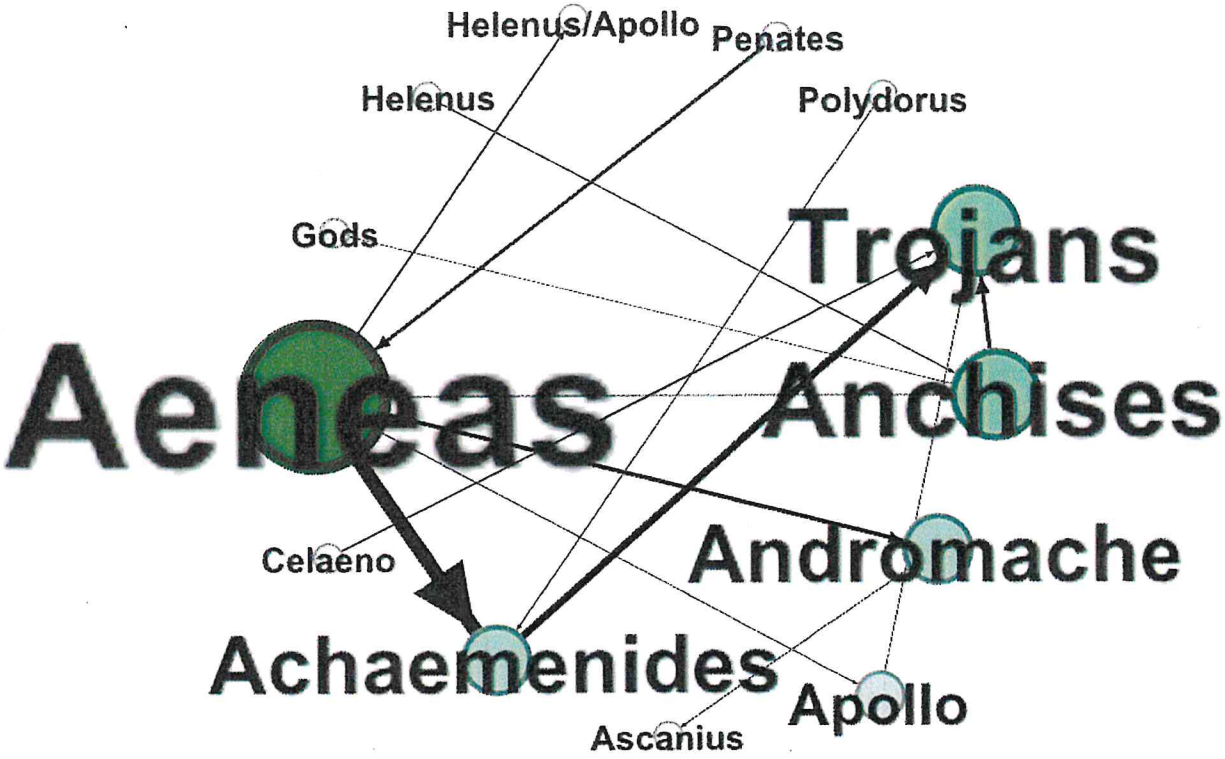
Book 2: Conversation Matrix (Normalized)

CHARACTERS	Aeneas	Anchises	Androgeos	Apollo	Coroebus	Creusa	Dido	Gods	Greeks	Hector	Hecuba	Jupiter	Laocoon	Panthus	Priam	Pyrrhus	Sinon	Trojans	Trojans as Greeks	Venus	TOTALS
Aeneas	3.85	11.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.78	0.00	0.00	0.00	0.47	0.00	0.00	0.00	2.43	0.00	0.00	19.72
Anchises	4.91	0.00	0.00	0.00	0.00	0.00	0.00	1.89	0.00	0.00	0.00	1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.11
Androgeos	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.18	0.00	1.18
Apollo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.12
Coroebus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.78	0.00	0.00	1.78
Creusa	7.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.52
Dido	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gods	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Greeks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hector	2.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.43
Hecuba	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.77	0.00	0.00	0.00	0.00	0.00	0.77
Jupiter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Laocoon	0.00	0.00	0.00	0.00	0.00	0.00	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.20
Panthus	4.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.26
Priam	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.51	0.00	0.00	0.00	0.00	5.51
Pyrrhus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.07	0.00	0.00	0.00	0.00	0.00	1.07
Sinon	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33.21	0.00	0.00	33.21
Trojans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trojans as Greeks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Venus	10.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.12
TOTAL	33.10	11.19	0.00	0.00	0.00	0.00	3.20	1.89	1.12	1.78	0.00	1.30	0.00	0.47	1.84	5.51	0.00	37.42	1.18	0.00	100.00


N_{ADC}: % of Spoken Dialogue in Book 2
(by character)
Venus 10%
Aeneas 20%
Anchises 8%
Androgeos 1%
Sinon 33%
Apollo 1%
Coroebus 2%
Creusa 8%
Pyrrhus 1%
Hecuba 3%
Hector 2%
Panthus 4%
Laocoon 3%
Priam 6%
Aeneas
Anchises
Androgeos
Apollo
Coroebus
Creusa
Dido
Gods
Greeks
Hector
Hecuba
Jupiter
Laocoon
Panthus
Priam
Pyrrhus
Sinon
Trojans
Trojans as Greeks
Venus


N_{ADC}: % of Received Dialogue in Book 2
(by character)
Trojans as Greeks 1%
Trojans 37%
Aeneas 33%
Pyrrhus 6%
Anchises 11%
Priam 2%
Hector 2%
Greeks 1%
Gods 2%
Dido 3%
Jupiter 1%
Aeneas
Anchises
Androgeos
Apollo
Coroebus
Creusa
Dido
Gods
Greeks
Hector
Hecuba
Jupiter
Laocoon
Panthus
Priam
Pyrrhus
Sinon
Trojans
Trojans as Greeks
Venus

BOOK 3							
	SPEAKER	RECEIVER	SUBJECT	WORDS	LINES	# OF LINES	TYPE
1	Polydorus	Aeneas	NONE	43.00	41-46	6.00	C8
2	Aeneas	Apollo	Achilles	36.00	85-89	5.00	PRA5
3	Apollo	Trojans	Dardanus, Aeneas	33.00	94-98	5.00	O5
4	Anchises	Trojans	Jupiter, Teucer, Cybele	99.00	103-117	14.92	O6
5	Penates	Aeneas	Apollo, Dardanus, Iasius, Jupiter	122.00	154-171	18.00	O7
6	Anchises	Aeneas and Trojans	Cassandra, Phoebus	44.00	182-188	6.75	C9
7	Celaeno	Trojans	Laomedon, Jupiter, Phoebus,	67.00	247-257	11.00	O8
8	Anchises	Gods	NONE	11.00	265-266	1.58	PRA6
9	Andromache	Aeneas	Hector	18.00	310-312	2.25	Q6
10	Aeneas	Andromache	Hector, Pyrrhus	31.00	315-319	5.00	Q7
11	Andromache	Aeneas	Priam, Cassandra, Achilles, Leda, Hermione, Helenus, Orestes, Neoptolemus, Ascanius, Hector, Bacchus	142.00	321-343	23.00	N6
12	Aeneas	Helenus/Apollo	Phoebus, Celaeno	65.00	359-368	10.00	Q8
13	Helenus/Apollo	Aeneas	Jupiter, Fates, Helenus, Juno, Circe, Apollo, Idomeneus, Philoctetes, Charybdis, Scylla, Sibyl	577.00	374-462	89.00	O9
14	Helenus	Anchises	Venus, Apollo, Aeneas	46.00	475-481	6.92	F1
15	Andromache	Ascanius	Astyanax	42.00	486-491	6.00	F2
16	Aeneas	Andromache/Helenus	Dardanus	82.00	493-505	13.00	F3
17	Anchises	Gods	NONE	13.00	528-529	2.00	PRA7
18	Anchises	Trojans	NONE	28.00	539-543	3.83	O10
19	Anchises	Trojans	Charybdis, Helenus	17.00	558-560	2.58	C10
20	Achaemenides	Trojans	Ulysses, Adamastus, Cyclops, Phoebus, Polyphemus,	291.00	599-606 + 613-654	49.42	N7

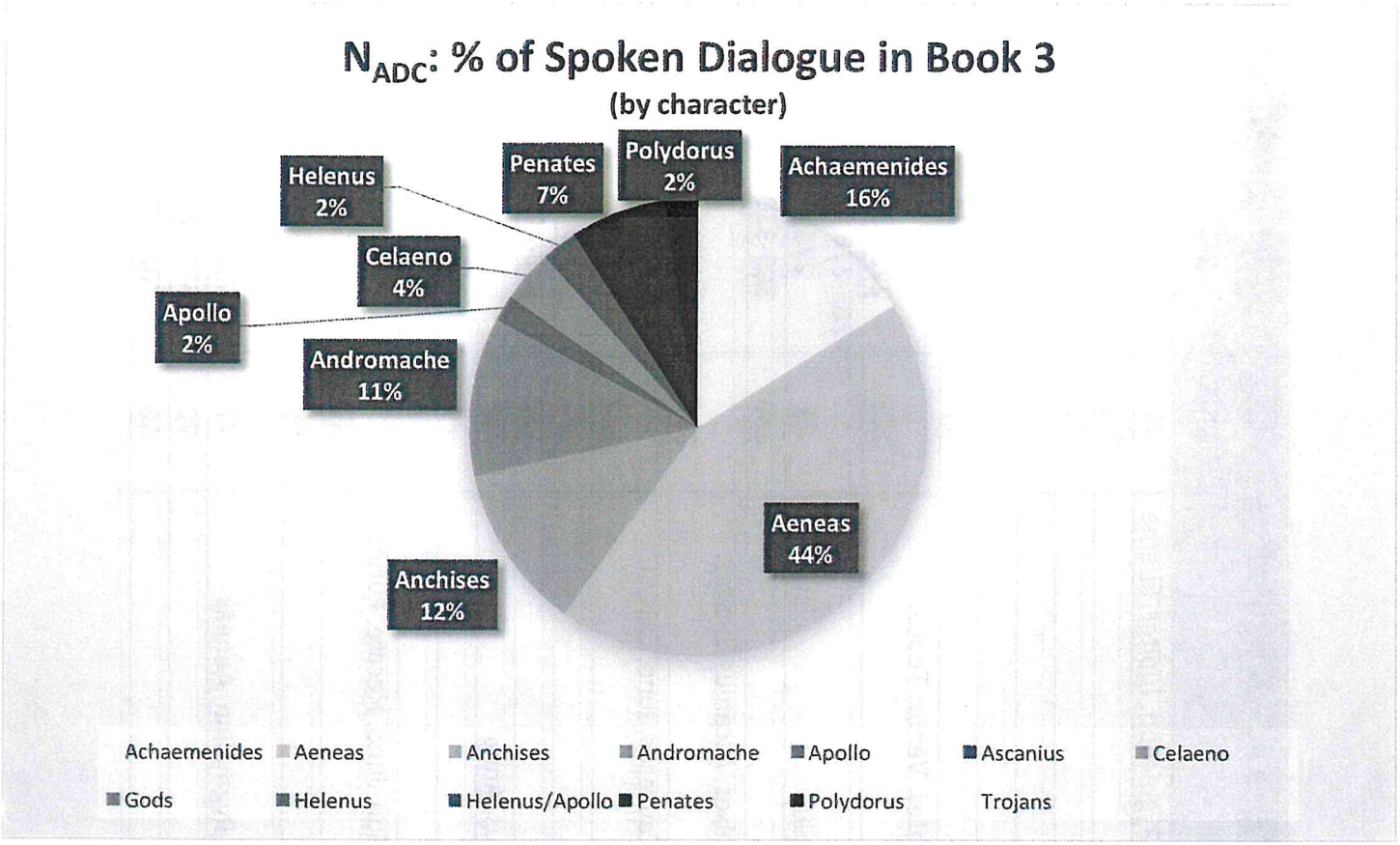


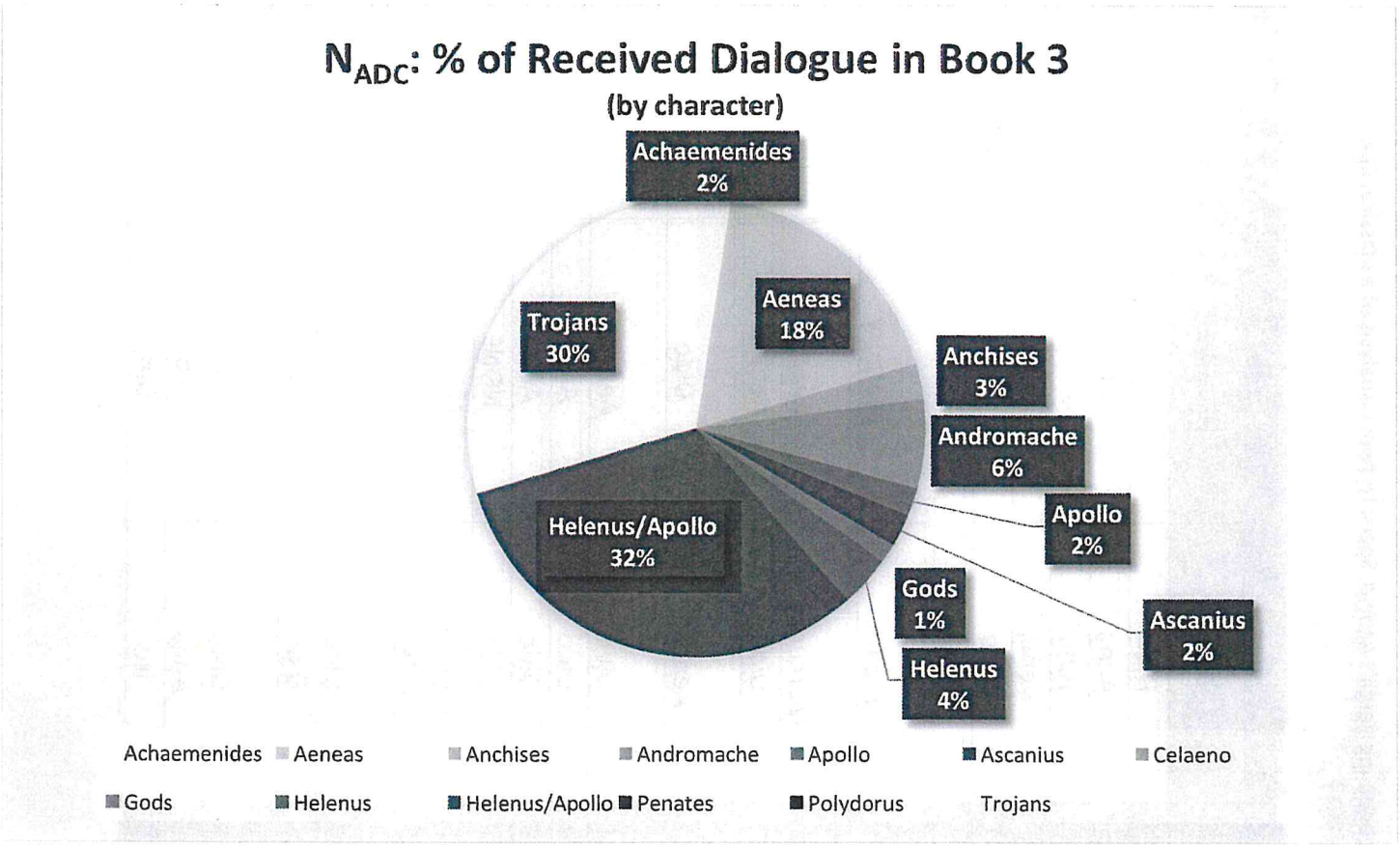
Book 3: Conversation Matrix

CHARACTERS	Achaemenides	Aeneas	Anchises	Andromache	Apollo	Ascanius	Calaeno	Gods	Helenus	Helenus/Apollo	Penates	Polydorus	Trojans	TOTAL	%
Achaemenides	0	0	0	0	0	0	0	0	0	0	0	0	291	291	16.10
Aeneas	0	0	0	113	36	0	0	0	65	577	0	0	0	791	43.77
Anchises	0	44	0	0	0	0	0	24	0	0	0	0	144	212	11.73
Andromache	0	160	0	0	0	42	0	0	0	0	0	0	0	202	11.18
Apollo	0	0	0	0	0	0	0	0	0	0	0	0	33	33	1.83
Ascanius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Celaeno	0	0	0	0	0	0	0	0	0	0	0	0	67	67	3.71
Gods	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Helenus	0	0	46	0	0	0	0	0	0	0	0	0	0	46	2.55
Helenus/Apollo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Penates	0	122	0	0	0	0	0	0	0	0	0	0	0	122	6.75
Polydorus	43	0	0	0	0	0	0	0	0	0	0	0	0	43	2.38
Trojans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
TOTAL	43	326	46	113	36	42	0	24	65	577	0	0	535	1807	100.00
%	2.38	18.04	2.55	6.25	1.99	2.32	0.00	1.33	3.60	31.93	0.00	0.00	29.61	100.00	

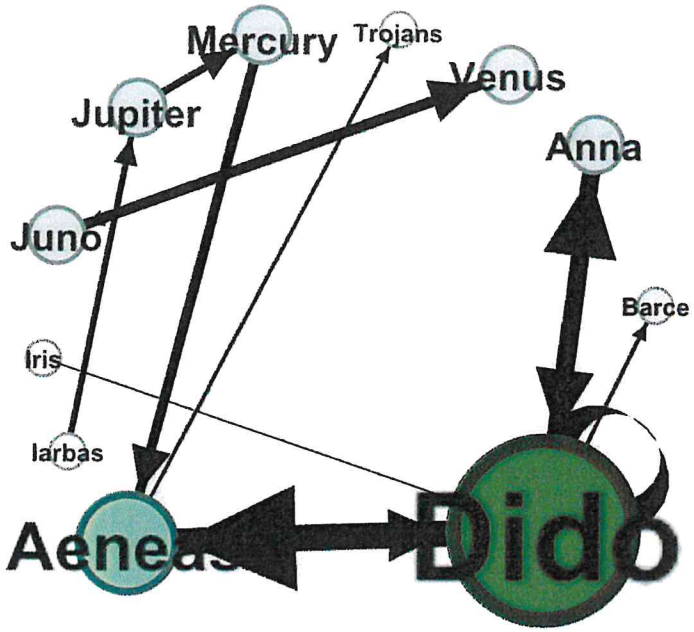
Book 3: Conversation Matrix (Normalized)

CHARACTERS	Achaemenides	Aeneas	Anchises	Andromache	Apollo	Ascanius	Calaeno	Gods	Helenus	Helenus/Apollo	Penates	Polydorus	Trojans	TOTAL
Achaemenides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.10	16.10
Aeneas	0.00	0.00	0.00	6.25	1.99	0.00	0.00	0.00	3.60	31.93	0.00	0.00	0.00	43.77
Anchises	0.00	2.43	0.00	0.00	0.00	0.00	0.00	1.33	0.00	0.00	0.00	0.00	7.97	11.73
Andromache	0.00	8.85	0.00	0.00	0.00	2.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.18
Apollo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.83	1.83
Ascanius	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Celaeno	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.71	3.71
Gods	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Helenus	0.00	0.00	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.55
Helenus/Apollo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Penates	0.00	6.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.75
Polydorus	2.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.38
Trojans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	2.38	18.04	2.55	6.25	1.99	2.32	0.00	1.33	3.60	31.93	0.00	0.00	29.61	100.00


N_{ADC}: % of Spoken Dialogue in Book 3
(by character)
Helenus 2%
Penates 7%
Polydorus 2%
Achaemenides 16%
Celaeno 4%
Apollo 2%
Andromache 11%
Aeneas 44%
Anchises 12%
Achaemenides
Aeneas
Anchises
Andromache
Apollo
Ascanius
Celaeno
Gods
Helenus
Helenus/Apollo
Penates
Polydorus
Trojans


N_{ADC}: % of Received Dialogue in Book 3
(by character)
Achaemenides 2%
Aeneas 18%
Trojans 30%
Anchises 3%
Andromache 6%
Apollo 2%
Helenus/Apollo 32%
Gods 1%
Ascanius 2%
Helenus 4%
Achaemenides
Aeneas
Anchises
Andromache
Apollo
Ascanius
Celaeno
Gods
Helenus
Helenus/Apollo
Penates
Polydorus
Trojans

BOOK 4							
	SPEAKER	RECEIVER	SUBJECT	WORDS	LINES	# OF LINES	TYPE
1	Dido	Anna	Aeneas, Sychaeus, Pygmalion, Jupiter, Shame	45	9-29	21.00	N8
2	Anna	Dido	Iarbas, Juno, Orion	141	31-53	22.75	D2
3	Juno	Venus	Aeneas, Dido	79	93-104	12.00	P10
4	Venus	Juno	Fortune, Jupiter	53	107-114	6.67	R4
5	Juno	Venus	Aeneas, Dido	79	115-127	12.42	P11
6	Iarbas	Jupiter	Dido, Aeneas, Paris	82	206-218	13.00	PRA8
7	Jupiter	Mercury	Zephyrs, Aeneas, Fates, Venus, Teucer, Ascanius	103	223-237	15.00	C11
8	Mercurius	Aeneas	Dido, Jupiter, Ascanius	73	265-276 (omit 273)	9.83	C12
9	Dido	Aeneas	Pygmalion, Iarbas	183	305-330	26.00	P12
10	Aeneas	Dido	Priam, Apollo, Anchises, Ascanius, Jupiter, Mercury	188	333-361	28.58	L1
11	Dido	Aeneas	Venus, Dardanus, Caucasus, Juno, Saturn, Apollo, Jupiter	167	365-387	23.00	R5
12	Dido	Anna	Aeneas, Anchises	141	416-346	21.00	P13
13	Dido	Anna	Atlas, priestess	132	478-498	21.00	C13
14	Dido	NONE	Laomedon, Sychaeus, Anna	128	534-552	19.00	S5
15	Mercury	Aeneas	Dido	70	560-570	10.17	C14
16	Aeneas	Trojans	Mercury	41	573-759	6.67	C15
17	Dido	NONE	Aeneas, Ascanius, Sun, Juno, Hecate, Furies, Jupiter	261	590-629	30.50	S6
18	Dido	Barce	Anna, Pluto	46	634-640	7.00	C16
19	Dido	NONE	Fortune, Sychaeus, Pygmalion, Aeneas	77	651-658 + 659-662	11.33	S7
20	Anna	Dido	NONE	72	675-685	10.25	A1
21	Iris	Dido	Dis	10	702-703	1.33	N9

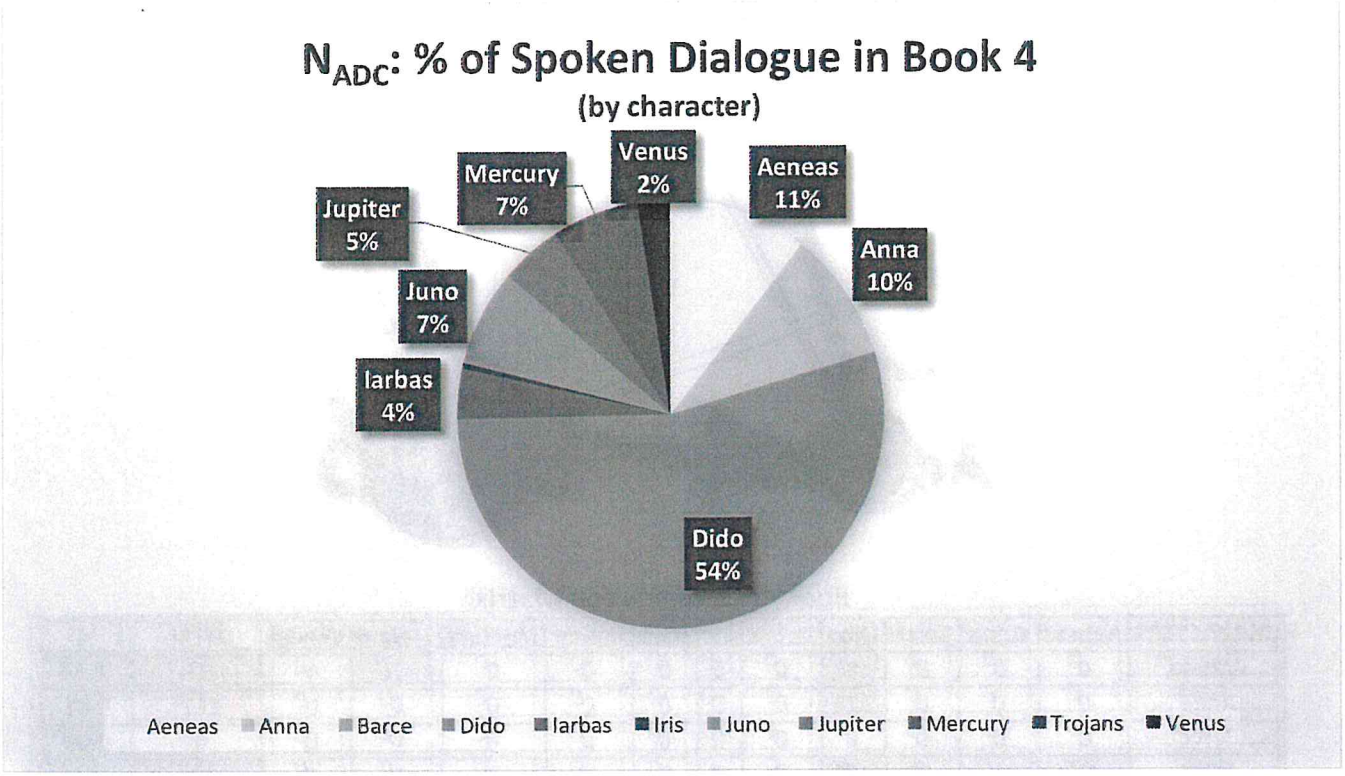


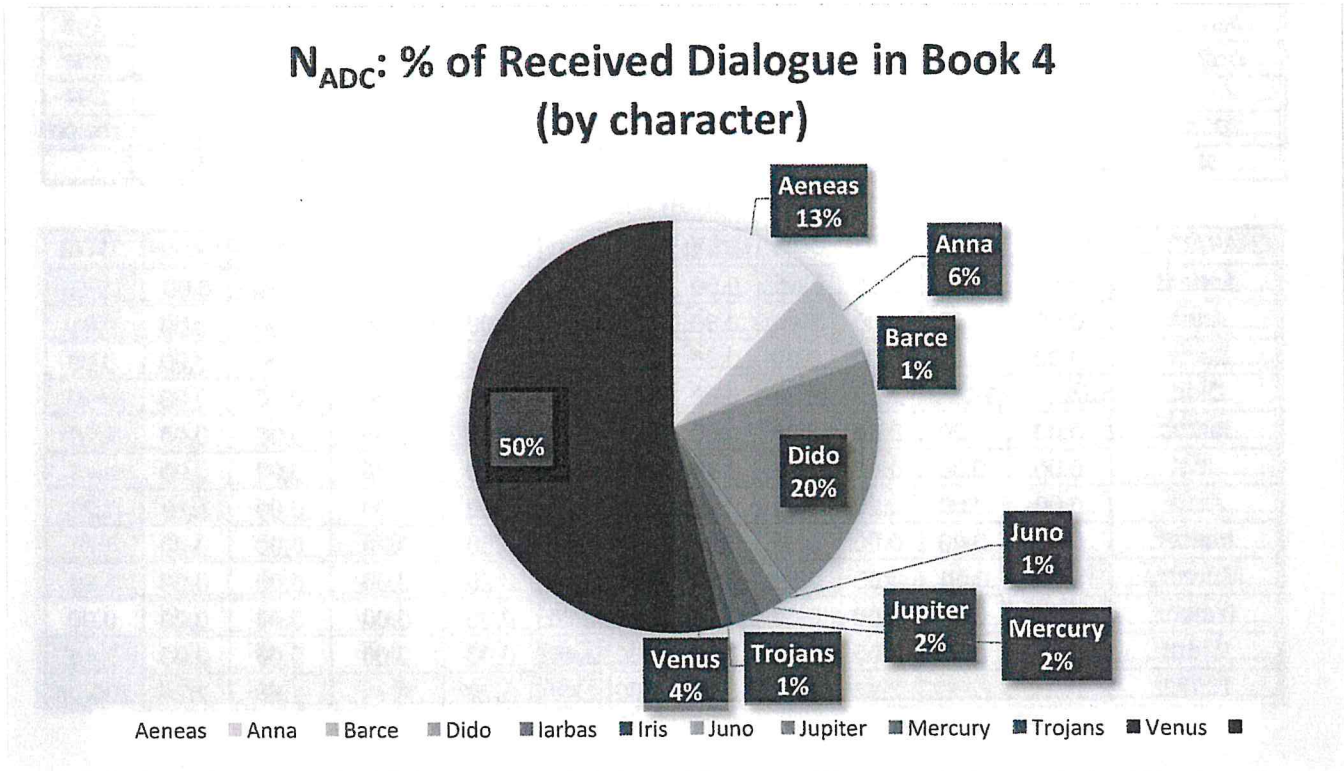
Book 4: Conversation Matrix

CHARACTERS	Aeneas	Anna	Barce	Dido	Iarbas	Iris	Juno	Jupiter	Mercury	Trojans	Venus	TOTAL	%
Aeneas	0	0	0	188	0	0	0	0	0	41	0	229	10.55
Anna	0	0	0	213	0	0	0	0	0	0	0	213	9.81
Barce	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Dido	395	273	46	466	0	0	0	0	0	0	0	1180	54.35
Iarbas	0	0	0	0	0	0	0	82	0	0	0	82	3.78
Iris	0	0	0	10	0	0	0	0	0	0	0	10	0.46
Juno	0	0	0	0	0	0	0	0	0	0	158	158	7.28
Jupiter	0	0	0	0	0	0	0	0	103	0	0	103	4.74
Mercury	143	0	0	0	0	0	0	0	0	0	0	143	6.59
Trojans	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Venus	0	0	0	0	0	0	53	0	0	0	0	53	2.44
TOTAL	538	273	46	877	0	0	53	82	103	41	158	2171	100.00
%	24.78	12.57	2.12	40	0	0	2.4	3.777	4.7444	1.889	7.278	100	

Book 4: Conversation Matrix (Normalized)

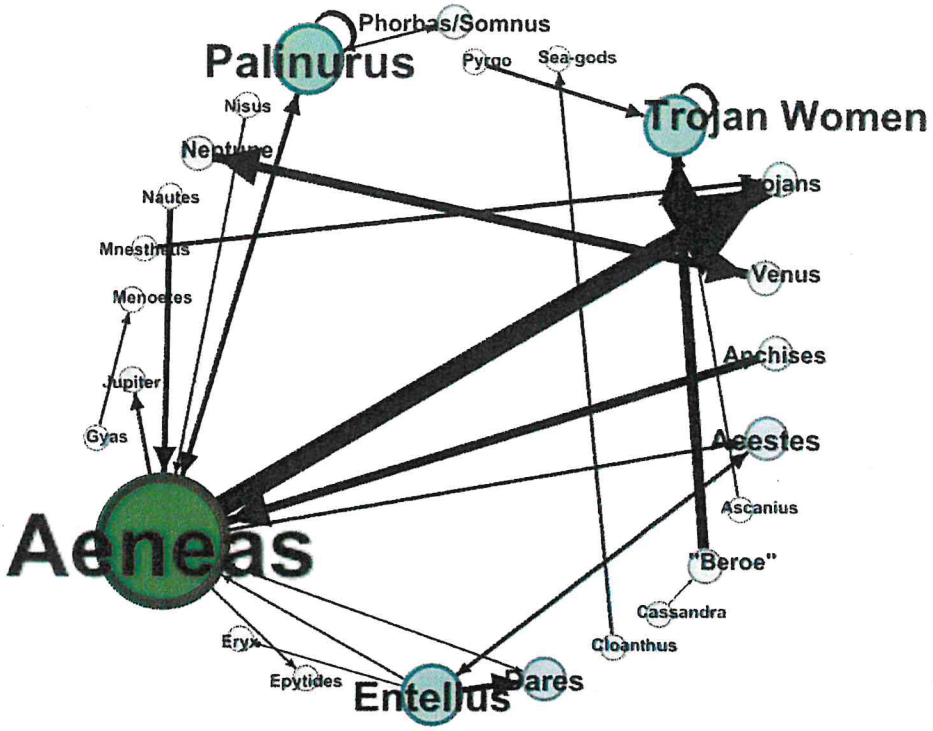
CHARACTERS	Aeneas	Anna	Barce	Dido	Iarbas	Iris	Juno	Jupiter	Mercury	Trojans	Venus	TOTAL
Aeneas	0.00	0.00	0.00	8.66	0.00	0.00	0.00	0.00	0.00	1.89	0.00	10.55
Anna	0.00	0.00	0.00	9.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.81
Barce	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dido	18.19	12.57	2.12	21.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	54.35
Iarbas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.78	0.00	0.00	0.00	3.78
Iris	0.00	0.00	0.00	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46
Juno	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.28	7.28
Jupiter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.74	0.00	0.00	4.74
Mercury	6.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.59
Trojans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Venus	0.00	0.00	0.00	0.00	0.00	0.00	2.44	0.00	0.00	0.00	0.00	2.44
TOTAL	24.78	12.57	2.12	40.40	0.00	0.00	2.44	3.78	4.74	1.89	7.28	100.00


N_{ADC}: % of Spoken Dialogue in Book 4
(by character)
Venus 2%
Aeneas 11%
Mercury 7%
Jupiter 5%
Anna 10%
Juno 7%
Iarbas 4%
Dido 54%
Aeneas Anna Barce Dido Iarbas Iris Juno Jupiter Mercury Trojans Venus


N_{ADC}: % of Received Dialogue in Book 4
(by character)
Aeneas 13%
Anna 6%
Barce 1%
50%
Dido 20%
Juno 1%
Jupiter 2%
Mercury 2%
Venus 4%
Trojans 1%
Aeneas Anna Barce Dido Iarbas Iris Juno Jupiter Mercury Trojans Venus

BOOK 5							
	SPEAKER	RECEIVER		WORDS	LINES	# OF LINES	TYPE
1	Palinurus	NONE	Neptune	10	13-14	1.58	A2
2	Palinurus	Aeneas	Jupiter, Fortune, Eryx	59	17-25	9.83	P14
3	Aeneas	Palinurus	Acestes, Anchises	38	26-31	5.58	C17
4	Aeneas	Trojans	Dardanus, Anchises, Acestes, Penates, Dawn	175	45-71	27.00	C18
5	Aeneas	Anchises	Anchises	24	80-83	4.00	G3
6	Gyas	Menoetes	NONE	25	162-164 + 166	3.25	C19
7	Mnestheus	Trojans	Hector, Mnestheus, Neptune	53	189-197	8.00	C20
8	Cloanthus	Sea-gods	NONE	30	235-238	4.00	PRA9
9	Aeneas	Trojans	NONE	67	304-314	11.33	C21
10	Aeneas	Trojans	NONE	17	348-350	2.42	R6
11	Nisus	Aeneas	Fortune, Salius	26	353-356	3.58	Q9
12	Aeneas	Trojans	NONE	14	363-364	2.00	C22
13	Dares	Aeneas	NONE	19	383-385	2.42	P15
14	Acestes	Entellus	Erx	33	389-393	5.58	P16
15	Entellus	Acestes	NONE	45	394-400	6.33	R7
16	Entellus	Dares	hercules, Eryx, Alcides, Dares, Aeneas, Acestes	76	410-420	11.33	P17
17	Aeneas	Dares	NONE	14	465-467	2.25	C23
18	Entellus	Aeneas and Trojans	Dares	21	474-476	2.83	C24
19	Entellus	Eryx	Eryx, Dares	14	483-484	2.00	PRA10
20	Aeneas	Acestes	Jupiter, Anchises, Cisseus	38	533-538	6.33	C25
21	Aeneas	Epytides	Ascanius	23	548-551	3.08	C26
22	Trojan Women	NONE	NONE	8	615-616		
23	"Beroe"	Trojan Women	Fortune, Eryx, Acestes, Penates, Hector, Cassandra, Neptune	128	623-640	17.83	P18
24	Cassandra	"Beroe"	NONE	7	637-638	0.83	O11
25	Pyrgo	Trojan Women	Beroe, Doryclus, Anchises	44	646-652	7.00	N10
26	Ascanius	Trojan women	NONE	23	670-673	3.08	C27

27	Aeneas	Jupiter	NONE	41	687-692	6.33	PRA11
28	Nautes	Aeneas	Fates, Acestes	67	709-718	10.00	P19
29	Anchises	Aeneas	Jupiter, Nautes, Dis, Sibyl, Night, East	112	724-739	16.00	C28
30	Aeneas	Anchises	NONE	13	741-742	1.58	Q10
31	Venus	Neptune	Juno, Fate, Jupiter, Aeolus	120	781-798	18.00	P20
32	Neptunus	Venus	Aeneas, Achilles, Peleus, Achilles	108	800-815	16.00	R8
33	Somnus (Phorbas)	Palinurus	Iasus	26	843-846	4.00	P21
34	Palinurus	Somnus	Aeneas	24	848-851	4.00	R9
35	Aeneas	Palinurus	NONE	13	870-871	2.00	A3

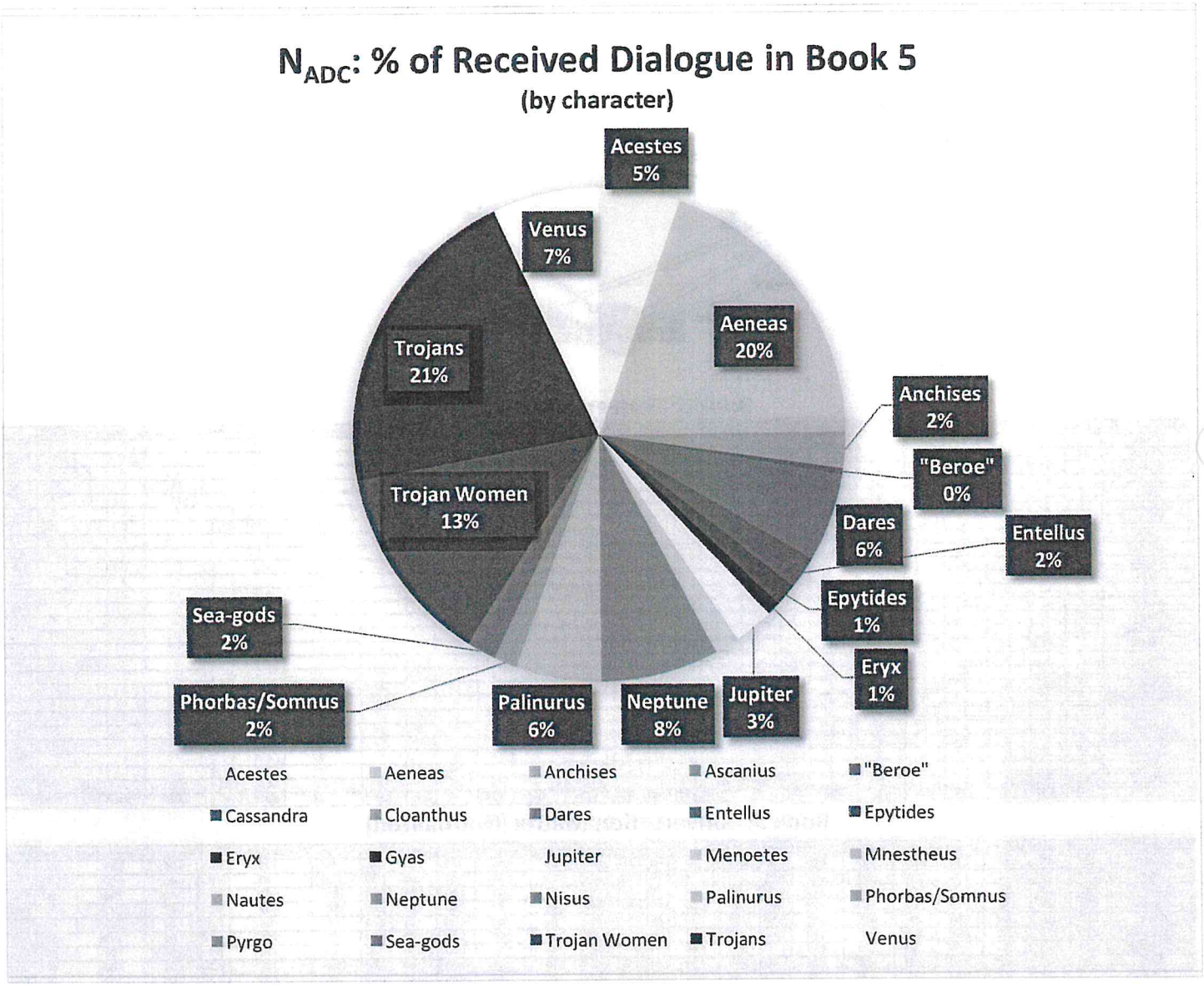


Book 5: Conversation Matrix

CHARACTERS	Acestes	Aeneas	Anchises	Ascanius	"Beroe"	Cassandra	Cloanthus	Dares	Entellus	Epytides	Eryx	Gyas	Jupiter	Menoetes	Mnestheus	Nautes	Neptune	Nisus	Palinurus	Phorbas/Somnus	Pyrgo	Sea-gods	Trojan Women	Trojans	Venus	TOTAL	%
Acestes	0	0	0	0	0	0	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	2.12
Aeneas	38	0	37	0	0	0	0	14	0	23	0	0	41	0	0	0	0	0	51	0	0	0	0	273	0	477	30.68
Anchises	0	112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	112	7.20
Ascanius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0	0	23	1.48
"Beroe"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	128	0	0	128	8.23
Cassandra	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0.45
Cloanthus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	30	1.93
Dares	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1.22
Entellus	45	21	0	0	0	0	0	76	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	156	10.03
Epytides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Eryx	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Gyas	0	0	0	0	0	0	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	25	1.61
Jupiter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Menoetes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Mnestheus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	0	0	53	3.41
Nautes	0	67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67	4.31
Neptune	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	108	108	108	6.95
Nisus	0	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	1.67
Palinurus	0	59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	24	0	0	0	0	0	93	5.98
Phorbas/Somnus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	0	0	0	0	0	0	26	1.67
Pyrgo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44	0	0	44	2.83
Sea-gods	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Trojan Women	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	8	0.51
Trojans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Venus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120	7.72
TOTAL	83	304	37	0	7	0	0	90	33	23	14	0	41	25	0	0	120	0	87	24	0	30	203	326	108	1555	100.00
%	5.34	19.55	2.38	0.00	0.45	0.00	0.00	5.79	2.12	1.48	0.90	0.00	2.64	1.61	0.00	0.00	7.72	0.00	5.59	1.54	0.00	1.93	13.05	20.96	6.95	100.00	

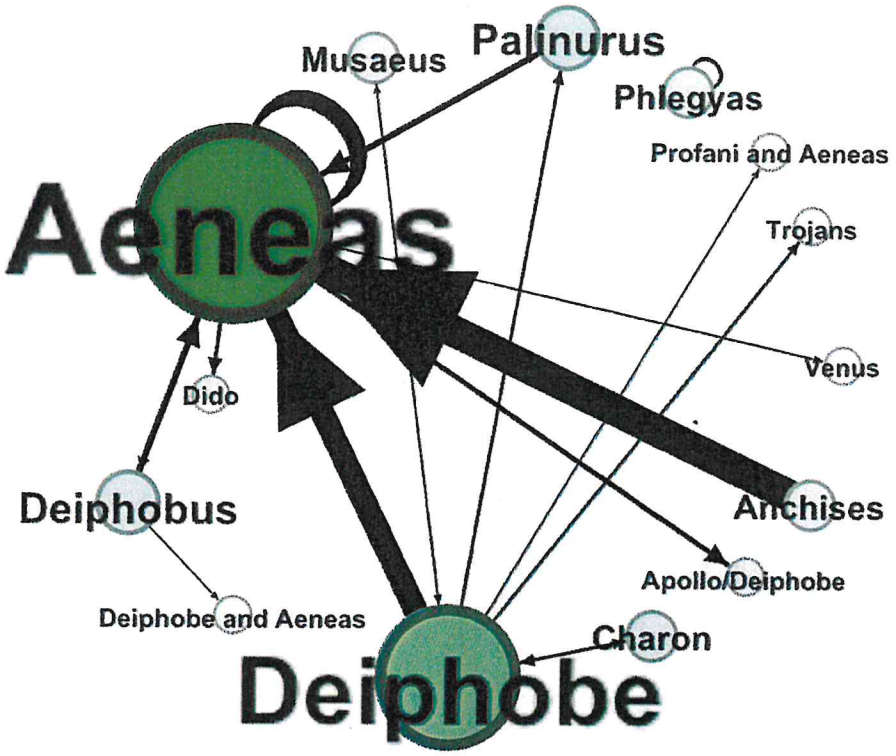
Book 5: Conversation Matrix (Normalized)

CHARACTERS	Acestes	Aeneas	Anchises	Ascanius	"Beroe"	Cassandra	Cloanthus	Dares	Entellus	Epytides	Eryx	Gyas	Jupiter	Menoetes	Mnestheus	Nautes	Neptune	Nisus	Palinurus	Phorbas/Somnus	Pyrgo	Sea-gods	Trojan Women	Trojans	Venus
Acestes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aeneas	2.44	0.00	2.38	0.00	0.00	0.00	0.00	0.90	0.00	1.48	0.00	0.00	2.64	0.00	0.00	0.00	0.00	0.00	3.28	0.00	0.00	0.00	0.00	17.56	0.00
Anchises	0.00	7.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ascanius	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.48	0.00	0.00
"Beroe"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.23	0.00	0.00
Cassandra	0.00	0.00	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cloanthus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.93	0.00	0.00	0.00
Dares	0.00	1.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Entellus	2.89	1.35	0.00	0.00	0.00	0.00	0.00	4.89	0.00	0.00	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Epytides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eryx	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gyas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jupiter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Menoetes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mnestheus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.41	0.00
Nautes	0.00	4.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Neptune	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.95
Nisus	0.00	1.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Palinurus	0.00	3.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.54	0.00	0.00	0.00	0.00	0.00
Phorbas/Somnus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.67	0.00	0.00	0.00	0.00	0.00	0.00
Pyrgo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.83	0.00	0.00
Sea-gods	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trojan Women	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.51	0.00	0.00
Trojans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Venus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	5.34	19.55	2.38	0.00	0.45	0.00	0.00	5.79	2.12	1.48	0.90	0.00	2.64	1.61	0.00	0.00	7.72	0.00	5.59	1.54	0.00	1.93	13.05	20.96	6.95


N_{ADC}: % of Received Dialogue in Book 5
(by character)
Acestes 5%
Venus 7%
Aeneas 20%
Trojans 21%
Anchises 2%
"Beroe" 0%
Trojan Women 13%
Dares 6%
Entellus 2%
Epytides 1%
Eryx 1%
Sea-gods 2%
Phorbas/Somnus 2%
Palinurus 6%
Neptune 8%
Jupiter 3%
Acestes
Aeneas
Anchises
Ascanius
"Beroe"
Cassandra
Cloanthus
Dares
Entellus
Epytides
Eryx
Gyas
Jupiter
Menoetes
Mnestheus
Nautes
Neptune
Nisus
Palinurus
Phorbas/Somnus
Pyrgo
Sea-gods
Trojan Women
Trojans
Venus

BOOK 6							
	SPEAKER	RECEIVER		WORDS	LINES	# OF LINES	TYPE
1	Deiphobe	Aeneas	NONE	20	37-39	3.00	C29
2	Deiphobe	Aeneas	Apollo	6	45-46	0.75	C30
3	Deiphobe	Aeneas	NONE	16	51-53	2.08	C31
4	Aeneas	Apollo and Deiphobe	Paris, Aeacus, Achilles, Phoebus, Trivia	131	56-76	20.42	PRA12
5	Deiphobe	Trojans	Dardanus, Achilles, Juno, Turnus	105	83-97	15.00	O12
6	Aeneas	Deiphobe	Pluto, Anchises, Hecate, Orpheus, Pollux, Theseus, Hercules, Jupiter	138	103-123	20.42	P22
7	Deiphobe	Aeneas	Anchises, Dis, Jupiter, Juno, Proserpine, Fate	202	125-155	29.67	C32
8	Aeneas	NONE	Misenus	23	187-189	3.00	PRA13
9	Aeneas	Doves and Venus	NONE	27	194-197	3.25	PRA14
10	Deiphobe	Profani and Aeneas	NONE	21	258-261	3.17	C33
11	Aeneas	Diephobe	NONE	22	318-320	2.92	A11
12	Deiphobe	Aeneas	Anchises, Charon	60	322-330	9.00	N11
13	Aeneas	Palinurus	Apollo	38	341-346	5.83	Q12
14	Palinurus	Aeneas	Apollo, Anchises, Notus, Anchises, Iulus, Venus	171	347-371	24.75	N12
15	Deiphobe	Palinurus	Furies	56	373-381	9.00	C34
16	Charon	Deiphobe	Sleep, Night, Hercules, Theseus, Pirithous, Dis	68	388-397	10.00	C35
17	Deiphobe	Charon	Proserpine, Pluto, Aeneas, Anchises	49	399-497	7.50	P23
18	Aeneas	Dido	Fate	81	456-466	11.00	P24
19	Aeneas	Deiphobus	Teucer, Rumor	61	500-508	9.00	Q13
20	Deiphobus	Aeneas	Helen, Menelaus, Aeolus, Ulysses	172	509-534	25.58	N13
21	Deiphobe	Aeneas	Pluto	38	539-543	5.83	C36
22	Deiphobus	Deiphobe and Aeneas	NONE	16	544-546	2.58	F4
23	Aeneas	Deiphobe	NONE	14	560-561	2.00	Q14
24	Deiphobe	Aeneas	Hecate, Rhadamanthus, Tisiphone, Hydra, Earth, Titan, Aloeus, Jupiter, Salmoneus,	421	562-627	65.42	N14

			Jupiter, Tityos, Lapith, Ixion, Pirithous, Tantalus, Fury, Theseus, Phlegyas				
25	Phlegyas	NONE	NONE	7	620	1.00	C37
26	Deiphobe	Aeneas	None	27	629-632	3.92	C38
27	Deiphobe	Musaeus	Anchises	20	669-671	3.00	Q15
28	Musaeus	Deiphobe	NONE	28	673-676	4.00	R10
29	Anchises	Aeneas	NONE	55	687-694	8.00	G4
30	Aeneas	Anchises	NONE	26	695-698	3.75	G5
31	Anchises	Aeneas	Fate	35	713-718	5.58	N15
32	Aeneas	Anchises	None	23	719-721	3.00	Q16
33	Anchises	Aeneas	Titan, Sol	187	722-751	**29.67**	N16
34	Anchises	Aeneas	Silvius, Lavinia, Procas, Capys, Numitor, Aeneas Silvius, Mars, romulus, Ilia, Assaracus, Jupiter, Cybele, Caesar, Augustus Caesar, Saturn, Atlas, Hercules, Erymanthus, Lerna, Bacchus, Numa, Tulus, Ancus, Brutus, Torquatus, Camillus, Monoecus, Decii, Drusi, Agamemmnon, Aeacus, Achilles, Minerva, Cato, Cossus, Gracchus, Scipio, Fabricius, Serranus, Fabius, Marcellus, Quirinus	657	756-853 + 855-859	103.00	O13
35	Aeneas	Anchises	NONE	30	863-866	4.00	Q17
36	Anchises	Aeneas	Mars, Tiber, Romulus, Marcellus	124	868-886	18.17	O14

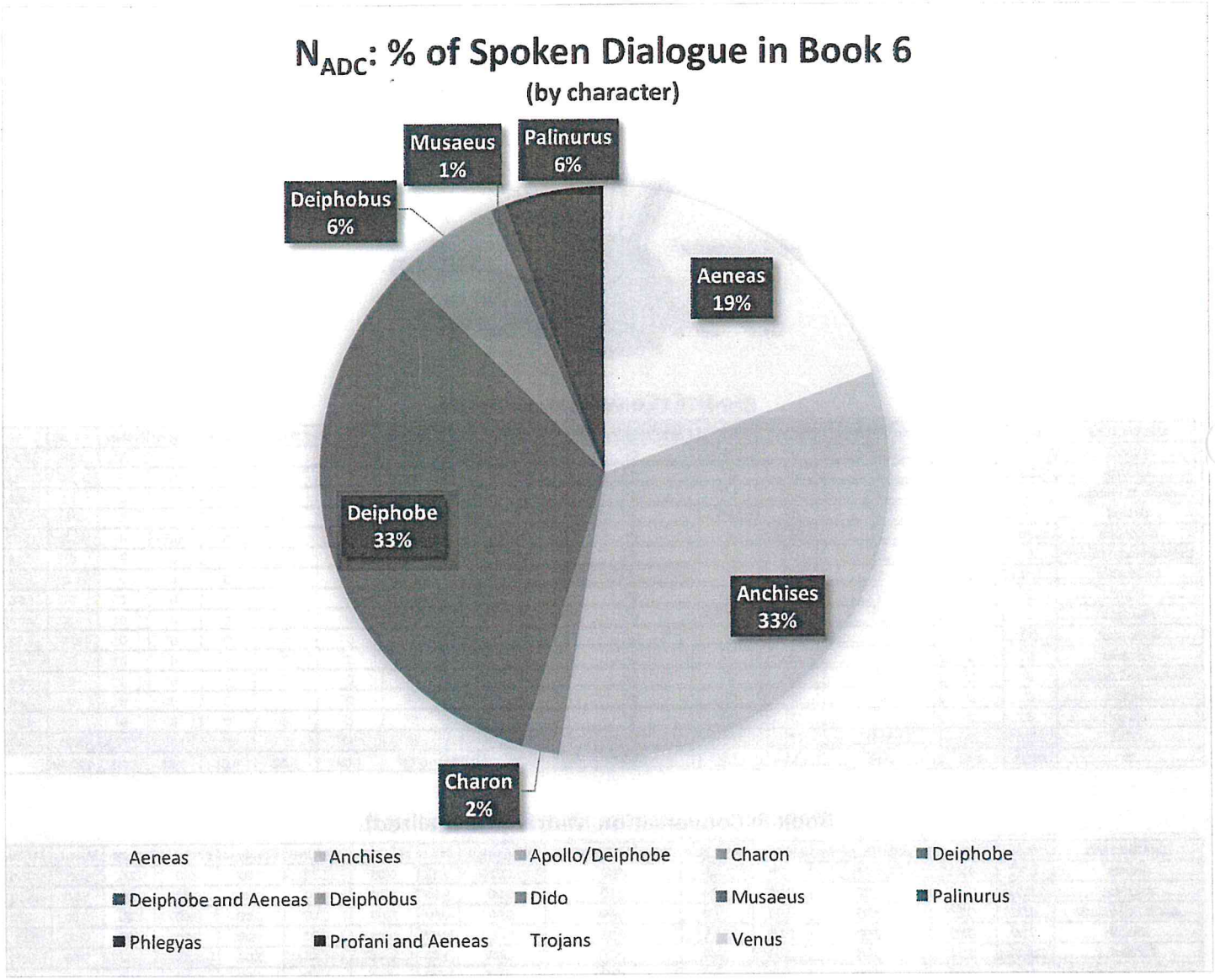


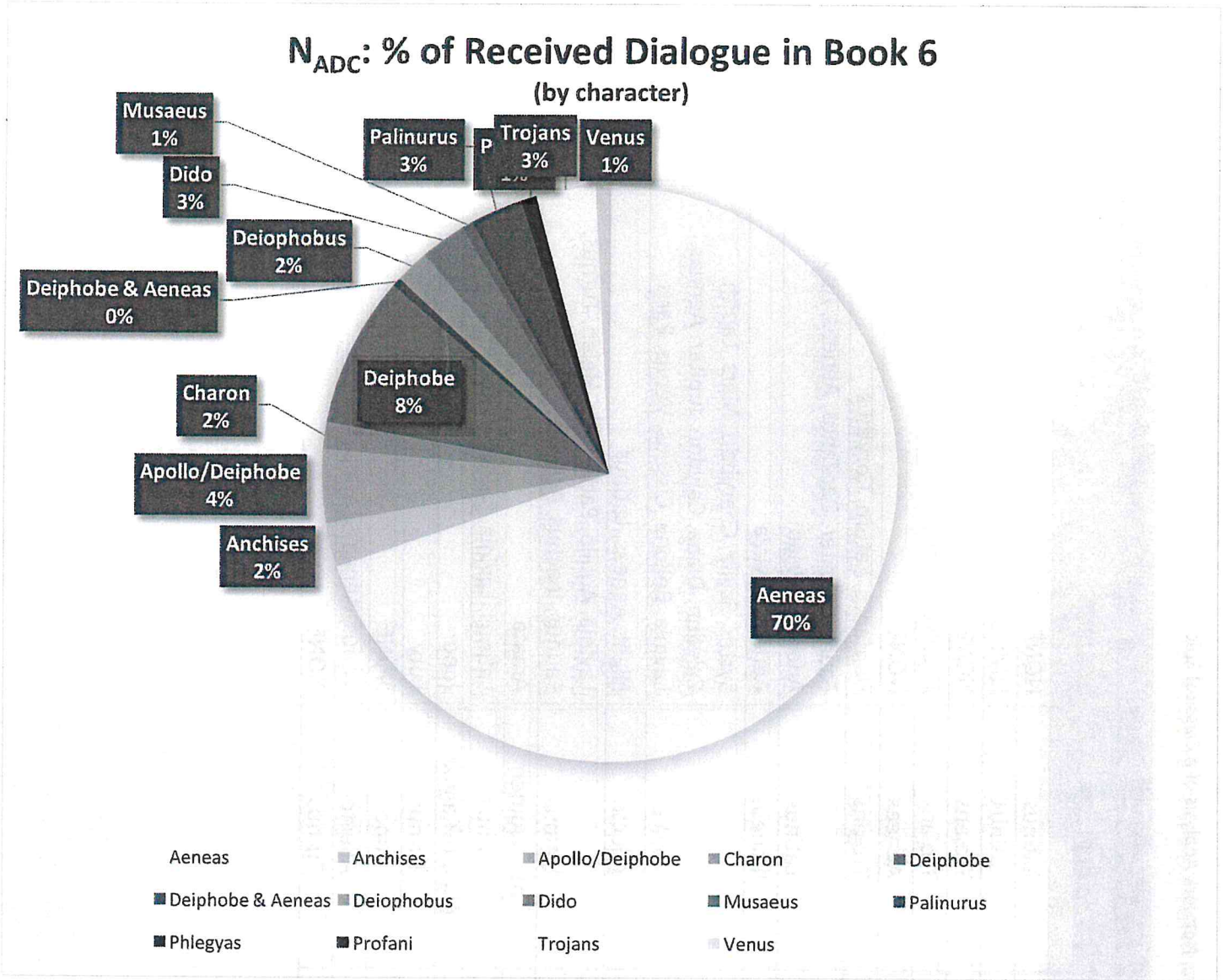
Book 6: Conversation Matrix

CHARACTERS	Aeneas	Anchises	Apollo/Deiphobe	Charon	Deiphobe	Deiphobe & Aeneas	Deiophobus	Dido	Musaeus	Palinurus	Phlegyas	Profani	Trojans	Venus	TOTAL	%
Aeneas	23	79	131	0	174	0	61	81	0	38	0	0	0	27	614	19.34
Anchises	1058	0	0	0	0	0	0	0	0	0	0	0	0	0	1058	33.32
Apollo/Deiphobe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Charon	0	0	0	0	68	0	0	0	0	0	0	0	0	0	68	2.14
Deiphobe	790	0	0	49	0	0	0	0	20	56	0	21	105	0	1041	32.79
Deiphobe and Aeneas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Deiphobus	172	0	0	0	0	16	0	0	0	0	0	0	0	0	188	5.92
Dido	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Musaeus	0	0	0	0	28	0	0	0	0	0	0	0	0	0	28	0.88
Palinurus	171	0	0	0	0	0	0	0	0	0	0	0	0	0	171	5.39
Phlegyas	0	0	0	0	0	0	0	0	0	0	7	0	0	0	7	0.22
Profani and Aeneas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Trojans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Venus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
TOTAL	2214	79	131	49	270	16	61	81	20	94	7	21	105	27	3175	100.00
%	69.73	2.49	4.13	1.54	8.50	0.50	1.92	2.55	0.63	2.96	0.22	0.66	3.31	0.85	100.00	

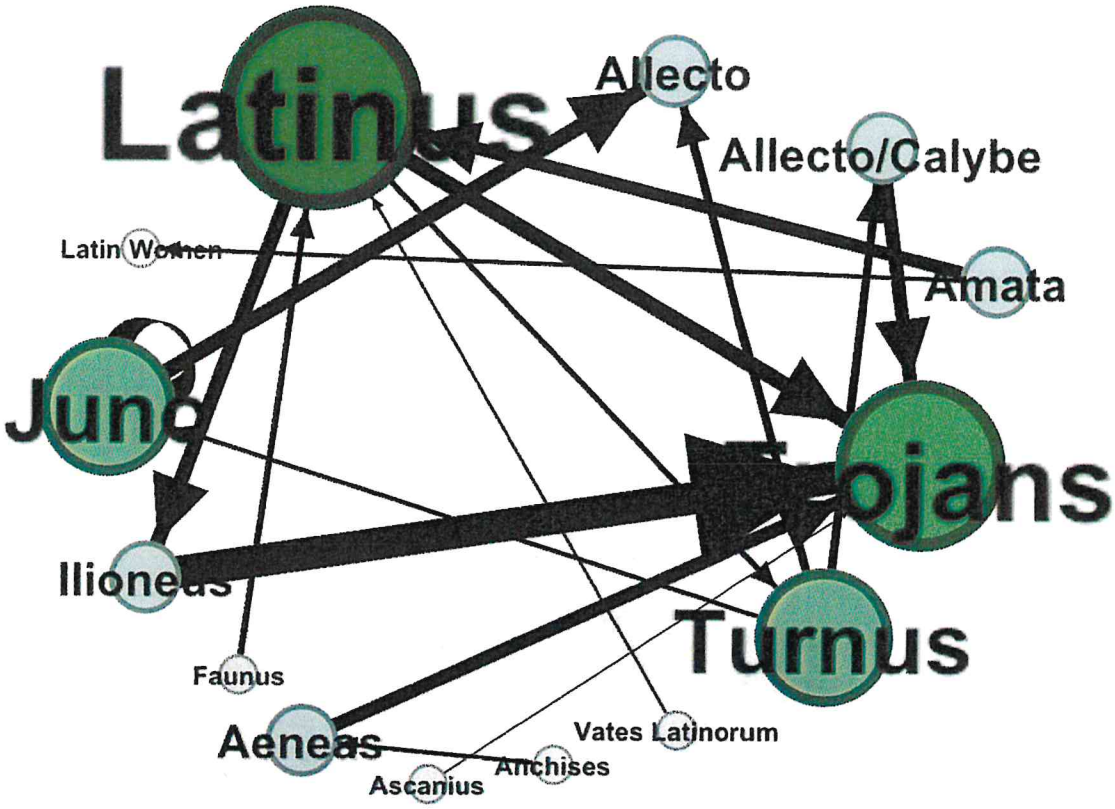
Book 6: Conversation Matrix (Normalized)

CHARACTERS	Aeneas	Anchises	Apollo/Deiphobe	Charon	Deiphobe	Deiphobe & Aeneas	Deiophobus	Dido	Musaeus	Palinurus	Phlegyas	Profani	Trojans	Venus	TOTAL
Aeneas	0.72	2.49	4.13	0.00	5.48	0.00	1.92	2.55	0.00	1.20	0.00	0.00	0.00	0.85	19.34
Anchises	33.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33.32
Apollo/Deiphobe	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Charon	0.00	0.00	0.00	0.00	2.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.14
Deiphobe	24.88	0.00	0.00	1.54	0.00	0.00	0.00	0.00	0.63	1.76	0.00	0.66	3.31	0.00	32.79
Deiphobe and Aeneas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Deiphobus	5.42	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.92
Dido	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Musaeus	0.00	0.00	0.00	0.00	0.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.88
Palinurus	5.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.39
Phlegyas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.22
Profani and Aeneas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trojans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Venus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	69.73	2.49	4.13	1.54	8.50	0.50	1.92	2.55	0.63	2.96	0.22	0.66	3.31	0.85	100.00


N_{ADC}: % of Spoken Dialogue in Book 6
(by character)
Musaeus 1%
Palinurus 6%
Deiphobus 6%
Aeneas 19%
Deiphobe 33%
Anchises 33%
Charon 2%
Aeneas
Anchises
Apollo/Deiphobe
Charon
Deiphobe
Deiphobe and Aeneas
Deiphobus
Dido
Musaeus
Palinurus
Phlegyas
Profani and Aeneas
Trojans
Venus


N_{ADC}: % of Received Dialogue in Book 6
(by character)
Musaeus 1%
Dido 3%
Deiophobus 2%
Deiphobe & Aeneas 0%
Charon 2%
Apollo/Deiphobe 4%
Anchises 2%
Palinurus 3%
Trojans 3%
Venus 1%
Deiphobe 8%
Aeneas 70%
Aeneas
Anchises
Apollo/Deiphobe
Charon
Deiphobe
Deiphobe & Aeneas
Deiophobus
Dido
Musaeus
Palinurus
Phlegyas
Profani
Trojans
Venus

BOOK 7							
	SPEAKER	RECEIVER	SUBJECT	WORDS	LINES	# OF LINES	TYPE
1	Vates Latinorum	Latinus	NONE	14	68-70	2.58	O15
2	Faunus	Latinus	Lavinia	39	96-101	6.00	O16
3	Ascanius	Trojans	NONE	4	116	0.67	N17
4	Aeneas	Trojans	Anchises, Jupiter	97	120-134	14.67	O17
5	Anchises	Aeneas	NONE	25	124-127	4.00	O18
6	Latinus	Trojans	Dardanus, Saturn, Corythus	113	195-211	17.00	Q18
7	Ilioneus	Latinus	Faunus, Jupiter, Dardanus, Aeneas, Apollo, Anchises, Priam	234	213-248	36.00	D3
8	Latinus	Ilioneus	Aeneas, Lavinia	103	259-273	14.58	R11
9	Juno	NONE	Syrtes, Scylla, Charybdis, Mars, Lapith, Calydon, Diana, Calydon, Jupiter, Aeneas, Lavinia, Bellona, Cisseus, Venus, Paris	207	293-322	30.00	S8
10	Juno	Allecto	Night, Aeneas, Latinus	64	331-340	10.00	P25
11	Amata	Latinus	Lavinia, Aquilo, Paris, Leda, Helen, Turnus, Faunus, Inachus, Acrisius	92	359-372	14.00	P26
12	Amata	Latin women	Amata	25	400-403	3.92	C39
13	Allecto/Calybe	Turnus	Latinus, Lavinia, Saturn, Juno	95	421-434	14.00	P27
14	Turnus	Allecto/Calybe	Juno	56	436-444	8.75	R12
15	Allecto	Turnus	Fury	56	452-455	4.00	T3
16	Allecto	Juno	NONE	26	545-551	7.50	P28
17	Juno	Allecto	Venus, Aeneas, Latinus	46	552-560	7.83	R13
18	Latinus	Turnus	NONE	35	594-599	5.58	O19

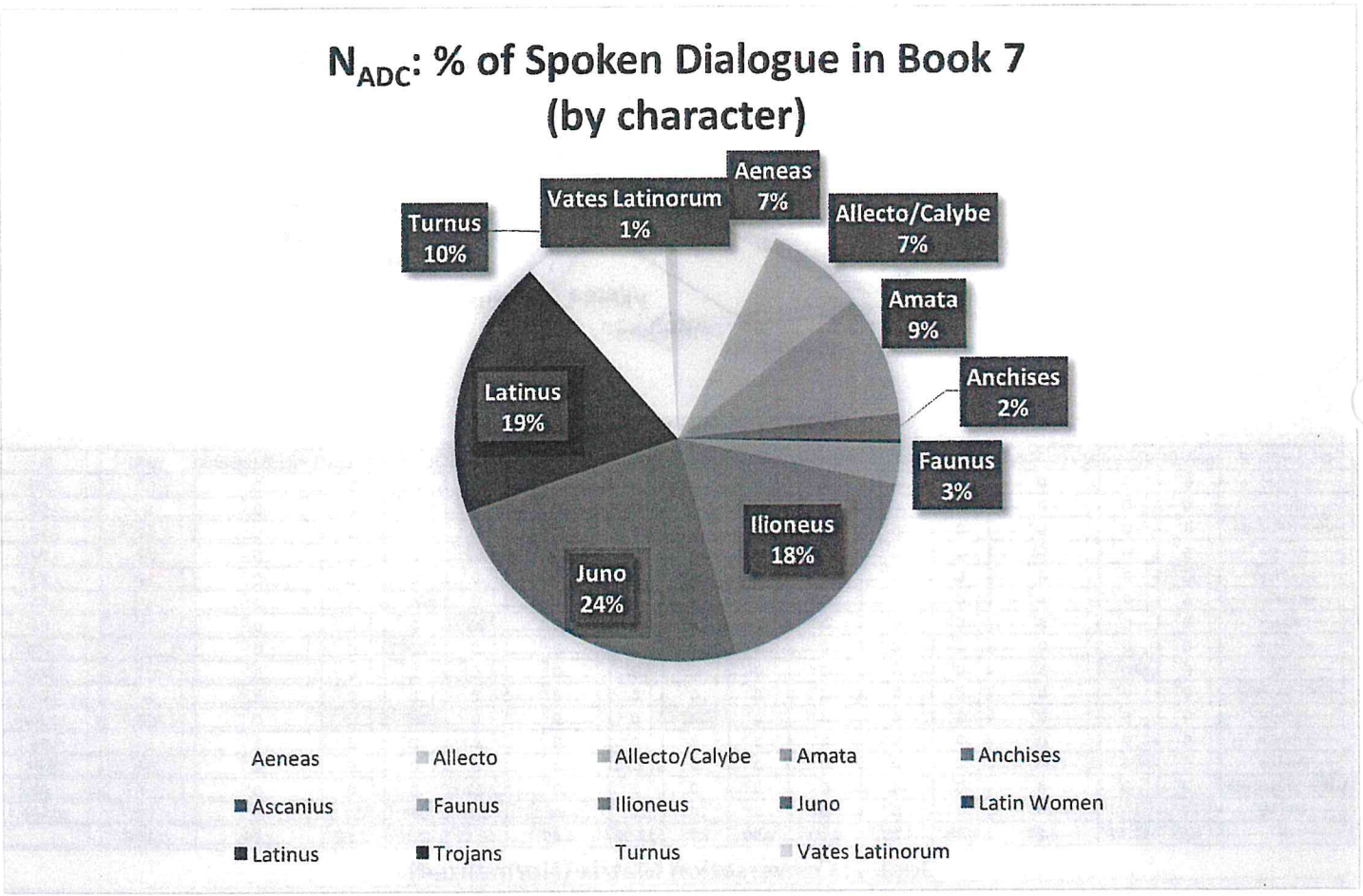


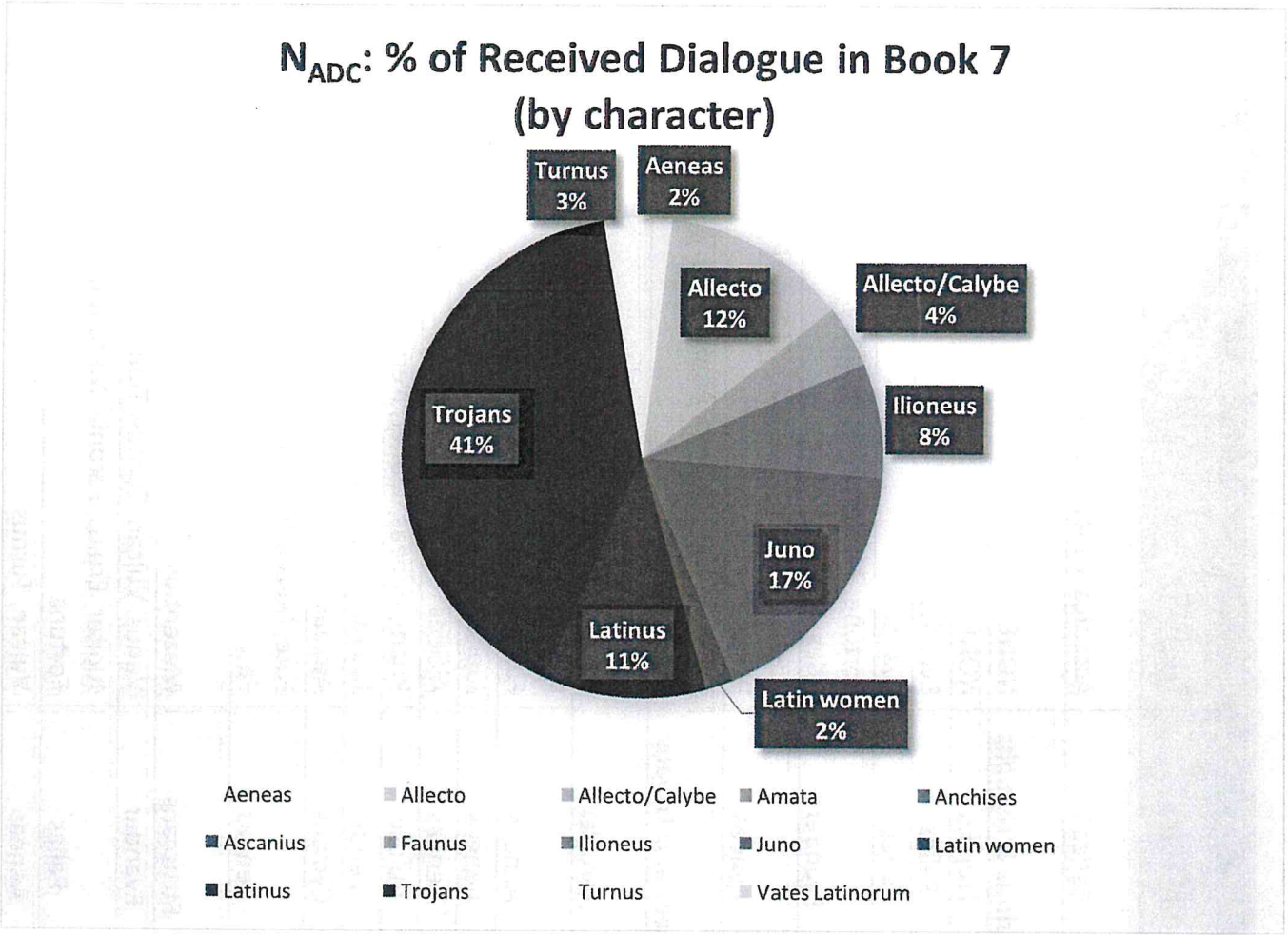
Book 7: Conversation Matrix

CHARACTERS	Aeneas	Allecto	Allecto/Calybe	Amata	Anchises	Ascanius	Faunus	Ilioneus	Juno	Latin women	Latinus	Trojans	Turnus	Vates Latinorum	Total	%
Aeneas	0	0	0	0	0	0	0	0	0	0	0	97	0	0	97	7.29
Allecto	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Allecto/Calybe	0	0	0	0	0	0	0	0	0	0	0	95	0	0	95	7.14
Amata	0	0	0	0	0	0	0	0	0	25	92	0	0	0	117	8.79
Anchises	25	0	0	0	0	0	0	0	0	0	0	0	0	0	25	1.88
Ascanius	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0.30
Faunus	0	0	0	0	0	0	0	0	0	0	39	0	0	0	39	2.93
Ilioneus	0	0	0	0	0	0	0	0	0	0	0	234	0	0	234	17.58
Juno	0	110	0	0	0	0	0	0	207	0	0	0	0	0	317	23.82
Latin Women	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Latinus	0	0	0	0	0	0	0	103	0	0	0	113	35	0	251	18.86
Trojans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Turnus	0	56	56	0	0	0	0	0	26	0	0	0	0	0	138	10.37
Vates Latinorum	0	0	0	0	0	0	0	0	0	0	14	0	0	0	14	1.05
TOTAL	25	166	56	0	0	0	0	103	233	25	145	543	35	0	1331	100.00
%	1.88	12.47	4.21	0.00	0.00	0.00	0.00	7.74	17.51	1.88	10.89	40.80	2.63	0.00	100.00	

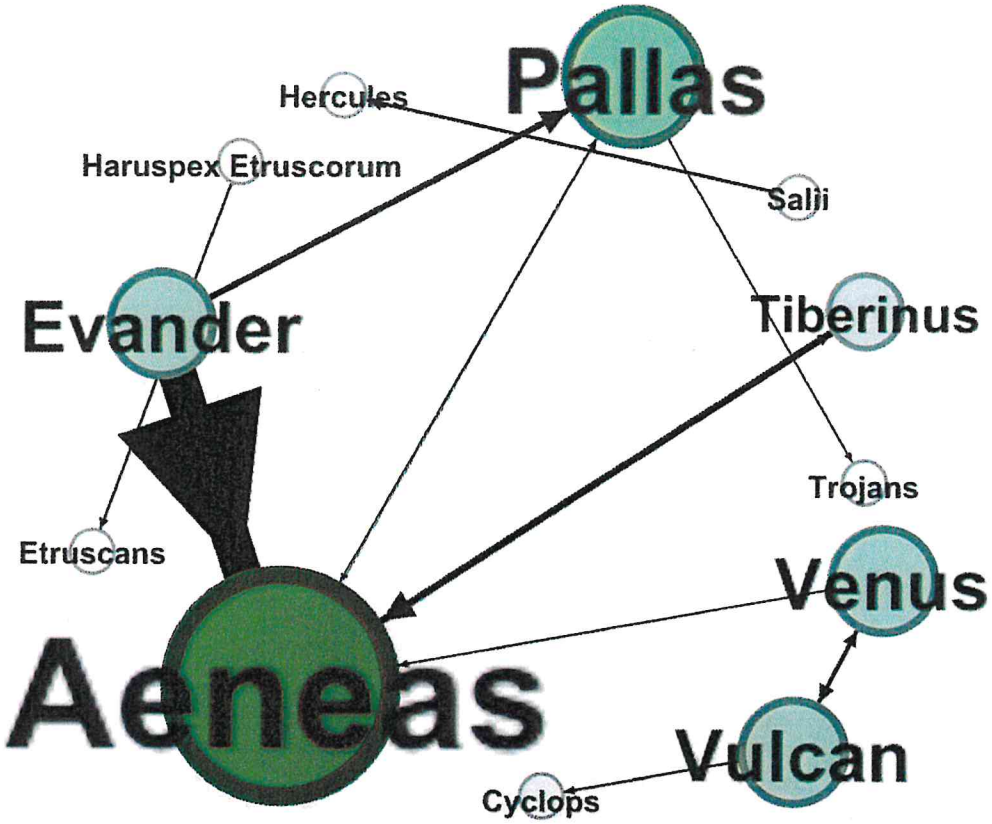
Book 7: Conversation Matrix (Normalized)

CHARACTERS	Aeneas	Allecto	Allecto/Calybe	Amata	Anchises	Ascanius	Faunus	Ilioneus	Juno	Latin women	Latinus	Trojans	Turnus	Vates Latinorum	Total
Aeneas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.29	0.00	0.00	7.29
Allecto	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Allecto/Calybe	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.14	0.00	0.00	7.14
Amata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.88	6.91	0.00	0.00	0.00	8.79
Anchises	1.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.88
Ascanius	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.00	0.00	0.30
Faunus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.93	0.00	0.00	0.00	2.93
Ilioneus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.58	0.00	0.00	17.58
Juno	0.00	8.26	0.00	0.00	0.00	0.00	0.00	0.00	15.55	0.00	0.00	0.00	0.00	0.00	23.82
Latin Women	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Latinus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.74	0.00	0.00	0.00	8.49	2.63	0.00	18.86
Trojans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Turnus	0.00	4.21	4.21	0.00	0.00	0.00	0.00	0.00	1.95	0.00	0.00	0.00	0.00	0.00	10.37
Vates Latinorum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.05	0.00	0.00	0.00	1.05
TOTAL	1.88	12.47	4.21	0.00	0.00	0.00	0.00	7.74	17.51	1.88	10.89	40.80	2.63	0.00	100.00


N_{ADC}: % of Spoken Dialogue in Book 7 (by character)
Aeneas 7%
Allecto/Calybe 7%
Amata 9%
Anchises 2%
Faunus 3%
Ilioneus 18%
Juno 24%
Latinus 19%
Turnus 10%
Vates Latinorum 1%
Aeneas
Allecto
Allecto/Calybe
Amata
Anchises
Ascanius
Faunus
Ilioneus
Juno
Latin Women
Latinus
Trojans
Turnus
Vates Latinorum


N_{ADC}: % of Received Dialogue in Book 7 (by character)
Turnus 3%
Aeneas 2%
Allecto 12%
Allecto/Calybe 4%
Ilioneus 8%
Juno 17%
Latin women 2%
Latinus 11%
Trojans 41%
Aeneas
Allecto
Allecto/Calybe
Amata
Anchises
Ascanius
Faunus
Ilioneus
Juno
Latin women
Latinus
Trojans
Turnus
Vates Latinorum

BOOK 8							
	SPEAKER	RECEIVER	SUBJECT	WORDS	LINES	# OF LINES	TYPE
1	Tiberinus	Aeneas	Ascanius, Pallas, Evander, Juno	195	36-65 (omit 46)	29.67	O20
2	Aeneas	**Tiberinus** & Nymphs	NONE	53	71-78	8.00	PRA15
3	Pallas	Trojans	NONE	18	112-114	2.42	Q19
4	Aeneas	Pallas	Evander	25	117-120	4.00	C40
5	Pallas	Aeneas	Evander	13	122-123	1.92	C41
6	Aeneas	Evander	Fortune, Atrides, Fate, Dardanus, Electra, Atlas, Mercury, Maia	171	127-151	25.00	D4
7	Evander	Aeneas	Anchises, Priam, Laomedon, Laomedon, Pallas,	129	154-174	20.58	R14
8	Evander	Aeneas and Trojans	Cacus, Vulcan, Geryon, Amphitryon, Alcides, Eurus, Potitius	553	185-275	90.58	N18
9	Salii	Hercules	Hylaeus, Pholus, Typhoeus, Jupiter	66	293-302	9.75	PRA16
10	Evander	Aeneas	Fauns,nymphs, Saturn, Jupiter, Tiber, Fortune, Fate, Carmentis, Apollo	151	314-336	23.00	N19
11	Evander	Aeneas	Jupiter, Janus, Saturn	50	351-358	7.83	N20
12	Evander	Aeneas	Alcides	24	362-365	3.42	P29
13	Venus	Vulcan	Priam, Aeneas, Jupiter, Nereus, Tithonus	83	374-386	13.00	P30
14	Vulcan	Venus	Jupiter, Jfate, Priam	68	395-404	9.58	R15
15	Vulcan	Cyclops	Aeneas	28	439-443	4.25	C42
16	Evander	Aeneas	Fate, Mezentius, Turnus, Tarchon, Pallas, Fate	322	470-519	50.00	N21
17	Haruspex Etruscorum	Etruscans	Mezentius	28	499-530	4.33	O21
18	Aeneas	Evander	Venus, Vulcan, Turnus, Tiber	57	532-540	8.75	O22
19	Evander	Pallas	Jupiter, Erulus, Feronia, Mezentius, Pallas, Fortune	159	560-583	23.17	F5
20	Venus	Aeneas	Vulcan, Turnus	20	612-614	3.00	P31

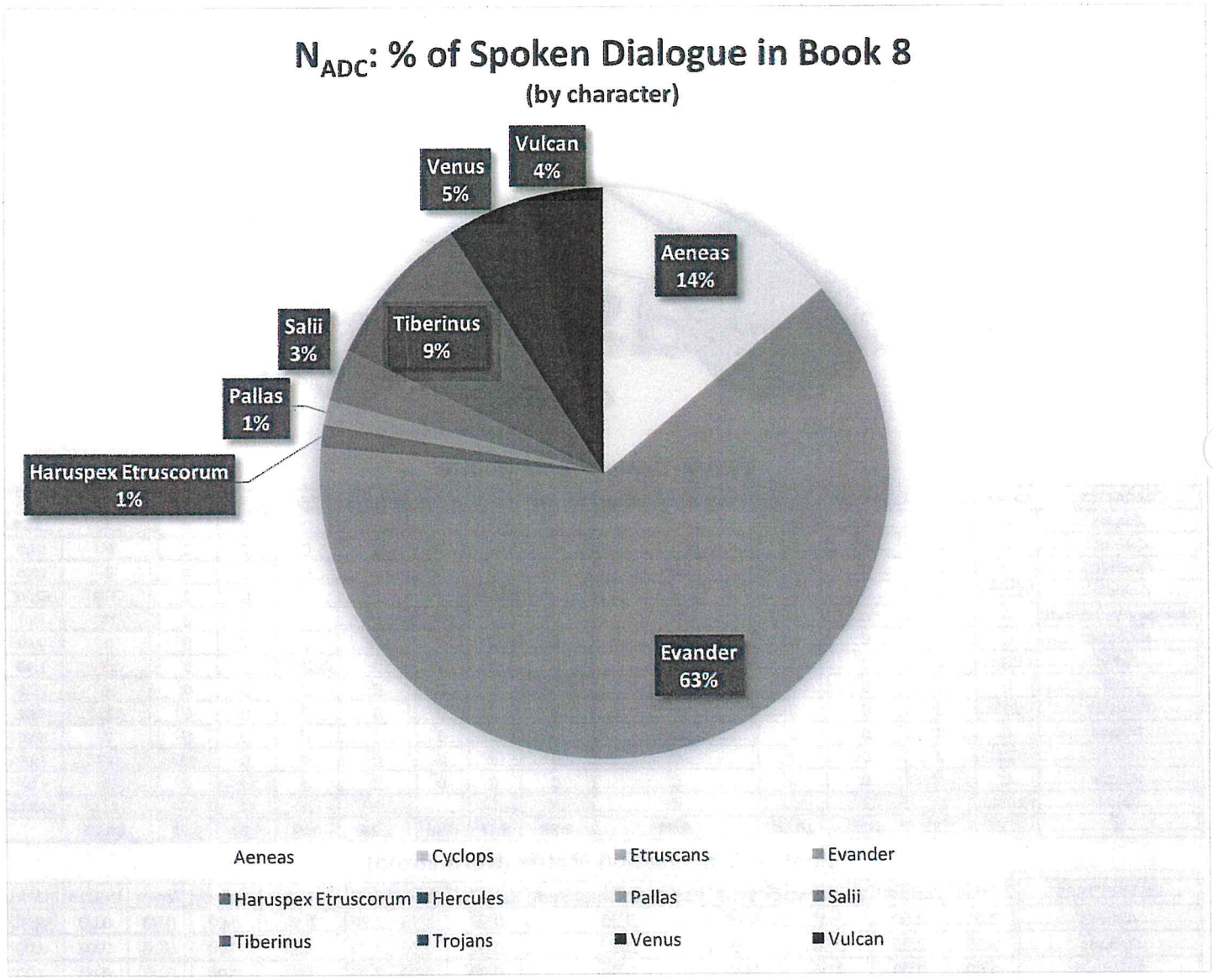


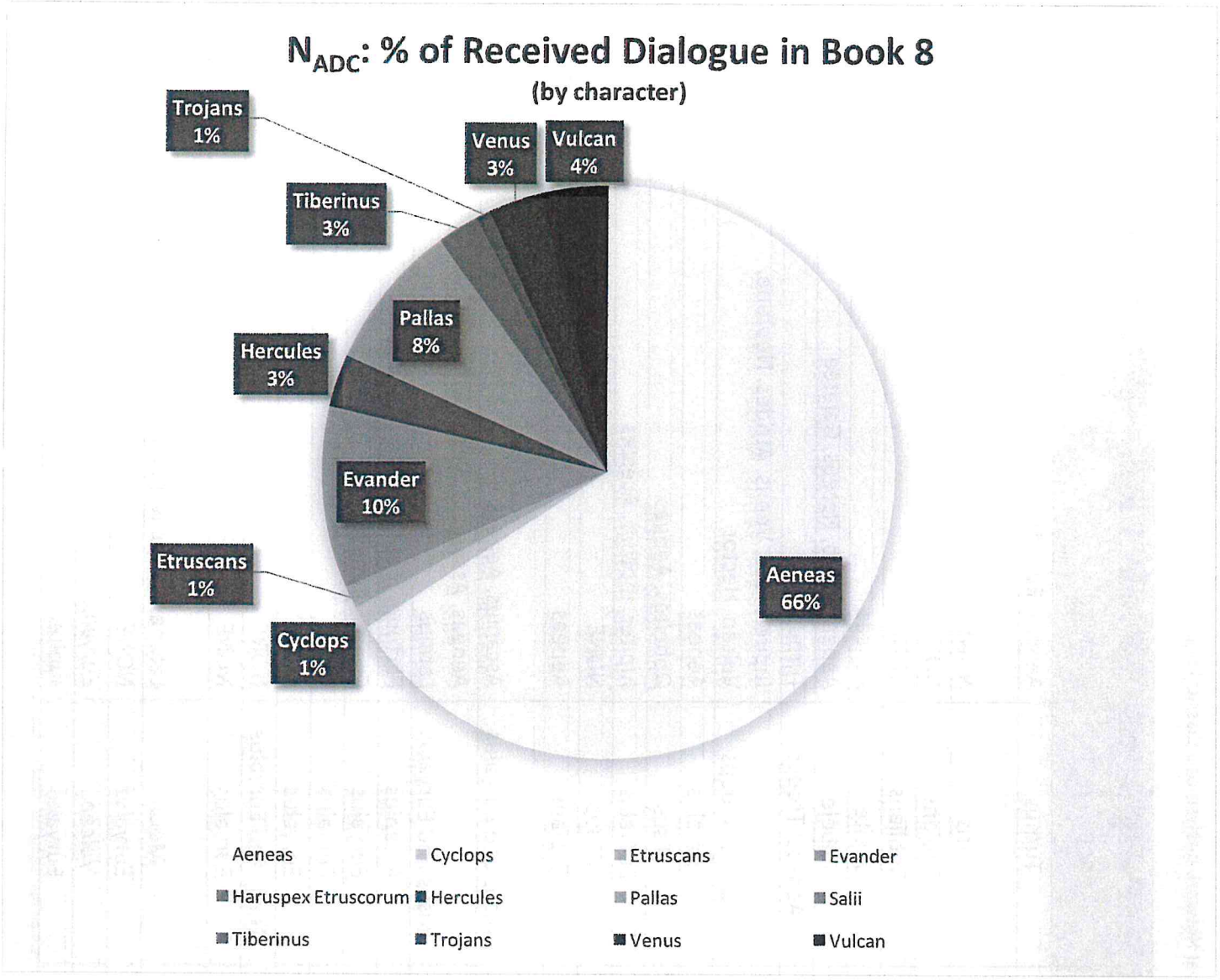
Book 8: Conversation Matrix

CHARACTERS	Aeneas	Cyclops	Etruscans	Evander	Haruspex Etruscorum	Hercules	Pallas	Salii	Tiberinus	Trojans	Venus	Vulcan	TOTAL	%
Aeneas	0	0	0	228	0	0	25	0	53	0	0	0	306	13.83
Cyclops	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Etruscans	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Evander	1229	0	0	0	0	0	159	0	0	0	0	0	1388	62.72
Haruspex Etruscorum	0	0	28	0	0	0	0	0	0	0	0	0	28	1.27
Hercules	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Pallas	13	0	0	0	0	0	0	0	0	18	0	0	31	1.40
Salii	0	0	0	0	0	66	0	0	0	0	0	0	66	2.98
Tiberinus	195	0	0	0	0	0	0	0	0	0	0	0	195	8.81
Trojans	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Venus	20	0	0	0	0	0	0	0	0	0	0	83	103	4.65
Vulcan	0	28	0	0	0	0	0	0	0	0	68	0	96	4.34
TOTAL	1457	28	28	228	0	66	184		53	18	68	83	2213	100.00
%	65.84	1.27	1.27	10.30	0.00	2.98	8.31	0.00	2.39	0.81	3.07	3.75	100.00	

Book 8: Conversation Matrix (Normalized)

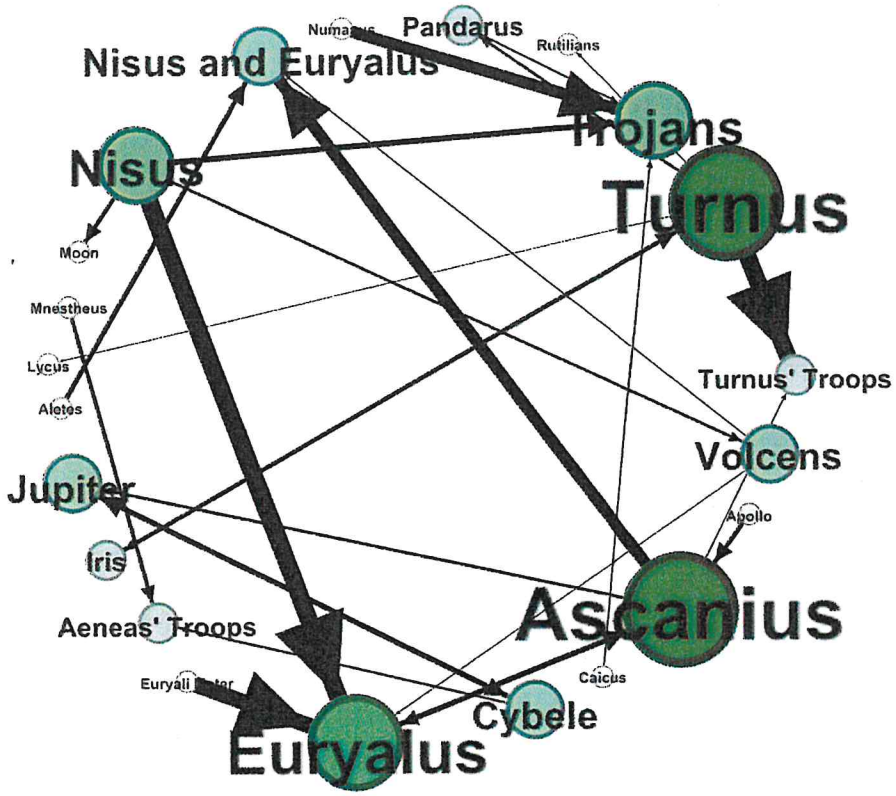
CHARACTERS	Aeneas	Cyclops	Etruscans	Evander	Haruspex Etruscorum	Hercules	Pallas	Salii	Tiberinus	Trojans	Venus	Vulcan	TOTAL
Aeneas	0.00	0.00	0.00	10.30	0.00	0.00	1.13	0.00	2.39	0.00	0.00	0.00	13.83
Cyclops	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Etruscans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Evander	55.54	0.00	0.00	0.00	0.00	0.00	7.18	0.00	0.00	0.00	0.00	0.00	62.72
Haruspex Etruscorum	0.00	0.00	1.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.27
Hercules	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pallas	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.81	0.00	0.00	1.40
Salii	0.00	0.00	0.00	0.00	0.00	2.98	0.00	0.00	0.00	0.00	0.00	0.00	2.98
Tiberinus	8.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.81
Trojans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Venus	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.75	4.65
Vulcan	0.00	1.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.07	0.00	4.34
TOTAL	65.84	1.27	1.27	10.30	0.00	2.98	8.31	0.00	2.39	0.81	3.07	3.75	100.00


N_{ADC}: % of Spoken Dialogue in Book 8
(by character)
Vulcan 4%
Venus 5%
Aeneas 14%
Salii 3%
Tiberinus 9%
Pallas 1%
Haruspex Etruscorum 1%
Evander 63%
Aeneas
Cyclops
Etruscans
Evander
Haruspex Etruscorum
Hercules
Pallas
Salii
Tiberinus
Trojans
Venus
Vulcan


N_{ADC}: % of Received Dialogue in Book 8
(by character)
Trojans 1%
Venus 3%
Vulcan 4%
Tiberinus 3%
Pallas 8%
Hercules 3%
Evander 10%
Etruscans 1%
Cyclops 1%
Aeneas 66%
Aeneas
Cyclops
Etruscans
Evander
Haruspex Etruscorum
Hercules
Pallas
Salii
Tiberinus
Trojans
Venus
Vulcan

BOOK 9							
	SPEAKER	RECEIVER	SUBJECT	WORDS	LINES	# OF LINES	TYPE
1	Iris	Turnus	Aeneas, Evander	51	6-13	8.00	C43
2	Turnus	Iris	NONE	31	18-22	4.42	PRA17
3	Caicus	Trojans	NONE	17	36-38	2.42	C44
4	Turnus	Rutilians	NONE	10	51-52	1.08	C45
5	Cybele	Jupiter	Aeneas	66	83-92	9.42	P32
6	Jupiter	Cybele	Aeneas, Doto, Nereus, Galatea	59	94-13	10.00	R16
7	Cybele	Aeneas' Troops	Turnus	25	114-117	3.67	C46
8	Turnus	Turnus' Troops	Jupiter, Fate, Venus, Atrides, Neptune, Vulcan, Hector	216	128-158	31.00	E3
9	Nisus	Euryalus	Aeneas	88	184-196	12.75	P33
10	Euryalus	Nisus	Opheltes, Aeneas	54	199-206	8.00	R17
11	Nisus	Euryalus	Jupiter, mother, Acestes	86	207-218	11.75	P34
12	Euryalus	Nisus	NONE	12	219-221	2.00	R18
13	Nisus	Trojans	Aeneas	72	234-245	11.58	P35
14	Aletes	Nisus and Euryalus	Ascanius, Aeneas	56	247-250 + 252-256	8.17	R19
15	Ascanius	Nisus and Euryalus	Aeneas, Assaracus, Vesta, Dido, Turnus, Latinus	152	257-280	23.00	R20
16	Euryalus	Ascanius	Fortune, mother, Priam, Acestes	79	281-292	11.17	P36
17	Ascanius	Euryalus	Creusa, Aeneas	46	296-302	7.00	R21
18	Nisus	Euryalus	NONE	34	320-323	4.00	C47
19	Nisus	Euryalus	NONE	14	355-356	1.92	C48
20	Volcens	Nisus and Euryalus	NONE	12	376-377	1.42	C49
21	Nisus	Euryalus	NONE	8	390-391	1.25	A4
22	Nisus	Moon	Latona, Hyrtacus, Euryalus	47	404-409	6.00	PRA18
23	Volcens	Euryalus	NONE	9	422-423	1.42	T4
24	Nisus	Volcens	Euryalus	31	427-430	4.00	P37
25	Euryalus Mater	Euryalus	Jupiter	121	481-497	17.00	A5

26	Turnus	Lycus	NONE	7	560-561	1.17	T5
27	Numanus	Trojans	Atrides, Ulysses	150	598-620	23.00	V1
28	Ascanius	Jupiter	NONE	34	625-629	5.00	PRA19
29	Ascanius	Turnus' Troops	NONE	12	634-635	1.83	T6
30	Apollo	Iulus	Assaracus	26	641-644	3.42	O23
31	Apollo	Iulus	Aeneas, Numanus, Apollo	24	653-656	3.58	C50
32	Pandarus	Trojans	Amata, Turnus	19	737-739	2.75	T7
33	Turnus	Pandarus	Priam, Achilles	14	741-742	2.00	T8
34	Turnus	Pandarus	NONE	17	747-748	2.00	T9
35	Mnestheus	Aeneas' Troops	Aeneas	43	781-787	6.58	E4

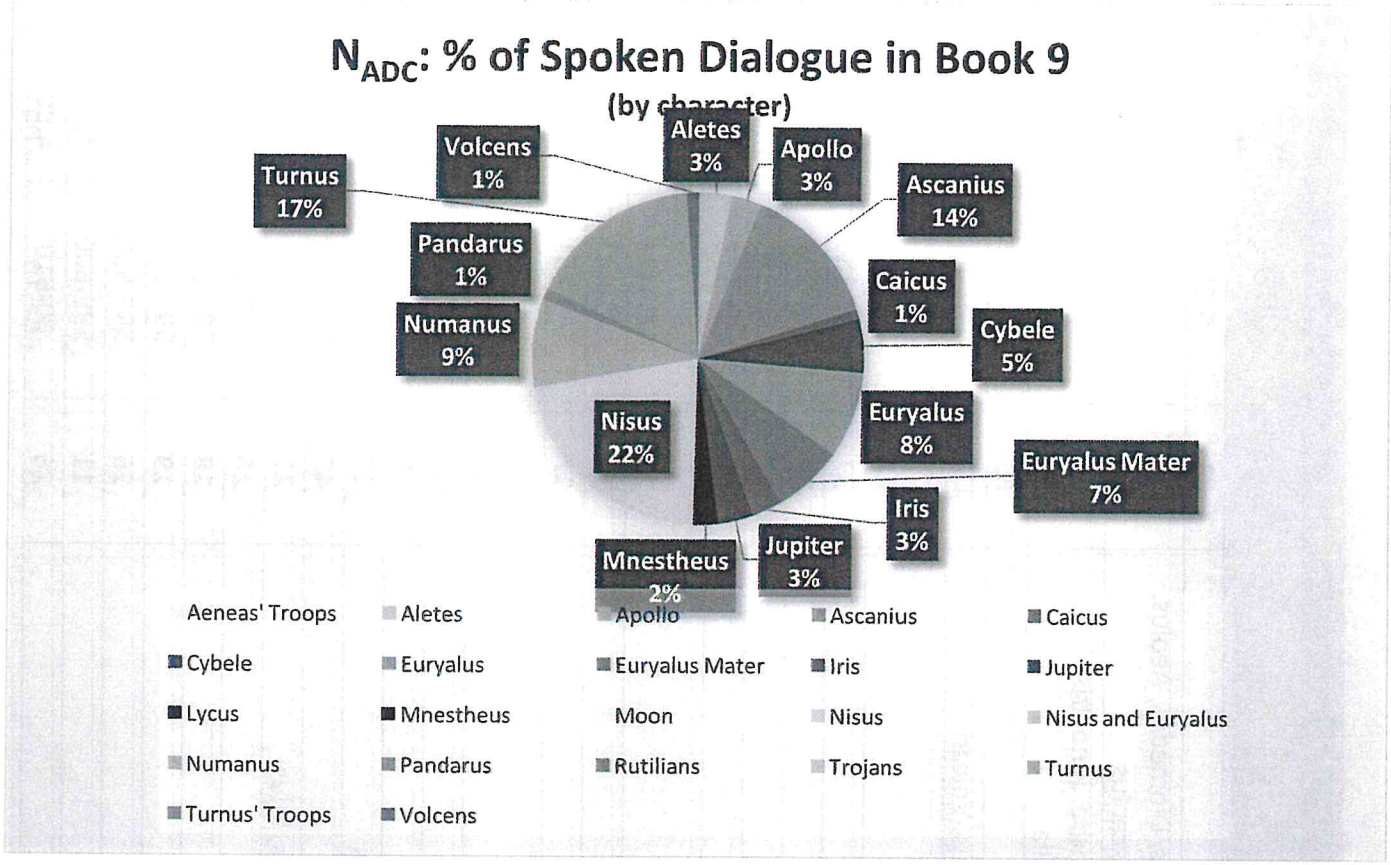


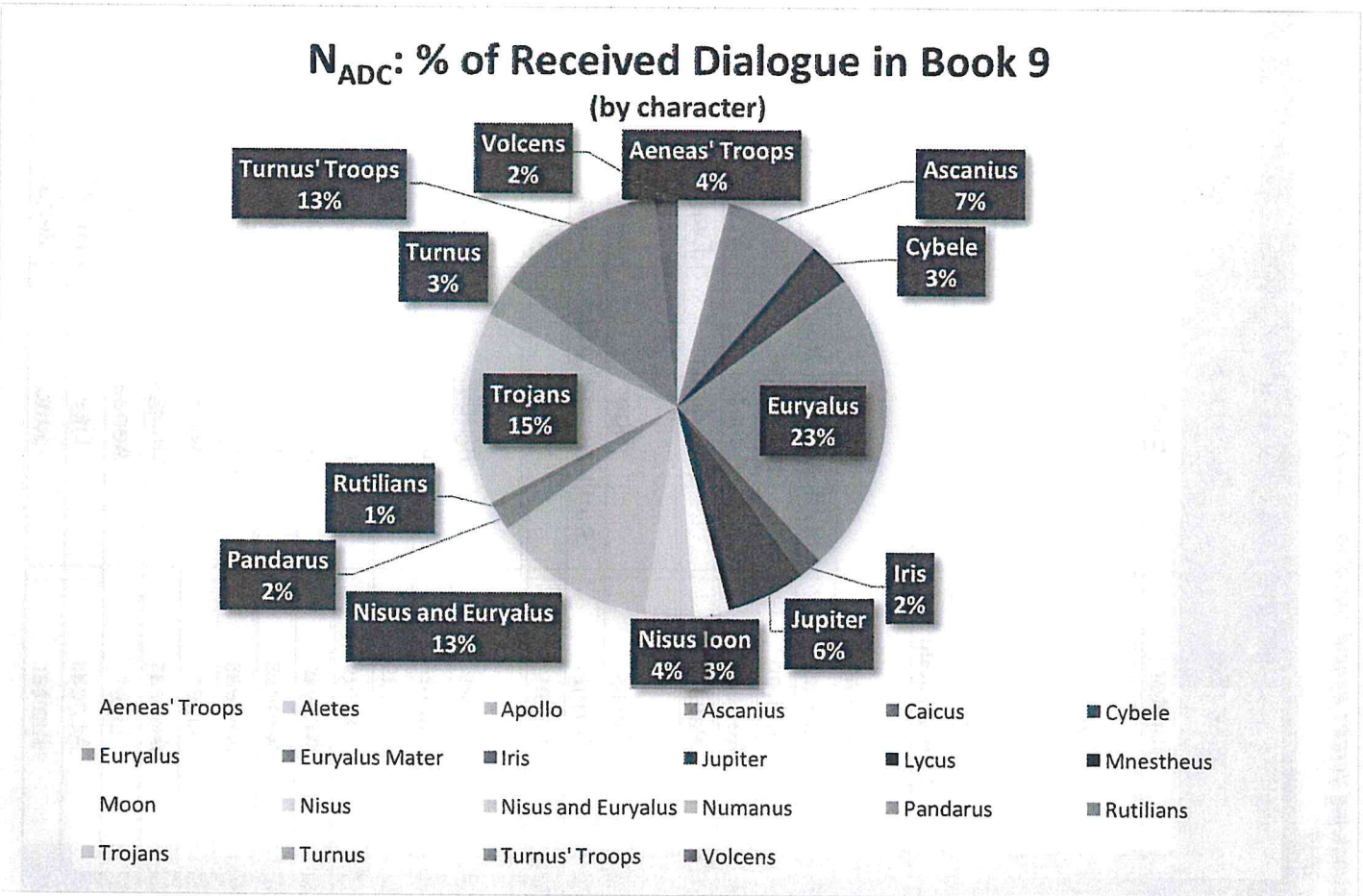
Book 9: Conversation Matrix

CHARACTERS	Aeneas' Troops	Aletes	Apollo	Ascanius	Caicus	Cybele	Euryalus	Euryali Mater	Iris	Jupiter	Lycus	Mnestheus	Moon	Nisus	Nisus and Euryalus	Numanus	Pandarus	Rutilians	Trojans	Turnus	Turnus' Troops	Volcens	TOTAL
Aeneas' Troops	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aletes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56	0	0	0	0	0	0	0	56
Apollo	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
Ascanius	0	0	0	0	0	0	46	0	0	34	0	0	0	0	152	0	0	0	0	0	12	0	244
Caicus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	17
Cybele	25	0	0	0	0	0	0	0	0	66	0	0	0	0	0	0	0	0	0	0	0	0	91
Euryalus	0	0	0	79	0	0	0	0	0	0	0	0	0	66	0	0	0	0	0	0	0	0	145
Euryali Mater	0	0	0	0	0	0	121	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	121
Iris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51	0	0	51
Jupiter	0	0	0	0	0	59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59
Lycus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mnestheus	43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43
Moon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nisus	0	0	0	0	0	0	230	0	0	0	0	0	47	0	0	0	0	0	72	0	0	31	380
Nisus and Euryalus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Numanus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	0	0	0	150
Pandarus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0	0	0	19
Rutilians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trojans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turnus	0	0	0	0	0	0	0	0	31	0	7	0	0	0	0	0	31	10	0	0	216	0	295
Turnus' Troops	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Volcens	0	0	0	0	0	0	9	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	21
TOTAL	68	0	0	129	0	59	406	0	31	100	7	0	47	66	220	0	31	10	258	51	228	31	1742

Book 9: Conversation Matrix (Normalized)

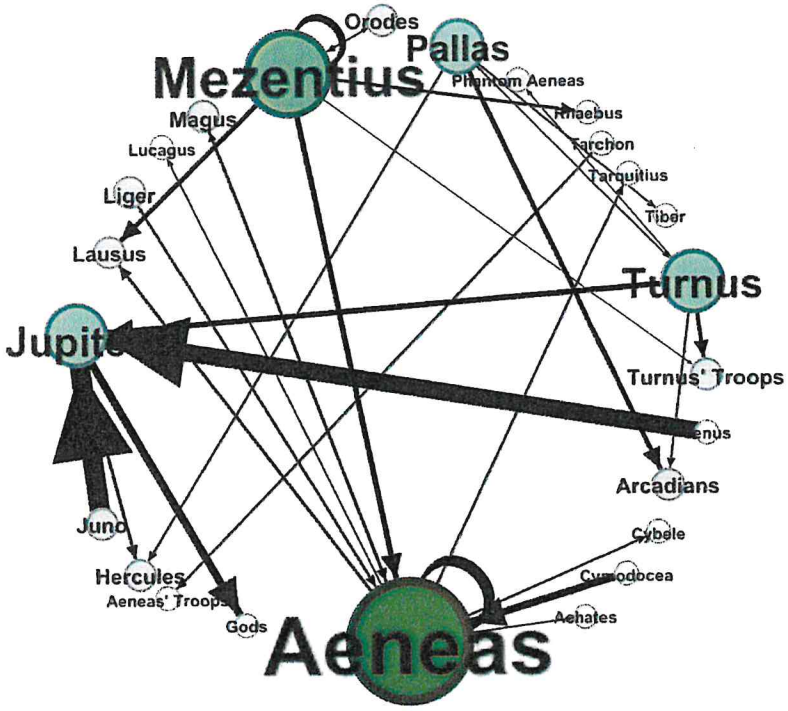
CHARACTERS	Aeneas' Troops	Aletes	Apollo	Ascanius	Caicus	Cybele	Euryalus	Euryali Mater	Iris	Jupiter	Lycus	Mnestheus	Moon	Nisus	Nisus and Euryalus	Numanus	Pandarus	Rutilians	Trojans	Turnus	Turnus' Troops	Volcens	TOTAL
Aeneas' Troops	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aletes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.21
Apollo	0.00	0.00	0.00	2.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.87
Ascanius	0.00	0.00	0.00	0.00	0.00	0.00	2.64	0.00	0.00	1.95	0.00	0.00	0.00	0.00	8.73	0.00	0.00	0.00	0.00	0.00	0.69	0.00	14.01
Caicus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.98
Cybele	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.22
Euryalus	0.00	0.00	0.00	4.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.32
Euryali Mater	0.00	0.00	0.00	0.00	0.00	0.00	6.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.95
Iris	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.93	0.00	0.00	2.93
Jupiter	0.00	0.00	0.00	0.00	0.00	3.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.39
Lycus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mnestheus	2.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.47
Moon	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nisus	0.00	0.00	0.00	0.00	0.00	0.00	13.20	0.00	0.00	0.00	0.00	0.00	2.70	0.00	0.00	0.00	0.00	0.00	4.13	0.00	0.00	1.78	21.81
Nisus and Euryalus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Numanus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.61	0.00	0.00	0.00	8.61
Pandarus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.09	0.00	0.00	0.00	1.09
Rutilians	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trojans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Turnus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.78	0.00	0.40	0.00	0.00	0.00	0.00	0.00	1.78	0.57	0.00	0.00	12.40	0.00	16.93
Turnus' Troops	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Volcens	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.21
TOTAL	3.90	0.00	0.00	7.41	0.00	3.39	23.31	0.00	1.78	5.74	0.40	0.00	2.70	3.79	12.63	0.00	1.78	0.57	14.81	2.93	13.09	1.78	100.00


N_{ADC}: % of Spoken Dialogue in Book 9
(by character)
Aletes 3%
Apollo 3%
Ascanius 14%
Caicus 1%
Cybele 5%
Euryalus 8%
Euryalus Mater 7%
Iris 3%
Jupiter 3%
Mnestheus 2%
Nisus 22%
Numanus 9%
Pandarus 1%
Turnus 17%
Volcens 1%
Aeneas' Troops
Aletes
Apollo
Ascanius
Caicus
Cybele
Euryalus
Euryalus Mater
Iris
Jupiter
Lycus
Mnestheus
Moon
Nisus
Nisus and Euryalus
Numanus
Pandarus
Rutilians
Trojans
Turnus
Turnus' Troops
Volcens


N_{ADC}: % of Received Dialogue in Book 9
(by character)
Aeneas' Troops 4%
Ascanius 7%
Cybele 3%
Euryalus 23%
Iris 2%
Jupiter 6%
Nisus Ioon 4% 3%
Nisus and Euryalus 13%
Pandarus 2%
Rutilians 1%
Trojans 15%
Turnus 3%
Turnus' Troops 13%
Volcens 2%
Aeneas' Troops
Aletes
Apollo
Ascanius
Caicus
Cybele
Euryalus
Euryalus Mater
Iris
Jupiter
Lycus
Mnestheus
Moon
Nisus
Nisus and Euryalus
Numanus
Pandarus
Rutilians
Trojans
Turnus
Turnus' Troops
Volcens

BOOK 10							
	SPEAKER	RECEIVER	SUBJECT	WORDS	LINES	# OF LINES	TYPE
1	Jupiter	Gods	NONE	63	6-15	10.00	C51
2	Venus	Jupiter	Turnus, Aeneas, Tydeus, Diomedes, Aeolus, Iris, Allecto, Fortune, Ascanius	290	18-62	44.58	D5
3	Juno	Jupiter & Gods	Aeneas, Latinus, Cassandra, Juno, Iris, Turnus, Pilumnus, Venilia	229	36-95	32.58	L2
4	Jupiter	Gods	NONE	63	104-113	9.42	C52
5	Cymodocea	Aeneas	Turnus, Cybele, Ascanius, Vulcan	119	228-245	17.42	N22
6	Aeneas	Cybele		27	252-255	17.42	PRA20
7	Turnus	Rutilians and Latins	Mars, Fortune	37	279-284	4.00	35
8	Tarchon	"His" crew	NONE	29	294-298	6.00	C53
9	Aeneas	Achates	NONE	17	333-335	4.58	C54
10	Pallas	Arcadians	Evander	71	369-378	20.42	E6
11	Pallas	Tiber	Halaesus	22	421-423	10.00	PRA21
12	Turnus	Rutilians and Latins	Pallas	17	441-443	3.00	C55
13	Pallas	Turnus	Evander	17	449-451	2.58	T10
14	Pallas	Alcides	Alcides, Turnus	26	460-463	4.00	PRA22
15	Jupiter	Hercules	Sarpedon, Turnus	42	467-472	6.00	P38
16	Turnus	Pallas	NONE	7	481	1.00	T111
17	Turnus	Arcadians	Evander, Pallas, Aeneas	26	491-495	4.08	T12
18	Magus	Aeneas	Anchises, Iulus	40	524-529	6.00	P39
19	Aeneas	Magus	Turnus, Pallas, Anchises, Iulus	27	531-534	4.00	R22
20	Aeneas	Tarquitius	NONE	26	557-560	4.00	T13
21	Liger	Aeneas	Diomedes, Achilles	18	581-583	2.42	T14
22	Aeneas	Lucagus	NONE	19	592-594	2.67	T15
23	Liger	Aeneas	Anchises, Venus	16	597-598	2.00	P40
24	Aeneas	Liger	NONE	11	599-600	1.42	T16
25	Jupiter	Juno	Venus	26	60-610	4.00	T17

26	Juno	Jupiter	Turnus, Daunus, Pilumnus	**69**	611-620	9.58	P41
27	Jupiter	Juno	Turnus	**39**	622-627	6.00	R23
28	Juno	Jupiter	Turnus	**38**	628-632	4.58	P42
29	Turnus	Phantom Aeneas	Lavinia	**14**	649-650	2.00	T18
30	Turnus	Jupiter (Winds)	Rumor	**87**	668-679	12.00	A6
31	Mezentius	Rutilians and Latins--Turnus'Troops	Orodes	**8**	737	10.00	T19
32	Orodes	Mezentius	NONE	**22**	739-741	2.58	O24
33	Mezentius	Orodes	Jupiter	**11**	743-744	1.17	T20
34	Mezentius	NONE	Lausus	**21**	773-776	3.25	PRA23
35	Aeneas	Mezentius	NONE	**11**	811-812	1.67	T21
36	Aeneas	Lausus	NONE	**41**	825-830	5.67	A7
37	Mezentius	Lausus	NONE	**69**	846-856	10.25	A8
38	Mezentius	Rhaebus, horse	Aeneas, Lausus	**44**	861-866	6.00	A9
39	Aeneas	Aeneas	Apollo	**11**	875-876	2.00	T22
40	Mezentius	Aeneas	Lausus	**30**	878-882	4.00	T23
41	Aeneas	Mezentius	NONE	**9**	897-898	1.17	T24
42	Mezentius	Aeneas	Lausus	**52**	900-906	7.00	P43

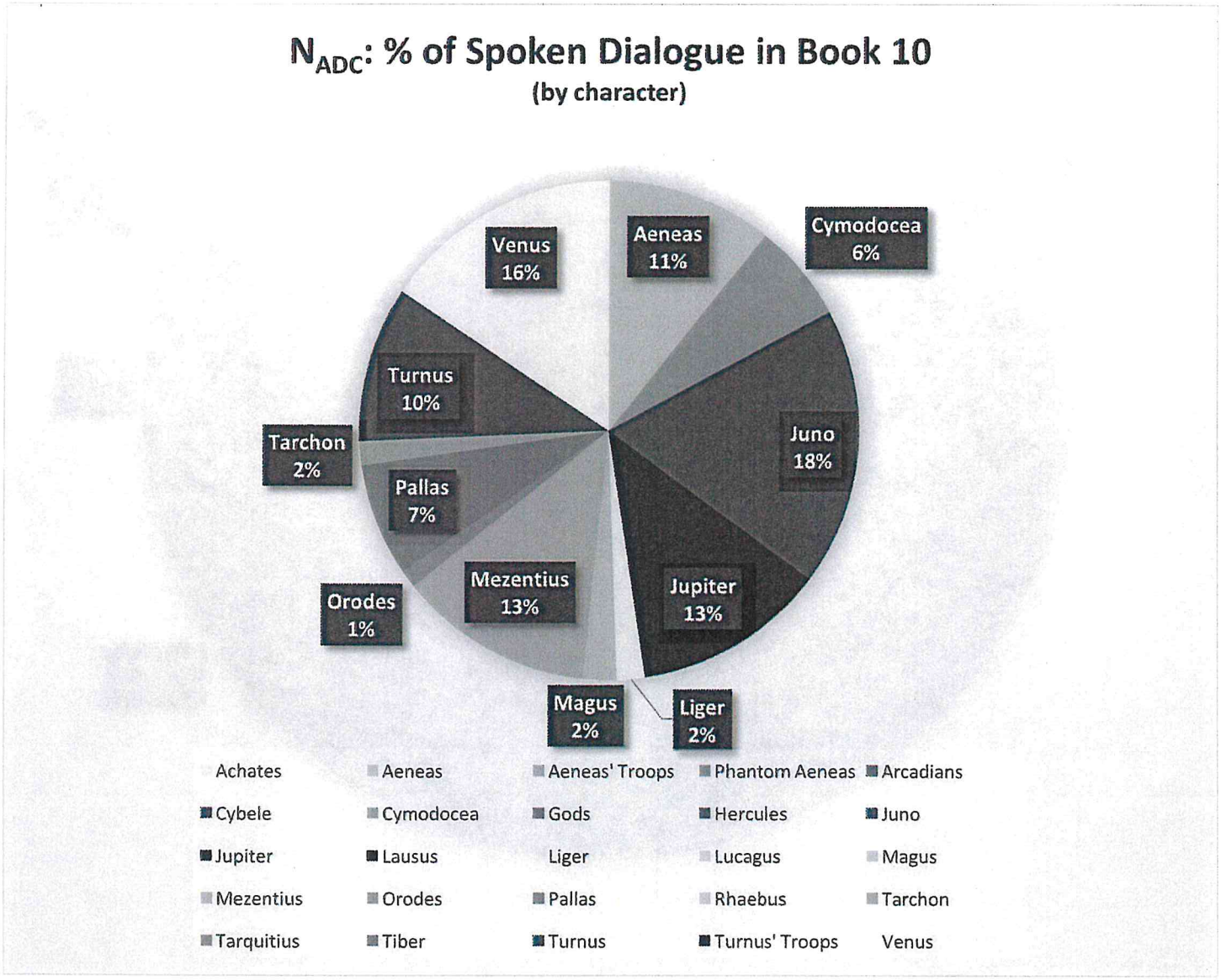


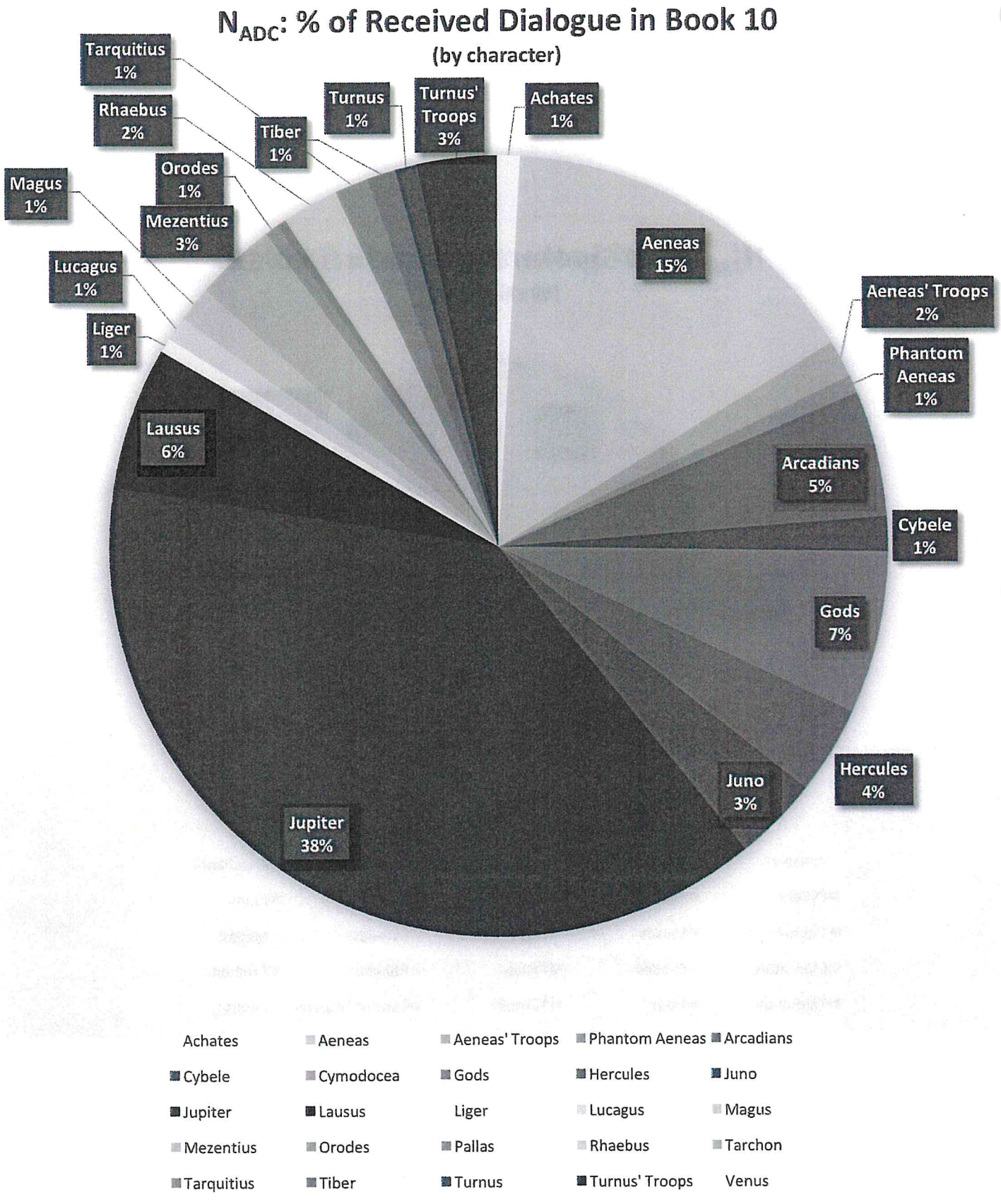
Book 10: Conversation Matrix

CHARACTERS	Achates	Aeneas	Aeneas' Troops	Phantom Aeneas	Arcadians	Cybele	Cymodocea	Gods	Hercules	Juno	Jupiter	Lausus	Liger	Lucagus	Magus	Mezentius	Orodes	Pallas	Rhaebus	Tarchon	Tarquitius	Tiber	Turnus	Turnus' Troops	Venus	TOTAL	%
Achates	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Aeneas	17	11	0	0	0	27	0	0	0	0	0	41	11	19	27	20	0	0	0	0	25	0	0	0	0	199	10.69
Aeneas' Troops	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Phantom Aeneas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Arcadians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Cybele	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Cymodocea	0	119	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	119	6.39
Gods	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Hercules	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Juno	0	0	0	0	0	0	0	0	0	336	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	336	18.05
Jupiter	0	0	0	0	0	0	0	126	42	65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	233	12.52
Lausus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Liger	0	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	1.83
Lucagus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Magus	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	2.15
Mezentius	0	82	0	0	0	0	0	0	0	0	69	0	0	0	0	21	11	0	44	0	0	0	8	0	235	12.63
Orodes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0	22	1.18
Pallas	0	0	0	0	71	0	0	0	26	0	0	0	0	0	0	0	0	0	0	0	0	22	17	0	136	7.31
Rhaebus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Tarchon	0	0	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	1.56
Tarquitius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Tiber	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Turnus	0	0	0	14	26	0	0	0	0	0	87	0	0	0	0	0	0	7	0	0	0	0	54	0	188	10.10
Turnus' Troops	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Venus	0	0	0	0	0	0	0	0	0	0	290	0	0	0	0	0	0	0	0	0	0	0	0	0	290	15.58
TOTAL	17	286	29	14	97	27	0	126	68	65	713	110	11	19	27	63	11	7	44	0	25	22	17	62	0	1861	100.00
%	0.91	15.37	1.56	0.75	5.21	1.45	0.00	6.77	3.65	3.49	38.31	5.91	0.59	1.02	1.45	3.39	0.59	0.38	2.36	0.00	1.40	1.18	0.91	3.33	0.00	100.00	

Book 10: Conversation Matrix (Noramlized)

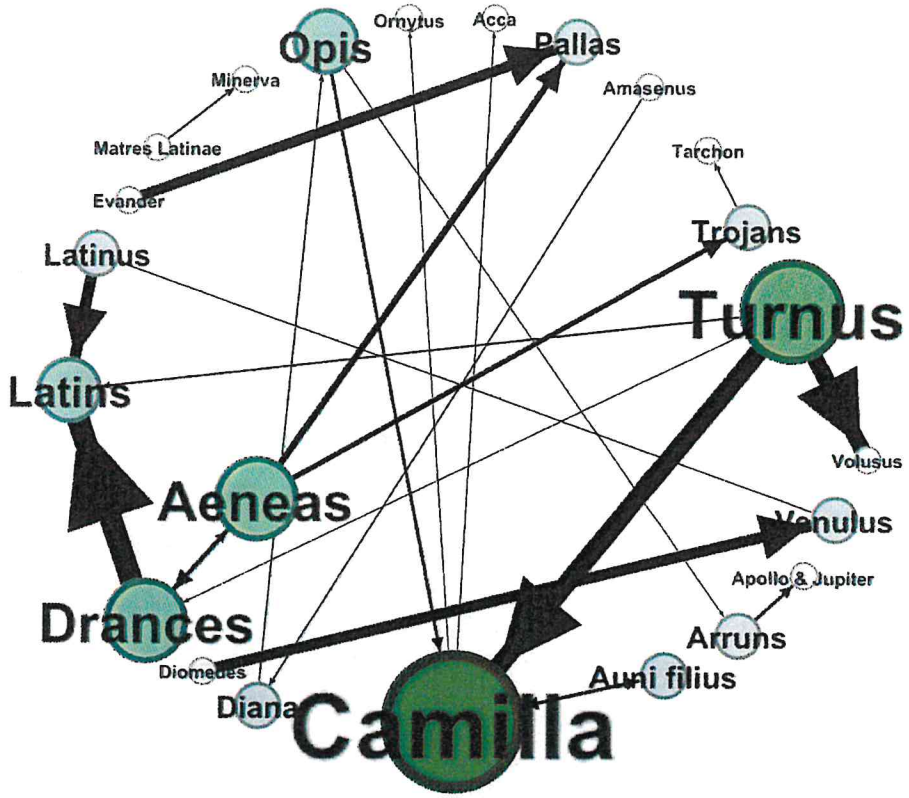
CHARACTERS	Achates	Aeneas	Aeneas' Troops	Phantom Aeneas	Arcadians	Cybele	Cymodocea	Gods	Hercules	Juno	Jupiter	Lausus	Liger	Lucagus	Magus	Mezentius	Orodes	Pallas	Rhaebus	Tarchon	Tarquitius	Tiber	Turnus	Turnus' Troops	Venus	TOTAL
Achates	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aeneas	0.91	0.59	0.00	0.00	0.00	1.45	0.00	0.00	0.00	0.00	0.00	2.20	0.59	1.02	1.45	1.07	0.00	0.00	0.00	0.00	1.40	0.00	0.00	0.00	0.00	10.69
Aeneas' Troops	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phantom Aeneas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arcadians	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cybele	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cymodocea	0.00	6.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.39
Gods	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hercules	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Juno	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.05
Jupiter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.77	2.26	3.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.52
Lausus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Liger	0.00	1.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.83
Lucagus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Magus	0.00	2.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.15
Mezentius	0.00	4.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.71	0.00	0.00	0.00	0.00	1.13	0.59	0.00	2.36	0.00	0.00	0.00	0.43	0.00	0.00	12.63
Orodes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.18
Pallas	0.00	0.00	0.00	0.00	3.82	0.00	0.00	0.00	1.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.18	0.91	0.00	7.31
Rhaebus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tarchon	0.00	0.00	1.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.56
Tarquitius	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tiber	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Turnus	0.00	0.00	0.00	0.75	1.40	0.00	0.00	0.00	0.00	0.00	4.67	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.00	0.00	0.00	0.00	2.90	0.00	0.00	10.10
Turnus' Troops	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Venus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.58
	0.91	15.37	1.56	0.75	5.21	1.45	0.00	6.77	3.65	3.49	38.31	5.91	0.59	1.02	1.45	3.39	0.59	0.38	2.36	0.00	1.40	1.18	0.91	3.33	0.00	100.00


N_{ADC}: % of Spoken Dialogue in Book 10
(by character)
Venus 16%
Aeneas 11%
Cymodocea 6%
Turnus 10%
Juno 18%
Tarchon 2%
Pallas 7%
Mezentius 13%
Jupiter 13%
Orodes 1%
Magus 2%
Liger 2%
Achates
Aeneas
Aeneas' Troops
Phantom Aeneas
Arcadians
Cybele
Cymodocea
Gods
Hercules
Juno
Jupiter
Lausus
Liger
Lucagus
Magus
Mezentius
Orodes
Pallas
Rhaebus
Tarchon
Tarquitius
Tiber
Turnus
Turnus' Troops
Venus


N_{ADC}: % of Received Dialogue in Book 10
(by character)
Tarquitius 1%
Rhaebus 2%
Tiber 1%
Turnus 1%
Turnus' Troops 3%
Achates 1%
Orodes 1%
Magus 1%
Mezentius 3%
Lucagus 1%
Liger 1%
Aeneas 15%
Aeneas' Troops 2%
Phantom Aeneas 1%
Lausus 6%
Arcadians 5%
Cybele 1%
Gods 7%
Hercules 4%
Juno 3%
Jupiter 38%
Achates
Aeneas
Aeneas' Troops
Phantom Aeneas
Arcadians
Cybele
Cymodocea
Gods
Hercules
Juno
Jupiter
Lausus
Liger
Lucagus
Magus
Mezentius
Orodes
Pallas
Rhaebus
Tarchon
Tarquitius
Tiber
Turnus
Turnus' Troops
Venus

BOOK 11							
	SPEAKER	RECEIVER	SUBJECT	WORDS	LINES	# OF LINES	TYPE
1	Aeneas	Trojans (officers)	Mezentius, Evander, Pallas	99	14-28	14.92	C56
2	Aeneas	Pallas	Fortune, Evander, Iulus	111	42-58	16.83	A10
3	Aeneas	Pallas	NONE	17	96-98	2.42	F6
4	Aeneas	Drances	Turnus	82	108-119	12.00	R24
5	Drances	Aeneas	Latinus, Tunus	50	124-131	7.75	R25
6	Evander	Pallas	Mars, Pallas, Aeneas, Turnus	211	152-181	30.00	A11
7	Venulus	**Latinus and** Latins	Diomedes, Saturn, Priam, Minerva, Menelaus, Atreus, Ulysses, Diomedes, Neoptolemus, Idomeneus, Venus, Teucer, Aeneas, Hector	332	243-295	53.00	N23
8	Diomedes	Venulus	Saturn, Priam, Minerva, Menelaus, Atreus, Ulysses, Neoptolemus, Idomeneus, Venus, Teucer, Aeneas, Hector	223	252-293	42.00	D6
9	Latinus	Latins	NONE	223	302-335	34.00	D7
10	Drances	Latins and Latinus	Dardanus, Lavinia, Aeneas, Turnus	455	343-375	33.00	D8
11	Turnus	**Drances** & Latinus	Evander, Bitias, Pandarus, Tydeus, Diomedes, Achilles, Fortune, Messapus, Tolumnius, Camilla, Victory, Achilles, Vulcan, Lavinia	18	378-444	66.00	D9
12	Turnus	**Latins** and Latinus	NONE	34	459-461	1.92	T25
13	Turnus	Volusus (and officers)	NONE	19	463-467	4.92	C57
14	Matres Latinae	Minerva	NONE	35	483-485	3.00	PRA24
15	Camilla	Turnus	Aeneas	77	502-506	5.00	P44
16	Turnus	Camilla	Aeneas, Rumor, Messapus, Tiburtus	381	508-519	12.00	C58
17	Diana	Opis	Camilla, Diana, Metabus, Casmilla, Trivia	25	535-594	59.75	N24
18	Amasenus	Diana	Latona, Diana	27	557-560	4.00	PRA25
19	Camilla	Ornytus	NONE	18	686-689	4.00	T26
20	Auni filius	Camilla	NONE	65	705-708	3.75	T27
21	Camilla	Auni filius	Aunus	59	715-717	3.00	T28

22	Tarchon	Tarchon	NONE	27	732-740	9.00	E7
23	Arruns	Apollo, Jupiter	NONE	56	785-793	9.00	PRA26
24	Camilla	Acca	Turnus	19	825-827	4.25	F7
25	Opis	Camilla	Diana	56	841-849	8.42	A12
26	Opis	Arruns	Camilla, Diana	19	855-857	2.83	T29

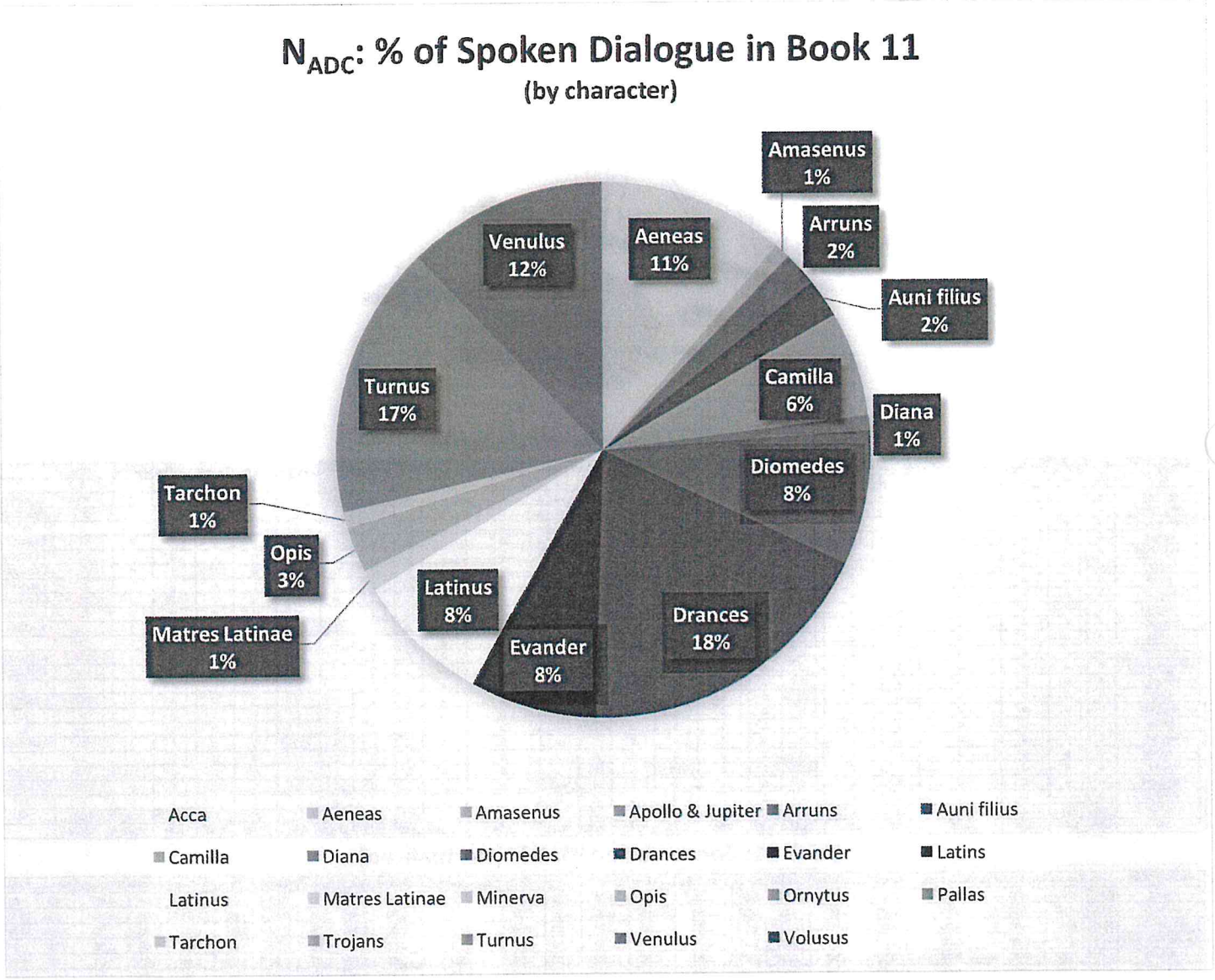


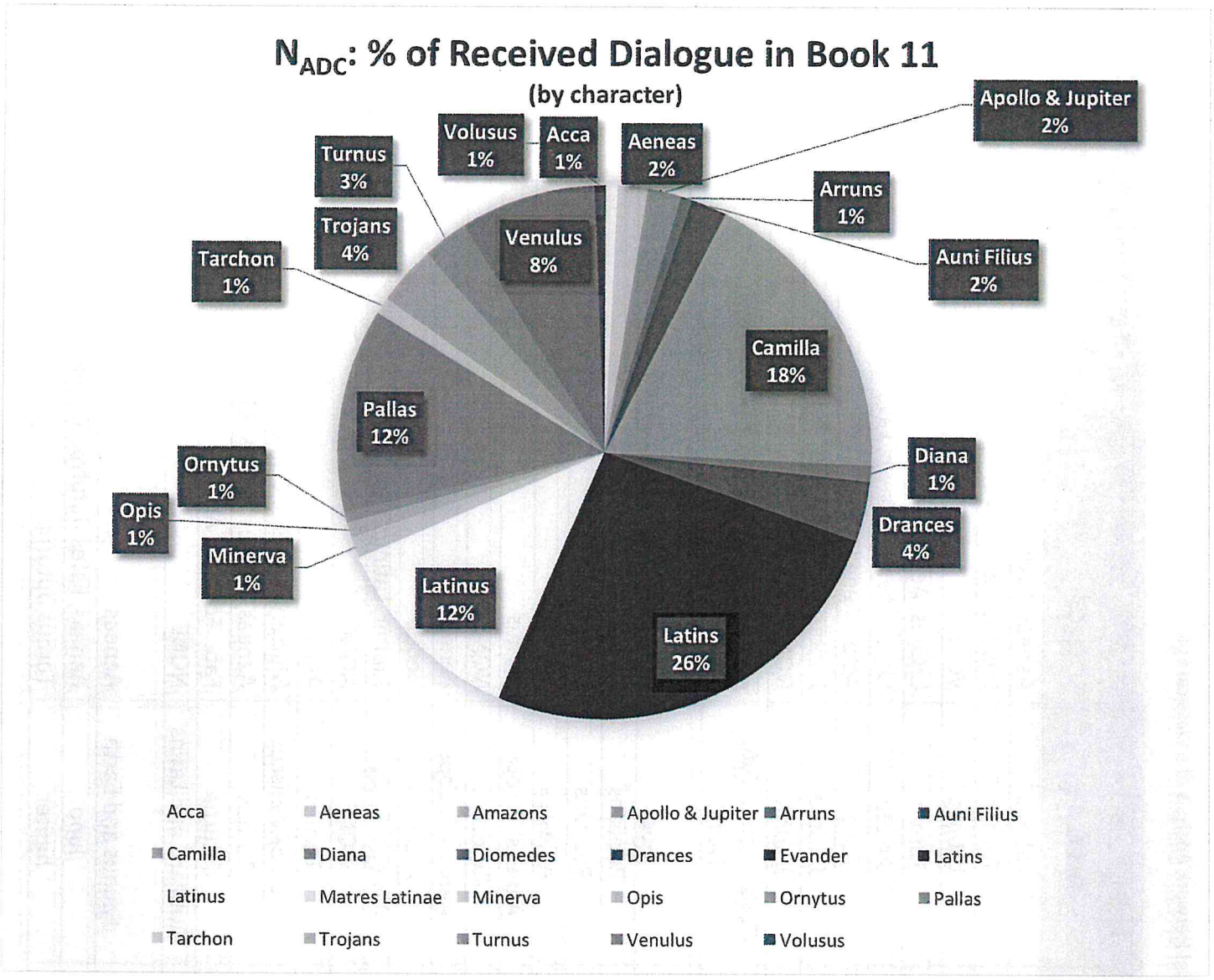
Book 11: Conversation Matrix

CHARACTERS	Acca	Aeneas	Amazons	Apollo & Jupiter	Arruns	Auni Filius	Camilla	Diana	Diomedes	Drances	Evander	Latins	Latinus	Matres Latinae	Minerva	Opis	Ornytus	Pallas	Tarchon	Trojans	Turnus	Venulus	Volusus	TOTAL	%
Acca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aeneas	0	0	0	0	0	0	0	0	0	82	0	0	0	0	0	0	0	128	0	99	0	0	0	309	11.28561
Amasenus	0	0	0	0	0	0	0	27	0	0	0	0	0	0	0		0	0	0	0	0	0	0	27	0.9861213
Apollo & Jupiter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arruns	0	0	0	56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56	2.0452885
Auni filius	0	0	0	0	0	0	65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65	2.3739956
Camilla	19	0	0	0	0	59	0	0	0	0	0	0	0	0	0	0	18	0	0	0	77	0	0	173	6.3184806
Diana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	25	0.9130752
Diomedes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	223	0	0	223	8.1446311
Drances	0	50	0	0	0	0	0	0	0	0	0	455	0	0	0	0	0	0	0	0	0	0	0	505	18.44412
Evander	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	211	0	0	0	0	0	211	7.706355
Latins	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Latinus	0	0	0	0	0	0	0	0	0	0	0	223	0	0	0	0	0	0	0	0	0	0	0	223	8.1446311
Matres Latinae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	0	0	0	0	0	0	0	0	35	1.2783053
Minerva	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Opis	0	0	0	0	19	0	56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	2.7392257
Ornytus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pallas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tarchon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	0	0	0	0	27	0.9861213
Trojans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turnus	0	0	0	0	0	0	381	0	0	18	0	34	0	0	0	0	0	0	0	0	0	0	19	452	16.5084
Venulus	0	0	0	0	0	0	0	0	0	0	0	0	332	0	0	0	0	0	0	0	0	0	0	332	12.125639
Volusus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	19	50	0	56	19	59	502	27	0	100	0	712	332	0	35	25	18	339	27	99	77	223	19	2738	100
%	0.69	1.83	0.00	2.05	0.69	2.15	18.33	0.99	0.00	3.65	0.00	26.00	12.13	0.00	1.28	0.91	0.66	12.38	0.99	3.62	2.81	8.14	0.69	100.00	

Book 11: Conversation Matrix (Normalized)

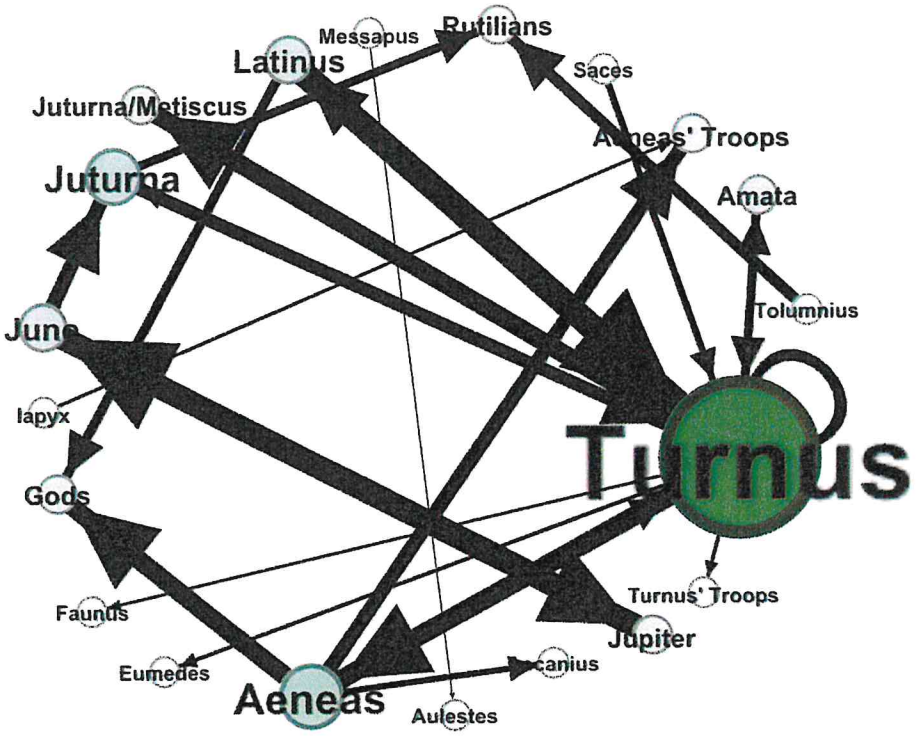
CHARACTERS	Acca	Aeneas	Amazons	Apollo & Jupiter	Arruns	Auni Filius	Camilla	Diana	Diomedes	Drances	Evander	Latins	Latinus	Matres Latinae	Minerva	Opis	Ornytus	Pallas	Tarchon	Trojans	Turnus	Venulus	Volusus	TOTAL
Acca	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aeneas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.67	0.00	3.62	0.00	0.00	0.00	11.29
Amasenus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99
Apollo & Jupiter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arruns	0.00	0.00	0.00	2.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.05
Auni filius	0.00	0.00	0.00	0.00	0.00	0.00	2.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.37
Camilla	0.69	0.00	0.00	0.00	0.00	2.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.66	0.00	0.00	0.00	2.81	0.00	0.00	6.32
Diana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91
Diomedes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.14	0.00	0.00	8.14
Drances	0.00	1.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.44
Evander	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.71	0.00	0.00	0.00	0.00	0.00	7.71
Latins	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Latinus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.14
Matres Latinae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.28
Minerva	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Opis	0.00	0.00	0.00	0.00	0.69	0.00	2.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.74
Ornytus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pallas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tarchon	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.99
Trojans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Turnus	0.00	0.00	0.00	0.00	0.00	0.00	13.92	0.00	0.00	0.66	0.00	1.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69	16.51
Venulus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.13
Volusus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	0.69	1.83	0.00	2.05	0.69	2.15	18.33	0.99	0.00	3.65	0.00	26.00	12.13	0.00	1.28	0.91	0.66	12.38	0.99	3.62	2.81	8.14	0.69	100.00


N_{ADC}: % of Spoken Dialogue in Book 11
(by character)
Amasenus 1%
Arruns 2%
Auni filius 2%
Camilla 6%
Diana 1%
Diomedes 8%
Drances 18%
Evander 8%
Latinus 8%
Matres Latinae 1%
Opis 3%
Tarchon 1%
Turnus 17%
Venulus 12%
Aeneas 11%
Acca
Aeneas
Amasenus
Apollo & Jupiter
Arruns
Auni filius
Camilla
Diana
Diomedes
Drances
Evander
Latins
Latinus
Matres Latinae
Minerva
Opis
Ornytus
Pallas
Tarchon
Trojans
Turnus
Venulus
Volusus


N_{ADC}: % of Received Dialogue in Book 11
(by character)
Apollo & Jupiter 2%
Aeneas 2%
Acca 1%
Volusus 1%
Turnus 3%
Arruns 1%
Trojans 4%
Venulus 8%
Auni Filius 2%
Tarchon 1%
Camilla 18%
Pallas 12%
Diana 1%
Ornytus 1%
Drances 4%
Opis 1%
Minerva 1%
Latinus 12%
Latins 26%
Acca
Aeneas
Amazons
Apollo & Jupiter
Arruns
Auni Filius
Camilla
Diana
Diomedes
Drances
Evander
Latins
Latinus
Matres Latinae
Minerva
Opis
Ornytus
Pallas
Tarchon
Trojans
Turnus
Venulus
Volusus

BOOK 12							
	SPEAKER	RECEIVER	SUBJECT	WORDS	LINES	# OF LINES	TYPE
1	Turnus	Latinus	Aeneas, Lavinia	46	11-17	7	C59
2	Latinus	Turnus	Daunus, Lavinia, Fortune	178	19-45	26.17	D10
3	Turnus	Latinus	Venus	46	48-53	6.00	R26
4	Amata	Turnus	Latinus, Aeneas	59	56-63	8.00	P45
5	Turnus	Amata	Idmon, Aeneas, Dawn, Lavinia	60	72-80	9.00	R27
6	Turnus	Spear	Actor, Aeneas	38	95-100	5.75	A13
7	Juno	Juturna	Jupiter, Fortune, Fates, Turnus	79	142-153	12.00	P46
8	Juno	Juturna	NONE	22	156-159	2.83	C60
9	Aeneas	Gods (Jupiter, Juno, Mars)	Turnus, Evander, Iulus, Victory, Mars, Latinus, Lavinia	130	176-194	19.00	PRA27
10	Latinus	Gods	Aeneas, Latona, Apollo, Diana, Janus, Dis	66	197-211	14.25	PRA28
11	Juturna	Rutilians	Turnus	61	229-237	9.00	E8
12	Tolumnius	Rutilians	NONE	47	259-265	6.83	E9
13	Messapus	Aulestes	Aulestes	8	296	1.00	T30
14	Aeneas	Aeneas' Troops	Turnus	37	313-317	5.00	C61
15	Turnus	Eumedes	NONE	27	359-361	3.00	T31
16	Iapyx	Aeneas' Troops	Aeneas	22	425 + 427-429	3.75	C62
17	Aeneas	Ascanius	Hector	44	435-440	6.00	F8
18	Aeneas	Aeneas' Troops	Jupiter, Latinus, Turnus	63	565-573	9.00	C63
19	Turnus	NONE	NONE	14	620-621	2.00	Q20
20	Juturna/Metiscus	Turnus	Aeneas	36	625-630	5.42	P47
21	Turnus	Juturna/Metiscus	Murranus, Ufens, Drances, Shades	128	632-649	18.00	R28
22	Saces	Turnus	Aeneas, Latinus, Amata, Messapus, Atinas	80	653-664	12.00	N25
23	Turnus	Juturna	Fate, Fortune, Aeneas	38	676-680	5.00	P48
24	Turnus	Rutilians and Latins	NONE	23	693-695	3.00	C64
25	Turnus	Faunus and Earth	Aeneas	20	777-779	2.83	PRA29
26	Jupiter	Juno	Aeneas, Fates, Juturna, Turnus	94	793-806	13.58	C65
27	Juno	Jupiter	Turnus, Juturna	140	808-828	21.00	P49

28	Jupiter	Juno	Saturn	71	830-840	11.00	O25
29	Juturna	Turnus	Juturna, Jupiter	94	872-884	13.00	A14
30	Aeneas	Turnus	NONE	40	889-893	15.00	T32
31	Turnus	Aeneas	Jupiter	13	894-895	1.58	T33
32	Turnus	Aeneas	Anchises, Daunus, Lavinia	121	931-937	7.17	P50
33	Aeneas	Turnus	Pallas	19	946-949	2.75	R29

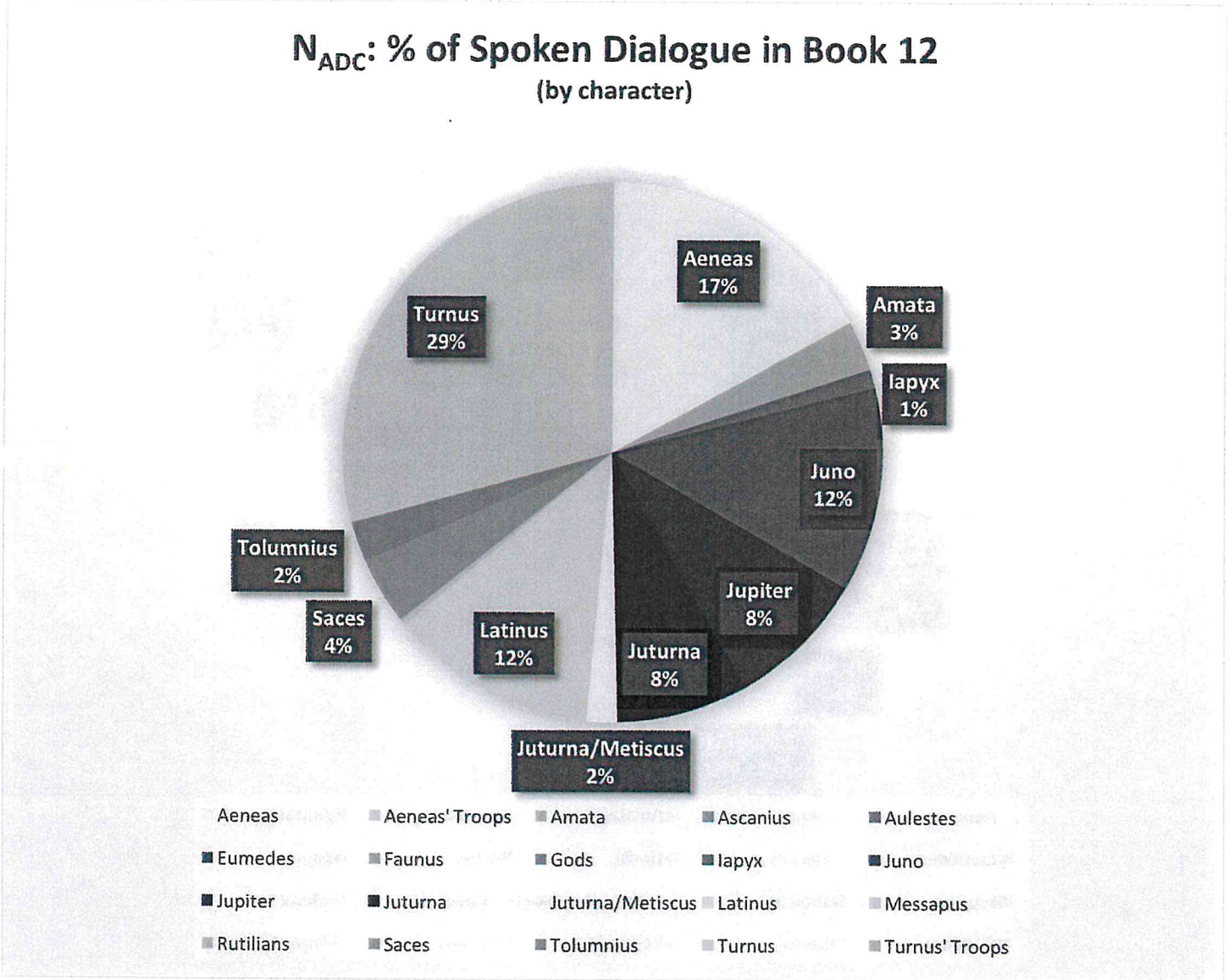


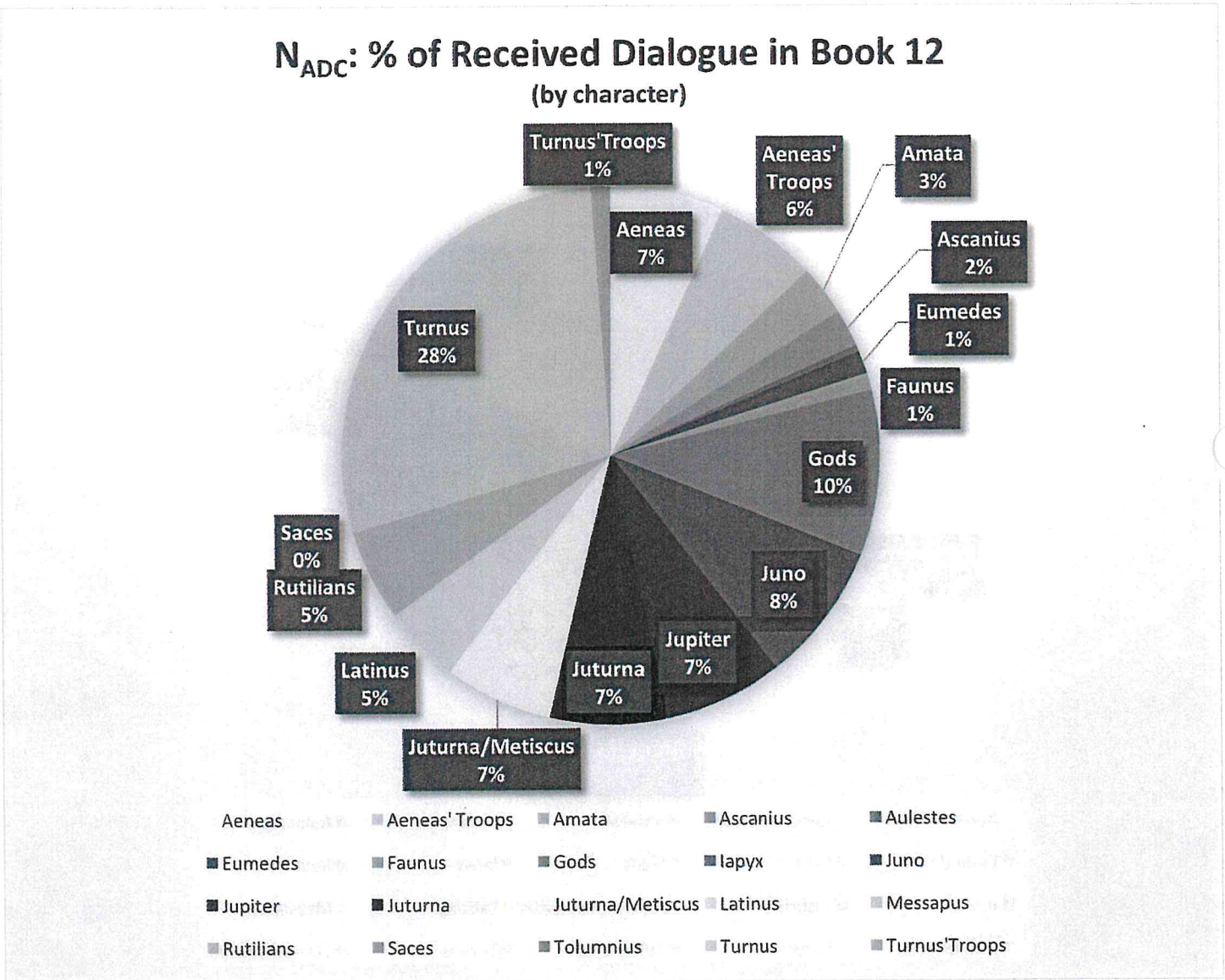
Book 12: Conversation Matrix

CHARACTERS	Aeneas	Aeneas' Troops	Amata	Ascanius	Aulestes	Eumedes	Faunus	Gods	Iapyx	Juno	Jupiter	Juturna	Juturna/Metiscus	Latinus	Messapus	Rutilians	Saces	Tolumnius	Turnus	Turnus' Troops	TOTAL	TOTAL
Aeneas	0	100	0	44	0	0	0	130	0	0	0	0	0	0	0	0	0	0	59	0	333	16.96
Aeneas' Troops	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Amata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59	0	59	3.00
Ascanius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Aulestes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Eumedes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Faunus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Gods	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Iapyx	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	1.12
Juno	0	0	0	0	0	0	0	0	0	140	101	0	0	0	0	0	0	0	0	0	241	12.27
Jupiter	0	0	0	0	0	0	0	0	0	165	0	0	0	0	0	0	0	0	0	0	165	8.40
Juturna	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61	0	0	94	0	155	7.89
Juturna/Metiscus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	0	36	1.83
Latinus	0	0	0	0	0	0	0	66	0	0	0	0	0	0	0	0	0	0	178	0	244	12.42
Messapus	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0.41
Rutilians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Saces	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	0	80	4.07
Tolumnius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47	0	0	0	0	47	2.39
Turnus	134	0	60	0	0	27	20	0	0	0	0	38	128	92	0	0	108	0	0	52	23	574	29.23
Turnus' Troops	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
TOTAL	134	122	60	44	8	27	20	196	0	165	140	139	128	92	0	108	0	0	558	23	1964	100.00
%	6.82	6.21	3.05	2.24	0.41	1.37	1.02	9.98	0.00	8.40	7.13	7.08	6.52	4.68	0.00	5.50	0.00	0.00	28.41	1.17	100.00	

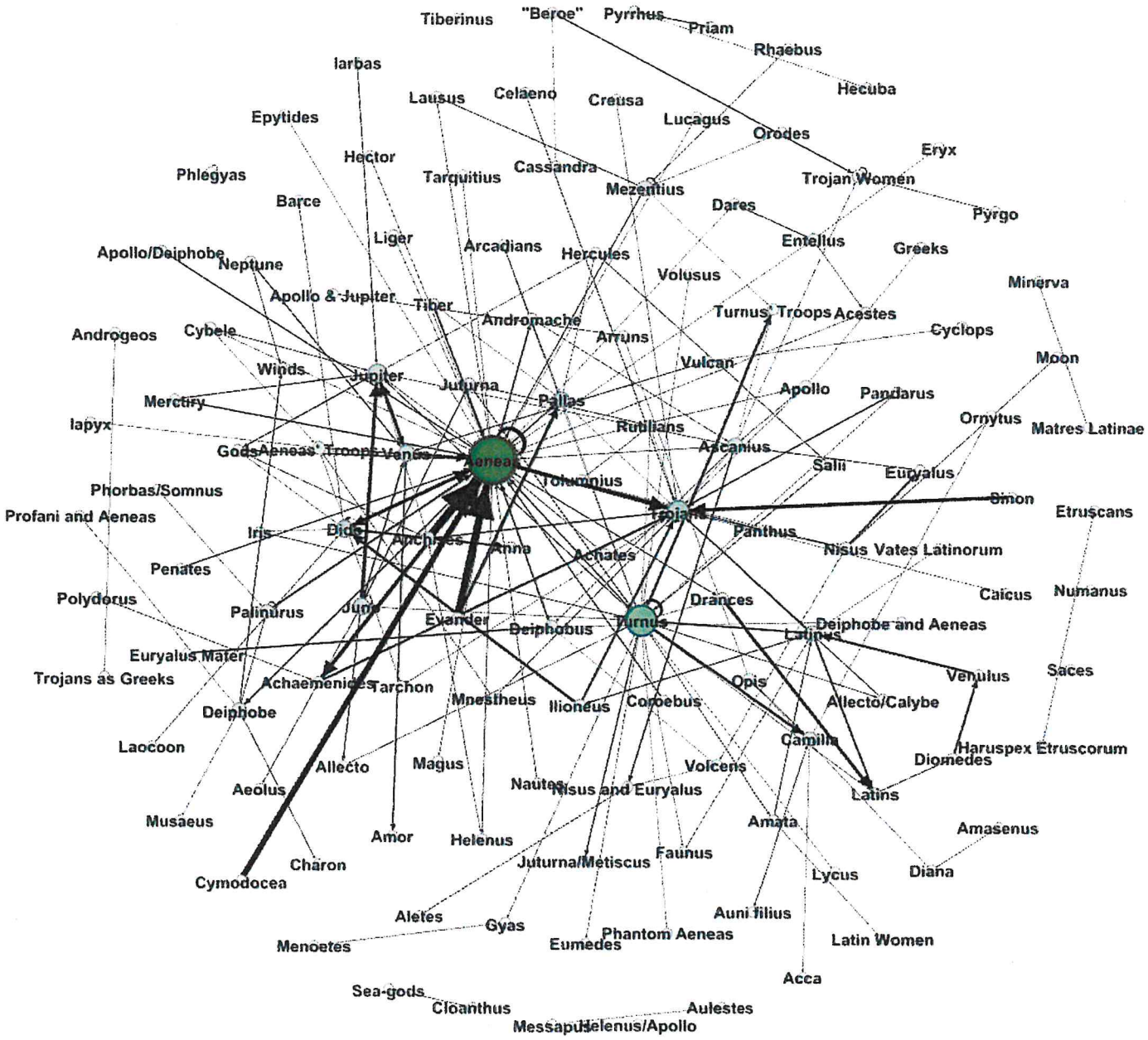
Book 12: Conversation Matrix

CHARACTERS	Aeneas	Aeneas' Troops	Amata	Ascanius	Aulestes	Eumedes	Faunus	Gods	Iapyx	Juno	Jupiter	Juturna	Juturna/Metiscus	Latinus	Messapus	Rutilians	Saces	Tolumnius	Turnus	Turnus' Troops	TOTAL
Aeneas	0.00	5.09	0.00	2.24	0.00	0.00	0.00	6.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00	16.96
Aeneas' Troops	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Amata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00	3.00
Ascanius	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aulestes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eumedes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Faunus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gods	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iapyx	0.00	1.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.12
Juno	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.13	5.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.27
Jupiter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.40
Juturna	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.11	0.00	0.00	4.79	0.00	7.89
Juturna/Metiscus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.83	0.00	1.83
Latinus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.06	0.00	12.42
Messapus	0.00	0.00	0.00	0.00	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41
Rutilians	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Saces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.07	0.00	4.07
Tolumnius	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.39	0.00	0.00	0.00	0.00	2.39
Turnus	6.82	0.00	3.05	0.00	0.00	1.37	1.02	0.00	0.00	0.00	0.00	1.93	6.52	4.68	0.00	0.00	0.00	0.00	2.65	1.17	29.23
Turnus' Troops	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	6.82	6.21	3.05	2.24	0.41	1.37	1.02	9.98	0.00	8.40	7.13	7.08	6.52	4.68	0.00	5.50	0.00	0.00	28.41	1.17	100.00


N_{ADC}: % of Spoken Dialogue in Book 12
(by character)
Aeneas 17%
Amata 3%
Iapyx 1%
Juno 12%
Jupiter 8%
Juturna 8%
Juturna/Metiscus 2%
Latinus 12%
Saces 4%
Tolumnius 2%
Turnus 29%
Aeneas
Aeneas' Troops
Amata
Ascanius
Aulestes
Eumedes
Faunus
Gods
Iapyx
Juno
Jupiter
Juturna
Juturna/Metiscus
Latinus
Messapus
Rutilians
Saces
Tolumnius
Turnus
Turnus' Troops


N_{ADC}: % of Received Dialogue in Book 12
(by character)
Turnus'Troops 1%
Aeneas' Troops 6%
Amata 3%
Aeneas 7%
Ascanius 2%
Eumedes 1%
Turnus 28%
Faunus 1%
Gods 10%
Saces 0%
Rutilians 5%
Juno 8%
Jupiter 7%
Latinus 5%
Juturna 7%
Juturna/Metiscus 7%
Aeneas
Aeneas' Troops
Amata
Ascanius
Aulestes
Eumedes
Faunus
Gods
Iapyx
Juno
Jupiter
Juturna
Juturna/Metiscus
Latinus
Messapus
Rutilians
Saces
Tolumnius
Turnus
Turnus'Troops

Static Conversational Network



Appendix 2: Dynamic Conversational Network Metrics

Book 1													
Character	**Weight**	**In-Degree**	**Out-Degree**	**Degree**	**Weighted In-Degree**	**Weighted Out-Degree**	**Weighted Degree**	**Eccentricity**	**Eigenvector Centrality**	**Pageranks**	**Betweenness Centrality**	**Closeness Centrality**	**Clustering Coefficient**
Achates	1.31	1.00	1.00	2.00	1.50	1.12	2.62	3.00	0.41	0.05	0.00	0.42	0.00
Aeneas	22.12	4.00	5.00	9.00	24.21	20.03	44.24	2.00	1.00	0.17	37.00	0.67	0.35
Aeolus	1.96	1.00	1.00	2.00	2.62	1.29	3.91	6.00	0.02	0.06	0.00	0.24	0.00
Amor	3.59	1.00	0.00	1.00	7.18	0.00	7.18	0.00	0.21	0.05	0.00	0.00	0.00
Dido	16.92	2.00	3.00	5.00	22.10	11.74	33.84	3.00	0.52	0.14	29.00	0.53	0.00
Gods	0.71	1.00	0.00	1.00	1.42	0.00	1.42	0.00	0.22	0.07	0.00	0.00	0.00
Ilioneus	10.71	2.00	1.00	3.00	8.21	16.64	24.85	4.00	0.24	0.10	16.00	0.36	0.00
Juno	5.40	1.00	2.00	3.00	1.29	6.06	7.35	5.00	0.02	0.08	9.00	0.31	0.00
Jupiter	9.01	1.00	1.00	2.00	6.96	11.05	18.01	4.00	0.21	0.05	0.00	0.36	0.00
Neptune	1.44	0.00	1.00	1.00	0.00	2.88	2.88	1.00	0.00	0.03	0.00	1.00	0.00
Trojans	1.42	1.00	0.00	1.00	2.84	0.00	2.84	0.00	0.41	0.05	0.00	0.00	0.00
Venus	23.99	2.00	3.00	5.00	18.79	29.19	47.98	3.00	0.50	0.10	19.00	0.53	0.00
Winds	1.44	1.00	0.00	1.00	2.88	0.00	2.88	0.00	0.00	0.05	0.00	0.00	0.00
Books 2													
Character	**Weight**	**In-Degree**	**Out-Degree**	**Degree**	**Weighted In-Degree**	**Weighted Out-Degree**	**Weighted Degree**	**Eccentricity**	**Eigenvector Centrality**	**Pageranks**	**Betweenness Centrality**	**Closeness Centrality**	**Clustering Coefficient**
Aeneas	26.41	6.00	5.00	11.00	27.35	19.72	47.07	2.00	1.00	0.16	25.00	0.75	0.21
Anchises	9.65	1.00	3.00	4.00	11.19	8.10	19.29	2.00	0.43	0.05	10.00	0.67	0.00
Androgeos	0.59	0.00	1.00	1.00	0.00	1.18	1.18	1.00	0.00	0.02	0.00	1.00	0.00

Apollo	0.56	0.00	1.00	1.00	0.00	1.12	1.12	1.00	0.00	0.02	0.00	1.00	0.00
Coroebus	0.89	0.00	1.00	1.00	0.00	1.78	1.78	3.00	0.00	0.02	0.00	0.47	0.00
Creusa	3.76	0.00	1.00	1.00	0.00	7.52	7.52	1.00	0.00	0.02	0.00	1.00	0.00
Dido	1.60	1.00	0.00	1.00	3.20	0.00	3.20	0.00	0.00	0.03	0.00	0.00	0.00
Gods	0.95	1.00	0.00	1.00	1.89	0.00	1.89	0.00	0.19	0.03	0.00	0.00	0.00
Greeks	0.56	1.00	0.00	1.00	1.12	0.00	1.12	0.00	0.00	0.03	0.00	0.00	0.00
Hector	2.10	1.00	1.00	2.00	1.78	2.43	4.21	3.00	0.43	0.05	0.00	0.46	0.00
Hecuba	0.38	0.00	1.00	1.00	0.00	0.77	0.77	2.00	0.00	0.02	0.00	0.67	0.00
Jupiter	0.65	1.00	0.00	1.00	1.30	0.00	1.30	0.00	0.19	0.03	0.00	0.00	0.00
Laocoon	1.60	0.00	1.00	1.00	0.00	3.20	3.20	1.00	0.00	0.02	0.00	1.00	0.00
Panthus	2.37	1.00	1.00	2.00	0.47	4.26	4.73	3.00	0.43	0.05	0.00	0.46	0.00
Priam	3.67	1.00	1.00	2.00	1.07	5.51	6.58	1.00	0.04	0.16	0.00	1.00	0.00
Pyrrhus	3.29	2.00	1.00	3.00	6.28	1.07	7.35	1.00	0.04	0.17	1.00	1.00	0.00
Sinon	16.61	0.00	1.00	1.00	0.00	33.21	33.21	1.00	0.00	0.02	0.00	1.00	0.00
Trojans	18.71	3.00	0.00	3.00	43.16	0.00	43.16	0.00	0.44	0.07	0.00	0.00	0.00
Trojans as Greeks	0.59	1.00	0.00	1.00	1.18	0.00	1.18	0.00	0.00	0.03	0.00	0.00	0.00
Venus	5.06	0.00	1.00	1.00	0.00	10.12	10.12	3.00	0.00	0.02	0.00	0.47	0.00

Book 3

Character	Weight	In-Degree	Out-Degree	Degree	Weighted In-Degree	Weighted Out-Degree	Weighted Degree	Eccentricity	Eigenvector Centrality	Pageranks	Betweenness Centrality	Closeness Centrality	Clustering Coefficient
Achaemenides	9.24	2.00	1.00	3.00	34.31	16.10	50.41	1.00	0.48	0.10	2.50	1.00	0.00
Aeneas	30.91	3.00	4.00	7.00	18.03	43.77	61.80	2.00	0.62	0.12	20.00	0.75	0.00
Anchises	7.14	1.00	3.00	4.00	2.55	11.73	14.28	3.00	0.35	0.07	8.00	0.57	0.00
Andromache	8.72	1.00	2.00	3.00	6.25	11.17	17.42	3.00	0.47	0.06	4.00	0.55	0.00
Apollo	1.91	1.00	1.00	2.00	1.99	1.83	3.82	1.00	0.47	0.06	1.50	1.00	0.00
Ascanius	1.16	1.00	0.00	1.00	2.32	0.00	2.32	0.00	0.35	0.07	0.00	0.00	0.00
Celaeno	1.85	0.00	1.00	1.00	0.00	3.71	3.71	1.00	0.00	0.04	0.00	1.00	0.00

Gods	0.66	1.00	0.00	1.00	1.33	0.00	1.33	0.00	0.26	0.06	0.00	0.00	0.00
Helenus	3.07	0.00	1.00	1.00	0.00	2.55	2.55	4.00	0.47	0.04	0.00	0.39	0.50
Helenus/Apollo	15.97	1.00	0.00	1.00	3.60	0.00	3.60	0.00	0.00	0.06	0.00	0.00	0.00
Penates	3.38	0.00	1.00	1.00	0.00	6.75	6.75	3.00	0.00	0.04	0.00	0.47	0.00
Polydorus	1.19	0.00	1.00	1.00	0.00	2.38	2.38	2.00	0.00	0.04	0.00	0.67	0.00
Trojans	14.80	4.00	0.00	4.00	29.61	0.00	29.61	0.00	1.00	0.23	0.00	0.00	0.00

Book 4

Character	Weight	In-Degree	Out-Degree	Degree	Weighted In-Degree	Weighted Out-Degree	Weighted Degree	Eccentricity	Eigenvector Centrality	Pageranks	Betweenness Centrality	Closeness Centrality	Clustering Coefficient
Aeneas	17.66	2.00	2.00	4.00	24.78	10.55	35.33	2.00	0.52	0.12	15.00	0.67	0.00
Anna	11.19	1.00	1.00	2.00	12.57	9.81	22.38	3.00	0.49	0.07	0.00	0.50	0.00
Barce	1.06	1.00	0.00	1.00	2.12	0.00	2.12	0.00	0.49	0.07	0.00	0.00	0.00
Dido	47.37	4.00	4.00	8.00	40.39	54.34	94.73	2.00	1.00	0.19	15.00	0.80	0.30
Iarbas	1.89	0.00	1.00	1.00	0.00	3.78	3.78	5.00	0.00	0.02	0.00	0.29	0.00
Iris	0.23	0.00	1.00	1.00	0.00	0.46	0.46	3.00	0.00	0.02	0.00	0.50	0.00
Juno	4.86	1.00	1.00	2.00	2.44	7.28	9.72	1.00	0.04	0.16	0.00	1.00	0.00
Jupiter	4.26	1.00	1.00	2.00	3.78	4.74	8.52	4.00	0.00	0.05	6.00	0.35	0.00
Mercury	5.67	1.00	1.00	2.00	4.74	6.59	11.33	3.00	0.02	0.06	10.00	0.45	0.00
Trojans	0.94	1.00	0.00	1.00	1.89	0.00	1.89	0.00	0.27	0.08	0.00	0.00	0.00
Venus	4.86	1.00	1.00	2.00	7.28	2.44	9.72	1.00	0.04	0.16	0.00	1.00	0.00

Book 5													
Character	Weight	In-Degree	Out-Degree	Degree	Weighted In-Degree	Weighted Out-Degree	Weighted Degree	Eccentricity	Eigenvector Centrality	Pageranks	Betweennes s Centrality	Closeness Centrality	Clustering Coefficient
Acestes	3.73	2.00	1.00	3.00	5.33	2.12	7.45	4.00	0.00	0.03	14.00	0.38	0.50
Aeneas	25.11	6.00	7.00	13.00	19.54	30.68	50.22	3.00	0.00	0.10	66.00	0.71	0.03
Anchises	4.79	1.00	1.00	2.00	2.38	7.20	9.58	4.00	0.00	0.02	0.00	0.43	0.00
Ascanius	0.74	0.00	1.00	1.00	0.00	1.48	1.48	1.00	0.00	0.01	0.00	1.00	0.00
"Beroe"	4.34	1.00	1.00	2.00	0.45	8.23	8.68	1.00	0.00	0.02	1.00	1.00	0.00
Cassandra	0.23	0.00	1.00	1.00	0.00	0.45	0.45	2.00	0.00	0.01	0.00	0.67	0.00
Cloanthus	0.96	0.00	1.00	1.00	0.00	1.93	1.93	1.00	0.00	0.01	0.00	1.00	0.00
Dares	3.50	2.00	1.00	3.00	5.79	1.22	7.01	4.00	0.00	0.03	0.00	0.43	0.50
Entellus	6.08	1.00	4.00	5.00	2.12	10.03	12.15	3.00	0.00	0.04	16.00	0.59	0.25
Epytides	0.74	1.00	0.00	1.00	1.48	0.00	1.48	0.00	0.00	0.02	0.00	0.00	0.00
Eryx	0.45	1.00	0.00	1.00	0.90	0.00	0.90	0.00	0.00	0.02	0.00	0.00	0.00
Gyas	0.80	0.00	1.00	1.00	0.00	1.61	1.61	1.00	0.00	0.01	0.00	1.00	0.00
Jupiter	1.32	1.00	0.00	1.00	2.64	0.00	2.64	0.00	0.00	0.02	0.00	0.00	0.00
Menoetes	0.80	1.00	0.00	1.00	1.61	0.00	1.61	0.00	0.00	0.02	0.00	0.00	0.00
Mnestheus	1.70	0.00	1.00	1.00	0.00	3.41	3.41	1.00	0.00	0.01	0.00	1.00	0.00
Nautes	2.15	0.00	1.00	1.00	0.00	4.31	4.31	4.00	0.00	0.01	0.00	0.44	0.00
Neptune	7.33	1.00	1.00	2.00	7.72	6.95	14.67	1.00	0.00	0.07	0.00	1.00	0.00
Nisus	0.84	0.00	1.00	1.00	0.00	1.67	1.67	4.00	0.00	0.01	0.00	0.44	0.00
Palinurus	5.79	3.00	3.00	6.00	5.59	5.97	11.56	4.00	0.00	0.07	16.00	0.48	0.67
Phorbas/Somnus	1.61	1.00	1.00	2.00	1.54	1.67	3.21	5.00	0.00	0.03	0.00	0.33	0.00
Pyrgo	1.41	0.00	1.00	1.00	0.00	2.83	2.83	1.00	0.00	0.01	0.00	1.00	0.00
Sea-gods	0.96	1.00	0.00	1.00	1.93	0.00	1.93	0.00	0.00	0.02	0.00	0.00	0.00
Trojan Women	6.78	4.00	1.00	5.00	13.05	0.51	13.56	0.00	0.00	0.30	0.00	0.00	0.25
Trojans	10.48	2.00	0.00	2.00	20.97	0.00	20.97	0.00	0.00	0.03	0.00	0.00	0.00
Venus	7.33	1.00	1.00	2.00	6.95	7.72	14.67	1.00	0.00	0.07	0.00	1.00	0.00

Book 6

Character	Weight	In-Degree	Out-Degree	Degree	Weighted In-Degree	Weighted Out-Degree	Weighted Degree	Eccentricity	Eigenvector Centrality	Pageranks	Betweenness Centrality	Closeness Centrality	Clustering Coefficient
Aeneas	44.54	5.00	8.00	13.00	69.73	19.34	89.07	2.00	1.00	0.18	50.00	0.71	0.21
Anchises	17.91	1.00	1.00	2.00	2.49	33.32	35.81	3.00	0.36	0.05	0.00	0.43	0.00
Apollo/Deiphobe	2.06	1.00	0.00	1.00	4.13	0.00	4.13	0.00	0.36	0.05	0.00	0.00	0.00
Charon	1.84	1.00	1.00	2.00	1.54	2.14	3.68	4.00	0.19	0.04	0.00	0.40	0.00
Deiphobe	20.65	3.00	6.00	9.00	8.50	32.78	41.28	3.00	0.50	0.12	38.00	0.63	0.07
Deiphobe and Aeneas	0.25	1.00	0.00	1.00	0.50	0.00	0.50	0.00	0.13	0.05	0.00	0.00	0.00
Deiphobus	3.92	1.00	2.00	3.00	1.92	5.92	7.84	3.00	0.36	0.05	6.00	0.46	0.00
Dido	1.28	1.00	0.00	1.00	2.55	0.00	2.55	0.00	0.36	0.05	0.00	0.00	0.00
Musaeus	0.76	1.00	1.00	2.00	0.63	0.88	1.51	4.00	0.19	0.04	0.00	0.40	0.00
Palinurus	4.17	2.00	1.00	3.00	2.96	5.39	8.35	3.00	0.55	0.06	0.00	0.43	1.00
Phlegyas	0.22	1.00	1.00	2.00	0.22	0.22	0.44	0.00	0.02	0.18	0.00	0.00	0.00
Profani and Aeneas	0.33	1.00	0.00	1.00	0.66	0.00	0.66	0.00	0.19	0.04	0.00	0.00	0.00
Trojans	1.65	1.00	0.00	1.00	3.31	0.00	3.31	0.00	0.19	0.04	0.00	0.00	0.00
Venus	0.43	1.00	0.00	1.00	0.85	0.00	0.85	0.00	0.36	0.05	0.00	0.00	0.00

Book 7

Character	Weight	In-Degree	Out-Degree	Degree	Weighted In-Degree	Weighted Out-Degree	Weighted Degree	Eccentricity	Eigenvector Centrality	Pageranks	Betweenness Centrality	Closeness Centrality	Clustering Coefficient
Aeneas	4.58	1.00	1.00	2.00	1.88	7.29	9.17	1.00	0.01	0.06	1.00	1.00	0.00
Allecto	6.24	2.00	0.00	2.00	12.47	0.00	12.47	0.00	1.00	0.09	0.00	0.00	0.50
Allecto/Calybe	5.67	1.00	1.00	2.00	4.21	7.14	11.35	1.00	0.17	0.05	1.00	1.00	0.00

Amata	4.40	0.00	2.00	2.00	0.00	8.79	8.79	3.00	0.00	0.03	0.00	0.47	0.00
Anchises	0.94	0.00	1.00	1.00	0.00	1.88	1.88	2.00	0.00	0.03	0.00	0.67	0.00
Ascanius	0.15	0.00	1.00	1.00	0.00	0.30	0.30	1.00	0.00	0.03	0.00	1.00	0.00
Faunus	1.47	0.00	1.00	1.00	0.00	2.93	2.93	3.00	0.00	0.03	0.00	0.44	0.00
Ilioneus	12.66	1.00	1.00	2.00	7.74	17.58	25.32	1.00	0.09	0.06	0.00	1.00	0.50
Juno	20.66	2.00	2.00	4.00	17.50	23.81	41.31	1.00	1.00	0.09	0.00	1.00	0.50
Latin Women	0.94	1.00	0.00	1.00	1.88	0.00	1.88	0.00	0.01	0.05	0.00	0.00	0.00
Latinus	14.88	3.00	3.00	6.00	10.89	18.86	29.75	2.00	0.03	0.11	18.00	0.67	0.03
Trojans	20.40	5.00	0.00	5.00	40.80	0.00	40.80	0.00	0.51	0.25	0.00	0.00	0.05
Turnus	6.50	1.00	3.00	4.00	2.63	10.37	13.00	2.00	0.09	0.06	12.00	0.80	0.08
Vates Latinorum	0.53	0.00	1.00	1.00	0.00	1.05	1.05	3.00	0.00	0.03	0.00	0.44	0.00

Book 8

Character	Weight	In-Degree	Out-Degree	Degree	Weighted In-Degree	Weighted Out-Degree	Weighted Degree	Eccentricity	Eigenvector Centrality	Pageranks	Betweenness Centrality	Closeness Centrality	Clustering Coefficient
Aeneas	39.83	4.00	3.00	7.00	65.84	13.82	79.66	2.00	1.00	0.24	14.00	0.80	0.08
Cyclops	0.63	1.00	0.00	1.00	1.27	0.00	1.27	0.00	0.05	0.05	0.00	0.00	0.00
Etruscans	0.63	1.00	0.00	1.00	1.27	0.00	1.27	0.00	0.01	0.06	0.00	0.00	0.00
Evander	36.51	1.00	2.00	3.00	10.30	62.72	73.02	2.00	0.52	0.10	0.00	0.67	1.00
Haruspex Etruscorum	0.63	0.00	1.00	1.00	0.00	1.27	1.27	1.00	0.00	0.03	0.00	1.00	0.00
Hercules	1.49	1.00	0.00	1.00	2.98	0.00	2.98	0.00	0.01	0.06	0.00	0.00	0.00
Pallas	4.86	2.00	2.00	4.00	8.31	1.40	9.71	2.00	0.80	0.14	5.00	0.67	0.33
Salii	1.49	0.00	1.00	1.00	0.00	2.98	2.98	1.00	0.00	0.03	0.00	1.00	0.00
Tiberinus	5.60	1.00	1.00	2.00	2.39	8.81	11.20	3.00	0.52	0.10	0.00	0.50	0.00
Trojans	0.41	1.00	0.00	1.00	0.81	0.00	0.81	0.00	0.41	0.09	0.00	0.00	0.00
Venus	3.86	1.00	2.00	3.00	3.07	4.65	7.72	3.00	0.05	0.05	5.00	0.54	0.00
Vulcan	4.04	1.00	2.00	3.00	3.75	4.34	8.09	4.00	0.05	0.05	1.00	0.41	0.00

Book 9													
Character	Weight	In-Degree	Out-Degree	Degree	Weighted In-Degree	Weighted Out-Degree	Weighted Degree	Eccentricity	Eigenvector Centrality	Pageranks	Betweenness Centrality	Closeness Centrality	Clustering Coefficient
Aeneas' Troops	1.95	2.00	0.00	2.00	3.91	0.00	3.91	0.00	0.53	0.08	0.00	0.00	0.00
Aletes	1.61	0.00	1.00	1.00	0.00	3.21	3.21	1.00	0.00	0.02	0.00	1.00	0.00
Apollo	1.44	0.00	1.00	1.00	0.00	2.87	2.87	4.00	0.00	0.02	0.00	0.44	0.00
Ascanius	10.71	2.00	4.00	6.00	6.66	14.01	20.67	3.00	0.51	0.10	24.00	0.67	0.00
Caicus	0.49	0.00	1.00	1.00	0.00	0.98	0.98	1.00	0.00	0.02	0.00	1.00	0.00
Cybele	4.31	1.00	2.00	3.00	3.39	5.23	8.62	1.00	0.75	0.09	7.00	1.00	0.00
Euryalus	15.82	4.00	1.00	5.00	27.85	3.79	31.64	4.00	0.52	0.08	16.00	0.43	0.08
Euryali Mater	3.47	0.00	1.00	1.00	0.00	11.49	11.49	5.00	0.00	0.02	0.00	0.33	0.00
Iris	2.35	1.00	1.00	2.00	1.78	2.93	4.71	3.00	0.15	0.03	0.00	0.50	0.00
Jupiter	4.56	2.00	1.00	3.00	5.74	3.39	9.13	2.00	1.00	0.08	12.00	0.67	0.00
Lycus	0.20	1.00	0.00	1.00	0.40	0.00	0.40	0.00	0.15	0.03	0.00	0.00	0.00
Mnestheus	1.23	0.00	1.00	1.00	0.00	2.47	2.47	1.00	0.00	0.02	0.00	1.00	0.00
Moon	1.35	1.00	0.00	1.00	2.70	0.00	2.70	0.00	0.01	0.03	0.00	0.00	0.00
Nisus	12.80	0.00	4.00	4.00	0.00	21.81	21.81	5.00	0.00	0.02	0.00	0.43	0.08
Nisus and Euryalus	6.31	3.00	0.00	3.00	12.63	0.00	12.63	0.00	0.51	0.07	0.00	0.00	0.00
Numanus	4.31	0.00	1.00	1.00	0.00	8.61	8.61	1.00	0.00	0.02	0.00	1.00	0.00
Pandarus	1.44	1.00	1.00	2.00	1.78	1.09	2.87	1.00	0.15	0.03	2.00	1.00	0.00
Rutilians	0.29	1.00	0.00	1.00	0.57	0.00	0.57	0.00	0.15	0.03	0.00	0.00	0.00
Trojans	7.41	4.00	0.00	4.00	14.81	0.00	14.81	0.00	0.17	0.09	0.00	0.00	0.00
Turnus	9.93	1.00	5.00	6.00	2.93	16.93	19.86	2.00	0.15	0.05	5.00	0.86	0.00
Turnus' Troops	6.54	2.00	0.00	2.00	13.09	0.00	13.09	0.00	0.62	0.05	0.00	0.00	0.00
Volcens	1.49	1.00	2.00	3.00	1.78	1.21	2.99	5.00	0.01	0.03	1.00	0.37	0.17

Book 11													
Character	**Weight**	**In-Degree**	**Out-Degree**	**Degree**	**Weighted In-Degree**	**Weighted Out-Degree**	**Weighted Degree**	**Eccentricity**	**Eigenvector Centrality**	**Pageranks**	**Betweenness Centrality**	**Closeness Centrality**	**Clustering Coefficient**
Acca	0.35	1.00	0.00	1.00	0.69	0.00	0.69	0.00	0.65	0.04	0.00	0.00	0.00
Aeneas	6.56	1.00	3.00	4.00	1.83	11.28	13.11	2.00	0.51	0.04	21.00	0.71	0.00
Amasenus	0.49	0.00	1.00	1.00	0.00	0.99	0.99	8.00	0.00	0.02	0.00	0.22	0.00
Apollo & Jupiter	1.02	1.00	0.00	1.00	2.05	0.00	2.05	0.00	0.08	0.06	0.00	0.00	0.00
Arruns	1.37	1.00	1.00	2.00	0.69	2.05	2.74	1.00	0.06	0.04	3.00	1.00	0.00
Auni filius	2.26	1.00	1.00	2.00	2.15	2.37	4.52	6.00	0.65	0.04	0.00	0.31	0.00
Camilla	12.33	3.00	4.00	7.00	18.34	6.31	24.65	5.00	0.93	0.09	46.00	0.42	0.00
Diana	0.95	1.00	1.00	2.00	0.99	0.91	1.90	7.00	0.01	0.04	15.00	0.27	0.00
Diomedes	4.07	0.00	1.00	1.00	0.00	8.14	8.14	3.00	0.00	0.02	0.00	0.50	0.00
Drances	11.05	2.00	2.00	4.00	3.65	18.45	22.10	3.00	0.77	0.04	25.00	0.56	0.17
Evander	3.85	0.00	1.00	1.00	0.00	7.71	7.71	1.00	0.00	0.02	0.00	1.00	0.00
Latins	13.00	3.00	0.00	3.00	26.00	0.00	26.00	0.00	1.00	0.09	0.00	0.00	0.17
Latinus	10.14	1.00	1.00	2.00	0.69	8.14	8.83	1.00	0.03	0.05	2.00	1.00	0.00
Matres Latinae	0.64	0.00	1.00	1.00	0.00	1.28	1.28	1.00	0.00	0.02	0.00	1.00	0.00
Minerva	0.64	1.00	0.00	1.00	1.28	0.00	1.28	0.00	0.01	0.04	0.00	0.00	0.00
Opis	1.83	1.00	2.00	3.00	0.91	2.74	3.65	6.00	0.03	0.05	28.00	0.34	0.00
Ornytus	0.33	1.00	0.00	1.00	0.66	0.00	0.66	0.00	0.65	0.04	0.00	0.00	0.00
Pallas	6.19	2.00	0.00	2.00	12.38	0.00	12.38	0.00	0.34	0.05	0.00	0.00	0.00
Tarchon	0.99	1.00	0.00	1.00	0.99	0.00	0.99	0.00	0.22	0.05	0.00	0.00	0.00
Trojans	1.81	1.00	1.00	2.00	3.62	0.99	4.61	1.00	0.33	0.03	8.00	1.00	0.00
Turnus	9.66	1.00	4.00	5.00	2.81	27.95	30.76	4.00	0.65	0.04	35.00	0.50	0.08
Venulus	10.14	1.00	1.00	2.00	8.14	0.69	8.83	2.00	0.01	0.04	2.00	0.67	0.00
Volusus	0.35	1.00	0.00	1.00	12.13	0.00	12.13	0.00	0.44	0.03	0.00	0.00	0.00

Book 12													
Character	Weight	In-Degree	Out-Degree	Degree	Weighted In-Degree	Weighted Out-Degree	Weighted Degree	Eccentricity	Eigenvector Centrality	Pageranks	Betweenness Centrality	Closeness Centrality	Clustering Coefficient
Aeneas	11.89	1.00	4.00	5.00	6.82	16.95	23.77	3.00	0.36	0.04	19.50	0.57	0.00
Aeneas' Troops	3.11	2.00	0.00	2.00	6.21	0.00	6.21	0.00	0.13	0.05	0.00	0.00	0.00
Amata	3.03	1.00	1.00	2.00	3.05	3.00	6.05	3.00	0.36	0.04	0.00	0.44	0.00
Ascanius	1.12	1.00	0.00	1.00	2.24	0.00	2.24	0.00	0.13	0.03	0.00	0.00	0.00
Aulestes	0.20	1.00	0.00	1.00	0.41	0.00	0.41	0.00	0.00	0.04	0.00	0.00	0.00
Eumedes	0.69	1.00	0.00	1.00	1.37	0.00	1.37	0.00	0.36	0.04	0.00	0.00	0.00
Faunus	0.51	1.00	0.00	1.00	1.02	0.00	1.02	0.00	0.36	0.04	0.00	0.00	0.00
Gods	4.99	2.00	0.00	2.00	9.98	0.00	9.98	0.00	0.25	0.05	0.00	0.00	0.00
Iapyx	0.56	0.00	1.00	1.00	0.00	1.12	1.12	1.00	0.00	0.02	0.00	1.00	0.00
Juno	10.34	1.00	2.00	3.00	8.40	12.27	20.67	4.00	0.02	0.07	13.00	0.36	0.00
Jupiter	7.76	1.00	1.00	2.00	7.13	8.40	15.53	5.00	0.02	0.05	0.00	0.27	0.00
Juturna	7.48	2.00	2.00	4.00	7.07	7.90	14.97	3.00	0.37	0.07	30.00	0.48	0.00
Juturna/ Metiscus	4.18	1.00	1.00	2.00	6.52	1.83	8.35	3.00	0.36	0.04	0.00	0.44	0.00
Latinus	8.55	1.00	2.00	3.00	4.68	12.42	17.10	3.00	0.36	0.04	3.50	0.48	0.00
Messapus	0.20	0.00	1.00	1.00	0.00	0.41	0.41	1.00	0.00	0.02	0.00	1.00	0.00
Rutilians	2.75	2.00	0.00	2.00	7.18	0.00	7.18	0.00	0.14	0.07	0.00	0.00	0.00
Saces	2.04	0.00	1.00	1.00	0.00	2.39	2.39	3.00	0.00	0.02	0.00	0.45	0.00
Tolumnius	1.20	0.00	1.00	1.00	0.00	4.07	4.07	1.00	0.00	0.02	0.00	1.00	0.00
Turnus	28.82	7.00	9.00	16.00	26.72	29.21	55.93	2.00	1.00	0.19	82.00	0.75	0.16
Turnus' Troops	0.59	1.00	0.00	1.00	1.17	0.00	1.17	0.00	0.36	0.04	0.00	0.00	0.00

Static Conversational Network – The Entirety of the *Aeneid*													
Character	**Weight**	**In-Degree**	**Out-Degree**	**Degree**	**Weighted In-Degree**	**Weighted Out-Degree**	**Weighted Degree**	**Eccentricity**	**Eigenvector Centrality**	**Pageranks**	**Betweenness Centrality**	**Closeness Centrality**	**Clustering Coefficient**
Acca	0.04	1.00	0.00	1.00	0.08	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00
Acestes	0.24	2.00	1.00	3.00	0.34	0.14	0.48	6.00	0.28	0.29	122.00	0.01	0.50
Achaemenides	0.70	2.00	1.00	3.00	2.54	1.19	3.74	3.00	0.50	0.61	3.00	0.01	0.17
Achates	0.16	1.00	1.00	2.00	0.21	0.11	0.32	5.00	0.37	0.40	0.00	0.00	0.00
Aeneas	22.36	25.00	35.00	60.00	25.64	17.04	42.68	4.00	0.58	0.68	4038.17	0.06	0.05
Aeneas' Troops	0.46	5.00	0.00	5.00	0.90	0.00	0.90	0.00	0.00	0.00	0.00	0.05	0.05
Aeolus	0.19	1.00	1.00	2.00	0.25	0.12	0.37	6.00	0.25	0.27	0.00	0.00	0.00
Aletes	0.12	0.00	1.00	1.00	0.00	0.23	0.23	1.00	1.00	1.00	0.00	0.00	0.00
Allecto	0.35	2.00	0.00	2.00	0.68	0.00	0.68	0.00	0.00	0.00	0.00	0.01	0.50
Allecto/Calybe	0.32	1.00	1.00	2.00	0.23	0.39	0.62	3.00	0.50	0.61	2.92	0.00	0.00
Amasenus	0.06	0.00	1.00	1.00	0.00	0.11	0.11	8.00	0.17	0.19	0.00	0.00	0.00
Amata	0.50	1.00	3.00	4.00	0.25	0.72	0.97	5.00	0.34	0.38	62.00	0.00	0.33
Amor	0.35	1.00	0.00	1.00	0.68	0.00	0.68	0.00	0.00	0.00	0.00	0.00	0.00
Anchises	3.99	2.00	4.00	6.00	1.44	6.33	7.77	5.00	0.38	0.42	83.00	0.01	0.25
Androgeos	0.04	0.00	1.00	1.00	0.00	0.08	0.08	1.00	1.00	1.00	0.00	0.00	0.00
Andromache	0.66	1.00	2.00	3.00	0.46	0.83	1.29	5.00	0.38	0.41	0.00	0.00	0.50
Anna	1.02	1.00	1.00	2.00	1.12	0.87	1.99	6.00	0.28	0.30	0.00	0.01	0.00
Apollo	0.29	1.00	3.00	4.00	0.15	0.42	0.57	7.00	0.24	0.28	62.00	0.00	0.25
Apollo & Jupiter	0.12	1.00	0.00	1.00	0.23	0.00	0.23	0.00	0.00	0.00	0.00	0.01	0.00
Apollo/Deiphobe	0.28	1.00	0.00	1.00	0.54	0.00	0.54	0.00	0.00	0.00	0.00	0.00	0.00
Arcadians	0.20	2.00	0.00	2.00	0.40	0.00	0.40	0.00	0.00	0.00	0.00	0.00	1.00
Arruns	0.16	1.00	1.00	2.00	0.08	0.23	0.31	1.00	1.00	1.00	3.00	0.01	0.00
Ascanius	1.02	4.00	6.00	10.00	0.83	1.11	1.94	6.00	0.30	0.36	298.11	0.01	0.09
Aulestes	0.02	1.00	0.00	1.00	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00

Auni filius	0.26	1.00	1.00	2.00	0.24	0.27	0.51	6.00	0.26	0.28	0.00	0.00	0.00
Barce	0.10	1.00	0.00	1.00	0.19	0.00	0.19	0.00	0.00	0.00	0.00	0.01	0.00
"Beroe"	0.28	1.00	1.00	2.00	0.03	0.52	0.55	1.00	1.00	1.00	1.00	0.00	0.00
Caicus	0.04	0.00	1.00	1.00	0.00	0.07	0.07	3.00	0.50	0.61	0.00	0.00	0.00
Camilla	1.42	3.00	4.00	7.00	2.06	0.71	2.77	5.00	0.34	0.39	509.00	0.01	0.00
Cassandra	0.01	0.00	1.00	1.00	0.00	0.03	0.03	2.00	0.67	0.75	0.00	0.00	0.00
Celaeno	0.14	0.00	1.00	1.00	0.00	0.27	0.27	3.00	0.50	0.61	0.00	0.00	0.00
Charon	0.25	1.00	1.00	2.00	0.20	0.28	0.48	7.00	0.22	0.24	0.00	0.00	0.00
Cloanthus	0.06	0.00	1.00	1.00	0.00	0.12	0.12	1.00	1.00	1.00	0.00	0.00	0.00
Coroebus	0.06	0.00	1.00	1.00	0.00	0.52	0.52	5.00	0.37	0.40	0.00	0.00	0.00
Creusa	0.27	0.00	1.00	1.00	0.00	0.12	0.12	3.00	0.50	0.61	0.00	0.00	0.00
Cybele	0.37	2.00	2.00	4.00	0.35	0.37	0.73	7.00	0.23	0.26	3.67	0.01	0.33
Cyclops	0.06	1.00	0.00	1.00	0.11	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00
Cymodocea	0.25	0.00	1.00	1.00	0.00	3.81	3.81	5.00	0.37	0.40	0.00	0.00	0.00
Dares	0.23	2.00	0.00	2.00	0.37	0.00	0.37	0.00	0.00	0.00	0.00	0.01	0.50
Deiphobe	2.76	3.00	5.00	8.00	1.11	1.03	2.14	6.00	0.28	0.33	396.50	0.01	0.07
Deiphobe and Aeneas	0.03	1.00	0.00	1.00	0.07	0.00	0.07	0.00	0.00	0.00	0.00	0.01	0.00
Deiphobus	0.52	4.00	2.00	6.00	1.30	0.77	2.07	5.00	0.37	0.40	408.67	0.01	0.05
Diana	0.11	1.00	1.00	2.00	0.11	0.10	0.21	7.00	0.21	0.23	88.00	0.00	0.00
Dido	6.28	6.00	6.00	12.00	6.26	5.96	12.22	5.00	0.38	0.43	431.42	0.02	0.20
Diomedes	0.47	1.00	1.00	2.00	0.27	0.91	1.19	7.00	0.21	0.23	143.00	0.01	0.00
Drances	1.28	2.00	2.00	4.00	0.41	2.07	2.48	4.00	0.38	0.41	61.60	0.00	0.50
Entellus	0.40	1.00	4.00	5.00	0.14	0.64	0.78	5.00	0.38	0.42	144.00	0.01	0.17
Epytides	0.05	1.00	0.00	1.00	0.09	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00
Eryx	0.03	1.00	0.00	1.00	0.06	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00
Etruscans	0.06	1.00	0.00	1.00	0.11	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00
Eumedes	0.06	1.00	0.00	1.00	0.11	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00
Euryalus	1.16	1.00	1.00	2.00	0.94	0.27	1.21	7.00	0.24	0.26	1.25	0.00	0.00
Euryalus Mater	0.26	0.00	1.00	1.00	0.00	0.82	0.82	6.00	0.27	0.29	0.00	0.00	0.00

Evander	3.85	1.00	2.00	3.00	0.94	6.56	7.49	5.00	0.37	0.41	0.00	0.00	1.00
Faunus	0.12	1.00	1.00	2.00	0.08	0.16	0.24	6.00	0.26	0.28	0.00	0.00	1.00
Gods	0.87	4.00	0.00	4.00	1.42	0.00	1.42	0.00	0.00	0.00	0.00	0.01	0.50
Greeks	0.04	1.00	0.00	1.00	0.08	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00
Gyas	0.05	1.00	1.00	2.00	0.13	0.10	0.23	1.00	1.00	1.00	63.00	0.00	0.00
Haruspex Etruscorum	0.06	0.00	1.00	1.00	0.00	0.11	0.11	1.00	1.00	1.00	0.00	0.00	0.00
Hector	0.15	1.00	1.00	2.00	0.12	0.17	0.29	5.00	0.37	0.40	0.00	0.00	0.00
Hecuba	0.03	0.00	1.00	1.00	0.00	0.05	0.05	2.00	0.67	0.75	0.00	0.00	0.00
Helenus	0.23	1.00	1.00	2.00	0.27	0.19	0.46	6.00	0.28	0.30	0.00	0.00	1.00
Helenus/Apollo	1.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hercules	0.28	3.00	0.00	3.00	0.55	0.00	0.55	0.00	0.00	0.00	0.00	0.01	0.00
Iapyx	0.05	0.00	1.00	1.00	0.00	0.09	0.09	1.00	1.00	1.00	0.00	0.00	0.00
Iarbas	0.17	0.00	1.00	1.00	0.00	0.34	0.34	7.00	0.23	0.26	0.00	0.00	0.00
Ilioneus	1.76	2.00	2.00	4.00	0.88	2.55	3.42	6.00	0.28	0.31	24.75	0.01	0.17
Iris	0.19	0.00	2.00	2.00	0.00	0.25	0.25	5.00	0.35	0.38	0.00	0.00	0.00
Juno	0.25	5.00	6.00	11.00	2.57	4.89	7.46	5.00	0.33	0.37	218.75	0.01	0.36
Jupiter	4.38	8.00	6.00	14.00	5.17	3.35	8.52	6.00	0.30	0.35	380.08	0.02	0.13
Juturna	0.62	2.00	2.00	4.00	0.57	0.64	1.21	5.00	0.34	0.37	79.83	0.01	0.33
Juturna/ Metiscus	0.35	1.00	1.00	2.00	0.52	0.15	0.67	5.00	0.33	0.36	0.00	0.00	0.00
Laocoon	0.11	0.00	1.00	1.00	0.00	0.22	0.22	6.00	0.28	0.30	0.00	0.00	0.00
Latin Women	0.05	1.00	0.00	1.00	0.10	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00
Latins	1.50	3.00	1.00	4.00	2.92	0.27	3.19	8.00	0.17	0.19	121.00	0.01	0.25
Latinus	2.71	5.00	4.00	9.00	2.33	2.67	5.01	5.00	0.35	0.39	432.42	0.02	0.09
Lausus	0.23	2.00	0.00	2.00	0.45	0.00	0.45	0.00	0.00	0.00	0.00	0.01	1.00
Liger	0.09	1.00	1.00	2.00	0.05	0.14	0.18	5.00	0.37	0.40	0.00	0.00	0.00
Lucagus	0.04	1.00	0.00	1.00	0.08	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00
Lycus	0.01	1.00	0.00	1.00	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00
Magus	0.14	1.00	1.00	2.00	0.11	0.16	0.27	5.00	0.37	0.40	0.00	0.00	0.00

Matres Latinae	0.07	0.00	1.00	1.00	0.00	0.14	0.14	1.00	1.00	1.00	0.00	0.00	0.00
Menoetes	0.05	1.00	0.00	1.00	0.10	0.00	0.10	0.00	0.00	0.00	0.00	0.01	0.00
Mercury	0.52	1.00	1.00	2.00	0.42	0.59	1.01	5.00	0.37	0.40	91.59	0.00	0.50
Messapus	0.02	0.00	1.00	1.00	0.00	0.03	0.03	1.00	1.00	1.00	0.00	0.00	0.00
Mezentius	0.63	3.00	6.00	9.00	0.26	0.96	1.22	5.00	0.38	0.43	217.02	0.01	0.27
Minerva	0.07	1.00	0.00	1.00	0.14	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00
Mnestheus	0.20	0.00	2.00	2.00	0.00	0.45	0.45	2.00	0.75	0.83	0.00	0.00	0.00
Moon	0.10	1.00	0.00	1.00	0.19	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00
Musaeus	0.10	1.00	1.00	2.00	0.08	0.11	0.20	7.00	0.22	0.24	0.00	0.00	0.00
Nautes	0.14	0.00	1.00	1.00	0.00	0.22	0.22	5.00	0.37	0.40	0.00	0.00	0.00
Neptune	0.62	1.00	2.00	3.00	0.49	0.72	1.21	6.00	0.29	0.32	8.50	0.00	0.00
Nisus	0.99	0.00	5.00	5.00	0.00	1.67	1.67	5.00	0.38	0.43	0.00	0.00	0.05
Nisus and Euryalus	0.46	3.00	0.00	3.00	0.90	0.00	0.90	0.00	0.00	0.00	0.00	0.01	0.00
Numanus	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Opis	0.21	1.00	2.00	3.00	0.10	0.31	0.41	6.00	0.26	0.29	174.00	0.01	0.00
Ornytus	0.04	1.00	0.00	1.00	0.07	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00
Orodes	0.07	1.00	1.00	2.00	0.05	0.09	0.14	6.00	0.28	0.30	0.00	0.00	0.00
Palinurus	0.94	4.00	3.00	7.00	0.74	1.08	1.83	5.00	0.37	0.40	378.00	0.02	0.50
Pallas	1.47	3.00	6.00	9.00	2.17	0.68	2.86	4.00	0.43	0.48	71.03	0.01	0.19
Pandarus	0.11	1.00	1.00	2.00	0.13	0.62	0.74	3.00	0.50	0.61	2.92	0.00	0.00
Panthus	0.17	1.00	1.00	2.00	0.03	0.30	0.33	5.00	0.37	0.40	0.00	0.00	0.00
Penates	0.26	0.00	1.00	1.00	0.00	0.50	0.50	5.00	0.37	0.40	0.00	0.00	0.00
Phantom Aeneas	0.03	1.00	0.00	1.00	0.06	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00
Phlegyas	0.03	1.00	1.00	2.00	0.03	0.03	0.06	0.00	0.00	0.00	0.00	0.02	0.00
Phorbas/Somnus	0.11	1.00	1.00	2.00	0.10	0.11	0.21	6.00	0.27	0.29	0.00	0.01	0.00
Polydorus	0.09	0.00	1.00	1.00	0.00	0.18	0.18	4.00	0.40	0.52	0.00	0.00	0.00
Priam	0.26	1.00	1.00	2.00	0.07	0.38	0.46	1.00	1.00	1.00	0.00	0.02	0.00
Profani and Aeneas	0.04	1.00	0.00	1.00	0.09	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00

Pyrgo	0.09	0.00	1.00	1.00	0.00	0.18	0.18	1.00	1.00	1.00	0.00	0.00	0.00
Pyrrhus	0.23	2.00	1.00	3.00	0.43	0.07	0.51	1.00	1.00	1.00	1.00	0.03	0.00
Rhaebus	0.09	1.00	0.00	1.00	0.18	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00
Rutilians	0.25	3.00	1.00	4.00	0.48	0.08	0.56	3.00	0.50	0.61	9.92	0.01	0.17
Saces	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Salii	0.14	0.00	2.00	2.00	0.00	0.60	0.60	5.00	0.34	0.37	0.00	0.00	0.00
Sea-gods	0.06	1.00	0.00	1.00	0.12	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00
Sinon	1.18	0.00	1.00	1.00	0.00	2.30	2.30	3.00	0.50	0.61	0.00	0.00	0.00
Tarchon	0.17	1.00	1.00	2.00	0.11	0.12	0.23	1.00	1.00	1.00	16.17	0.04	0.00
Tarquitius	0.05	1.00	0.00	1.00	0.11	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00
Tiber	0.05	2.00	1.00	3.00	0.31	0.80	1.11	5.00	0.37	0.40	0.00	0.01	1.00
Tiberinus	0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tolumnius	0.10	0.00	1.00	1.00	0.00	0.19	0.19	4.00	0.40	0.52	0.00	0.00	0.00
Trojan Women	0.44	4.00	1.00	5.00	0.83	0.03	0.87	0.00	0.00	0.00	0.00	0.07	0.25
Trojans	5.53	17.00	1.00	18.00	10.39	0.11	10.50	2.00	0.67	0.75	89.17	0.05	0.03
Trojans as Greeks	0.04	1.00	0.00	1.00	0.08	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00
Turnus	5.03	10.00	24.00	34.00	3.03	6.76	9.78	4.00	0.50	0.59	2245.49	0.02	0.07
Turnus' Troops	0.66	3.00	0.00	3.00	1.28	0.00	1.28	0.00	0.00	0.00	0.00	0.01	0.00
Vates Latinorum	0.03	0.00	1.00	1.00	0.00	0.06	0.06	6.00	0.26	0.28	0.00	0.00	0.00
Venulus	1.17	1.00	1.00	2.00	0.91	1.36	2.28	6.00	0.26	0.28	165.00	0.01	0.00
Venus	4.67	5.00	6.00	11.00	3.27	5.02	8.30	5.00	0.40	0.45	609.09	0.01	0.10
Volcens	0.11	1.00	2.00	3.00	0.13	0.09	0.21	6.00	0.28	0.30	2.00	0.00	0.00
Volusus	0.04	1.00	0.00	1.00	0.08	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00
Vulcan	0.38	1.00	2.00	3.00	0.34	0.39	0.73	6.00	0.29	0.32	62.00	0.00	0.00
Winds	0.14	2.00	0.00	2.00	0.71	0.00	0.71	0.00	0.00	0.00	0.00	0.01	0.00

9 ANNOTATED BIBLIOGRAPHY

Agarwal, Apporv, Augusto Corvalan, Jacob Jensen, and Owen Rambow. "Social Network Analysis in *Alice in Wonderland*." In *Workshop on Computational Linguistics for Literature, Montréal, Canada, June 8, 2012*: 88-96.

This paper hand-annotates an edition of Lewis Carroll's *Alice in Wonderland* in order to analyze the use of different types of networks, i.e., static and dynamic networks, to show the function and role of characters in the novel. This paper is the first to use dynamic networks in order to avoid the over homogenizing of the text at hand. This paper is important because its networks are based on different types of social events (*interaction* and *observation*). It provides further options in analyzing the relationships in the works of Homer and Vergil and demonstrates how these social events can be used in determining perspective and in creating character sketches.

Alberich, R., J. Miro-Julia, and F. Rosselló. "Marvel Universe looks almost like a real social network." Preprint. http://arxiv.org/pdf/cond-mat/0202174.pdf.

This article uses "collaboration networks" in order to study the interactions of characters within the Marvel Universe and to decide if they are representative of real world interactions. This paper is important because it is the first to use social network analysis to analyze literature. Their network is static and based on co-occurrence relationships. Their paper is also important because it compares the results to real world situations, and it also compares the results to a "null random model." This model helps to determine if the results in the Marvel Universe are indicative or representative of the data available. The authors found that, though the Marvel Universe tries to mimic human relations, there is still an artificiality to the network in terms of how the characters interact with one another.

Albert, Réka and Albert-László Barabási. "Statistical Mechanics of Complex Networks." *Reviews of Modern Physics* 74, no. 1 (2002): 47-97.

This paper systemically overviews complex networks, focusing on the statistical mechanics of network topology and dynamics. It rather importantly looks at real world results and in doing so demonstrates the real-world application of network theory. This paper is also important because it provides explanations for the mathematics underlying this network theory.

Alexander, Michael C. and James A. Dankowski. "Analysis of an Ancient Network: Personal Communication and the Study of Social Structure in a Past Society." *Social Networks* 12, no. 4 (December 1990): 313-335.

This article looks at 280 letters written by Cicero between 68 and 43 BC and applies social network analysis to study the relationships between senators and knights. This paper uses more quantitative methods to derive a more complete picture of the interactions between social classes. This paper is important because it is the earliest application of such theory to pieces of Classical literature and/or history. It also demonstrates the results of the calculations and methodologies and how the importance of these studies can be best communicated to Classicists rather than computer scientists, mathematicians, or sociologists.

Almas, Bridget, Alison Babeu, David Bamman, Federico Boschetti, Lisa Cerrato, Gregory Crane, Brian Fuchs, David Mimno, Bruce Robertson, and David Smith. "What Did We Do With A Million Books: Rediscovering the Greco-Ancient world and reinventing the Humanities." In White Paper Submitted to the NEH, National Endowment for the Humanities, 2011. http://dl.tufts.edu/catalog/tufts:PB.001.001.00022.

This article looks at the goal of creating dynamic variorum editions, which allows readers to explore various versions of a text as well as to view the discourse occurring about certain portions of the text. The paper explores the issues of moving towards such a system and working with such a large quantity of text. This report is important because it addresses the problems that Classicists, in particular, face with the digitization of text.

Ardanuy, Marjona Coll and Caroline Sporleder. "Clustering of Novels Represented as Social Networks." *Linguistic Issues in Language Technology (LiLT)* 12 no. 4 (Oct. 2015): 1-28.

By representing relationships in novels as in both dynamic and static social networks, Ardanuy and Sproleder's article focuses on the possible use of character structure to determine the genre and style of an author. This paper is a comparative study between novels, and thus may proof helpful if comparisons are drawn directly between Homer and Vergil. It also provides insight by introducing the use of social network analysis in literature, defining dynamic and static social networks, and discussing the advantages and disadvantages of using conversational and co-occurrence networks. It also discusses the difficulties of coreferences, i.e., the different manners of address for the same person, a common problem for epics, which are populated with patronymics and epithets.

Bohannon, John. "Deciphering myths into legends." Accessed September 5, 2016. http://www.stuff.co.nz/science/7346191/Deciphering-myths-into-legends.

Published July 25, 2012, this article focuses on Carron and Kenna's article. Interestingly, they too tag on the fact that the authors also analyzed the Irish epic as well as *Beowulf* and the *Iliad*. This article pays particular attention to the fact that these stories are

myths which may be based on real people and events and also draws attention to the lack of a control group in Carron and Kenna's study.

Borgatti, Stephen P., Martin G. Everett, and Jeffrey C. Johnson. *Analyzing Social Networks*. Los Angeles: Sage Publications Ltd., 2013.

As an introductory text, Borgatti, Everett, and Johnson offers an introduction to the mathematical foundations. They provide definitions for the elements of the network and categorize the different types of networks. The two types that they focus on are large networks and ego networks. This text is important because it helps to further corroborate the background information from Kadushin and Scott's texts. Moreover, the text provides more information on the visualization of graphs.

Carron, Pádraig Mac. "A Network Theoretic Approach to Comparative Mythology." PhD diss., Coventry University, 2014.

This dissertation by Pádraig Mac Carron studies how network theory can be applied to the study of comparative mythology. In chapter two, he provides an in-depth look at network theory, including key terms and calculations. In chapter three, he looks more specifically on social networks, and in chapter four, on mythological networks. In chapters five and six, he analyzes 33 different networks before comparing them. Using the metrics of network theory, he is able to further categorize and compare these mythological networks and thus provide new insight to the field of comparative mythology. As an expansion of his work in conjunction with Ralph Kenna, this article provides important insight on the exact methodologies and calculations used in their more truncated articles.

Carron, Padraig Mac and Ralph Kenna. "If Achilles Used Facebook..." Accessed September 5, 2016. http://www.nytimes.com/2012/09/09/opinion/sunday/the-social-networks-of-myths.html?_r=0

Published September 8, 2012, this article, from the title onward, draws connections between the methods used by Carron and Kenna. This article specifically focuses on the Irish epic, though it seeks to draw attention through the name-dropping of Achilles. This article is important because it notes that Carron and Kenna's study does not replace traditional approaches but rather offers new perspectives and evidence.

Carron, Pádraig Mac and Ralph Kenna. "Universal Properties of Mythological Networks." *Europhysics Letters (EPL)* 99 (2012). DOI: 10.1209/0295-5075/99/28002.

This paper uses social network analysis in order to question Joseph Campbell's claim that mythological narratives share the same fundamental structure, i.e., the *monomyth*. Carron and Kenna's work is important because it is the first work to analyze the *Iliad* in this fashion as well as one of the first to use these strategies to compare literature. It

compares the social network structure of four epics – *Beowulf,* the *Iliad*, and *Táin Bó Cuailnge* – and four fictional narratives – Hugo's *Les Misérables,* Shakespeare's *Richard III*, Tolkein's *Fellowship of the Ring*, and Rowling's *Harry Potter*. Through their analysis they found that these stories contain elements of real social networks. Specifically, for the *Iliad*, they found that Homer's work contained properties most similar to real social networks. This argument corroborates the archaeological evidence that supports the historicity of some of the events in the *Iliad*.

Celikyilmaz, Asli, Dilek Hakkani-Tur, Hua He, Greg Kondrak, and Denilson Barbosa. "The Actor-Topic Model for Extracting Social Networks in Literary Narrative." *Proceedings of the NIPS 2010 Workshop – Machine Learning for Social Computing*.

Celikyilmaz et al. create a generative model for conversational dialogues. The actor-topic model (ACTM) allows for the unsupervised attribution of actors in social network from literature by attributing quotations to certain actors. They also attempt to draw connections in terms of topics between different speakers. Through this information, they plan to create social networks. While I do not plan to rely on the automatic attribution of texts, this demonstrates the evolution of distant reading and analysis of texts in terms of computational and social network analysis.

Cline, Diane Harris. "Six Degrees of Alexander: Social Network Analysis as a Tool for Ancient History." *Ancient History Bulletin* 26 (2012): 59-69.

In this paper, Diane Harris Cline discusses the use of Social Network Analysis (SNA) in the study of history. She first provides a survey of the history scholarship that utilizes these techniques and notes that, while the use of this methodology has been around since the early 1990s, its usages has largely gone unnoticed and applauded. She shows how she created three networks: the network surrounding Philip II of Macedon, the network of Pericles, and the network of Alexander the Great. Cline also makes the important connection to the field of prosopography. This is a brief review and introduction of SNA, meant to show its applicability and potential usefulness. As such, she does not delve deeply into the mathematical foundations or the metrics involved with SNA; however, she does discuss the beneficial nature of the visualizations.

Cline, Diane H. "Social Network Analysis and Ancient History." Paper presented at annual meeting for the American Philological Association (APA), Chicago, Illinois, January 3, 2014.

After having heard this presentation at the 145th Annual Meeting of the APA, this paper was inspired me to first study the use of social network analysis with classical texts. This presentation presents an overview of how these techniques have been used in studying the Classics as well as Classical texts. Begun in May 2012, this project analyzes the social network revolving around Alexander the Great and 404 of his closest companions. She

sorts these relationships in several different ways and uses these visualizations to analyze some of the main events in Alexander the Great's life.

Collins, Nick. "Beowulf and Iliad 'more plausible than Shakespeare.'" Accessed September 5, 2016. http://www.telegraph.co.uk/culture/9423516/Beowulf-and-Iliad-more-plausible-than-Shakespeare.html.

Published July 25, 2012, this article draws attention to *Beowulf* and the *Iliad* and succinctly demonstrates the claim of the article. This article is important for its brevity and for its ability to show the main points of the argument.

Crane, Gregory. "What Do You Do with a Million Books?" *D-Lib Magazine* 12, no. 3 (March 2006). Accessed December 7, 2015. http://www.dlib.org/dlib/march06/crane/03crane.html

Crane opens this article by first positing that it would take some forty lifetimes to read every volume in a single million book library. This factoid drives home the difficulty of dealing with digital libraries. In this article, he advocates for the creation of not just digital libraries but intelligent digital libraries. He wants digital libraries to be mindful of six factors: (1) scale, (2) heterogeneity of content, (3) granularity of objects, (4) noise, (5) audience, and (6) collections and distributors. He then offers some suggestions for what can be feasibly done with a million books. This article is important because it places the Classics within the context of the digitized library.

Crane, Gregory, and David Smith. "Extracting Two Thousand Years of Latin from a Million Book Library." *Journal on Computing and Cultural Heritage*. 5.1.2 (2012) *ACM Digital Library.* Web. Nov. 25 2013.

This article considers large open digitization projects such as the Internet Archive and Google Books and the place that works of Classical relevance have within such collections. Crane and Smith work to extract works of note to academics and passerby in the field of Classics. This paper is important because it considers the importance of the Classics within the context of large text projects.

Elson, David K. and Kathleen R. McKeown. "Automatic Attribution of Quoted Speech in Literary Narrative." In *Proceedings of the Twenty-Fourth Association for the Advancement of Artificial Intelligence (AAAI) Conference on Artificial Intelligence.* Atlanta, Georgia, 2010.

I do not intend to write or utilize the code necessary for the automatic attribution of quoted speech by a computer, in part, because the coding capabilities are beyond me and, in part, because the coding for Latin – and Greek especially – are especially primitive at the moment. Because Greek utilizes a different alphabet and is more character based, computational analysis of Greek texts is significantly behind that of Latin. Through Elson and McKeown's study, they were only able to achieve an 83% of

accuracy in their quotations in English authors. Nevertheless, this article demonstrates the importance potential for such attribution in novels and pieces of like literature.

Elson, David K. and Kathleen R. McKeown. "Extending and Evaluating a Platform for Story Understanding." n Proceedings of the AAAI 2009 Spring Symposium on Intelligent Narrative Technologies II (2009), Stanford, CA, 32-35.

In this paper, the authors show the recent expansions to SCHEHERAZADE, "a platform for narrative intelligence that formally represents stories." They are attempting to build a new kind of corpus. Instead of the traditional collection of texts, SCHEHERAZADE intends to create a collection of story graphs. These graphs, which include nodes (characters) and arcs (actions), are reminiscent of social network graphs. Their extensions include widening the encoding – or sorting and labeling – of the novels so that there is a greater increase in its capability, though a margin of error still exists. This paper is of particular use to my paper because it shows the growing use of such graphs in the annotation and analysis of authors.

Elson, David K., Nicholas Dames, Kathleen R. McKeown. "Extracting Social Networks from Literary Fiction." In *Procedures of the 48th Annual Meeting of the Association for Computational Linguistics, Uppsala Sweden, July 11-16, 2010*: 138-147.

This paper surveys 60 nineteenth-century novels and serials from 31 different authors in order to evaluate social networks based on dialogue interactions. Elson et al. are the first to create social networks based on such criteria. They propose two hypotheses: (1) "that there is an inverse correlation between the amount of dialogue in a novel and the number of characters" and (2) "that a significance difference in the nineteenth-century novel's representation of social interaction is geographical." This paper is important because it provides the basis for a possible evaluation of the works of Homer and Vergil based on conversations rather than by circumstance.

Emerging Technology from the airXiv. "The Remarkable Properties of Mythological Social Networks." Accessed September 5, 2016. https://www.technologyreview.com/s/516081/the-remarkable-properties-of-mythological-social-networks/.

Published on June 13, 2013, this article connects the work of Miranda, Baptista, de Souza Pinto, whose work on the *Odyssey* was based off Carron and Kenna's analysis of epics, to the social networks of Facebook, Twitter, and LinkedIn. It also makes an important connection o Stanley Milgram's study in the 1960s, which established the phrase "six degrees of separation." This article is important because it demonstrates how the topic can be explained to a wide audience.

Gil, Sebastian, Laney Kuenzel, and Caroline Suen. "Extraction and Analysis of Character Interaction Networks from Plays and Movies." Technical Report, Stanford University.

In this article, Gil, Kuenzel, and Suen combine the two approaches to literary analysis, i.e., qualitative and quantitative studies, to consider the character interaction networks that can be derived from modern plays and movies. This article first describes related work before discussing their methods in gathering data and extracting networks. While the analysis of their findings is interesting, the mathematical foundations of their analysis is of greatest significance. The calculations form the basis for those done in the study of Vergil's *Aeneid*.

Highet, Gilbert. *The Speeches in Vergil's Aeneid*. Princeton, New Jersey: Princeton University Press, 1972.

In this book, Highet closely analyzes the speeches and speakers in Vergil's Aeneid. He does so by (1) looking at and defining the speeches and their speakers, (2) focusing on the "formal speeches," (3) focusing on the "informal speeches," (4) discussing the speakers and their models in other pieces of literature, and (5) considering Vergil as an orator as well as a poet. The second portion of his text is of the most import this paper as it defines the different types of speeches and locates them in the text of Vergil. Also of importance is his INDEX LOCORUM as he sorts the speeches by different categories. His categorization of the texts may provide further explanation for the mathematical analysis of the dialogue. While his references are used as the basis for the consideration of the speeches and dialogue in Vergil's Aeneid, these references are checked for accuracy.

Ioannis, Antoniou and Tsompa Eleni. "Statistical Analysis of Weighted Networks." *Discrete Dynamics in Nature and Society* (2008).

This paper provides a brief overview of the three defining the statistical parameters of networks: average path length, degree distribution, and clustering coefficient. Weighted networks are important because they help determine the different capacities or flows of information in links between nodes. It is important to be able to effectively measure these capacities. In its exploration of weighted networks, they look at the clustering coefficient and its different definitions. They compared five different definitions and looked at the dependence weighted clustering coefficients on the weights by looking at the relative perturbation norm of the weighted network. This paper is important because it offers insight on the growing emphasis on weighted networks rather than unweighted networks and alternative avenues of calculating the clustering coefficient.

Jayannavar, Prashant Arun, Apporv Agarwal, Melody Ju, and Owen Rambow. "Validating Literary Theories Using Automatic Social Network Extraction." *Proceeds of NAACL-HLT Fourth Workshop on Computational Linguistics for Literature*. Denver, Colorado, June 4, 2015: 32-41.

This paper investigates whether theories about nineteenth century British novels are validated or contradicted by computational theories, specifically theory analysis. Before advocating "distant reading," this paper first analyzes the literary theories at hand before testing to see if computational analysis validates such things. Specifically, they looked at the role of urban and rural settings on relationships. This paper is important because it builds upon Elson et al.'s previous work and demonstrates the depth of analysis possible.

Kadushin, Charles. *Understanding Social Networks: Theories, Concepts, and Findings.* Oxford: Oxford University Press, 2012.

Kadushin's text acts as an introduction to the theories underlying social network analysis. While it defines key terms, it looks more at explaining why these methods matter rather than the mathematical foundations. Kadushin also places the theories and concepts within a greater context by considering how social networks affect social interactions. The latter portion of the book and its focus on small worlds and network influences is of particular interest and note for the course of this paper. Kadushin's work will help to place a greater sense of meaning to the visualizations and calculations.

Kenna, Ralph and Pádraig Mac Carron. "A Networks Approach to Mythological Epics." In *Maths Meets Myths: Quantitative Approaches to Ancient Narratives,* edited by Ralph Kenna, Máirín MacCarron and Pádraig MacCarron. Cham, Switzerland: Springer International Publishing, 2017.

In this chapter, Ralph Kenna and Pádraig Mac Carron, in a more expanded form than their original academic article, write about how by quantitatively comparing structural properties of myths, new comparisons and observations can be made. They provide a brief introduction to network theory as well as the elements of complex network analysis necessary for comparison. In this article, they continue to study the Greek *Iliad*, the Anglo-Saxon *Beowulf,* the Irish Táin Bó Cúailnge, but they also add the Icelandic *Njáls saga* to their study. This essay is particularly useful in their discussion of the results asw well as the background information provided for each of these four epics.

Kenna, Ralph and Pádraig Mac Carron. "Math Meets Myths: Network Investigations of Ancient Narratives." *Journal of Physics: Conference Series* 681 (2016): 1-12. Accessed April 16,2 017. Doi: 10.1088/1742-6596/681/1/012002.

In this article, Kenna and Carron revisit their initial forays into the use of statistical physics and network theory on comparative mythology. This article, in particular,

focuses on Irish epic and on the *Táin Bó Cúailnge* (Cattle Raid of Cooley), the most famous epic of Irish mythology. First they provide a discussion of the Táin and by contextualizing it, demonstrate how these methods can be applied. They then look at metrics that can demonstrate if the relationships in the epic are representative of those in real life. The results are then compared to Homer's *Iliad* and the Old English epic, *Beowulf*. This visitation of their initial work provides an extremely helpful description of how network theory can be used to study the relationships in the epic.

Kydros, Dimitrios, Panagiotis Notopoulos, and Georgios Exarchos. "Homer's Iliad – A Social Network Analytic Approach." *International Journal of Humanities and Art Computing* 9 no. 1 (2015): 115-132.

Following in the steps presented by MacCarron and Kenna, this paper uses social network analysis in order to analyze Homer's *Iliad*. It first discusses the formation of the network, the topological network analysis, structural and grouping analysis, and then a section on the final results. Kydros et al. introduce the important concept that some nodes ought to represent groups of people such as the Amazons and that nodes can be partitioned into different groups (Greeks, Trojans, Gods, and Others). Their network is static and based on co-occurrence relationships, where "corresponding actors *interact* in some way" (118). This paper is important because it demonstrates the way in which social network analysis has been applied to Classical literature as it provides information on the various actors in the epic.

Massey, Steven E. "Social network analysis of the biblical Moses." *Applied Network Science* 1, no. 3 (2016): 1-19.

In this article, Steven E. Massey studies the figure of biblical Moses in terms of the books of the Pentateuch: Genesis, Exodus, Leviticus, Numbers, and Deuteronomy. This article is interesting in the way in which it both explores whether or not the books in the Bible are capable of capturing the real-world characteristics of social relationships and explores the role of Moses and Yahweh. Though the metrics used are familiar, the combination of these research questions is unique to this article. This article is useful in its examination of these networks in this manner.

Meadows, David. "On the 'Plausibility' of the Iliad and Social Networks?" Accessed September 5, 2016. https://rogueclassicism.com/2012/07/25/on-the-plausibility-of-the-iliad-and-social-networks/.

Published July 25, 2012, this article was written by Classicists, David Meadows, and reflects on the sudden influx of articles, written regarding Carron and Kenna's study. Meadows argues that the article is based upon statistical calculations, which despite the claims of various articles, are rather beyond his understanding. Moreover, he criticizes the oversimplification of Carron and Kenna's study in these articles and what such claims by those outside of academia mean for those inside the bubble.

Miranda, P.J., M.S. Baptista, and S.E. de Souza Pinto. "Analysis of communities in a mythological social network." Preprint. http://arxiv.org/abs/1306.2537.

Based upon Carron and Kenna's original paper on the use of social network analysis in literature, this paper analyzes Homer's *Odyssey.* The topological quantities collected help to classify the relationships in the *Odyssey* as real or fictional. His study uses a static social network, which is based on co-occurrence rather than conversational relationships. This paper is useful in that it demonstrates how such analytical techniques have been used in Classical Studies – though not by Classicists, as evidenced by their reliance on translations.

Moreno, Jacob L. *Who Shall Survive? A new Approach to the Problem of Human Interrelations.* Washington D.C.: Nervous and Mental Disease Publishing, 1934.

This book published by Jacob Moreno provides the foundations for the application of graph theory to human relationships. Moreover, he created the field of sociometry, a quantitative method for measuring social relationships. He looks at how sociometry can be used in relation to psychology, sociology, anthropology, and economics. In this book, he created the sociogram, which is a way to graphically represent individuals as nodes and relationships as links. As such a pivotal work, Moreno's piece was worth briefly surveying in order to understand the origins of this application of network and graph theory.

Moretti, Franco. "Network Theory, Plot Analysis." *New Left Review* no. 68 (2011): 80-102.

This article provides an introduction to network theory and describes it as a way to quantify plot, create models, and visualize information about a story's plot. His analysis relies on explicit connections, based on the entirety of a piece of literature when he looks at Shakespeare's *Hamlet* and on parts when he looks at *The Story of the Stone*. He also lays out some three of the positive repercussions for this approach. Such network analysis keeps readers mindful of the past, creates specific character "regions" within the plot, and allows for the reduction and abstraction required for the creation of models. This article is important because it lays out some of the important reasons for network analysis.

Park, Geyong-Mi, Sung-Hwan Kim, Hye-Reon Hwang, and Hwan-Gue Cho. "Complex System Analysis of Social Networks Extracted from Literary Fictions." *International Journal of Machine Learning and Computing* 3 no. 1 (Feb. 2013): 107-111. DOI: 10.7763/IJMLC.2013.V3.282.

This paper intends to analyze the characters in novels and to calculate the "distance" of these characters in the text. By doing such a study, they hope to determine more objectively the importance of fiction characters. This work is important because it provides the actual mathematical calculations used to consider the distance between

individuals and the hierarchal structure of the networks at hand. It is also important because it takes into account the weight or significance of the relationships.

Ryberg-Cox, Jeff. "Social Networks and the Language of Greek Tragedy." *Journal of the Chicago Colloquium on the Digital Humanities and Computer Science* 1, no. 3 (2011): 1-11.

This paper uses texts from the Perseus Digital Library in order to create a comparative study of the relationships between characters in works of Greek tragedy. This paper is important because it hopes to bridge the gap between the modern distance reading approach and the close reading approach. They found four different types of social networks since the number of players in a Greek tragedy is limited in nature. Ryberg-Cox's paper is furher important because he touches upon the importance of visualizations in the reading of Classical texts as well as the possibilities of integrating text and language into the construction of the relationships.

Sack, Graham. "Character Networks for Narrative Generation." *Intelligent Narrative Technologies: Papers form the 2012 AIIDE Workshop:* 38- 43.

In this paper, Graham Sack proposes the use of social networks as an AI (artificial intelligence) narrative generation mechanism. He first looks at the relationship between character networks and narrative structures by constructing three networks of characters in 19th Century British fiction. He looks at co-occurrence networks in Charles Dickens' *The Pickwick Papers,* George Eliot's *Middlemarch*, and Henry James' *The Ambassadors*. He refers to these networks as "descriptive" as they show what happen "after the fact" as they show what narrative events take place. His analysis of the meaning of various factors – the graph density, the amount of isolates, and the clustering coefficient – is of particular help as he dwells less on the calculation of these numbers and more on the significance of the results. In the second portion of his paper, he looks at "generative" networks and looks at characters "before the fact" to explore why events happen. In particular, he looks at ideas from ""structural balance theory" and using this theory, he creates a kind of "proto-narrative" based on the evolving relationships of characters and he shows what happened leading up to a specific event.

Science 2.0. "What the Iliad Can Tell Us About Science 2.0 And Networks." Accessed September 5, 2016. http://www.science20.com/news_articles/what_iliad_can_tell_us_about_science_20_and_networks-92450.

Published July 25, 2012, this article focuses on the way in which, for once, scientists are "butting into" the work of humanists, rather than the other way around. This article is important because it is a nice synthesis of the work of Carron and Kenna and because it demonstrates how widely their work was shared.

Scott, John. *Social Network Analysis: A Handbook*. 2nd ed. London: Sage Publications, 2000.

Scott's *Social Network Analysis* is, as the eponymous title suggests, one of the seminal introductory texts on its topic. It provides insight on the development of the analysis as well as the main elements of graph theory. It also provides crucial definitions for terms such as density and centrality. As such, this text proves as a crucial text in providing necessary background information on the methodologies, which intend to be used throughout the course of this paper.

Stiller, James and Matthew Hudson. "Weak Links and Scene Cliques within the Small World of Shakespeare." *Journal of Cultural and Evolutionary Psychology* 3 no. 1 (2005): 57-73.

This paper builds off the article published by Stiller, Nettle, and Dunbar in 2003 and analyzes the value of weak links in the world of Shakespeare. They maintain the same argument that "the success of an audience's interaction with a dramatic performance ultimately depends on the accurate mimesis of natural human social groups within the diegetic world" (60). They analyze the presence of weak links in 10 Shakespearean plays. They no longer focus on static networks but instead look at dynamic networks, which are discerned in the different scenes of the play and which were reliant on dialogue interactions between characters. This paper is important because it causes need to consider if Homer and Vergil use the same small world networks to the same end, i.e., allowing for the easy conversation between author and listener/reader.

Stiller, James, Daniel Nettle, and Robin I. M. Dunbar. "The Small World of Shakespeare's Plays." *Human Nature* 14 no. 4 (2003): 397-408.

Stiller, Nettle, and Dunbar apply social network analysis to the many plays of Shakespeare. They argue that dramas depend on people's ability to follow how others relate to one another, and in order for people to understand best these relationships, it is important that dramas mirror real live alliances, kinships, and social groups. They study static networks, confined to each play. Their points for comparison are small world networks found in hunter-gatherer camps. They found that Shakespeare's dramas had "small world properties" and that as the number of characters increased, the number of cliques – of groups of friends – increased. This article is important because its argument is less reliant on whether or not Shakespeare's plays are based in fact but is more determined to consider how these real-life relationships impact the reader's understanding of the text and how the text moves its readers.

Shurkin, Joel. "Using Social Networks to Analyze the Classics." Accessed September 5, 2016. https://www.insidescience.org/news/using-social-networks-analyze-classics

Published on July 24, 2012, this article is arguably the first in a series to publicize the use of social network analysis on classical novels, i.e., the article by Mac Carron and Kenna. The article acknowledges that those leading the study are applied physicists and not

humanities academics and that this this type of study is still controversial amongst humanists.

Sutherland, John. "Beowulf, Shakespeare and the plausibility of fiction." Accessed September 5, 2016. https://www.theguardian.com/commentisfree/2012/jul/25/beowulf-shakespeare-plausible-fiction?newsfeed=true#comment-17351783.

This article, published on July 25, 2012, takes note of the "silly season flutter in the newspapers" caused by Carron and Kenna's article. They claim that it is because the article is a bit more accessible than most. While they do not deny the validity of the findings, they take care to note that "Physicists and mathematicians, we may conclude, are as at sea with great literature as most of the rest of us would be with Antisotrophy, Vortex Clusters, and their Dynamics." This article is so important because it interestingly notes the skepticism directed towards the value of the study of literature in this fashion as it ends "I think, for the reason, that Carron and Kenna may be on something. But you don't need a PhD in maths [sic] to work it out. A love of literature will do it."

Toivonen, Riitta, Jussi M. Kumpula, Jari Saramäki, Jukka-Pekka Onnela, János Kertész, and Kimmo Kaski. "The role of edge weights in social networks: modeling structure and dynamics." *Noise and Stchastics in Complex Systems and Finance*, vol. 6601, no. 1 (2007): B1-B8.

This structure examines the importance of edge weights in social networks whose structure influences human interaction and community. Links between individuals can be either strong or weak. This paper looks at how a social network is constructed with weighted links and the effect that the weight of the links has on other networks. These weighted links are important because they lend to a greater understanding of the relationships in the *Aeneid*.

Wang, Xaio Fan and Guanrong Chen. "Complex Networks: Small-World, Scale-Free and Beyond." *IEEE Circuits and Systems Magazine* First Quarter 2003: 6-20.

In this paper, the authors provides an introduction to the basic concepts, processes, and important results in the study of complex networks. The basic concepts of average path length, the clustering coefficient, and degree distributions are explained in great detail before these concepts are applied to complex network models. Complex networks tend to be small-world and scale-free. Wang and Chen lay out several types of models: regular coupled networks, nearest-neighbor coupled networks, random networks, and scale-free models or exponential networks. They also note seminal authors and their small-world network models, including Watts and Strogatz, Newman and Watts, and Barabási and Albert. They then overview real-world examples of complex networks such as the AIDS propagation and blackouts of electric transmission. They end their paper by discussing the importance of robustness and fragility in the dynamical synchronization of complex networks. In plain speak, they look at the removal of certain nodes in a

network and judging how the networks and other nodes are affected in turn. In total, this paper provides an important overview of complex networks and what that means, and as an overview of this specific topic, this paper is important to the analysis of my paper.

Wasserman, Stanley and Katherine Faust. *Social Network Analysis: Methods and Applications.* Cambridge: Cambridge University Press, 1994.

Wasserman and Faust's text, while introductory, delves far deeper as an overview of social network analysis. They look at networks, relations, and structure; mathematical representations of social networks; structural and locational properties; roles and positions; dyadic and triadic methods; statistical dyadic interaction models; and the future direction of analysis. It gives the necessary background information and definitions before delving into the application of these theories. They discuss these topics in far greater detail. As such, their text acts a good follow-up text for Scott, Kadushin, and Borgatti et al.'s texts. They allow for the further analysis of the use of these methods in the articles, where an understanding of these methods is taken for granted.

10. REFLECTION

This project was first conceived in the January of 2014. I had the opportunity to attend my first meeting of the Society for Classical Studies, then the American Philological Association. I eagerly attended the only panel on digital classics. There I was deeply moved by a presentation, entitled "Social Network Analysis and Ancient History", by Diane Cline. Through the basic application of social network analysis, she was able to better visualize the relationships of figures such as Perseus and Alexander the Great. Most notably, she mentioned a key paper by Carron MacCarron and guy on the application of this work to Homer's *Iliad* and other epics. Though different from the concepts of corpus linguistics that I had learned about in the summer of 2013 during the Summer Opportunities for Intellectual Activity (SOfIA), this approach to the study of antiquity had the same blend of quantitative and qualitative analysis. This approach possessed the same blend of mathematics and humanities, which I had so admired in the senior thesis of Matthew Katsenes MC'04, "From Infinity to Improbability and Back Again: An investigation of the classical foundations of the calculus." However, this idea to analyze the *Aeneid* lay dormant for three years due to my rigorous research schedule and because of the gargantuan amount of time attached to such an analysis of a text.

Though we originally discussed working with Caesar and the *Anabasis*, I privately wished to return once more to where I began my research journey at Monmouth College. I wished to return once more to exploring the interdisciplinary nature of mathematics and classical studies – following in the footsteps of Matt, in this instance, certainly had not led me astray. I spent the summer of 2016 wading through Vergil's *Aeneid* via the translation of Stanley Lombardo as I

had never fully read the text. I also began to annotate the text and tentatively explore the relationship structures, though this was difficult to do without knowing precisely the sorts of information that was needed for the calculations and for the foundations of the math.

While I originally set out to analyze not only Vergil's *Aeneid* but also Homer's *Iliad* and *Odyssey*, I quickly realized my over ambitiousness in light of my other conferences over the course of the school year. As I began to read through the scholarly literature on the application of these studies during the fall semester, I realized that classicists, for the most part, had only grazed the surface of social network analysis by focusing on the visualizations. The mathematics underlying these images had been, for the most part, left to the wayside! I felt that the quantitative analysis of the text held something more than merely the figures that would be created. Therefore, I focused much of my energy not only on the reading of this text and the data entry but also on learning the mathematical foundations of social network analysis.

I am no mathematician (– least of all at the same level as Matt). Because of this deficit, I spent a large part of the end of the fall semester and the beginning half of the semester, reading through texts pertaining to graph theory and network theory. I also had to do a lot of cross-comparison of texts as the variables in these equations were not at all uniform. This knowledge gave me a greater understanding of the articles that I had originally read about the application of social analysis to literature. With this knowledge in hand, I then had to return to these key articles, and the many mathematical nuances became far clearer to me. Because of this understanding of the math, I had to reanalyze the text of the *Aeneid* and make the categorization of the relationships more uniform and thus make the data less dirty. This then led me to have to enter the data and to then re-enter it again in a different format so that it

could probably be read by the gprogram, Gephi, which was used to produce the visualizations and many of the calculations. I also had to clarify the questions that I was asking of the text to narrow down what calculations I had to perform. During this time, I also made great strides in terms of my understanding of the varied application of Gephi as well as Microsoft Excel.

Following all of this work, I then had to set about writing the actual paper. The drafts from my submissions to the Eta Sigma Phi panel at the Society for Classical Studies and to the Classical Association of the North East proved particularly useful to me as did the comments that I received from the meeting at CANE. Following advice from Dr. Sienkewicz on my very first research paper, I then set a firm outline to guide the construction of my paper. Recognizing that the mathematics involved with this paper were geared towards an audience geared more towards classics than mathematics, I went to great lengths to make sure that the structure was clear and the definitions throughout the paper were clear. I first did the background and literature review before focusing on the equations. The calculations and the evaluation of these numbers took the greatest amount of time and effort. During these initial drafts, Matt was of great help in terms of his mathematical expertise as he had a reasonably decent understanding of both aspects of the paper.

I very much viewed this paper as the culmination of my research here at Monmouth College. This project was very extensive and, perhaps, with a less rigorous research schedule, it could have been completed in a more timely and thorough manner. Overall, however, I have gained a greater understanding of social network analysis as well as the mathematics underlying this methodology, and I have also gained valuable experience analyzing data through Gephi and through Microsoft Excel. I have also gained a more intimate relationship

with Vergil's *Aeneid* as I now know not only the plot but also the characters with far greater facility and depth than I did before this research project.

In writing this reflection and considering what I had learned, I thought back to when I wrote my very first research paper here at Monmouth. Since that paper, I have become far better at not only reading academic articles but also in finding further sources to support and explain my research. I have honed my ability to find articles through resources such as a key book's bibliography and Google Scholar, to skim them to judge their usefulness, and to read them thoroughly to glean information from them. I have become better at finding convincing research questions to explore and also at narrowing the realm of focus as so many conclusions can be reached through such quantitative analysis as I like to pursue.

Though I got frustrated at the end of the process, I also realized, upon reflection, how much my endurance had increased over the years. I used to get frustrated like this far earlier in the process. The paper would also go off the deep-end much sooner as on my very first research paper, Matt was quick to point out where I lost steam... at only page 6. For my last major project on Eutropius and digital texts, Matt pointed out again where I started to lose steam and that was then somewhere around page 30. While my endurance is not quite up to writing a doctoral thesis, it has gotten better over the years as has my overall writing style, though, as you noted, I still struggle with making conclusions that would be pleasing not just to mathematicians but to classicists. Overall, however, I am satisfied with this project, and I feel more comfortable with taking on a project of such a great magnitude again in the future. I have learned a lot about the value of interdisciplinary studies and research that I am sure will benefit me in the future.

ELLISON AND EXISTENTIALISM: THE QUESTION OF AUTHENTICITY AMIDST BRUTALITY

Midwest Journal of Undergraduate Research (MJUR) Conference
Monmouth, Illinois, May 2017

First published in 1952, Ralph Ellison's *Invisible Man,* though predominantly viewed as a novel about race or even as a *bildungsroman,* is an active and lively participant in the shaping of Black Existentialism. His work has been considered especially in the context of Fyodor Dostoyevsky's *Notes from the Underground* as both authors' unnamed narrators trace the events in their lives that have both destroyed and renewed them as individuals. In this paper, I focus on the way in which violence and racism shape Ellison's young, nameless narrator's search for authenticity, a key theme for existentialists. The narrator lives in a world filled with "epistemological brutality," which emerges from the Anti-Black racism ingrained within the American culture of the mid-1900s and which shapes the experiences of the recipients and givers of violence as they search for meaning and knowledge. This suffering, which stems from racism, represents a divergence from the influential, white European Existentialists of the nineteenth and early twentieth centuries. The narrator experiences brutality throughout the course of his life and from a variety of sources, and this violence both provides meaning in the Invisible Man's life and inhibits his search.

First published in 1952, Ralph Ellison's *Invisible Man,* though predominantly viewed as a race novel or even as a *bildungsroman*, is an active and lively participant in the shaping of Black Existentialism. As noted by Elliott Evans, while the racial dimensions of the novel have certainly not been neglected, it can also be difficult when reading this novel to avoid ontological issues involving authenticity, estrangement, and the emergence of the anti-hero. This difficulty, in turn, leads to a difficulty in avoiding key themes of existentialism, though the explicit connections between Ellison and existentialism in academic scholarship have been sparing. In the course of this paper, I first establish the role of *Invisible Man* in the school of existentialist literature. I then focus on the way in which violence and racism shape Ellison's young, nameless narrator's search for authenticity, a key theme for existentialists, by examining key episodes of violence and the significant mentor figures interspersing these episodes and by considering how these events and figures both help to provide meaning in his life and inhibit his quest.

Ellison openly acknowledged that "there is an existentialist tradition within American Negro life." Many argued that Existentialism is a "European phenomenon addressing European experience." In turn, Gordon argues that Africana existential philosophy truly exists as a branch of black philosophies of existence, in which the prevailing questions are both "What are we?" and "What shall we do?" These philosophies of existence or existential philosophies focus on concerns similar to existentialism, i.e., "freedom, anguish, responsibility, agency, sociality, and liberation," but look at them through "lived contexts of concern." As Gordon puts it, there is a focus on the "exploration of their lived experience of blackness."

Gordon also writes that one does not have to be Africana nor a black existential philosopher to have contributed to Africana existential philosophy. Though Ralph Ellison is one

whom Gordon refers to as an "out-of-the-closet" existentialist, Ellison was rather specific in his personal identification. In his own words, Ellison writes in 1963 that

> If I were to identify myself as an existentialist writer, then it would be existentialism in terms of Andre Malraux rather than Sartre. It would be in terms of Unamuno, let's say, without the religious framework, rather than Camus's emphasis.

He notes that he first became acquainted with the works of Søren Kierkegaard and Miguel de Unamuno before existentialism became a literary movement. He openly critiqued French existentialism for their "simplistic, privileged, and impassioned summations of the status of Black Americans."

Despite this preference for authors outside the tradition of French Existentialism, Ellison has been often been examined in the context of Jean Paul Sartre. Additionally, there have been studies connecting Ellison's references to blues with Existentialism. Overall, however, the connection between Existentialism and Ellison have been limited. Even in the seminal biographies of Ellison by Lawrence Patrick Jackson and Arnold Rampersad, there are only brief passing references to these influences. He has been claimed as part of the existential tradition by the likes of George Cotkin as well as Lewis Gordon, the founder of the Black Existential movement. Eliot J. Wilcox especially pushes for connections to be made between Ellison and the major works and figures of the French Existential movement, specifically Sartre and Camus. In terms of the existential novel, Ralph Ellison is not alone. Rather, he is following in the tradition of, amongst many others, Albert Camus' *The Stranger*, Franz Kafka's *The Trial,* Jean-Paul Sartre's *Nausea*, and, as previously mentioned, Fyodor Dostoyevsky's *The Underground Man.* Most immediately, his mentor and friend, Richard Wright, put to pen the similarly named novella, *The Man Who Lived Underground*, as well as his more widely piece, *Native Son*.

Therefore, despite the lack of current scholarship, the connections between Ellison and existentialism are worth examining.

Ellison's narrator begins more at the end rather than the beginning. He establishes his invisibility from the very opening of the novel with the statement, "I am an invisible man." He goes further and explains that he is invisible because others refuse to see him and rather when they see him, they only see his "surroundings, themselves, or figments of their imagination." His identity is never truly recognized. Though as Evans notes, "the invisibility to which the hero in an enlightened state refers, resides in the eyes of others, it is equally true that it is in his own blindness that allows him to become victim" The difficulties faced by the narrator lie not only in the outside world but rather within the narrator himself.

Besides merely beginning with a testament to his invisibility, the narrator immediately provides an account of an intersection of violence and his own invisibility. One night, he bumps into a man, who, in turn, calls him an insulting name. The narrator lashes out against this white man, and as he beats the man, he realizes that the man had not truly seen him but was instead "in the midst of a walking nightmare." Though the stranger is every bit aware of the situation, he is still limited in that he does not truly see the narrator for whom he is. All the narrator can do is laugh at this mistake.

But, how does he get to this point? How does he get to the point that he not only laughs at his invisibility, but, moreover, recognizes this state of being, this state of invisibility. In order to discover the reason why the narrator has reached this point in his quest for authenticity, he brings the audience back some twenty years. He acknowledges his difficulties as a young man:

> All my life I had been looking for something, and everywhere I turned someone tried to tell me what it was. I accepted their answers too, though they were often in

> contradiction and even self-contradictory. I was naive. I was looking for myself and asking everyone except myself questions which I, and only I, could answer. It took me a long time and much painful boomeranging of my expectations to achieve a realization everyone else appears to have been born with: That I am nobody but myself. But first I had to discover that I am an invisible man!

But, the question of who exactly he was still remains, and this journey was shaped through his mentors and his experiences with violence.

From a young age, he was haunted by the words of his dying grandfather, who urged him to

> ...keep up the good fight. I never told you, but our life is a war and I have been a traitor all my born days, a spy in the enemy's country ever since I give up my gun back in the Reconstruction. Live with your head in the lion's mouth. I want you to overcome 'em with yeses, undermine 'em with grins, agree 'em to death and destruction, let 'em swoller you till they vomit or bust wide open."

His grandfather's advice haunts him throughout the course of this novel. Though his grandfather had been praised for his meekness, upon his deathbed, he seems to regret his actions and urge his relations to avoid his mistakes. His advice also demonstrates the often unclear distinction between public persona and private individual and how the outside world may dictate how one acts but not necessarily how one feels or thinks. This influence can have a detrimental effect on the quest to live an authentic life.

The narrator, despite feeling conflicted and guilty, seems to carry out his grandfather's advice. He rises high in the estimation of not only those in his school but of also the wealthy, powerful white men in town. He rises so high that he is invited to give his speech on humility, which he had already given at graduation, to a gathering of the town's leading white citizens. It was perceived as a "triumph" for his community. However, at this meeting, he is invited to take part in a battle royal, and despite his reluctance to fight, he is blindfolded and placed into the

ring with the regulars. Through this blindfolding, there is the physical removal of sight and the further dehumanization of one another. The "invisibility" of each figure is further manifest as, in this fight, the narrator reports that "everyone fought hysterically. It was complete anarchy. Everybody fought everybody else. No group fought together."

In this situation, the division between blacks is imposed, and the narrator does his best to play one against the other in order to best protect himself. He is only mildly successful as he soon is left alone with one another fighter to compete for the winner's prize. Unsurprisingly, the narrator is defeated. Yet, even when the men are unblindfolded and can see one another, they are then urged to fight one another on the floor to get the gold and bills, which are later revealed to be fake, scattered on the ground. More than that, however, the rug is electrocuted. Played against one another by the town leaders through their desperation for money and material goods, they are forced to violence. The choice - the ability - to live a more authentic life is greatly limited.

Despite this experience, the narrator is able to give his speech so well that he is gifted with not only a briefcase but a scholarship to the state college for Negroes. At this institution, the narrator rises once more to the top. He is tasked with the responsibility of driving a trustee of the college, Mr. Norton, a white Bostonian, around the campus. Their visit takes a turn as they soon approach the cabins owned by sharecroppers and soon see Jim Trueblood, who is rumored to have impregnated not only his wife but to have also raped and impregnated his daughter. Appalled by this act, Mr. Norton insists on hearing the story from Trueblood himself, and the narrator reluctantly pulls over the car. The narrator had noted, those at the college hated - or rather feared - those who lived as farmers and seemed to bring disgrace. After

Trueblood committed his crime, his wife and daughter violently lashed out against him. They threw objects at him and even struck him with a hot iron and an axe. After news of the incident spread, his black neighbors had attempted to cast him out and those at the college had been had been terrible to him. It was the wealthier white people were more moved by pity. This story told by Trueblood demonstrates the different reactions, based on race, when social mores and norms of behavior, are violated. Because this act of violence carries significantly more weight and holds significantly more bearing on not just the individual but on those of a shared race.

Shocked by this story, the narrator struggles to return the trustee back to the college. Though Mr. Norton reassures him that he does not fault the narrator, the young man is still summoned to meet with Mr. Bledsoe, the president of the college. Mr. Bledsoe draws an implicit comparison between the narrator and Trueblood when he charges him with tearing down the race rather than uplifting the race. He tells the narrator that he must be "disciplined" and that the "only way to please a white man is to tell him a lie." He has played the "game" of the grandfather, and through this mask of servility, he has won the game and the prizes that have come with it. That prize is power. Mr. Bledsoe elaborates: "Power doesn't have to show off. Power is confident, self-assuring, self-starting and self-stopping, self-warming and self-justifying." Through his lies and through his outward obedience, he claims to be in control rather than being controlled. Bledsoe, like the narrator's grandfather, demonstrates how the outward persona and private character differ and how one can work to such great success within the context of a white world. After this lecture, the narrator, thoroughly berated, is

confused and he accepts responsibility for what has happened rather than confronting the challenge of his grandfather and Mr. Bledsoe.

Expelled from the school, he is sent to New York City to find a job. Eventually, he settles into a job on Long Island, making paint with Liberty Paints. After a mishap with the paint mixing, he is sent to the basement to work with Lucius Brockway. Brockway is initially paranoid that the narrator may be an engineer or, at least, his replacement. He laters that the narrator is a union man after his job, and he threatens to outright kill him. Again, moved by the influence of the white owners and the powers at hand, there is a breakdown in communication as they begin to turn on one another and even turn to violence. The question of how to live an authentic life is twisted from above. Moreover, his "passivity and submission to absurdity have stripped him of all meaning" (Evans 19)

As soon as matters are resolved, there is a great explosion. The narrator, upon awaking, finds himself in a hospital undergoing electroshock therapy. After this simulated lobotomy, he no longer remembers his name or even who he is. He cannot even orient himself through his relations to others such as his mother. This removal of the self through such an extreme occasion of violence, which operates under the guise of healing, acts as a brief momentary reset button on the narrator's sense of identity. Removed from any relations to others, he struggles. This scene acts as a kind of extreme, exaggerated demonstration of the core underlying issues that the author should face when he is removed from those upon whom he depends for as Ellison explains "The major flaw in the hero's character is his unquestioning willingness to do what is required of him by others."

After being released from the hospital, he is taken in by a kind, older woman, Mary Rambo. Once again without work, he wanders the streets of Harlem. He witnesses the eviction of an older black couple. As the crowd begins to rush the officers, he hurries to speak up as he fears what "the sight of violence might release" in him. As "law-abiding" people, he encourages them to care for this elderly couple, who could so easily be their grandparents, to clear the streets, and to return the possessions inside to "hide their shame." There is a burst of violence as the officers are forced away as they make their way inside. This scene demonstrates how the masses can be roused to violence through a common cause and through powerful rhetoric. Moreover, this scene marks a pivotal turn in the narrator's life. Though he had been previously recognized for his speech, such as in the case of the Battle Royal, his sense of identity is once again established and strengthened, yet, now there is an element of rebellion and a liking towards a kind of "useful" violence.

Following this speech, the narrator catches the notice of Brother Jack and the Brotherhood, an organization that works to better the situation of everyone - no matter the race - in New York. Similar to Bledsoe, he too works with great success with the white man, though with far greater facility and seeming equality. As shown at the end of the novel, however, he deliberately manipulates and controls the masses. It is through the danger – violence? – of his words and his message that he stifles any search for meaning and any attempts to live authentically. Nevertheless, it is through Brother Jack that the narrator has the opportunity to find a new purpose to his life that had been lost since his expulsion from college. Again, his sense of self is greatly defined by his relation towards others and their systems of living.

Having been trained in the ideology of the Brotherhood, the narrator has great success with his speeches and rallies. He is momentarily reassigned to another part of the city, away from Harlem, when he is accused of putting his own needs before the group. He eventually returns to Harlem when the Brotherhood's influence falters. Upon his return, he runs into Tod Clifton. The former youth organizer now sells Sambo dolls, symbols of black man's dull-wittedness. The narrator is outraged, and when he attempts to pursue him, he is witness to Tod's senseless death. When Tod resists arrest for illegally selling the dolls, the police officer mercilessly shoots him. Outraged, the narrator wonders if the police officer alone would be the "historian, judge, witness, and executioner" since he only had borne witness to the crime. He raises a public funeral on his behalf, and in doing so, once again rallies public opinion and public rage to his side.

Cast from the Brotherhood for acting on his own, the narrator returns to Harlem. When he realizes that he is being followed by followers of Ras the Exhorter, who is hypercritical of the Brotherhood's actions, he buys a hat and a pair of sunglasses to disguise himself. While wandering the streets, he is mistaken for a man named Rinehart. Block after block, this Rhinehart is recognized in a variety of professions: lover, hipster, gambler, briber, and spiritual leader. This character is important in that he allows the narrator to realize the power of invisibility and the flexibility built into these relationships.

With this realization, he returns to the Brotherhood with the intention of providing them false information. Soon after this, a series of riots break out in Harlem, and he joins a gang of looters, who burn down a tenement building. He also runs into Ras, who now refers to himself as "the Destroyer." On horseback and armed with a spear and shield, Ras turns the

crowd against the narrator when he recognizes him, and he is forced into an underground coal bin. The violence demonstrates the narrator's prevailing choice to follow others, though he does so under the guise of being a sort of Rinehart figure and under the guise of following his grandfather's advice.

In the epilogue, the narrator returns to the present, and he explains that he has told his story in order to begin to tear away his invisibility. He no longer fears of waking those who are sleeping. Moreover, he has realized that when he justified others in the past, he, in fact, had to take himself by the throat and choke himself until his "eyes bulged and my tongue hung out and wagged like the door of an empty house in a high wind." As an invisible man, as one who is not recognized by others for who he is, he still has to carry that "sickness" with him. There is some part of him which is inextricably linked to those difficulties. Despite these difficulties, again, he has realized, as Ellison explains, "what he had not discovered throughout the book: you have to make your own decisions; you have to think for yourself." Moreover, he makes the brave choice to leave his "hibernation" and to emerge because he has a "socially responsible role." In this way, Ellison also emerges with a greater sense of responsibility not only for himself but for those around him than is typically associated with existentialists.

As Evans notes, whether or not themes of existentialism were "consciously injected into the texture of the work by the author," they invariably appeared in works of Afro-American literature. As such, though the exact relationship between Ellison and French existentialists Sartre and Camus is a tad tenuous, there is no denying that Ellison was dealing with existentialist themes. The narrator lives in a world in which brutality in many forms is used as an epistemological tool. This brutality emerges from the Anti-Black racism ingrained within the

American culture of the mid-1900s and this type of suffering represents a divergence from the influential, white European Existentialists of the nineteenth and early twentieth centuries. As Elliot notes, the narrator's battle "moved beyond the racial plane to a struggle with an entire universe whose inhabitants did not share his intensity, his heightened awareness, or his willingness to struggle to to the death." Through this move, Ellison allies his narrator with that of Sartre, Kafka, and Dostoyevsky.

Bibliography

Albert, Matt. *Digication e-Portfolio :: Invisible Man :: Intro.* Digication, Inc, 11 Nov., 2011. Web. May 6, 2016.

Frank, Joseph. "Ralph Ellison and Dostoyevsky." *Through the Russian Prism: Essays on Literature and Culture.* Princeton: Princeton University Press, 1989.

Jacobs, Karen. "One-Eyed Jacks and Three-Eyed Monsters: Visualizing Embodiment in Ralph Ellison's *Invisible Man." The Eye's Mind: Literary Modernism and Visual Culture.* Ithaca, New York: Cornell University Press, 2001. 145-200.

Marks, Steven Gary. "Dostoevsky's Irrationalism." *How Russia Shaped the Modern World: From Art to Anti-Semitism, Ballet to Bolshevism.* Princeton: Princeton University Press, 2002.

Powers, Dolores Beth. *The meaning of freedom in Ralph Ellison's Invisible Man.* MA Diss. University of Iowa, 1973.

Wiredu, Kwasi, ed. *A Companion to African Philosophy.* Blackwell Publishing: Malden, MA, 2004.