The Conflict Over Origins: A Discourse Analysis of the Creationism/Evolution Dispute*

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The debate about human origins between creationists and natural scientists is hardly a new one. In its latest cycle, the dispute concerns the status of Intelligent Design creationism and the process of teaching of evolutionary theory in public schools. In public discourse, this dispute is primarily political but motivated by deeply held feelings about identity. The creationists have a religious motivation and see themselves as defending a Christian identity – "humans as made in the image of God" – against the forces of secular humanism, which would depict humans as "merely animals." The scientists see the issue primarily in terms of professional identity. It is a matter of good science versus bad. The present study uses network modeling tools to investigate the most recent iteration of this long-standing dispute. Newspaper texts depicting the controversy are subjected to content coding to reveal the development of the semiotic network that forms the basis of the conflict. Characteristics of the public discourse are compared by time and urbanization. Analysis reveals how presentations of the controversy give voice to and speak to particular constituencies while excluding others. Arguments sympathetic to the creationist version of events tend to portray the conflict as a scholarly dispute between old orthodoxy and a new theory, minimizing the religious nature of the ID movement. Arguments friendly to the science side portray a conflict involving the separation of church and state and the best interests of science education. The newspaper coverage of the creationism dispute from September 2005 to December 2005, around the time of the Dover trial, generally showed more sympathy to the scientific argument. The network structure of the discourse centers on a cluster of central themes, including evolution, creationism, science, and education, with secondary concepts such as complexity, controversy and religion connected to the main hubs. There were few differences in the discursive network when compared by metropolitan and non-metropolitan sources.

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Many people – participants and onlookers – see the dispute about intelligent design creationism as one of the fronts in the "culture war." Indeed, Gordy Slack (2007) calls it "the battle over the meaning of everything." It is an interesting sociological puzzle. On the one hand, there is no scientific debate at the heart of this dispute. Despite the best efforts of its proponents, the intelligent design movement is just that, a movement and not a scientific theory. It has zero credibility in biology. The science is quite clear: evolution by natural selection is the best explanation of the diversity of life on the planet. Creationism, in any of its incarnations (Old Earth, Young Earth, Creation Science, Intelligent Design) is not regarded as legitimate scientific practice.

On the other hand, the creationist impulse is clearly closer to public opinion. People believe the creationist story of origins, whether literally or metaphorically; Americans' high levels of belief and apparent religiosity are well known. There is something generally appealing to Americans about the belief that humans were created in their present form by a supernatural force. Something about the evolution explanation is hard to accept. Though some of those who believe in the creationist story are, as a result, anti-science, many – perhaps most – are not. In any individual, it might be dismissed as merely cognitive dissonance. Collectively, however, it is a social conflict that involved social movements, political organizations, public education, and the courts.

The debate about creationism is a political one. It concerns issues such as science teaching in public education, the social status of science, conflict over social morality, and more. It is very clearly a major dispute in the public sphere. The present study endeavors to map some of the important features of this dispute by way of exploratory analysis of the newspaper coverage of the debate over intelligent design creationism.

Discourse and the Public Sphere

Habermas (1989) defines the "public sphere" as an ideal type of social activity associated with politics in the modern era. He notes: "The bourgeois public sphere may be conceived above all as the sphere of private people come together as a public; they soon claimed the public sphere regulated from above against the public authorities themselves, to engage them in a debate over the general rules governing relations in the basically privatized but publicly relevant sphere of commodity exchange and social labor" (Habermas 1989:27). It emerged only when authority became depersonalized and a civil society developed as distinct from the state. It is the place where individuals, as private citizens,

converged to discuss political principles that bear on their interests (Calhoun 1992; Habermas 1989).

The public sphere is not simply the context of politics in modern societies. Rather, it is the location of a kind of communicative practice. The spread of news, which accompanied the spread of commerce, made possible a sense of common interests (Henkin 1998). The connection between private economic interactions and political discourse is of vital importance for the developing sense of the meaning of "public." Calhoun (1992:8) notes, "[t]he same processes helped to engender both a more widespread literacy and an approach to the printed word as a source of currently significant 'public' information." This sense of "public" could materialize only with rational discussion. Because of its rational basis, the bourgeois public sphere, Habermas (1992) argues, contained universalistic discourses that, at least potentially, could be adapted as new groups were incorporated into the cultural elite. It was potentially inclusive as a result of the spread of public texts, such as books, newspapers and pamphlets. What mattered was the quality of the idea, not the status of the speaker (Calhoun 1992).

One manifestation of this communicative practice, of particular importance to the public discourse of newspapers, is the construction of social problems. The public sphere is the stage for the political spectacle (Edelman 1988). Public discourse in the welfare state is a form of claims-making (Calhoun 1992; Habermas 1992). Negotiations over social policy often play a critical role in the rhetorical construction of problems (Edelman 1988). Claims-making results from the mobilization of social movements; movement organizations have a hand in constructing the political spectacle.

Recent social movements literature has been guided by two influential theoretical perspectives, political process and resource mobilization. Both perspectives see collective action as primarily rational and goal-directed, with attention paid to the construction and maintenance of group solidarity. Contemporary work has focused on patterns of action, repertoires, and their temporal sequencing, cycles (Tilly 1995; Tarrow 1995).

Decision-making is seen as an important part of collective action. In order to understand how group decision-making is possible, Gamson (1992), Snow and Benford (1992), and others, have focused on the process of framing. Frames are defined as cognitive schemes that organize perception and apprehension of the events and actors that populate the experiences of movement participants. Frames constitute the complex unnoticed structure that people use to figure out "what is going on." The core tasks of framing include diagnosis (constructing some aspect of the social world as a social problem amenable to collective action), prognosis (constructing a strategy that gives participants a feeling of efficacy), and motivation (constructing an emotional attachment to the values and activities

of the movement) (Snow and Benford 2000). Frames are sometimes constructed interactively in the course of collective action, but as Snow et al. (1986) assert, they are sometimes presented by movement organizers, especially "professional activists," as finished and fixed features of the movement.

A promising development is the recent "discursive turn" in social movement research. Steinberg (1994, 1998, 1999) has cogently assessed the theoretical problems of frame analysis. Drawing on Bahktinian semiotics and cultural psychology, he shows how the concept of discourse supplies the necessary flexibility and subtlety to account for the symbolic dimension of modern social movements. Whereas frames suggest a fixed or relatively rigid content, the discursive field calls attention to the dynamic properties of symbolic material. The present work builds on the notion of a discursive field by applying some of the concepts from the study of networks.

The Evolution/Creationism Dispute

American creationism has a long history. It appeared at about the same time as Darwin's *On the Origin of Species* arrived in the U.S. Although it is commonly understood to be a class-based (via access to formal education) movement, Numbers (1998) argues that the conflict is inspired more by theological perspective. He notes that many religious organizations remained ambivalent to evolution and that a few embraced it, either as theistic evolution – the idea that evolution is directed by the deity – or in the belief that scientific evolution reveals the mind of God.

It is a certain conservative theology, centered on a hyper-literalist interpretation of scripture, that motivates active opposition to evolution. Fundamentalists have tended to be more reactionary on this issue than Pentecostals (Numbers 1998). It appears that anxiety over Biblical authority is the main reason for this. Numbers quotes Baptist creationist Henry Morris as explaining "If you take Genesis [the book in which the creation stories are given] literally, you are more inclined to take Revelation literally" (Numbers 1998:7).

According to Larson (2007:14) the anti-evolution movement includes three core demands "(1) removing evolutionary biology from the classroom, or (2) balancing it with some form of creationist instruction, or (3) teaching it in some fashion as 'just a theory'." He notes that it is "the minds of American high school students that are at stake" (Larson 2007:14).

When Darwin's book was first published in America, most scientists and believers were opposed to evolution. Scientists slowly warmed to the theory by the beginning of the twentieth century

and some of the faithful had also. In the schools, especially the public schools, creationism was still the order of the day. There was no real substance beyond an adherence to the Biblical story of creation; there wasn't much to creationism beyond the fundamentalist theology at this point. The Scopes trial was a captivating event, but it didn't much shift the balance in the conflict. It may be that science won the argument with creationism in the trial, but Larson (2007) suggests, if anything, the anti-evolution movement became more active in the aftermath.

The first major change to American creationism occurred around the middle of the twentieth century. In an effort to employ the language of science, to tap into the growing public status of science in America, creationists began to make arguments that "true science" was consistent with scripture. The most significant effort in this regard was Henry Morris' book, *The Genesis Flood*. Morris founded the Institute for Creation Research, and American creationism came to be dominated by the Young Earth perspective. Efforts to teach this "scientific creationism" in the public schools were rebuffed by the courts, culminating in the Supreme Court's 1987, *Edwards v. Aguillard* decision, which ruled that creation science was religion, not science, and could not be taught in place of (or alongside) evolution.

Intelligent Design creationism emerged soon thereafter. ID creationism was much deliberate about using the vocabulary and rhetoric of science in its public presentations of the theory of intelligent design. (Proponents were much more open in discussing their motivations when talking to one another.) The prime mover of ID creationism was law professor Phillip Johnson (Larson 2007; Slack 2007; Pennock 1999). He first articulated the claim that the "Darwinian orthodoxy" was stifling alternative explanations of life's diversity on the basis of ideology – namely, philosophical materialism – and not the logic of science. To make such an argument, Johnson needed to change the dominant view of what constitutes science, and thus the main thrust of ID creationism was born. ID creationism is different from creation science in that it includes many more actual scientists (that is, people with advanced science degrees from non-religious universities) though many of its adherents are not biologists, but medical doctors, engineers, or mathematicians.

The motives of the main ID creationists appear to be similar to those of the earlier waves. The projection of the creationist project is more sophisticated, to be sure, but the anxiety is the same. The enemy is a scientific worldview – what Johnson calls philosophical materialism – that undermines traditional authority, allowing for cultural changes that are at odds with conservative theological values. (This view is based on the mistaken assertion that a science that requires methodological naturalism necessitates philosophical materialism (Pennock 1999). Although scientists are somewhat more

disbelieving than Americans at large, the many believers in the sciences demonstrates that acceptance of the scientific method does not inevitability end in atheism.)

The latest battle in the creationism conflict was the Dover trial. The Dover Pennsylvania school board had long had some interest in pushing evolution out of the high school biology curriculum. By 2004, the membership on the board had shifted decisively in the direction of creationism. The board passed a change to the curriculum that included a disclaimer and the suggestion of an alternative view, offering a ID book, *Of Pandas and People*, as a resource. The board was encouraged by a conservative Christian law firm that was looking for test cases and had offered to represent a local school board pro bono if it would adopt an ID-friendly curriculum. A group of parents, supported by the ACLU and the National Center for Science Education, filed a lawsuit to block the change.

The behavior of the board was certainly ethically questionable and politically stupid. They had been quite open about their creationist motives – board meetings had been covered by the local press which documented the board's religious expressions – and, presumably under advisement by their lawyers and advisors from the ID's leading political organization, the Discovery Institute in Seattle, hurriedly, and sloppily, tried to cover their tracks in the aftermath of the lawsuit. They claimed, unbelievably, that they had only one motive: to improve science education in the school district.

The bench trial began in September 2005, lasted 40 days, and featured testimony by several ID proponents and several opponents as expert witnesses. Judge John Jones, a solid conservative appointed by President George W. Bush, presided. He handed down a verdict in mid-December. The verdict was surprising only in the extent to which Judge Jones dismissed the board's claims. His decision was a very public scolding; the board was wrong on all counts. Their testimony, he suggested, was obviously less than truthful (Slack 2007). The judge ruled that ID creationism is, like its ancestors, a religious expression and not science. Johnson's claim that science could (and should) include supernatural causes (expressed in the trial by Lehigh University biochemist Michael Behe) was directly rejected. By the time the trial had ended, the citizens of Dover had grown tired of the dishonesty of the creationist board and elected a new slate running on the promise to stop the nonsense (Slack 2007).

METHOD

Conceptual network analysis is a relatively new and under-utilized approach in the social scientific study of discourse. The goal is to construct a "mental map" based on coding of the semantic links among concepts (Carley 1986, 1993, 1994, 1997; Carley and Palmquist 1992). This diagram of

semantic relations reflects either a cognitive map of an individual's knowledge domain or a socio-cognitive map of a group's discourse. The latter technique can be used to estimate the shared understanding of a domain among members of a social group. The utility of this approach for studying social movements discourse has been demonstrated (Shortell 2004a, 2004b, 2005; Sánchez 2003).

The strength of network analysis lies in its ability to uncover structural relations between the concepts, and therefore, to provide a glimpse at how arguments might be put together. The socio-cognitive network of concepts yields a general topology of the discursive field. Arguments require a raw material of sensibility, and the network is best expressed through a matrix of co-occurrences. Argument construction can be traced through an analysis of contingencies, rather than just the more familiar forms of tag-and-sort coding.

Because the emphasis here is on pragmatics (cf. Leech 1983; Levinson 1983) rather than semantics, the paragraph was the coding unit for all analysis (Popping 2000). In written English, the paragraph is the basic syntactic container for the argument. In this regard, as a coding unit, it falls between the "utterance" and the "text" in the formal units of Leech's and Svartvik's (1994) communicative grammar. Researchers studying concepts generally use the sentence as the coding unit. In this study, though, concepts are regarded as the building-blocks of arguments; as a result, the paragraph was chosen as coding unit throughout.

Content coding of 27 themes was done with *SemioCode*. Themes included CONTROVERSY, RELIGION, SCIENCE, EDUCATION, GOVERNMENT, TRUTH, PURPOSE, POLITICS, ORIGINS, HUMAN, APE, NATURE, TIME, LIFE, HONESTY, ATHEISM, NOVELTY, CHILDREN, MYSTERY, COMPLEXITY, IMMORALITY, DIGNITY, FREEDOM POWER, and IDEOLOGY. All themes were operationalized as a set of keywords. A theme was coded as present if any one of the keywords was present in a paragraph, otherwise it was coded as absent.

Texts were collected using the *LexisNexis* database for all American newspapers. Only news stories and editorials were included. Search terms included evolution, Darwin, creationism, and intelligent design. For the present study, texts from four months, September 2005 to December 2005, were analyzed. All texts published during the month were grouped together. The data include almost 13,000 paragraphs containing more than half a million words.

For comparison, texts were sorted into two categories, Metropolitan and Non-Metropolitan, based on the location of the newspaper in which the article appeared. (This is more complicated than it may appear because many newspapers run stories by wire services, so the location of the newspaper is

not always an indication of where the text was authored. Since the purpose of the present study is to map the discourse of the public sphere, sorting text by location is suitable. What matters is where the texts were being read and discussed. On this matter, the Metropolitan sources were more likely to be read in less urban places than the Non-Metropolitan sources were likely to be read in the metropolises.)

Frequency data – that is, a binary matrix in which each row vector represents a paragraph – was used to calculate odds and odds ratios. Co-occurrence data, in the form of a square matrix, was used to calculate network diagnostics and graphs. Graphs depict the network structure of the discursive field; each theme is a vertex and edges are determined based on the probability of co-occurrence. Data were analyzed with the R statistical programming language (R Development Team 2008; Butts 2006; Butts with Hunter and Handcock 2006; Meyer, Zeileis and Hornik 2006).

Odds ratios are used as the measure of contingency in the present analysis; instead of measuring the degree to which proportions of one variable vary by the other, as is the case with the standard Chi-square test often used with percentage tables, odds express the likelihood that a random case possesses one value of a variable rather than any other. Odds ratios show if the odds for a value of one variable are contingent on the value of the other variable (Rudas 1998; Knoke and Burke 1980).

RESULTS

Table 1 displays odds ratios for EVOLUTION and CREATIONISM with the other themes for four time points, September, October, November, and December in 2005, for all news sources. This corresponds to the time of the Dover trial and decision. Most of the texts discuss the conflict in terms of the trial or the issues it raised. As a result, the discourse tends to be pretty stable during this period.

The odds ratio is a ratio of the cross product of the 2x2 contingency table (concept present or absent); it expresses the extent to which the odds of one theme are contingent on the condition of the other. For example, in Table 1, the odds ratio for EVOLUTION and CONTROVERSY is 2.1; this indicates that EVOLUTION was twice as likely to occur in paragraphs in which CONTROVERSY occurred as paragraphs in which CONTROVERSY was absent.

The relationship between EVOLUTION and TRUTH appears to jump in December (2.5, 2.3, 2.7, 4.2, September to December). This may be a result of the fact that TRUTH was a more prevalent theme in the month in which Judge John Jones issued his trial verdict. In his judgment, the school board had been deceptive about their actions and motives during their testimony. Slack (2007) suggests that the lack of credibility of the defense witnesses may have been the decisive factor in the board

elections that saw an anti-creationist slate sweep the contested seats and take control of the board. The lack of credibility seemed to taint the entire ID effort. The meme of science as truth-seeking in contrast with ID political machinations gained some traction. The odds for CREATIONISM and TRUTH also generally trend upward.

(It is important to keep in mind that odds depict the likelihood of co-occurrence between themes. That CREATIONISM and TRUTH tend to appear in paragraphs together does not reveal whether the arguments are positive or negative; the coding does not distinguish between "creationism is true" or "creationism is not true." The importance of the linkage is that both concepts are needed to build the argument, whatever it is specifically.)

Perhaps the most striking change in the links with EVOLUTION is the increased association with APE in November and December (3.1, 1.9, 5.0, 9.3). The focus on evolutionary theory as it applies to humans was at the heart of the dispute; this is the scientific fact that most animates the creationist opposition. Newspaper coverage of this focus increases during the time period under investigation. The odds of HUMAN and APE also increase (8.0, 10.7, 8.9, 11.8, not shown in Table 1). In a sense, this is a shift in attention away from the creationist claim, which asserts evidence for design by offering examples that generally concern non-human animals (e.g., the bacterial flagellum). The ID proponents want to depict their opposition to evolutionary theory as not deriving from their religious objection to the scientific understanding of human creation.

The odds for EVOLUTION and DIGNITY appear to decline over the period under investigation. There are relatively few instances of DIGNITY in the texts, however, so this may be a statistical artifact.

There is a downward trend for CREATIONISM and ORIGINS as well as MYSTERY. Unlike for EVOLUTION there is a positive association between CREATIONISM and POWER in November and December. This suggests that attention shifted from the substantive claims of ID creationism, that it makes the origin of life more understandable (by asserting is it unknowable to materialist science), to its political argument, that evolutionary theory, in the form of a "Darwinian orthodoxy" is stifling alternative explanations.

Both EVOLUTION and CREATIONISM are positively associated with CONTROVERSY, SCIENCE, EDUCATION, NATURE, LIFE, and COMPLEXITY. These are the main subjects of the narrative. CREATIONISM is somewhat more likely to be linked to RELIGION than is EVOLUTION. In contrast, EVOLUTION has a stronger connection to ORIGINS. Both EVOLUTION and

CREATIONISM are connected to COMPLEXITY, though the odds are generally higher for CREATIONISM; this is almost entirely due to the fact that the most frequently mentioned scientific claim of ID creationism concerns "irreducible complexity" or "specified complexity." Reporters trying to explain what ID creationism claims to know would likely refer to one of these terms.

Table 2 shows odds ratios for EVOLUTION and CREATIONISM broken down by newspaper source. In this comparison, texts from all four months are combined. (The interaction of time and source was not investigated.) Newspapers from the major American metropolises were grouped together (including, among others, those from New York, Washington, DC, Chicago, Los Angeles, San Antonio, Pittsburgh and Philadelphia). All other sources were group together in the Non-Metropolitan category. The patterns of odds ratios for EVOLUTION and CREATIONISM in the two discourses are very similar.

The Non-Metropolitan discourse contains twice as many paragraphs as the Metropolitan one, but only about 50% more words. This means the Non-Metropolitan sources tended to contain articles with shorter paragraphs. Whatever else this might say about the differences in the newspaper styles in less or more urban places, it has one important consequence for the present study. Because the paragraph was the coding unit, the total number of co-occurrences will generally be lower in texts with shorter paragraphs. The network built on the Non-Metropolitan sources, therefore, will be less dense.

Table 3 gives the degree centrality of the three network models (all texts, Non-Metropolitan, Metropolitan). Edge counts and relative frequencies are shown. In general, the connections between themes are more dispersed in the Metropolitan discourse. EDUCATION has more edges, relatively speaking, in the Non-Metropolitan network than in the Metropolitan one. The same can probably be said of ORIGINS. RELIGION and NATURE appear to be somewhat more connected to the other concepts in the Metropolitan network.

Figure 1 depicts the network structure for all texts. The network graph clearly shows the core concepts in the conflict. These appear as hubs in the network: EVOLUTION, CREATIONISM, SCIENCE, and EDUCATION. Both SCIENCE and EDUCATION both have a constellation of concepts connected to them. EVOLUTION and CREATIONISM are clearly bridges, connecting indirectly the concepts associated with SCIENCE and EDUCATION. Other bridges include secondary concepts such as CONTROVERSY, TRUTH, ORIGIN and COMPLEXITY.

In Figure 2, the network structure of the discourse from Non-Metropolitan sources is given. The basic features of the network are similar to that given in Table 1. This network is somewhat less dense.

As a result, there are four isolates: TIME, POWER, IMMORALITY, and HONESTY.

Figure 3 shows the network structure generated from the Metropolitan sources. The structure is familiar, though because the network as a whole is denser, there is more direct interconnections between the primary and secondary concepts, and relatively fewer attached only to SCIENCE or EDUCATION.

There was more similarity between the Non-Metropolitan and Metropolitan sources than was expected. The networks of both included the same hubs: EVOLUTION, CREATIONISM, SCIENCE, and EDUCATION. In the discourse of the Metropolitan sources, RELIGION also has sufficient links to be called a hub. There were generally more connections in the discourse of the Metropolitan sources, so there are also fewer isolates. This may be a feature of metropolitan discourse generally, or may be the result of the generally longer articles with longer paragraphs. It is interesting to note that ATHEISM and SCIENCE are linked in the Metropolitan discourse but not in the Non-Metropolitan one.

Exemplars

> September 2005
> *Now that President Bush has endorsed **intelligent design,** the social conservatives and religious zealots who constitute an ever larger and louder wing of the Republican base have been emboldened in their crusades for fundamentalist values and against any science whose findings and methods run counter to their beliefs.* [Dark Ages primary, *Pittsburgh Tribune Review,* 9/11]
>
> *"It has nothing to do with intelligence. There are tons of intelligent people who are ardent **creationists**. It has to do with information; it has to do with **education**,' said **Ken Ham**, president of Answers in Genesis, based in Petersburg, Ky.*
>
> *"The real problem lies in the fact that the majority of **churches** are just **teaching** the **Bible** as a book of stories. They are not teaching people about **science** and how to defend the **Christian faith**,' Ham said. "And the majority of Christian leaders have told them it is OK to believe in **evolution.'*** [No one origin fits all in flock Christian views on creation vary, *San Bernardino Sun*, 9/4]

*Roger Goram of Dover Township went to the Dover Fire Hall last night for the video "Why **Evolution** is Stupid" because he said he's interested in hearing from experts on both sides of the **intelligent design-evolution** issue.*

*Goram, who said he's a **Christian** who believes in **evolution,** said the video's presentation of a speech by **Kent Hovind**, leader of **Creation Science Evangelism**, based in Pensacola, Fla., was simplistic.*[Video another take in debate: 'Why **Evolution** Is Stupid', *The York Dispatch*, 9/30]

October 2005

*A fundamental role of **science** is to test and successively refute these multiple **hypotheses**, until the list gets sufficiently culled to become more manageable. Hypotheses that simply can't be tested -- like the hypothesis that **God** is the ultimate source of **biological complexity** -- do not meet the basic criteria of science. Those that withstand multiple and diverse bouts of testing -- like **Darwin's** hypothesis that **life** on Earth evolved over millions of years through **natural selection** -- get taken seriously, especially as more and more **evidence** accrues that points in the same direction.*[Don't let the '**intelligent design**' myth take hold, *Pittsburgh Post-Gazette*, 10/9]

*In his second day of testimony, **Behe** vehemently defended his life's work while a **lawyer** for the American Civil Liberties Union reminded the court that Behe has been unable to convince leading **scientific organizations** -- and even his peers at Lehigh -- of the concept's **validity**.*

***"Intelligent design"** is the belief that **mankind's** development is too **complex** to have **evolved** without an **intelligent designer**. Critics says it's the same as **creationism**, a **biblical** explanation of the formation of **life** that the **U.S. Supreme Court** says cannot be part of **public school science curricula**.* [Witness says God isn't only possible designer, *Morning Call* (Allentown, Pennsylvania), 10/19]

*When battles over **evolution** are in the news, as with the current Dover, Pa., **court case**, sales of fish jump. That case, now being tried in federal district court in Harrisburg, Pa., pits a **school board** that required students to be introduced to **"intelligent design"** as an alternative to **evolution** against parents who contend that it violates their **religious freedoms**.*[A bumper crop of ideas evolves from iconic fish, *The Times Union* (Albany, New York), 10/23]

November 2005
*In Pennsylvania, a trial is under way in **federal court** after the Dover **school board's** decision to include a statement about **intelligent design** in **biology** classes. **Intelligent design** holds that some features of life are too **complex** to have **evolved** without guidance and, therefore, must have been guided by a **designer**.*

*Proponents of **intelligent design** were a driving force in the **standards** awaiting a vote on Tuesday. Similar **controversies** have surfaced in Ohio, Minnesota and other states.*

*Yet Kansas has received much of the spotlight, culminating in May when the state board conducted trial-like hearings pitting **evolution** against **intelligent design.** The hearings attracted reporters from around the world.* [State BOE's science vote could come to naught, *The Wichita Eagle*, 11/7]

*One of the biggest stories in the news recently has been the attempt by some to have **"intelligent design"** taught in **science classes**. Kansas went so far as to redefine science in order to force this concept into **schools**, while other states have put labels on **science textbooks**, warning that **evolution** is "just a theory." Both types of actions miss the point of what a **scientific theory** is.* [Theory' backs evolution, *The State Journal-Register* (Springfield, IL), 11/20]

December 2005

*They, like President Bush and virtually the entire population of American **evangelicals**, believe **creationism** is not only a **valid scientific theory**, but the only possible explanation for **life** on Earth. To them, **evolution** presents an **alternative scientific theory** that contradicts their model of the universe. This is not an accurate representation.* [Creationism is belief, not science, *Fresno Bee*, 12/4]

*"We think (U.S. **District Judge** John Jones III) really overreached. He basically used this to step on a soapbox and pontificate about his views on **intelligent design** and even **religion**," said John West, a senior fellow at the Center for **Science** and **Culture**.*[Ruling may create new interest in movement, *Seattle Post-Intelligencer*, 12/21]

*"I don't see that the Dover case has any bearing in Ohio," Robert Lattimer said before Tuesday's ruling. The Hudson **chemist** headed Science Excellence for all Ohioans, a pro-**intelligent design** group.*

*"The lesson contains no hint of **religion** or **intelligent design.** It merely presents a **scientific** challenge to **macroevolution**."* [Intelligent design loses, *Cleveland Plain Dealer*, 12/21]

*For the first time, a **federal judge** has banned the **teaching** of so-called **intelligent design** theory in **science** classes. Although the decision by Judge John E. Jones III is binding only in his Pennsylvania district, his 139-page opinion has implications for any **school district** wrestling with how to teach **evolution**.* [Intelligent Design Is A Theory of Faith, *Tampa Tribune*, 12/24]

DISCUSSION

Most of the texts investigated here were fairly straightforward descriptions of the Dover trial.

These generally employed the kind of evenhandedness that is so common in contemporary American journalism. The arguments of both the creationists and the scientists are expressed. A few of the texts were openly sympathetic to the creationist argument. More were favorable to the scientists' point of view, less out of advocacy of that view than out of deference to the prestige of science as an institution.

This raises an interesting question about the public sphere. In some conflicts, the various perspectives are articulating particular values. Whether you are for or against gay marriage, for example, would seem to be entirely a matter of value choices; if you accept traditional sexual norms, you are likely to oppose gay marriage and if you adhere to a cosmopolitan humanism, you are likely to favor the extension of the institution to same-sex couples.

In the case of the creationism conflict, however, there is more at stake than just value choices, though that drives the partisans just as in other cultural conflicts. There is the matter of current scientific knowledge. It generates a kind of gravitational pull in the discursive field, tugging arguments into its sphere of influence. As is often said in the contemporary public sphere, you are entitled to your own opinions, but not your own facts. In this case, the routine employment of the "A says, B says" organization of reporting is not a neutral act. To the extent that our public sphere values rational thought, we may require a more critical evaluation of the facts in our news.

The new science of networks is being applied to more and varied phenomena (Barabási 2002). The present research attempts to build a semiotic approach that integrates some of the insights of network science into the study of the public sphere. Data analyzed here are part of a larger project which includes 41 months of texts on the creationism conflict. It may be possible to develop a more sensitive model of network structure by fitting the model to the entire time frame.

The cutting edge of network modeling in sociology is to be found in the social networks literature. Such studies are almost exclusively based on network data derived from individuals or organizations. How such tools might be applied to the study of public discourse remains to be seen. It may be that some of the theoretical models have more or less direct analogues in discourse. Many of the problems that seem settled as applied to networks of individuals or organizations don't rest so easily on the discursive field. If friendship networks, for example have a tendency to form complete triads, does it follow that conceptual networks should do the same? Is it a meaningful question to ask of concepts?

It may also be necessary to improve the validity of the comparison of sources in the present study by introducing a third category, so that mid-sized cities can be separated from small towns. In

addition, testing for the effect of region might be revealing, as well as the interaction of region and urbanization. One intriguing possibility is to compare sources from major college and university locations with the others.

BIBLIOGRAPHY

Barabási, Albert-László. 2002. *Linked: The New Science of Networks*. Cambridge, MA: Perseus.

Butts, Carter T. 2006. *sna: Tools for Social Network Analysis*. R package version 1.4. [software application]

Butts, Carter T. with help from David Hunter and Mark S. Handcock. 2006. *network: Classes for Relational Data*. R package version 1.1-2. [software application]

Calhoun, Craig. 1992. Introduction: Habermas and the Public Sphere. Pp 1-48 in *Habermas and the Public Sphere*, edited by Craig Calhoun. Cambridge, MA: Massachusetts Institute of Technology.

Carley, Kathleen. 1986. An Approach for Relating Social Structure to Cognitive Structure. *Journal of Mathematical Sociology*. 12(2):137-189.

-----. 1993. Coding Choices for Textual Analysis: a Comparison of Content Analysis and Map Analysis. Pp 75-126 in *Sociological Methodology 1993*, edited by P. V. Marsden. Cambridge: Blackwell.

-----. Content Analysis. Pp 725-730 in *The Encyclopedia of Language and Linguistics*, edited by R. E. Asher. Edinburgh: Pergamon Press.

-----. 1997. Network Text Analysis: the Network Position of Concepts. Pp 79-100 in *Text Analysis for the Social Sciences*, edited by Carl W. Roberts. Mahwah, NJ: Lawrence Erlbaum Associates.

Carley, Kathleen and Michael Palmquist. 1992. Extracting, Representing, and Analyzing Mental Models. *Social Forces* 70 (3):601-636.

Edelman, Murray. 1988. *Constructing the Political Spectacle*. Chicago: University of Chicago.

Gamson, William A. 1992. *Talking Politics*. New York: Cambridge University Press.

Habermas, Jurgen. 1989. *The Structural Transformation of the Public Sphere: An Inquiry into a Category of Bourgeois Society*. Cambridge, MA: Massachusetts Institute of Technology.

------. 1992. Further Reflections on the Public Sphere. Pp 421-460 in *Habermas and the Public Sphere*, edited by Craig Calhoun. Cambridge, MA: Massachusetts Institute of Technology.

Henkin, D. M. 1998. *City Reading: Written Words and Public Spaces in Antebellum New York*. NY: Columbia University.

Leech, Geoffrey. 1983. *Principles of Pragmatics*. London: Longman.

Leech, Geoffrey and Jan Svartvik. 1994. *A Communicative Grammar of English. 2nd edition*. London: Longman.

Levinson, Stephen C. 1983. *Pragmatics*. Cambridge: Cambridge University Press.

Meyer, David, Achim Zeileis, and Kurt Hornik. 2006. *vcd: Visualizing Categorical Data*. R package version 1.0-2. [software application]

R Development Team. 2008. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. [software application]

Sánchez, Nancy. 2003. Lessons from the Past: Constructing a Black Identity in the 21st Century. Paper presented at the annual meeting of the Eastern Sociological Society. Boston, MA.

Shortell, Timothy. 2005. African-American Abolitionism as a Human Rights Discourse. Paper presented at the annual meeting of the Amherst Branch of the Association for the Study of African-American Life and History. Amherst, MA.

-----. 2004a. The Rhetoric of Black Abolitionism: an Exploratory Analysis Of Anti-Slavery Newspapers In New York State. *Social Science History*. 28(1):75-109.

-----. 2004b. The Decline of the Public Sphere: A Semiotic Analysis of the Rhetoric of Race in New York City. Pp 159-177 in *Ethnic Communities in New York City. Volume Seven, Research in Urban Sociology*, edited by Jerome Krase and Ray Hutchinson. New York: Elsevier.

-----. 2002. *SemioCode: Content Coding Software for Quantitative Text Analysis*. [software application]

Snow, David A. and Robert D. Benford 1992. Master frames and cycles of protest. Pp 133-155 in *Frontiers in Social Movement Theory*, edited by Aldon. D. Morris and Carol McClurg Mueller. New Haven: Yale University Press.

-----. 2000. Framing Processes and Social Movements: An Overview and Assessment. *Annual Review of Sociology*. 26:611-639.

Snow, David A., E. Burke Rochford, Steven K. Worden and Robert D. Benford. 1986. Frame alignment processes, micromobilization and movement participation. *American Sociological Review* 51:464-81.

Steinberg, Marc W. 1994. The dialogue of struggle: the contest over ideological boundaries in the case of London silk weavers in the early nineteenth century. *Social Science History* 18(4):505-541.

-----. 1998. Tilting the frame: considerations on collective action framing from a discursive turn. *Theory and Society* 27(6):845-872.

-----. 1999. *Fighting Words: Working-Class Formation Collective Action, and Discourse in Early Nineteenth-Century England*. Ithaca: Cornell University Press.

Tarrow, Sidney G. 1995. Cycles of Collective Action: Between Moments of Madness and the Repertoire of Contention, Pp 89-116 in *Repertoires and Cycles of Collective Action*, edited by Mark Traugott. Durham, NC: Duke University Press.

Tilly, Charles. 1995. Contentious Repertoires in Great Britain, 1858-1834, Pp 15-42 in *Repertoires*

and Cycles of Collective Action, edited by Mark Traugott. Durham, NC: Duke University Press.

Table 1. Odds Ratios for Evolution and Creationism with Other Themes by Time.

	September		October		November		December	
Theme	Evolution	Creationism	Evo.	Cre.	Evo.	Cre.	Evo.	Cre.
Controversy	2.1[c]	3.7[c]	1.9[c]	3.2[c]	2.4[c]	3.4[c]	2.0[c]	2.9[c]
Religion	1.0	1.4[b]	1.4	1.5[c]	1.0	1.7[c]	1.2[a]	1.9[c]
Science	2.9[c]	2.1[c]	2.9[c]	2.5[c]	3.3[c]	2.3[c]	3.4[c]	2.4[c]
Education	1.9[c]	2.4[c]	1.7[c]	1.8[c]	1.8[c]	2.2[c]	1.7[c]	1.7[c]
Government	1.3[a]	1.7[c]	1.0	1.3[b]	1.0	1.6[c]	1.3[b]	1.6[c]
Truth	2.5[c]	0.9	2.3[c]	1.1	2.7[c]	2.0[c]	4.2[c]	1.7[c]
Purpose	1.2	0.9	1.1	0.7	1.4	0.9	0.9	1.3
Politics	1.0	0.8	1.2	0.6[a]	0.9	0.7[b]	1.2	1.2
Origins	2.5[c]	2.5[c]	2.8[c]	2.2	4.5[c]	1.6[a]	3.3[c]	1.3
Human	2.0[b]	0.9	2.0[c]	1.0	2.2[c]	1.1	2.0[a]	1.0
Ape	3.1[c]	0.9	1.9[a]	1.0	5.0[c]	0.8	9.3[c]	0.4[b]
Nature	1.4[a]	1.4[a]	1.4[a]	1.4[b]	1.7[c]	1.9[c]	1.8[c]	1.9[c]
Time	1.8[c]	1.0	1.3[a]	0.8	2.1[c]	0.9	1.4[b]	1.1
Life	3.2[c]	2.4[c]	3.1[c]	2.2[c]	3.0[c]	2.1[c]	3.0[c]	2.3[c]
Honesty	1.0	1.0	1.3	0.5	1.0	1.4	0.8	0.9
Atheism	1.5	0.6	1.6	0.7	0.8	0.8	1.7	1.1
Novelty	3.7[c]	1.9[c]	2.5[c]	1.4[a]	2.4[c]	1.3[a]	3.6[c]	1.5[b]
Children	0.7	0.9	0.9	0.4[b]	0.9	0.8	1.3	1.0
Mystery	0.8[c]	1.8	1.4	1.0	3.4[a]	0.6	0.6	0.4
Complexity	3.4[c]	6.1[c]	3.1[c]	5.8[c]	2.3[c]	18.9[c]	2.8[c]	7.5[c]
Immorality	0.8	0.6	1.3	0.2	0.2	3.6[c]	1.5	0.2[a]
Dignity	6.9	0.6	8.5[a]	2.3	0.2	0.2	0.6	0.1
Freedom	0.6	0.6	0.7	1.4	1.1	1.6	0.6	0.7
Power	1.1	2.0	0.8	1.3	1.5	2.5[b]	1.3	2.3[b]
Ideology	1.5	1.8	4.3[b]	1.1	1.2	1.6	1.1	1.5
Paragraphs	2,295		3,277		3,680		3,648	
Evo. x Cre.	2.1[c]		1.6[c]		1.5[c]		1.9[c]	

Note: [a] $p < 0.05$; [b] $p < 0.01$; [c] $p < 0.001$

Table 2. Odds Ratios for Evolution and Creationism with Other Themes by Newspaper Source.

	Non-Metropolitan		Metropolitan	
Theme	Evolution	Creationism	Evolution	Creationism
Controversy	2.4[c]	3.2[c]	1.8[c]	3.4[c]
Religion	1.1	1.6[c]	1.1	1.6[c]
Science	3.3[c]	2.5[c]	2.8[c]	2.1[c]
Education	1.7[c]	1.8[c]	1.7[c]	2.2[c]
Government	1.0	1.4[c]	1.2[a]	1.9[c]
Truth	3.3[c]	1.4[c]	2.1[c]	1.9
Purpose	1.1	0.9	1.2	1.0
Politics	0.9	0.7	1.2	0.9
Origins	3.1[c]	1.8	3.2[c]	1.8[c]
Human	2.0[c]	1.1	2.1[c]	0.9
Ape	4.3[c]	0.8	3.7[c]	0.6[a]
Nature	1.4[c]	1.8[c]	1.4[c]	1.4[c]
Time	1.5[c]	1.0	1.7[c]	0.9
Life	3.5[c]	2.2[c]	2.6[c]	2.1[c]
Honesty	1.0	1.0	0.9	0.9
Atheism	1.3	0.7	1.3	0.8
Novelty	2.7[c]	1.2[c]	3.3[c]	1.7[c]
Children	1.0	0.8	0.9	0.7
Mystery	1.7	1.1	1.1	0.7
Complexity	3.3[c]	9.6[c]	2.2[c]	5.8[c]
Immorality	1.0	0.4	0.5	1.6
Dignity	1.8	0.4	0.7	0.2
Freedom	0.7[a]	1.0	0.8	1.1
Power	0.9	2.0[b]	1.4	1.6
Ideology	3.0[b]	1.0	2.2	1.6
Paragraphs	8,452		4,448	
Evo. x Cre.	1.8[c]		1.5[c]	

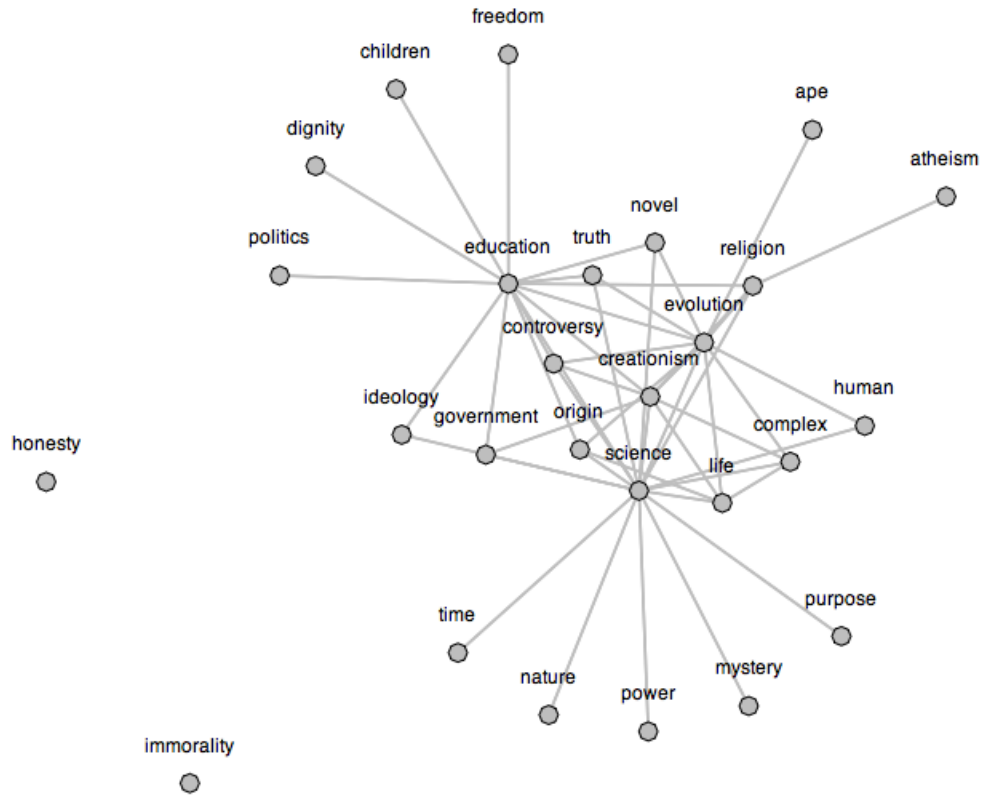
Note: [a] $p < 0.05$; [b] $p < 0.01$; [c] $p < 0.001$

Table 3. Degree Centrality of Themes in the Conceptual Network by Newspaper Source.

	All Texts		Non-Metropolitan		Metropolitan	
Theme	count	percent	count	percent	count	percent
Evolution	12	12.2	11	12.5	16	13.1
Creationism	8	8.2	8	9.1	10	8.2
Controversy	4	4.1	4	4.5	4	3.3
Religion	5	5.1	5	5.7	9	7.3
Science	18	18.4	15	17.0	21	17.2
Education	14	14.3	13	14.8	12	9.8
Government	3	3.1	3	3.4	6	4.9
Truth	3	3.1	2	2.3	3	2.5
Purpose	1	1.0	1	1.1	1	0.8
Politics	1	1.0	1	1.1	1	0.8
Origins	4	4.1	4	4.5	3	2.5
Human	2	2.0	1	1.1	2	1.6
Ape	1	1.0	1	1.1	1	0.8
Nature	1	1.0	1	1.1	4	3.3
Time	1	1.0	0	0.0	2	1.6
Life	5	5.1	5	5.7	5	4.1
Honesty	0	0.0	0	0.0	1	0.8
Atheism	1	1.0	1	1.1	2	1.6
Novelty	3	3.1	3	3.4	4	3.3
Children	1	1.0	1	1.1	1	0.8
Mystery	1	1.0	1	1.1	2	1.6
Complexity	4	4.1	4	4.5	4	3.3
Immorality	0	0.0	0	0.0	0	0.0
Dignity	1	1.0	1	1.1	4	3.3
Freedom	1	1.0	1	1.1	1	0.8
Power	1	1.0	0	0.0	1	0.8
Ideology	2	2.0	1	1.1	2	1.6
Total	98		88		122	

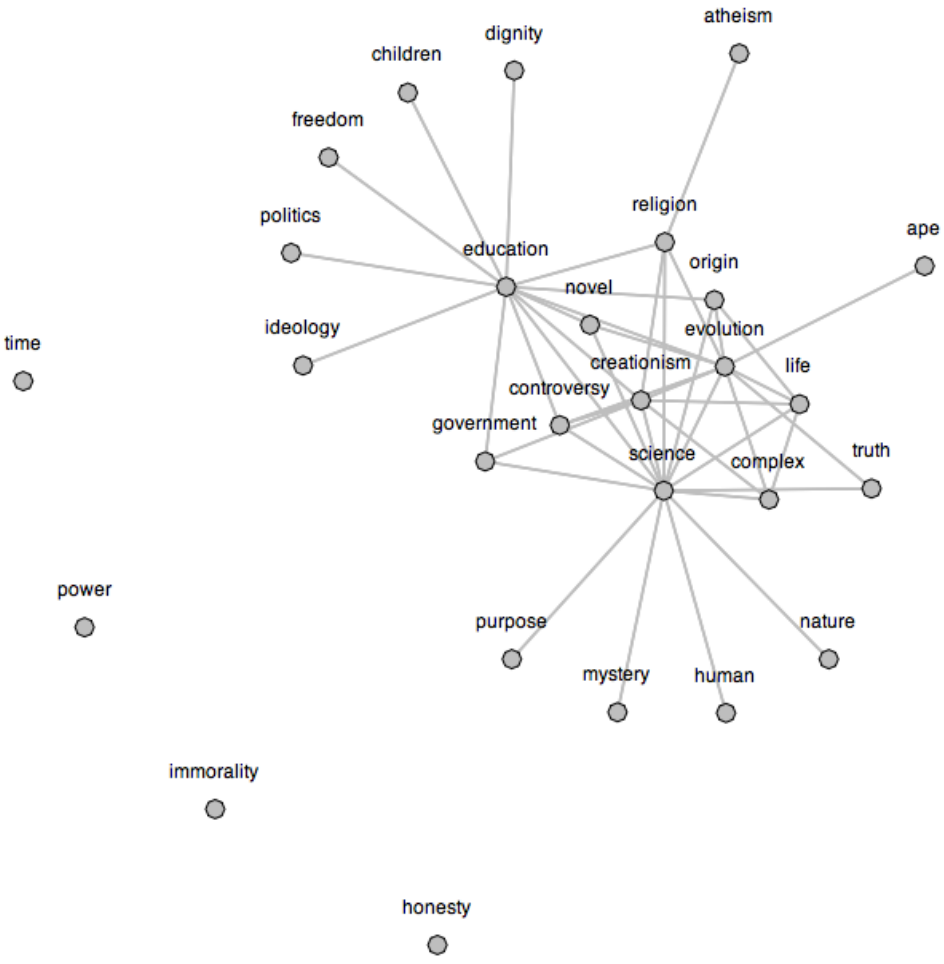
Note: Degree centrality refers to the overall “connectedness” of a vertex in a network graph. It represents the number of edges attached to each vertex. High degree centrality scores identify hubs in the network.

Figure 1. Network Structure of the Discursive Field, All Texts.



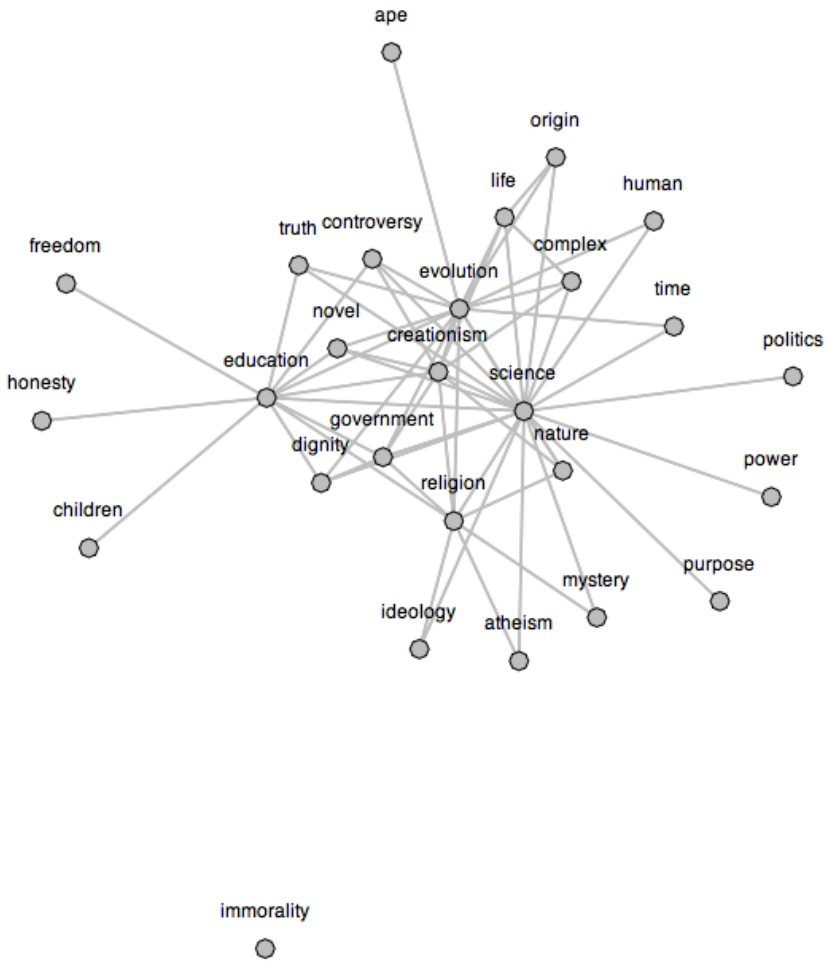
Note: Vertices represent themes. Edges are determined by the average conditional probability of the co-occurrence of themes. An edge is drawn when the average conditional probability exceeds the threshold; in this graph, the threshold was 0.3.

Figure 2. Network Structure of the Discursive Field, Non-Metropolitan Sources.



Note: Vertices represent themes. Edges are determined by the average conditional probability of the co-occurrence of themes. An edge is drawn when the average conditional probability exceeds the threshold; in this graph, the threshold was 0.3.

Figure 3. Network Structure of the Discursive Field, Metropolitan Sources.



Note: Vertices represent themes. Edges are determined by the average conditional probability of the co-occurrence of themes. An edge is drawn when the average conditional probability exceeds the threshold; in this graph, the threshold was 0.3.