Darkness in Academia: Cultural Models of How Anthropologists and Journalists Write About Controversy

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> We write to inform you of an impending scandal that will affect the American Anthropological profession as a whole in the eyes of the public, and arouse intense indignation and calls for action among members of the Association. In its scale, ramifications, and sheer criminality and corruption it is unparalleled in the history of Anthropology... (Turner and Sponsel 2000)

Introduction

The memo by Turner and Sponsel marked the beginning of a scandal in anthropology that resulted in hundreds of news reports, an investigation by the American Anthropological Association, and a series of both public and private debates, which have polarized many anthropologists concerned about research ethics and human rights. The prediction by Turner and Sponsel in their email to the AAA leadership has largely come true, "this nightmarish story... will be seen (rightly in our view) by the public, as well as most anthropologists, as putting the whole discipline on trial" (Turner and Sponsel 2000). In the days following Turner and Sponsel's memo, I began saving the emails and statements about the controversy and allegations made in Patrick Tierney's *Darkness in El Dorado: How Scientists and Journalists Devastated the Amazon* (2002) on a World Wide Web site. The purpose of the web site at that time was to share the documents with my doctoral advisor, James S. Boster, while he was conducting fieldwork in Ecuador. Over time, the combination of searching for documents on the controversy and being sent materials by authors, the web site archive has grown to over 600 documents, which include news and journal articles, American Anthropological Association (AAA) El Dorado Task Force documents, statements made by individuals and organizations, and emails sent on email lists during the first few months after Turner and Sponsel's email (Hume 2012a).

The aim of this paper is to systematically explore these documents for lexical patterns that indicate how key terms were used to analyze and report the allegations, thus forming cultural models of the Darkness in El Dorado controversy. The purpose of this paper is not an analysis of the validity of the allegations in Tierney's book or to take sides with any of the stakeholders in the controversy. Rather, by conducting a systematic analysis of terms used to write about the controversy, the variation in the cultural models of various actors (e.g., journalists and anthropologists) is described and compared.

Background

In place of a history of the Darkness in El Dorado controversy (for an historical account see Borofsky (2005)), the following is a summary of my personal involvement with the controversy and the theoretical basis for the analysis of cultural models. I do not have an opinion on the validity of the allegations made in Tierney's book and by others. I created the web site archive of documents about the controversy so that those who are interested in the controversy could find information to arrive at their own decision about who was telling the truth, what actually happened, and what actions should be taken. There are others who are more qualified by either experience with the Yanomami or with the key players in the scandal that should be stating opinions about the matter.

My personal contribution to the discussion to the Darkness in El Dorado controversy, other than a conservator of information, has been as an audience member during the "Research Among the Yanomami" panel at the American Anthropological Association (AAA) meetings in San Francisco, November 16 2000 and the "A Critical History of the 'Darkness in El Dorado' Controversy" panel at the AAA meetings in Philadelphia, December 2 2009, as well as a discussant in a session about the Darkness in El Dorado controversy at the 2010 AAA Annual Meetings, in New Orleans, where I presented a paper on the status of the web archive of documents on the controversy (categories, content numbers and page views) (Author 2010). As of February 2012, the archive houses 615 documents indexed and categorized on 14 web pages (Hume 2012a). The Darkness in El Dorado archive documents receive approximately 2,500 page views per month. In sum, my participation in the controversy thus far has been an observer and collector of written material about the controversy, not as a stakeholder in the validity of the allegations.

In an attempt to discover lexical patterns of the written material that I have collected over the past ten years, cultural modeling is used to describe the patterns in terms that have been used by authors writing about the controversy in journal and news articles, the AAA Darkness in El Dorado Task Force documents, emails and letters written just after the controversy arose, and unpublished position statements by individuals and organizations. Cultural models consist of one or more semantic relationships (schemas) that organize the elements of cognition into interpretive frameworks used to describe internal or external phenomena (D'Andrade 1995:151). The lexicon used to describe phenomena provides a method for interpreting the same phenomena. Variation among individuals in their application and knowledge of a cultural model may reflect context in which the model is applied, use different schemas and/or different aspects of the same schema, or rely upon a different hierarchal level of the cultural model (Garro 2000:285-287). To build a cultural model of how journalists, anthropologists, and others have written about the Darkness in El Dorado Controversy, text analysis

(modified from Gravlee and Sweet 2008) and network analysis (see Borgatti et al. 2009 and Hanneman and Riddle 1998) were chosen to conduct a systematic analysis of the contents of the Darkness in El Dorado documents in my archive.

Methods

In an attempt to be transparent in the methods used for the analysis of the documents as well as provide the steps necessary for such an analysis for other researchers, the following is a detailed narrative of the methods used for this analysis. Of the 615 documents collected about the Darkness in El Dorado controversy, 87 were not used in the analysis because they either were not written in English (70) or written before the controversy "broke" in September 2000 (17) (Hume 2012b). The earlier documents were excluded because they were not reactions to or reporting on the allegations made in Tierney's book. The remaining 528 documents were converted to plain text from HTML using TextMate (Odgaard 2010) and PDF using Acrobat X Professional (Adobe Systems 2011). Any extraneous text (i.e., the header information for HTML documents which includes "Darkness in El Dorado - Archived Document") was removed after conversion to plain text. These document were then separated by type: AAA documents (44), emails and letters (34), published documents (296), and unpublished documents (154). The AAA documents include the Preliminary Report of the AAA El Dorado Task Force documents and media advisories (Hume 2012c) as well as the Peacock Report (Peacock et al. 2001). The emails and letters include posts to listervs (i.e., ANTHRO-L) dated between September and November 2000 (Hume 2012d) and the Turner and Sponsel Memo (Turner and Sponsel 2000). The published documents include newspaper, journal, newsletter, book reviews (Hume 2012e), film reviews (Hume 2012f), and online news articles (Hume 2012g). Unpublished documents include statements by universities, individuals, and organizations, excluding the AAA documents (Hume 2012h). I acquired the unpublished documents mostly by direct email from the authors.

Once the documents were prepared, they were coded for key terms using MAXQDA (2010). The codes were created for those terms which occurred more than 50 total times and met any of the following criteria: (1) proper names (i.e., *Chagnon*, *Tierney*, and *Yanomami*), (2) words related to the controversy (i.e., *investigation*, *crimes*, and *genocide*, but not city, goal, or nation), and (3) dates (i.e., *2001* and *November*). In the 528 documents, the 511 terms were auto-coded through lexical searches, which resulted in 244,492 coded segments. The coded segments were then analyzed and exported for further statistical analysis by coded segments (individual codes by document and category) and code relations (instances where each code occurs in the same sentence, with another code) with all documents and each document category.

The coded segments were analyzed with SYSTAT (2009) using two-way tables to discover which terms were used more frequently in some types of documents (e.g., number of times *Chagnon* is mentioned in AAA documents versus published documents) as well as which terms were used more frequently in different years, which resulted in 2,044 code instances (511 codes in each of the four document types). The 10 terms with the highest and lowest standard deviations from the mean across all documents were isolated (see tables 1 to 3 below). The limit of twenty terms was chosen as a representation of the major sources of variation in the content of the documents and is by no means exhaustive of the minor analytical differences among documents.

The code relation data were analyzed with UCINET (Borgatti et al. 2002) and visualized with NetDraw (Borgatti 2002). The code relation data was plotted with NetDraw where the numbers of relationships shown were adjusted (reduced and increased) until a discernable pattern developed among the nodes and ties in the diagram. The isolated nodes (terms) were then removed and the eigenvector score for each node was used to adjust the node size in the network (see figures 1 to 7 below). An eigenvector "is an effort to find the most central actors… in terms of the 'global' or 'overall' structure of the network" (Hanneman and Riddle 2005:157). By using the statistical method of factor analysis, the location of each node's distance to other nodes is termed an eigenvalue, the sum of which is termed an eigenvector (Hanneman and Riddle 2005:157). The network diagrams enable the comparison of terms used in the documents by how the near terms appear to each other and how connected they are to other terms in the network.

Results

The word frequency analyses yielded patterns that indicate the focus of the Darkness in El Dorado controversy. The ten most frequent terms used in all of the documents were (out of the 244,492 coded segments): *Yanomami* (9319), *Chagnon* (7945), *Neel* (6231), *Tierney* (5717), *research* (4076), *book* (3630), *measles* (2933), *anthropology* (2875), *anthropologists* (2535), and *vaccine* (2264). These results are not surprising as the key players (*Yanomami*, *Chagnon*, *Neel*, and *Tierney*) and issues (*research*, *measles*, and *vaccine*) are represented, as well as the mechanism for the controversy's publicity (*book*) and the discipline responsible for the research among the Yanomami (*anthropology* and *anthropologists*).

Table 1:Ten highest and lowest coded terms within each category of documents by their standard deviations from the mean across all documents.

Coded Term	Document Category	Count	Mean Across All Documents	Standard Deviation from Mean
Tierney	AAA	510	1293.61	-21.79
Chagnon	AAA	1194	1797.75	-14.24
Sponsel	AAA	48	219.49	-11.58
Davi	Published	22	174.25	-11.53
Neel's	AAA	4	120.6	-10.62
Health	Published	170	368.79	-10.35
Tierney's	AAA	1	107.93	-10.29
Controversy	AAA	18	138.93	-10.26
Epidemic	AAA	213	424.26	-10.26
Chagnon's	AAA	2	107.48	-10.17
Scientists	Published	594	334	14.23
2001	AAA	484	255.46	14.3
Kopenawa	AAA	182	64.26	14.69
Tierney	Published	2541	1841.36	16.3
1967	AAA	309	118.79	17.45
Neel's	Unpublished	440	193.54	17.72
Yanomami's	AAA	198	57.25	18.6
Chagnon	Published	3503	2558.97	18.66
Tribe	Published	408	163.3	19.15
Davi	AAA	382	122.41	23.46

An analysis of how the coded terms vary in frequency of use in each category of documents yields a pattern of use that indicates a discrepancy between how the controversy was written about in the AAA documents and the published news articles (see table 1). The terms *1967*, *2001*, *Yanomami's*, and *Davi Kopenawa* (coded separately, but together indicate one individual) were used more often and the terms *Tierney*, *Chagnon*, *Sponsel*, *Neel's*, *Tierney's*, *Controversy*, *Epidemic*, and *Chagnon's* were used less often in the AAA documents, on average, than any other category of documents. The terms *tribe*, *Chagnon*, *Tierney* and *scientists* were used more often and the terms *Davi* and *health* less often in the published news articles than any other category of documents. As indicated by the document categories listed in table 1, the greatest disparity between how terms are used exists between the AAA documents and the published news articles.

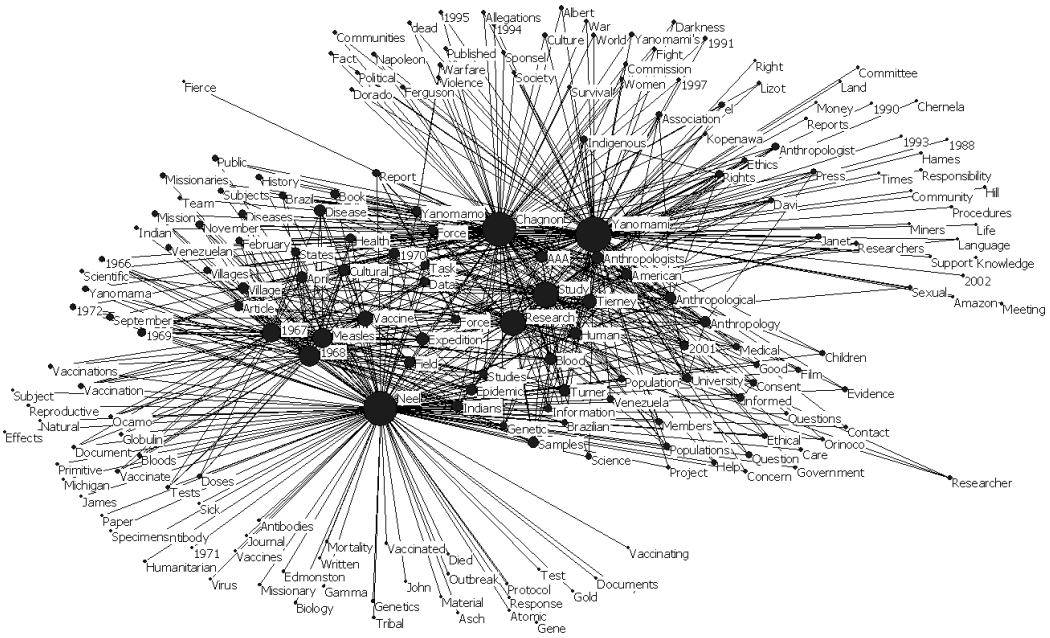

Figure 1: Network diagram of terms among all documents (only the ties with a strength of 5,000 or greater are shown and isolates have been removed).

The network analysis of the relationships between the terms in all documents shows a pattern where there are three central nodes (*Neel*, *Chagnon* and *Yanomami*), which organize the terms into three clusters (see figure 1). The analysis of eigenvector centrality indicates that there is not one node or a small set of central nodes that are tied to the rest of the nodes in the network, but that the network contains multiple clusters that are minimally tied to one another (the first factor explains 29.5 percent of the variance and there is a 2.878:1 ratio between first and second eigenvalues). The node size in all figures is a function of eigenvector centrality, larger nodes having more connections to other nodes and smaller nodes have few connections to other nodes. Overlapping nodes have been moved from their original location so that the entire labels are visible.

The first cluster of nodes (indicated in the grouping in the lower left side of Figure 1) are mostly connected to *Neel* and include terms concerning his actions while doing research among the Yanomami (e.g., *vaccination*, *specimens*, *humanitarian*, *sick*, and *protocol*), descriptions of his background (e.g., *biology*, *Michigan*, and *atomic*), and various other terms that are not necessarily connected only with *Neel*, but apparently were used in close proximity to *Neel* in the documents (e.g., *gold*, *Asch*, and *journal*). The second cluster of nodes (indicated in the grouping in the upper left side of figure 1) are mostly connected to *Chagnon* and *Yanomami* nodes. This cluster includes terms concerning Chagnon's

research with the Yanomami (e.g., *warfare*, *violence*, *Ferguson*, and *culture*) and the experiences the Yanomami have had with outsiders (e.g., *miners*, *money*, and *ethics*). The third cluster of nodes (indicated in the grouping in the middle of the diagram) include terms related to the 1966 to 1967 expedition (left hand side; e.g., *mission*, *measles*, and *team*), the investigation by the AAA El Dorado Task Force (e.g., *AAA*, *Task*, *Force*), and informed consent (right hand side; e.g., *ethical*, *contact*, and *consent*).

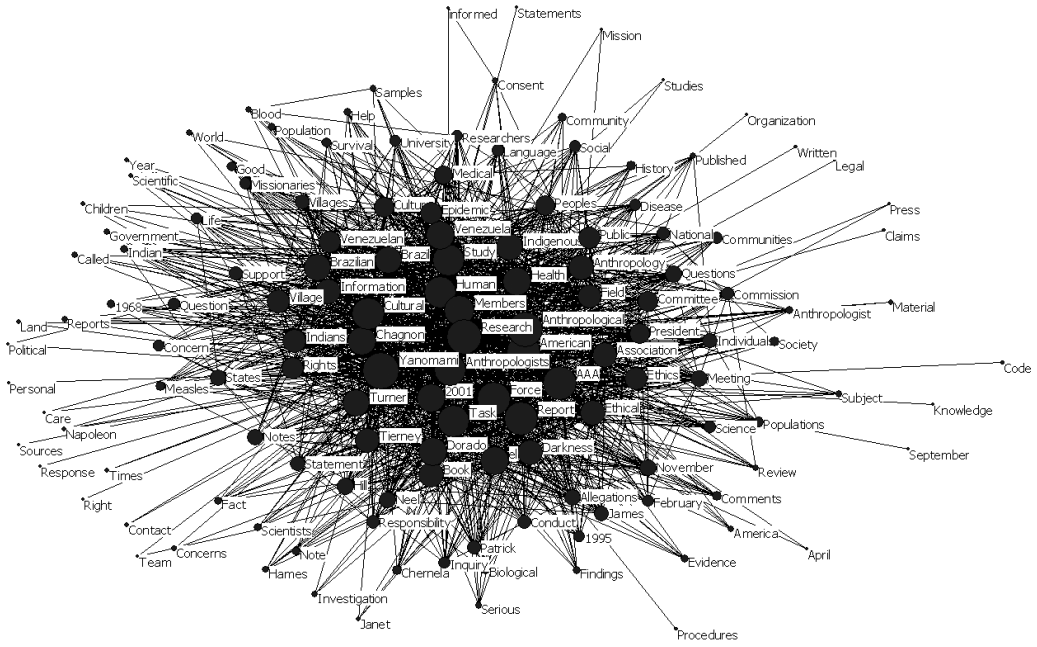

Figure 2: Network diagram of terms among the AAA documents (only the ties with a strength of 15 or greater are shown and isolates have been removed).

The network analysis of the relationships between the terms in the AAA documents shows a pattern containing many central nodes, which organize the terms into one cluster (see figure 2). The analysis of eigenvector centrality indicates that there are many nodes that are tied to the rest of the nodes in the network (the first factor explains 23.1 percent of the variance and there is a 9.524:1 ratio between first and second eigenvalues). The center of the network diagram represents the mechanisms (e.g., *members*, *task*, *report*), key concerns (e.g., *health*, *Yanomami*, *epidemic*), and locations of interest (e.g., *Venezuela* and *Brazilian*) for the AAA Darkness in El Dorado Task Force. The outside nodes of the diagram represent the issues that the task force considered in their investigation (e.g., *procedures*, *code*, *claims*, *informed*, *samples*, and *children*).

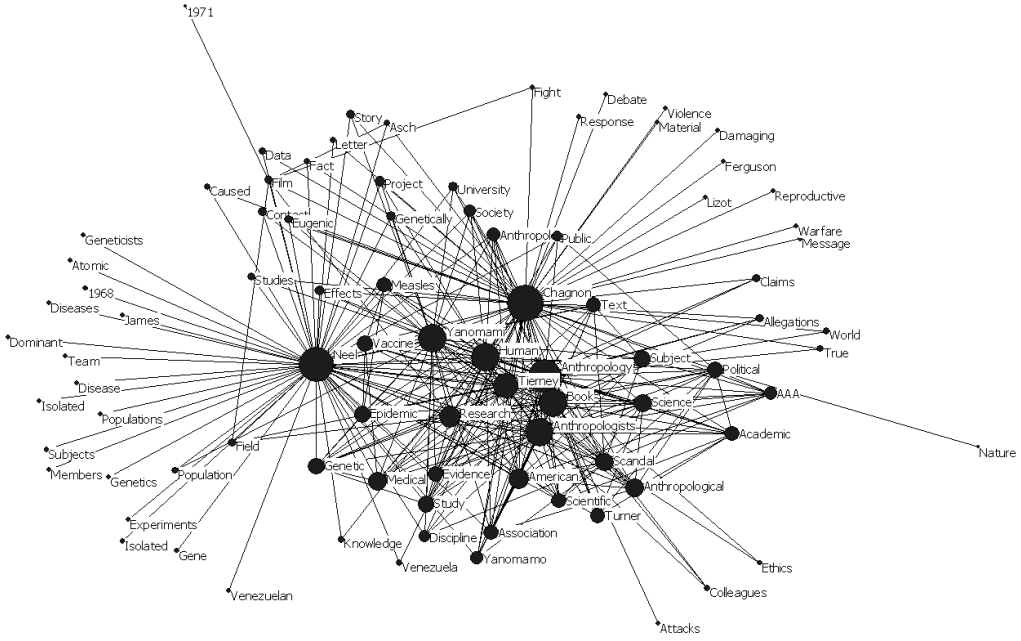

Figure 3: Network diagram of terms among the email documents (only the ties with a strength of 500 or greater are shown and isolates have been removed).

The network analysis of the relationships between the terms in the email documents shows a pattern where there are two central nodes (*Neel* and *Chagnon*) with several other nodes that are well connected (see figure 3). The analysis of eigenvector centrality indicates that there are several nodes that are tied to the rest of the nodes in the network (the first factor explains 34.6 percent of the variance and there is a 4.117:1 ratio between first and second eigenvalues). The two central nodes (*Neel* and *Chagnon*) border a central cluster of terms where the lower half terms are related to anthropology and anthropological ethics (e.g., *research*, *anthropologists*, and *ethics*), while the upper terms are related to their 1967 to 1968 research expedition (e.g., *measles*, *project*, and *caused*). The left cluster of terms is nearly exclusively connected with *Neel* and includes terms related to his bio-medical research (e.g., *disease*, *genetics*, and *atomic*). The upper left cluster of terms is almost exclusively connected with *Chagnon* and includes terms related to his research with the Yanomami (e.g., *violence*, *reproductive*, and *warfare*).

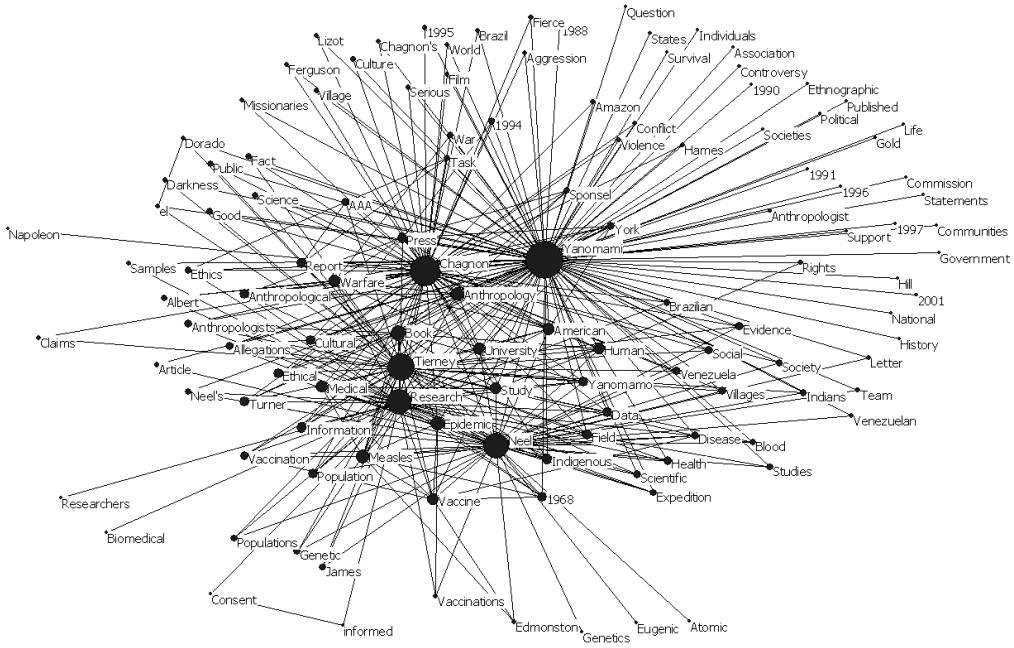

Figure 4: Network diagram of terms among the published documents (only the ties with a strength of 900 or greater are shown and isolates have been removed).

The network analysis of the relationships between the terms in the published documents shows a pattern where there is one central node (*Yanomami*) and four semi-central nodes (*Chagnon*, *Tierney*, *research*, and *Neel*) which form one rough cluster (see figure 3). The analysis of eigenvector centrality indicates that there are some nodes that are tied to the rest of the nodes in the network (the first factor explains 30.4 percent of the variance and there is a 3.627:1 ratio between first and second eigenvalues). The dense center of this network consists of general terms about the controversy (e.g., *Yanomami*, *anthropology*, *Tierney*, *research*, *Neel*, and *study*). Terms in the lower part of the diagram focus on research ethics of Neel's biomedical research (e.g., *atomic*, *vaccinations*, *genetic*). The left side of the network consists of terms concerning anthropological ethics (e.g., *ethics*, *samples*, and *allegations*). The upper part of the network consists of Chagnon's research among the Yanomami (e.g., *village*, *war*, and *aggression*). The right side of the network includes about the AAA Task Force investigation (e.g., *commission*, *Hill*, and *evidence*).

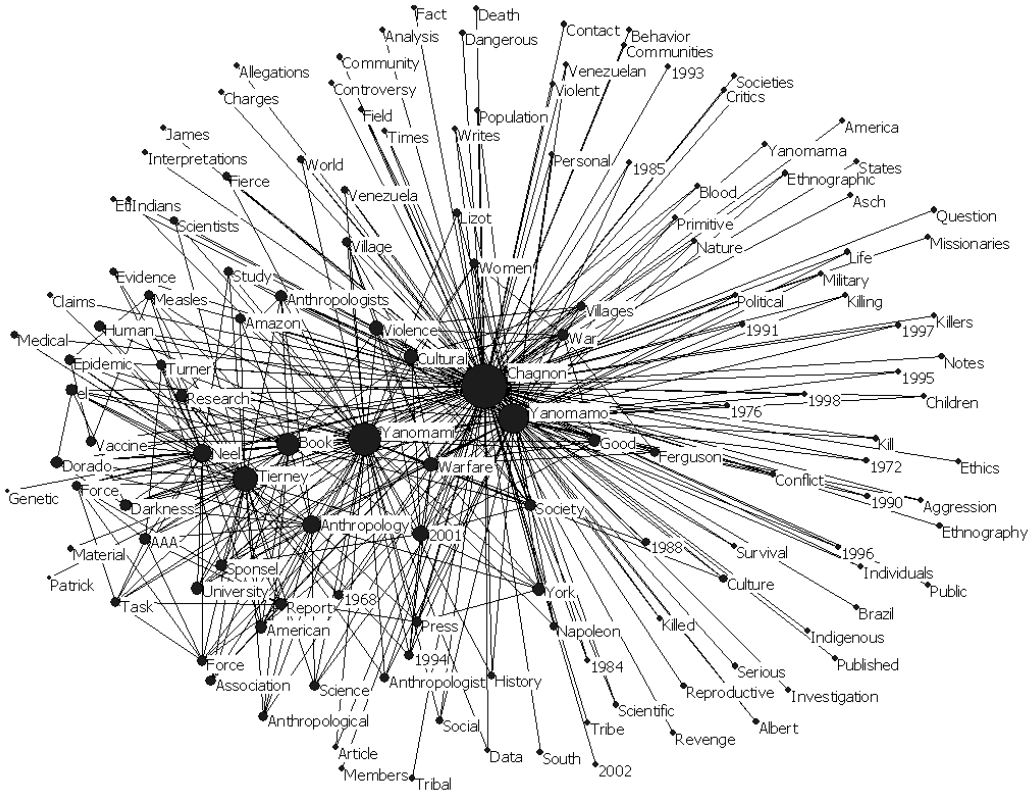

Figure 5: Network diagram of terms among the unpublished statements (only the ties with a strength of 900 or greater are shown and isolates have been removed).

The network analyses of the relationships between the terms in the unpublished statements shows a pattern which has one central node (*Chagnon*) with several other nodes forming interconnections with each other (see figure 5). The analysis of eigenvector centrality indicates that there are few nodes that are tied to the rest of the nodes in the network, this network is the least connected among those networks analyzed here (the first factor explains 21 percent of the variance and there is a 3.607:1 ratio between first and second eigenvalues). Several nodes are loosely clustered in the center-left side of the diagram and contain common general terms about the controversy (e.g., *Tierney*, *Yanomami*, *Neel*, and *anthropology*). The upper part of the network includes terms related to allegations of harm (e.g., *violence*, *death*, and *claims*). The left side of the diagram includes terms related to the cause of harm (e.g., *killing*, *missionaries*, and *aggression*). The lower part of the diagram includes terms concerning research among the Yanomami (e.g., *anthropology*, *science*, and *data*).

Table 2:Ten highest and lowest coded terms within all documents by their standard deviations from the mean across all documents.

Coded Term	Year	Count	Mean Across All Documents	Standard Deviation from Mean
Force	2000	104	843.04	-25.45
Task	2000	49	419.68	-18.09
Tierney	2002	520	1104.23	-17.58
Book	2002	265	738.55	-17.43
Blood	2000	111	480.27	-16.85
Yanomamo	2002	36	278.50	-14.53
Yanomami	2000	2130	2872.43	-13.85
Research	2000	766	1242.53	-13.52
Report	2000	140	406.47	-13.22
Davi	2000	6	179.55	-12.95
Task	2002	612	265.71	21.24
Book	2000	1904	1166.52	21.59
Tierney	2000	2646	1744.09	21.60
War	2010	131	21.05	23.96
Force	2004	156	26.52	25.14
Referendum	2003	17	0.36	27.79
Immunization	2003	23	0.65	27.79
Yanomamo	2010	234	43.86	28.71
Force	2002	1242	533.75	30.66
Resolution	2003	30	0.69	35.31

In addition to the document category, time (coded by year) is another attribute that shows a pattern of variation in the terms used to describe the Darkness in El Dorado controversy. An analysis of how the coded terms vary in frequency of use in all of the documents results in the largest variance being between in the AAA documents and the published news articles (see table 2). The terms *Tierney, book, blood,* and *Yanomami* were used more often in earlier documents than later ones. The terms *resolution, task force* (coded as two terms), *Yanomamo, immunization, referendum, research*, *report*, and *Davi* were used more often in later documents than earlier ones. These terms are confounded by document type, as 72 percent of the documents are dated in either 2000 or 2001,

the AAA Task Force documents in 2002 are longer than most other documents, the emails and letters are exclusively from 2000, and the 2010 documents mostly concern José Padilha's film, *Secrets of the Tribe* (2010).

Table 3:Ten highest and lowest coded terms within published journal and news articles in 2000 and 2001 by their standard deviations from the mean across all documents.

Coded Term	Year	Count	Mean Across All Documents	Standard Deviation from Mean
Neel	2001	323	454.59	-6.17
Yanomama	2000	97	171.44	-5.69
Report	2000	59	104.81	-4.47
Public	2000	77	116.61	-3.67
Scientists	2001	104	148.67	-3.66
Web	2000	35	63.16	-3.54
Amazon	2001	90	130.32	-3.53
Book	2001	403	475.70	-3.33
Mead	2001	7	22.03	-3.20
Anthropologists	2001	173	219.95	-3.17
Warfare	2001	81	52.62	3.91
Sociobiology	2001	42	22.64	4.07
Task	2001	28	13.15	4.09
Neel	2000	1163	1031.41	4.10
Lizot	2001	48	26.61	4.15
Albert	2001	16	5.81	4.23
Web	2001	56	27.84	5.34
Public	2001	91	51.39	5.52
Report	2001	92	46.19	6.74
Yanomama	2001	150	75.56	8.56

An analysis of how the coded terms vary in frequency of use in the published documents for 2000 and 2001 yields pattern of use that indicates a change in focus between how the controversy was written about in the AAA documents and the published news articles (see table 3). The terms *Neel, scientists, Amazon, book, Mead,* and *anthropologists* were used more often in 2000 than 2001 documents. The terms *Yanomama, report, public, web, Albert,*

Lizot, task, sociobiology, and warfare were used more often in 2001 than 2000 documents.

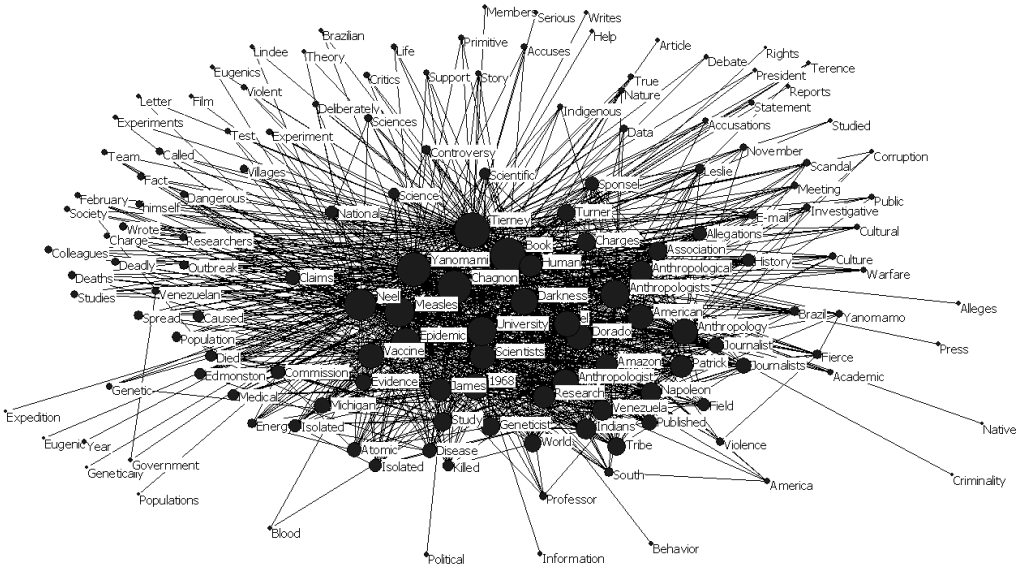

Figure 6: Network diagram of terms among the published journal and news articles in 2000 (only the ties with a strength of 33 or greater are shown and isolates have been removed).

The network analyses of the relationships between the terms in the published documents in 2000 shows a pattern where there are several central nodes (*Tierney*, *book*, *Yanomama*, and *Chagnon*) with several other secondary nodes (e.g., *Neel*, *measles*, *epidemic*, *university*, *scientists*, *darkness*, *el*, *dorado*, *anthropology*) being prominent as well (see figure 6). The analysis of eigenvector centrality indicates that there are several central nodes that are tied to the rest of the nodes in the network (the first factor explains 19.5 percent of the variance and there is a 6.51:1 ratio between first and second eigenvalues). While the center of this network is focused several nodes (see list of central and secondary nodes above) the terms on the left side of the diagram focus on the alleged impact of research with the Yanomama (e.g., *outbreak*, *team*, and *spread*). The upper part of the network includes terms related to the general discussion among academics about the allegations (e.g., *critics*, *accuses*, and *controversy*). The right side of the diagram includes terms related to the discussion among anthropologists at the 2000 AAA meetings (e.g., *meeting* and *investigative*). The lower part of the diagram does not include many terms, but appears to be focused upon aspects of Neel's research (e.g., *atomic* and *disease*).

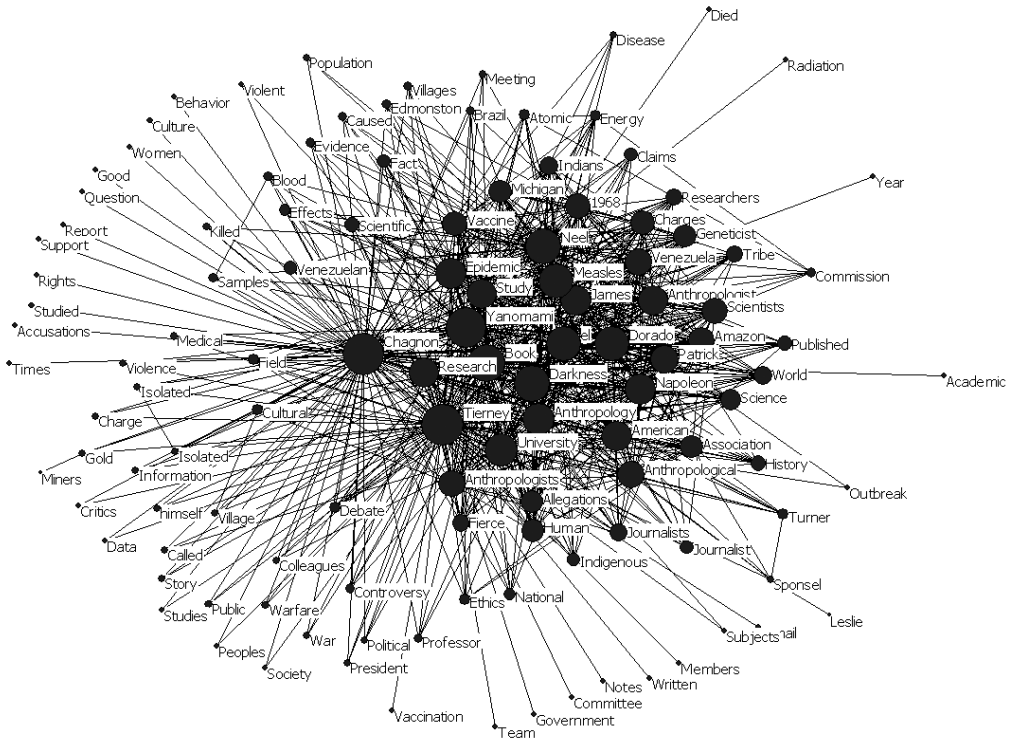

Figure 7: Network diagram of terms among the published journal and news articles in 2001 (only the ties with a strength of 15 or greater are shown and isolates have been removed).

The network analyses of the relationships between the terms in the published documents in 2001 show a pattern where there are three central nodes (*Tierney*, *Yanomama*, and *Chagnon*) with several other nodes (e.g., *Neel*, *measles*, *epidemic*, *university*, *scientists*, *darkness*, *el*, *dorado*, *anthropology*) form a cluster in the right side of the diagram (see figure 7). The analysis of eigenvector centrality indicates that there are several central nodes that are tied to the rest of the nodes in the network (the first factor explains 16.2 percent of the variance and there is a 7.264:1 ratio between first and second eigenvalues). While the center of this network has several nodes (see list of central and secondary nodes above) the terms on the left side of the diagram include terms related to Chagnon's research among the Yanomami (e.g., *miners*, *samples*, and *violence*). The upper part of the network includes terms related to the Neel's research among the Yanomami (e.g., *Edmonston*, *atomic*, and *disease*). The lower part of the diagram includes terms related to the discussion among anthropologists and others about the allegations made in Tierney's book (e.g., *ethics, committee,* and *members*).

Discussion and Conclusion

Our biases constrain and at times may even determine how we interpret evidence, motives of others, and implications for actions. Due to the biases that we, as anthropologists, have due to our theoretical, personal, and advocacy positions, formal systematic analysis of the Darkness in El Dorado archive documents is an avenue towards understanding how the terms used results in cultural models of the controversy. Things are related to each other and the strength of the relationship is important to understanding variation in patterns of cultural knowledge. The network analysis above demonstrates that different groups of actors (those who wrote the AAA documents, published news and journal articles, unpublished statements, and email documents) present different cultural models of the controversy, whether the authors are focused on allegations (AAA documents), Chagnon (email and unpublished documents) or Yanomami (published journal and news articles), they have created different cultural models of the Darkness in El Dorado Controversy. Over time, the emphasis on different terms also indicates changes in cultural models of the controversy.

The pattern that resulted from an analysis of the terms in all documents (see figure 1) shows that three actors (Neel, Chagnon, and the Yanomami) form central nodes by which issues on the controversy are organized. Neel is associated with his research activities and motivations during the 1967 to 1968 expedition. Chagnon and the Yanomami are associated with critiques about Chagnon's research among the Yanomami. All three actors frame issues relating to the 1967 to 1968 expedition and the investigation by the AAA Darkness in El Dorado task force on research ethics. It appears, from this analysis, that the controversy forms around three distinct suites of issues: (1) Neel's biomedical methods and motivations, (2) Chagnon's prior research findings among the Yanomami, and (3) the investigation of the 1967 to 1968 expedition by the AAA. Not surprisingly, the AAA documents (see figure 2) are focused on issues relating to the investigation of the 1967 to 1968 expedition. Questions about Chagnon's research findings among the Yanomami and Neel's biomedical methods and motivations are largely absent.

The email documents (see figure 3), while tightly centered on general terms concerning the actors a key issues of the controversy (e.g., Chagnon, Neel, Yanomami, evidence, and vaccine), the terms associated with ethics are minimal (lower part of figure 3) when compared to the number of terms concerning Neel's research approach (left side) and critique of Chagnon's prior research findings among the Yanomami. The unpublished statements by individuals and organizations clearly center upon Chagnon and most of the ties between nodes concern terms associated with Chagnon's research among the Yanomami and allegations against Chagnon (see figure 5).

The analysis of the published news and journal articles produced the only network in which Yanomami, not Chagnon, Neel, or a host of other significant

terms is the central node of the network (see figure 4). This pattern is important because the published news and journal articles became the public face of anthropology, how the general public was informed about the Darkness in El Dorado Controversy. From the central nodes of this network, we can construct the basic message that was received by readers, Tierney wrote a book about how Chagnon and Neel's research caused an epidemic among the Yanomami. Of course, there is much more to this story; the claims, allegations, and reports that have biases and are subject to interpretation. These cultural models have significance beyond the writers of the documents. Those that read the documents may, depending upon their own lenses and biases, adopt or be otherwise affected by the cultural model coded in the writing of the article. Of special interest is how non-anthropologists learned about and assimilated the cultural model of the Darkness in El Dorado controversy from the published documents.

The frequency of several terms used to describe the controversy changed between 2000 and 2010 (see table 2). In the short term, between 2000 and 2002, there was a shift away from terms such as *Tierney, book, and Yanomamo* towards terms such as *task force, blood, Yanomami, resolution, immunization,* and *referendum.* This change indicates that the controversy was less about Tierney's book and more about the investigation and the referendum to rescind the AAA's acceptance of the Report of the El Dorado Task Force. The difference between the 2000 and 2001 network analyses is not in the central terms used (e.g., *Chagnon, Tierney* and *Yanomama*) or in the secondary terms of importance (e.g., *Neel, measles, epidemic, university, scientists, darkness, el, dorado, anthropology*), but the tertiary terms that were used to describe the Darkness in el Dorado controversy (see table 3 and figures 6 and 7). As indicated by the centrality of the nodes and the number of connections to other nodes, the focus on Tieney's book and the allegations against Neel and Chagnon in 2000 metamorphizes into a focus on Changon's actions and the response of the American Anthropological Association in 2001.

The systematic analysis of the Darkness in El Dorado archive documents has resulted in a complex set of cultural models that are dependent upon the genre of the documents (e.g., AAA Task Force versus journal and news articles) and the time in which the document was written. Text and network analysis enable the analysis of complex patterns among coded terms among numerous documents in which the variation in times used and relationships with other terms may be statistically and visually analyzed as well as interpreted. The text and network analysis in this paper did not and cannot address important issues central to the Darkness in El Dorado controversy, namely the validity of the allegations, the impact that the controversy has had on the individuals and communities involved, and how anthropologists should use this controversy to reflect on our current research ethics, but has shown the cultural models that have been used to write

about the controversy. As anthropologists and others write about these important questions, the terms they choose to weave together in their writing will, no doubt, create new cultural models of the controversy. We, as anthropologists, must take time after we write on these issues to analyze and reflect how our cultural models on the Darkness in El Dorado controversy have changed or perhaps, stayed the same.

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