SCIENCE, EDUCATION, AND OBFUSCATION:
THE HORIZON OF CREATIONIST LEGISLATION AND WHAT IT MEANS
FOR A CONTINUING CONTROVERSY

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FOR A CONTINUING CONTROVERSY

by

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THE HORIZON OF CREATIONIST LEGISLATION AND WHAT IT MEANS
FOR A CONTINUING CONTROVERSY

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ABSTRACT

Antievolutionists have attempted to legally undermine the teaching of evolution in the public school science classroom for nearly a decade, introducing and passing a number of bills and initiating law suits all aimed at limiting students’ exposure to evolution from 1922 to 2013. However, not all legislative or legal attempts by creationists to limit the teaching of evolution use the same tactic, and in the most current phase of the evolution-creationism “controversy” (1995-2013), creationists have adopted a more subtle and covert tactic to undermine the teaching of evolution. This analysis uses Perelman’s theory of argumentation to uncover creationists’ use of strategic ambiguity and a brand of incommensurability in antievolution bills. This analysis finds that by using a more ambiguous strategy to appeal to a broad set of liberal values, creationists limit message resolution, broaden their potential support base, and offer a particularly democratic solution to the social controversy regarding the teaching of evolution.
INTRODUCTION

The creationist campaign against evolution has lasted for nearly a decade, with creationists introducing legislation, passing bills, and initiating law suits all aimed at evolution. Creationist arguments present in legislation vary depending on the era and change in response to unfavorable legal decisions (Haarscher, 2009). The creationist-evolution controversy can be segmented based on argumentative tactics, with early legislation arguing for the banishment of evolution, intermediate legislation arguing for creationist religious rights, and more recent, or creation science and neocreationist, legislation arguing that creationism is scientific (Scott, 2005). However, some legislation introduced or passed between 1995 and 2013 share only minimal commonalities with historical forms of creationist legislation noticed by scholars studying the controversy. Current legislation omits problematic rhetorical trends observed in historical creationist legal attempts to undermine the teaching of evolution and falls into at least one of the following rhetorical categories: rhetoric based on “evidence” against evolution, rhetoric based on preserving critical thinking, and rhetoric based on rights and discrimination. The seeming disconnect between current legislation and historical creationist legislation and the appearance of novel creationist rhetorical tactics lead to the questions: To what extent does current creationist legislation relate to previous forms of legislation, and what do the argumentative tactics of current bills reveal about the evolution-creationism controversy? The purpose of this analysis is to provide possible answers to these questions. By applying Perelman and Olbrecht-Tyteca’s framework for analyzing arguments to representative legislative artifacts, this work will uncover tactics in antievolution legislation introduced or passed between 1995 and
2013, reveal relationships between current bills and historical bills, and highlight a few implications creationist legislation may have on science education.
HISTORY

The classroom controversy between evolution and creationism, lasting just shy of a century, has evolved in response to various legal challenges, court decisions, and turns in creationist approaches to undermine the teaching of evolution. The first phase of the legal controversy in the United States (US) lasted from 1922 to 1968 and consisted of banning the teaching of evolution altogether. Next, creationists issued Religious Freedom arguments, with creationists filing law suits against the teaching of evolution, claiming it infringed on their religious rights. This approach based on Religious Freedom persisted from 1972 through 2000. The third phase of the legal controversy was based on the advent of Creation Science and Intelligent Design (ID). In this phase, lasting from the 1980s to 2005, creationists proposed legislation based on claims made by either Christian scientists or a minority of scientists at odds with the portions of evolution. The current phase of the legal controversy, beginning in 1995, consists of proposing state-level legislation based on pedagogical fairness, teaching the controversy, and freedom from discrimination. Although the controversy has changed since its genesis, the creationist goal has remained undermining evolution—a goal which historically developed as a response to modernism.

American fundamentalism was largely a reaction to the German modernism movement of the 1880s (Larson 1997, 33). Using higher criticism, modernists showed that certain section of the Bible and some Biblical stories had been influenced by earlier non-Hebrew theologies. The product of higher criticism was a perspective that the Bible was both of human agency and divinely inspired (Larson 1997, 33-38). However, fundamentalists preferred an understanding of the Bible that contended scripture was inerrant, Christ was born of a virgin, Christ died for
humanity’s sins, Christ rose after death, and Christ actually performed the Biblical catalogue of miracles (Larson 1997, 33-39). Fundamentalists, particularly members of The Fundamentals, began a campaign to secure a traditional perspective of Biblical interpretation, publishing books, pamphlets, and essays and going on nation-wide fundamentalist circuits (Larson 1997, 20). At first, subscribers to Christian Fundamentalism largely neglected evolution. However, the occurrence of World War I sparked fundamentalist action. Viewing World War I as the product of German militarism and racial superiority theories, fundamentalist Christians, particularly William Jennings Bryan, attributed the bloodshed to criticism and evolution—based on widespread German acceptance of evolution and German eugenics programs based on evolutionary principle (Larson 1997, 33-39).

William Jennings Bryan led the initial American charge against the teaching of evolution. Bryan’s outcry and subsequent public support to ban evolution prompted political action. On March 23, 1925, Tennessee, with the Butler Act, became the first state to ban the teaching of evolution. The Butler Act passed due to large public approval, despite scientists’ almost unanimous objection. However, the ACLU quickly responded and mounted a legal resistance to the bill, using John T. Scopes, a science teacher who purportedly breached the Butler Act by teaching evolution, as their test case. The “monkey” trial ensued as mostly a publicity stunt, and ended when a Tennessee Supreme court judge overturned Scopes’ conviction on a technicality. After the Scopes trial, the legal campaign against evolution continued unimpeded because of World War II, with anti-evolution bills being passed unchallenged throughout the southern US, where fundamentalism was strongest, until the Space Race of the 1960s (Scott 2005).

A resurgence of evolution due to an attempt by the US government to revamp science education impelled legal action in the 1960s. A federally funded program initiated in the 1950s
focused on bettering precollege science education by reintroducing evolution into public school curricula which prompted a legal response (Scott 2005). With the space race waging between the US and the Soviet Union, American politicians realized the need for better science education. As part of the effort, the federal endowment to the National Science Foundation (NSF) increased and university-level professors were hired as textbook consultants. Biological science consultants were quick to notice a general lack or misrepresentation of evolution in extant textbooks. The books were revised to include proper representations of evolution, according to college standards regarding the theory. The new books were widely published, and evolution was injected back into public school curricula. However, the reintroduction of evolution and NSF-based standards regarding evolution created tension for science teachers in states with Scopes-era laws. Teachers could either teach modern science and break the law, or default and miss national standards. A solution came in the form of a Supreme Court decision in 1968.

In 1968, Arkansas was one of the few states with Scopes-era laws. However, the Arkansas Education Association (AEA), in conjunction with Susan Epperson, a teacher in Arkansas, challenged the constitutionality of established antievolution law on the premise of the First Amendment (Scott, 2005). Epperson and the AEA argued that disallowing the teaching of evolution encroached on teachers’ and students’ rights of free speech. An initial ruling siding with Epperson was later overturned when the case was appealed at the Arkansas Supreme Court. The case was eventually heard by the US Supreme Court, where Justices found the law unconstitutional (Epperson v. Arkansas 1968). Prohibiting teachers from teaching evolution was no longer legal, and the decision prompted a change in the antievolution approach. Instead of fighting to keep evolution out of the classroom, creationists attempted to introduce creationism to the classroom.
After *Epperson*, creationists argued that evolution violated students and teachers rights and that if evolution was taught, creationism should be too. Legal appeals and private law suits against various public entities, such as schools and the Smithsonian Institute, ensued, but none produced a favorable judgment for creationists (Scott 2005). In all cases presented during this period, decisions determined that teaching evolution did not violate teacher or student rights, and that allowing creationism, based on Christian theology, in the classroom was unconstitutional.

The established unconstitutionality of banning evolution from the science classroom and the illegitimacy of private law suits’ arguments that teaching evolution violated student and teacher rights led to the rise of the Creation Science and ID movements (Scott 1997). The Institute of Creation Research (ICR), headed by Henry Morris, initiated the advancement of Creation Science, with a focus on academia instead of politics (Scott 2005). Morris lobbied for academic acceptance of Creation Science in the hopes that it would eventually trickle down to public school curricula. However, Morris’ attempt was ignored by most educators and scientists. The ICR decided to transition to a more grass-roots approach, advocating local action. The grass-roots effort proved more effective and, by the early 1980s, resulted in the introduction of 27 state-level bills, two of which were passed in Arkansas and Louisiana (Scott 2005, 106). The passing of the Arkansas law provoked ACLU action and a legal response.

*McLean v. Arkansas* was the legal challenge to Arkansas’ Act 590. The lead plaintiff in the case, Methodist clergyman William McLean, and representatives from the ACLU and a New York law firm, Skadden, Arps, Slate, Meagher, and Flom, argued that Creation Science served a non-secular purpose, promoted religion, and violated the Establishment Clause (Scott 2005). The plaintiff found that omitting religion from the classroom was not anti-religious and that Creation Science was not science. Judge William Overton, using the Lemon Test (i.e., a three-prong test
of a law’s constitutionality regarding the Establishment Clause; a method derived from the Supreme Court ruling in *Lemon v. Kurtzman*), ruled in favor of the plaintiffs (Scott 2005). The Louisiana act met a similar fate. The ACLU also led the legal charge against the Louisiana bill, and the Federal Court, Court of Appeals, and the United States Supreme Court all ruled that allotting equal time for Creation Science endorsed a religious cause and was unconstitutional (Scott 2005).

Burdened by inherent religious undertones running through Creation Science and disadvantageous legal decisions, creationists responded by omitting any religious features from proposed legislation; renaming their alternative to evolution, ID; and attempting a multi-front advance. ID was a new form of creation science that did not espouse the same non-secularism as Creation Science; creationists simply called the supreme entity responsible for biodiversity the “Designer” instead of the “Creator”. The advance included mounting legal responses based on “evidence” against evolution, ensuring that evolution was taught as “theory and not fact”, proposing textbook disclaimers on content viewed as too reliant on evolution, and the research of ID proponents (Scott 1997, 277-281). Creationists’ ID campaign experienced limited success, with most proposed bills and state education amendments being dropped. And, the decision in *Kitzmiller v. Dover Area School District* largely ended ID legal attempts to undermine evolution in 2005. The decision explained that allowing the teaching of ID in the public science classroom was not legal because it did endorse a religion, citing a clear relationship between ID and its predecessor, Creation Science (Jones 2005, 17).
HISTORICAL FORMS OF CREATIONIST ARGUMENTATION

Creationist argumentation uses a variety of tactics depending on the phase of the controversy. The initial argumentative tactic utilized in the Scopes-era of the controversy was to simply ban the teaching of evolution (Scott 2005; Haarscher 2009). The tactic in the second phase was to liken evolution to religion and argue that religious rights were stifled by the teaching of evolution (Haarscher 2009). Next, the tactic in the third phase was to use Creation Science and ID to liken creationism to science (Haarscher 2009).

The tactic in the first phase of the controversy, exemplified by the Butler Act, was to ban the teaching of evolution in all publically funded schools. Using rhetoric that highlighted Darwin’s proposition that man evolved “from a lower order of animals” and established a dichotomy between evolution and Biblical creationism, the bill easily passed because of overwhelming public approval due to demonizing rhetoric. The basis of this advance was to exclude evolution via demonization, evidenced by language that attributed World War II to evolution, drew attention to then publically disagreeable notion of phylogenetics, and painted evolutionists as threats to modern society (Haarscher 2009). The tactic, although short-lived and deemed unconstitutional, ushered in the overarching theme of all creationist legal challenges: undermine the teaching of evolution in public schools.

The second phase utilized a less direct approach. Instead of simply banning evolution in favor of Biblical creationism, antievolutionists argued that teaching evolution in the public science classroom infringed upon student and teacher rights of religious freedom because evolution itself endorsed a theology (i.e., atheism) and directly attacked Christianity, violating the First Amendment. Rhetoric in the lawsuits established a link between evolution and atheism
and included language that suggested the teaching of evolution directly challenged students and teachers observing Biblical views regarding creation. However, the tactic fell flat, with court decisions citing a lack of evidence that 1) evolution was religious and 2) the teaching of evolution infringed on the rights of students and teachers (Perluss 1981; Marovich 1989; Borene 2000). The failure of this tactic prompted another change in creationist arguments.

Influenced by the court’s rejection of arguments based on religious freedom, the third phase adopted tactics that likened creationism to science using the research of creation and ID scientists (Condit 1998). Creationists argued that aspects of evolution were weak and “scientific” evidence of divine creation or of an intelligent designer existed. Creation Science and ID proponents concluded that in order to maintain neutrality and fairness, equal time should be dedicated to the teaching of evolution and either Creation Science or ID (Haarscher 2009). Creation Science and ID argumentative strategy abandoned the idea of ousting evolution from the classroom and ushered in the proposition of teaching both evolution and creationism (Scott 2005), an idea first proposed in Wright (1972).
LITERATURE REVIEW

Review of current creationist bills (i.e., bills proposed or passed from 1996-2013) uncovers the use of strategically ambiguous rhetoric that appeals to liberal values and avoids alienating groups of potential supporters and legal pitfalls. In addition, the language of these bills fosters an incommensurable juxtaposition between science and creationist alternatives to science, in order to substantiate arguments and bolster support. These observations situate this research in the body of scholarship concerning the rhetoric of creation-evolution controversy. In reviewing literature regarding the controversy and applying the argumentative analytic framework provided by Perelman, a foremost theorist in argumentative theory, three artifacts in the current phase of the controversy will highlight how creationists approach the controversy in their newest legal advance against evolution.

Analyses of the various tactics used by creationists throughout the evolution-creationism controversy are plenty and range from in-depth explanations of the circumstances surrounding the controversy to analyses addressing argumentative tactics. Perhaps most prominent among scholars focusing on circumstance surrounding the controversy, creationist legislation, and scientific answers to creationist arguments is Eugenie Scott, NCSE (National Center for Science Education) executive director and physical anthropologist. Scott has analyzed commitment to evolution and creationism (1997) and types of creationism and creationist legislation (Scott and Branch 2003) and offered advice to scientists regarding the controversy (1996). In her book covering the controversy, *Evolution vs. Creationism* (2005), Scott tackles misunderstandings of evolution, creationist alternatives to evolution, and religious issues surrounding the controversy.
(Scott 1996, 1997, and 2005). However, Scott’s treatment of the types of creationism and consideration of turn-point legal campaigns are of particular importance.

Scott explains that creationist argumentation has evolved from early intolerance regarding evolution, with legislation reflecting a grounded stance on the teaching of Biblical creationism in the public science classroom (e.g., the Butler Act), to what she refers to as “neocreationism”. Neocreationism refers to creationists’ multifaceted approach, spawned after the Edwards v. Aguillard decision and the deemed unconstitutionality of Creation Science, that consisted of state-level campaigns and arguments predicated on the research of ID scientists (113). Scott posits that the neocreationist era of the controversy saw a reformulated focus on infiltrating the science classroom by way of a so-called secular alternative to evolution, efforts geared towards undermining the legitimacy of evolution, and an increase in grassroots and public campaigns. Aside from ID and other public-based creationist attempts to undermine the teaching of evolution, Scott details a grass-root effort initiated by John Hansen known as the TEACHES campaign. She explains that the campaign prompted the introduction of state-level bills in Ohio, Georgia, and Arizona. Scott also mentions Santorum’s attempt to limit the teaching of evolution, the Sense of the Senate amendment to the Elementary and Secondary Education Act Authorization Bill. Scott is perhaps the most prominent scholar concerned with the controversy, exploring a number of angles on both the scientific and religious side. However, Randy Moore is another prominent author who has published work concerning a number of issues surrounding the controversy.

Moore, like Scott, recognizes classes of creationist legal approaches. Moore has published a number of works regarding the controversy, including legal responses to creationist attempts to limit the teaching of evolution (Moore 2004; Moore, Jensen, and Hatch 2003). Moore
(2002b) considers creationist tactics including “villification” of evolution, public relation campaigns, legislative approaches, and teaching evidence against evolution. Moore explains that the tactic stems from the *Edwards v. Aguillard* decision and “invents” evidence against evolution to support the supposition that evolution should be taught differently or that alternatives to evolution should be offered in the science classroom (72). Moore concludes his inspection by mentioning the efficacy of the creationist legal campaign. He explains that the creationist challenge to the teaching of evolution has not been successful legally, with creationists losing every major legal battle. However, the campaign has generated powerful public support, and creationists have influenced the formulation of public school science standards in a number of regions (74-75). Moore has also explored the effects of teaching creationism in the classroom (Moore, Brooks, and Cotner 2011; Moore and Cotner 2009). Moore advocates for the preservation of science education by continually publishing works similar to the ones reviewed.

Haarscher (2009), like Moore and Scott, distinguishes patterns of creationist argumentation. He suggests that after the first phase of creationist attempts to undermine evolution, which he calls the “frontal attack” (i.e., argumentative tactics of Scopes-era legislation), there have been five rhetorical segments of the controversy as follows: equal time and emphasis, where creationists argued for equal time for both evolution and creationism; creation science, where creationists offered a religious alternative to evolution; evolution as a religion, where creationists argued evolution was not secular; evolution as “just a theory”, where creationists argued that evolution should be presented as a largely unfounded theory; and the ID phase, where creationists offered an alternative, devoid religious references, to evolution (365-372). Haarscher concludes that creationists use the pseudo-argument (i.e., an argument where the rhetor is not convinced of her own argumentative tenants) to change premises and, necessarily,
tactics in an argument or series of arguments (361-362). Haarscher suggests that the “ascent of the pseudo-argument” occurred after the “frontal attack” and the Epperson decision (362-365). Haarscher’s analysis of the controversy relies heavily on the work of Perelman and Olbrechts-Tyteca.

Perelman and Olbrechts-Tyteca (1969), the scholars from whom Haarscher borrows the idea of the pseudo-argument, offer a framework for interpreting and analyzing arguments. Perelman and Olbrechts-Tyteca consider arguments ranging in structure from formal to informal, and do not restrict analytical considerations to either strictly logical or strictly persuasive cases, where an argument is evaluated along a spectrum of logic and persuasion based on an emotional relationship between a rhetor and an audience. Perelman and Olbrechts-Tyteca explain that the foundation of any argument, whether formal or informal, is audience adherence, or the perceived similarity between an argument’s tenants and an audience’s values. Perelman and Olbrechts-Tyteca posit that an argument’s ultimate acceptance or rejection is based on audience adherence, where a greater level of adherence inclines an audience towards argument acceptance. Perelman and Olbrechts-Tyteca explain that objects of agreement foster argument acceptance (66). The scholars also posit that objects of agreement often consist of certain values used to bolster the effect of the object.

Perelman and Olbrechts-Tyteca separate values into two distinct categories: abstract and concrete values. Abstract values are those that relate to intangible ideas such as justice (77). Concrete values are those that refer to a specific group, entity, or person (77). Perelman and Olbrechts-Tyteca explain that, because of association, certain values can be both concrete and abstract depending on the way they function within an argument. For example, some current creationist bills use the term “discrimination” as both a concrete and abstract value. Under
certain circumstances, creationists refer to the concrete relationship between a subjugated group and a dominant group, but under different rhetorical circumstances, they use the term to invoke an associative value such as fairness. The authors relate values to both real and preferable objects in the following ways. Real objects of agreement may rely on both concrete and abstract values, but preferable objects of agreement necessarily rely on abstract values (78-79). Perelman and Olbrechts-Tyteca also explain that when preferential arguments are used, hierarchies are created. Hierarchies are rhetorically generated value structures where one value is preferred over another. Hierarchies are also inevitable externalities of preferential argumentation since the foundation of preferential argumentation requires valuation of one situation (66; 80). Perlman and Olbrechts-Tyteca’s objects of adherence, values, and hierarchies all function to increase audience adherence. Eisenberg (1984), focusing in part of audience adherence, contends that one strategy when communicating values can be ambiguity.

Eisenberg posits that communication maybe intentionally ambiguous in order to serve a particular function (227). Eisenberg calls this sort of approach to communication “strategic ambiguity”. Eisenberg suggests that ambiguous messages lack clarity, where clarity is dependent on the degree of communication lucidity which is, in turn, reliant on a source’s ability to limit a receiver’s interpretation of a message. The merit of a message is often based on clarity, with a clear message superseding an ambiguous message. However, Eisenberg posits that clarity is only a metric for message success if the disseminator’s goal was to be clear, which is not the case when strategic ambiguity is employed. Eisenberg defines strategic ambiguity as the use of a message, promoting an array of interpretations, for a particular function (229-230). Strategic ambiguity is an essential part of organizing in three ways (227). Strategic ambiguity fosters unity among different populations, allots for organizational change, and conserves “source
attributions”. According to Eisenberg, an ambiguous message does not limit interpretations, thereby affording leniency for a range of values, opinions, and backgrounds (230-232). Ambiguous messages also allow a rhetor to manipulate the meaning of a message after it has been disseminated, creating distance between rhetors’ values and audience values and facilitating fluid organizational change (232-234). Finally, Eisenberg submits that ambiguous messages allow an audience to maintain a rhetor’s credibility even if the message is ill-received: “People act to maintain a consistent set of beliefs about others, and hence dispositional attributions have considerable inertia.” (234-135). Eisenberg cites Linda Putman and Ritch Sorenson (1982) who suggest that equivocal messages, the authors’ term for ambiguous strategy, can be identified based on message attributes, where messages include little specific detail or an abundance of abstract language (Eisenberg 1984, 229).

Randy Allen Harris’ book, Rhetoric and incommensurability (2005), centers on Kuhn and Feyerabend’s idea of incommensurability, or the notion that there are certain situations in which two elements are incomparable because of the lack of a common substituent, reference point, or symbolic standard (3). Incommensurability, as a theory, became an issue among philosophers of science after its co-introduction by Kuhn and Feyerabend (Harris 2005). Kuhn and Feyerabend suggested that the lack of common reference points and symbolic standards ought to cripple science because of the implications for interdisciplinary, inter-theory analysis (Harris 2005). However, science overcomes communicative barriers rooted in incommensurability (3). In his work, Harris considers multiple types of incommensurability. The types of incommensurability, Harris explains, are as follow: brick-wall, cosmic, semantic, and pragmatic incommensurability (21). Semantic incommensurability refers to communicative situations in which communication is hampered by parties’ definitional differences regarding terms or phrases (22). Harris explains
that semantic incommensurability is largely the product of linguistic variations (41). Linguistic variation refers to situations in which communication is impeded because of meaning difference, where one person or group maintains a certain definition for a term and another holds a varying definition for the same word. Harris suggests that groups inherit the meaning of terms via “semiotic webs”, or networks of terms that derive at least part of their definition from the context in which they are used (42). For instance, the word “theory” means something different to scientists than it does to a non-scientist because of two different contexts. Harris also posits that semantic incommensurability is one of the most debilitating types of incommensurability, especially if calibration, or the process of establishing a mutually agreeable definition of a term, is not achieved (49-50).

Using the framework provided by these scholars, this work will analyze, historically situate, and reveal implications of current creationist legislation. In order to understand the current controversy, Perelman and Olbrecths-Tyteca’s argumentative theory will be applied to three artifacts as selected by the following criteria and Eisenberg and Harris will reveal some of the tactics used by creationists in current legislation.
ARTIFACTS AND METHODS

The history of the controversy reveals that creationist arguments predicated on ID were in recession in the 2000s and largely abandoned after the *Kitzmiller v. Dover Area School District* decision (Jones 2005). Following this decline, another form of creationist legislation rose to prominence. These bills limited mention of non-secular elements (e.g., “Creation Science”), included less detail than previous creationist attempts, and were predicated on a number of different arguments. The prominence of these bills, or post-ID bills, rose sharply after 2000, with the highest number of bills being introduced from 2008-2013 (Fig. 1).

**Figure 1: Distribution of Introduced Post-ID Bills**

Post-ID bills all argue that limiting scientific instruction to evolution renders science education incomplete. The bills use various language and rhetorical tactics to advance the notion of unfulfilled education. However, a rhetorical pattern emerges, where all of the bills fall into at least one of the following rhetorical categories: rhetoric based on “evidence” against evolution,
rhetoric based on the supposed preservation of critical thinking, and rhetoric based on “rights” and “discrimination”. Bills falling under the evidence against evolution category pivot on the creationist notion that because evidence against evolution is not being taught, students’ and teachers’ access to academic freedom is limited and science education is incomplete (e.g., Ohio HB 62, available in Scott 2005, 203-204). Legislation in the critical thinking class argues that by presenting diverse viewpoints regarding evolution and explaining why evolution generates controversy, students’ critical thinking abilities will be enhanced, improving science education (e.g., Sense of the Senate Amendment, Appendix, 2; Georgia HB 1563, available in Scott 2005, 201-202). The final type of bills comprise the most recent legislation and center on the idea that teachers and students subscribing to creationist views are discriminated against and that by introducing creationist alternatives to evolution, students’ education would improve (Alabama HB 391 2004; New Mexico SB 371 2007; Oklahoma HB 4224 2011).

Of the bills proposed or passed between 1996 and 2013, three artifacts were chosen according to the following criteria. To identify argumentative trends in the current phase and to identify rhetorical similarities and differences between proposed legislation after ID attempts and historical legal challenges to the teaching of evolution, artifacts that undermined the teaching of evolution, revealed new trends in creationist argumentation, represented large portions of proposed legislation, and showed significant rhetorical and argumentative influence over current bills (as measured by the number of recurrent elements between possible artifacts and other pieces of legislation) were chosen. Although more than 50 bills have been proposed or passed (Fig.1) that fit some of these criteria, only three artifacts, as follow, sufficiently fulfill all requirements: Identical bills issued in response to the TEACHES (Teach Evolution Accurately, Consistently, Honestly, Equitably, and Scientifically) campaign (Appendix, 1); the Sense of the
Senate amendment to the Elementary and Secondary Education Act Authorization Bill, spearheaded by Pennsylvania Senator Rick Santorum (Appendix, 2); and the Discovery Institute’s Academic Freedom bill template (Appendix, 3).

The TEACHES campaign was a grassroots effort initiated by John Hansen, a retired Wisconsin teacher, that lasted from 1995 to 2000. The attempt consisted of Hansen driving from state to state, lobbying lawmakers to introduce bills that encouraged “fair treatment” of evolution. Hansen’s effort resulted in the introduction of at least four bills (Ohio HB 62 1996, and HB 697 2000; Georgia HB 1133 1998; Arizona HB 2585 2000) and one proposed amendment to state education standards in Ohio in 2002 (bills and educational amendment available in Scott 2005, 203-204). The bills and state standard amendment, because they all use similar language, will be considered as one artifact in this analysis. All of the bills spawned by this campaign undermine evolution, use language that eliminates a non-secular alternative to evolution, and share argumentative features with a number of bills between 1996 and 2013.

The Sense of the Senate amendment to the Elementary and Secondary Education Act Authorization Bill, colloquially known as the Santorum amendment to the No Child Left behind Act, was an attempt by Senator Santorum to improve public science education by stipulating the teaching of the ongoing controversy between evolution and creationism in order to better students’ critical thinking skills. The Santorum Amendment undermines evolution in a less overt way than the TEACHES campaign. However, like the TEACHES campaign, the amendment inspired the formation of a number of current creationists bills and used the improvement of critical thinking skills as a tactic to introduce alternatives to evolution into the classroom.

The Discovery Institute’s template bill was a document issued by the Discovery Institute, a Seattle-based Christian public policy advocate group, to be introduced by any state, complete
with blanks for state names and identifiers. The template suggests that students and teachers are 
discriminated against for subscribing to differing views on the origin of humankind. Most of 
current creationist legislation use the argumentative tactics and appeal to antidiscrimination like 
the Discovery institute template. In addition, the Discovery Institute template clearly undermines 
the teaching of evolution by insinuating that teachers and students should have the right to teach 
and learn about alternatives to evolution.

The TEACHES campaign was chosen as a representative of the evidence against 
evolution category because it predates all post-ID legislation using “evidence against evolution” 
as the main premise. The Santorum Amendment to No Child Left Behind was chosen to 
represent the critical thinking class because it too predates all post-ID legislation using the 
ideograph “critical thinking”. The Discovery Institute’s Academic Freedom bill was chosen to 
represent the third category because this artifact reflects common argumentative strategies 
present in post-ID legislation falling into the rights and discrimination camp. In order to 
understand what these artifacts argue and the implications of the arguments, Perelman and 
Olbrechts-Teyteca’s ideas of objects of adherence, values, and hierarchies will be used as a 
framework to interpret the artifacts.
ARGUMENT ANALYSIS

Current creationist bills all use strategically ambiguous rhetoric that appeals to liberal values, avoids alienating groups of potential supporters, and mitigates risk of unfavorable legal judgment. The language in these bills also uses incommensurability as a foundation to support certain arguments. However, current bills do not use these tactics in exactly the same way or by using the same premises. Rather, bills use one of three approaches exemplified by each artifact. By applying Perelman’s argumentative framework to arguments present in the TEACHES campaign, the Santorum Amendment, and the Discovery Institute’s template bill, the objects of adherence, values, and hierarchies all found in the artifacts will highlight the way current legislation functions and the common argumentative tactics of this phase of the controversy.

TEACHES Campaign

As the TEACHES acronym implies, the root of the campaign’s argument is simple. Evolution is not being presented in a fair manner, and in order to restore fairness, according to bills based on the TEACHES campaign, teachers should be allowed to present evidence against evolution. Ohio HB 62, a bill spawned by the TEACHES campaign (Scott 2005), explicitly states this idea by suggesting a symmetrical approach: evidence for evolution and against evolution should be taught equally. This bill and the campaign in general both reveal important elements of adherence, values, and a hierarchy all of which are important for audience adherence.

This artifact seeks audience adherence by presenting a problem and a solution. The premise relating to the problem is the author’s notion that evolution is not being presented fairly. This premise relies on the creationist presumption that evidence against evolution exists. The
premise relating to the solution addresses the problem directly by simply suggesting that evidence against evolution should be taught alongside evidence for evolution. This argument structure, finding fault with the status quo and affording a solution, reveals the author’s intent to appeal to a specific audience by presenting both a real and a preferable object of adherence. The real object of adherence in this case is the author’s appraisal of the current state of public science education. The preferable object of adherence is the restoration of fairness in the classroom. This sort of argument structure is not a novel creationist tactic. “Evidence against evolution” was a powerful term setting up a similar preferable premise during the neocreationist period of the controversy. However, during this phase of the controversy, the alternative creationists were pursuing was ID, as opposed to just evidence against evolution as the TEACHES campaign suggests. This is an important distinction in terms of the difference between neocreationism and post-ID creationism; neocreationists supplied a concrete alternative that the courts deemed non-secular and, therefore, unfit for the public science classroom. Post-ID creationists in the TEACHES campaign, perhaps building off of the courts’ decisions regarding ID legislation, supply a more ambiguous alternative, teach evidence against evolution. This evolution in argumentation coupled with the function of the author’s objects of adherence and premises reveal two types of values that construct the artifact’s hierarchy.

The TEACHES argument uses both concrete and abstract values to garner audience adherence. By suggesting the use of evidence against evolution, the TEACHES campaign uses the concrete value of evidence. This value serves a twofold function. First, it invokes the ideal of empiricism and the scientific process. In doing so, the value secures the argument’s place in a discussion regarding science instruction. Second, this value adds legitimacy to the abstract value of fairness. The TEACHES argument hinges on the idea of fairness in the classroom. Without
using evidence as a value and an alternative to evolution, the argument by fairness falls apart. The TEACHES argument also uses the abstract value of inequitability, where teachers teach an unfair version of evolution in light of evidence against the theory. The TEACHES campaign emphasizes fairness over inequitability by suggesting that restoring fairness is preferable to retaining the status quo. This hierarchy marks another attempt to garner audience support. The TEACHES argument favors the liberal value of fairness, or equality, over the largely disagreeable value of inequitability, where ideas, supported by evidence, should be viewed as equal and granted merit regardless of consensus. It is by this approach that the TEACHES campaign broadens its perspective audience from those only concerned by the teaching of evolution in the public science classroom to those who support the liberal ideal of fairness.

**Santorum Amendment**

The Santorum amendment, like the TEACHES campaign, eliminates any mention of a non-secular alternative. In fact, the Santorum amendment does not offer any alternative to evolution. Instead, the amendment argues that teaching students the controversy and how to determine the difference between a testable scientific theory and claims made “in the name of science”. The objects of adherence, values, and hierarchy the Santorum amendment are distinct from those in both the TEACHES campaign and the bills of previous phases of the controversy.

The objects of adherence used in the artifact function in three ways. First, the preferable object of adherence is explicitly stated and establishes the foundation of the argument. The artifact suggests that is preferable that science education should prepare students to think critically—a goal included in most science curricula. Second, the artifact establishes another preferable object of adherence by suggesting that students should be prepared to participate in public discussions regarding evolution. This premise reflects the educational objective of
generating publicly active citizens. The final object of adherence is real and implicit. In establishing the preferable situation, where students are taught to think critically and participate civically, the artifact implies that the then current approach to science curricula were under-preparing students. This real and the two preferable objects of adherence establish the foundation of the argument represented in the following syllogism: students are not being prepared adequately to think critically and participate in the public debate surrounding evolution; therefore, science education should include instruction aimed at teaching the controversy regarding evolution to rectify the shortcoming. The argument purposed by the artifact uncovers three values.

The most apparent two values the argument invokes are critical thinking and civic responsibility, where the artifact seeks greater audience adherence and support for the premises by appealing to these broad values. In this instance, critical thinking and civic responsibility function as abstract values. Although, both values may be viewed as real, the way in which they are used in the artifact suggests that they are an abstraction because the artifact uses them both as ideals to bolster a preferable premise instead of reflect an existent reality. The third value, pragmatism, is another abstract value. This value is implied in the argument as is used to establish the argument’s hierarchy, where critical thinking and civic preparedness supersede pragmatism. As the argument describes, better preparing students to think critically and participate civically are preferable to allowing science education to maintain the status quo based on a scientific majority.

**Discovery Institute’s Legislative Template**

The template, published on the Discovery Institute’s website in 2008—the same year as a peak in post-ID bills (Fig. 1)—was designed to be effortless for lawmakers to introduce. The
template even includes blanks for state names to aid in ease of operation. Most of the bills introduced from 2008 to the present use language either derived or directly quoted from this artifact. The artifact’s title, “The Academic Freedom Act”, suggests the bill’s purpose: to secure academic freedom. The goal of the bill is to protect students’ and teachers’ right to academic freedom regarding science education, while maintaining secularism. This approach is similar to the argumentative tactic used by creationists in the “religious rights” phase of the controversy. This artifact uses a number of adherence objects and values and a subsequent hierarchy to support its argument.

The objects of adherence for this artifact differ significantly from the other two artifacts in most regards, however the template’s argument structure is similar to the problem-solution approach of the TEACHES campaign and related bills. The template includes both real and preferable premises. The bill explains that existent law does not cover academic freedom for students and teachers regarding the teaching of evolution, and students and teachers subscribing to differing views regarding the theory of evolution are discriminated against. As a solution and preferable premise, the bill concludes that, in order to mitigate discrimination and protect the rights of teachers and students, teachers should be allowed to present other scientific views regarding chemical and biological diversity, and students should not be penalized for their beliefs regarding evolution. These premises reveal the values substantiating the argument and increasing the likelihood of audience adherence.

The values of the template include the following: academic freedom, rights, and discrimination. Academic freedom and rights serve as abstract values and help garner adherence by appealing to the audience’s sense of freedom. Discrimination, as both a concrete and abstract value, also bolsters adherence by seeking empathy and engaging the audience’s ideal of fairness.
The template also uses the values to generate a hierarchy. The bill leads the audience to conclude that something must be done to restore the rights of students and teachers and to fight discrimination. On a larger scale, this broad appeal to liberal rights and antidiscrimination sentiment is common to most legislation introduced after 2008. Some bills even take it further, lumping rights associated with evolution and science instruction with rights that go beyond evolution and science instruction (See Florida SB 1854 2011 for its consideration of education regarding the Declaration of Independence, sexual education and abuse, and racism prevention).

These three artifacts all highlight current creationist argumentative tactics. The three artifacts also have one important commonality; they all rely heavily on appeals to values that are not concrete and subsequent hierarchies to support their respective premises. However, although the artifacts use values to advance arguments, the three artifacts argue very different things. The dissimilar nature of the three artifacts coupled with the observation that all of the artifacts drop any mention of a non-secular alternative to evolution suggests two conclusions. First, the incongruent approach in both argument content and language of the artifacts suggest that post-ID legislation is different from historic creationist legislation and arguments. Second, the disparate character of the bills and ambiguous language regarding alternatives to evolution may suggest that creationists are using ambiguity as part of an overarching strategy.

**Strategic Ambiguity**

Strategically ambiguous communication is a resource that affords rhetors better control of communication, especially after messages have been disseminated (Eisenberg 1984). Strategic ambiguity provides control over messages by accounting for three communicative variables. The first is audience receptiveness to messages. An ambiguous message promotes a “unified diversity” because of the lack of alienating detail. For example, post-ID legislation neglects
mention of anything overtly non-secular. Second, ambiguous messages account for future changes in context. In the current phase of creationist legislation, bills are intentionally ambiguous to foster adaptation to changes in context such as unfavorable legal decisions or public reception. Finally, strategically ambiguous communication allows rhetors to maintain credibility if a message is ill-received because messages that lack clarity create interpretive exits for the communicator. For post-ID legislation, the ambiguous nature of bills allows laws makers and individuals responsible for the inception of bills to create distance between themselves and messages. In order to understand the role ambiguity plays in the current controversy, it is essential to understand how each function of ambiguous communication predicated on argument structure, arrangement, and content aids in undermining the teaching of evolution.

There is an inherent tension when organizing individuals, where individuality is hard to maintain when trying to garner group cohesion and acceptance of a common goal (Eisenberg 1984). This tension is apparent throughout the evolution-creationism controversy. Scott (1997) highlights the problem created by the balance, or lack of balance, between individuality and community relative to the controversy. Among individuals exposed to rhetoric surrounding antievolution legislation, there are variations in commitment to both religious and evolutionary perspectives, and commitment to either evolution or religion is best characterized by a continuum, with total commitment to Biblical literalism on one pole and total acceptance of naturalistic mechanisms on the opposite (Scott 1997). The presence of an indiscrete number of views regarding the teaching of evolution makes ambiguity a befitting strategy. Creationists in the current phase avoid alienating groups of potential supporters by limiting message resolution and appealing to widely accepted liberal principles exemplified in the artifacts.
The appearance of creationist leniency in legislation to account for varying degrees of commitment to creationism was not abrupt. Creationist legal approaches, beginning with the frontal attack and ending with the psuedoargument, have evolved (Haarscher 2009). This evolution shows a creationists’ progression toward ambiguity. Early in the controversy, creationists argued that science education should only include the Judeo-Christian explanation for biodiversity. In the Creation Science-ID era, creationists decreased message resolution by suggesting that a supreme being or an intelligent designer, not necessarily God, was responsible for parts of biodiversity. And, in the current phase, creationists suggest various solutions regarding the teaching of evolution, none of which include a well-defined alternative to evolution. This recession of detail and elimination of non-secular terms, perhaps spurred by unfavorable legal judgment, broadens the support base for current creationist bills and helps creationists dodge legal pitfalls. The second function of ambiguity adds even more utility to current creationist bills.

Strategic ambiguity facilitates goal changes by generating relationships between audience members and campaign principles and fostering collective metaphors (Eisenberg 1984). The artifacts highlight the use of collective metaphors or values. The values defined in the artifacts’ arguments appeal to broad audiences and attempt to rally individuals around a respective principle. For each artifact, the values promote audience identification and interpretation of the argument. This aids in the fight against the teaching of evolution in two ways. First, it helps accrue public and political support for antievolution legislation. Second, it fosters a relationship between supporters and the legislation allowing those responsible for drafting and enacting bills to change tenants of the argument without risking the loss of proponents. Because of association with values of audience members, current antievolution bills can be thought of as gateway
legislation, where those responsible for legislation hook a following and maintain freedom to change legislation according to the legal environment—assuming legislative figureheads continue to promote the association between legislation and a following. This function may serve as another mechanism to work around potential legal difficulties. With increased ability to change argument structure while preserving support, individuals generating legislation can reformulate bills in order to circumvent unfavorable legal responses. The final function of strategic ambiguity preserves “privileged positions” (Eisenberg 1984).

Ambiguous messages are deniable because they create distance between rhetors and the messages they craft (Eisenberg 1984). The repercussions of this observation function in a twofold manner for current creationist legislation. These messages preserve future options and allow lawmakers to save face. Politicians may introduce bills that are ill-received for various reasons, including but not limited to legislation that violates legal precedent. Instead of being characterized as a creationist for introducing an antievolution bill, lawmakers can maintain representative objectivity because of the ambiguous nature of their messages regarding the teaching of evolution. This allows representatives to make multiple attempts at undermining the teaching of evolution, while preserving reputation. This, in part, may explain the dissimilarities between the artifacts and the apparent trial-and-error approach noticed in this phase of the controversy. By presenting arguments in an ambiguous fashion, those responsible for crafting and introducing legislation can present different arguments with minimal risk.

Creationists in current legislation use strategic ambiguity in a number of ways. However, most importantly is the use of liberal values in an ambiguous fashion to garner public support for legislation, while preserving a veneer of secularism. Strategic ambiguity may help explain dissimilarities in argumentative tactics among the artifacts, the reason the artifacts establish the
values and hierarchies they do, and the overarching inclusion of ambiguous rhetorical and linguistic elements, however it does not fully explain the artifacts in that it does not uncover a common premise among the artifacts and another tactical turn in creationist legislation. All of the artifacts and bills in the current phase use Kuhn and Feyerabend’s idea of the incommensurability to propose that limiting science education to just evolution renders students’ education incomplete and in some cases discriminatory.

**Incommensurability**

Incommensurability describes a philosophical problem when two competing theories, without a common metric for comparison, vie for acceptance (Harris 2005). Subtypes of incommensurability exist and describe a number of different rhetorical situations. Creationists use incommensurability, particularly semantic incommensurability in this phase, to substantiate arguments regarding the educational value of differing views on biodiversity and origins of life. In effect, creationists use the logic that because evolution and supernatural origins do not share a common metric it is impossible to deem one more valuable than the other. Thus, evolution should not be exclusively taught. This logic permeates every phase of the controversy, however, not all phases use the same class of incommensurability. Each stage of the controversy exhibits a different form of incommensurability based on rhetorical context. For example, arguments in ID legislation used pragmatic incommensurability to support the idea that design scientists looked at data gathered from both evolutionists and creationists and came to the conclusion that the existence of a designer may account for biodiversity. These arguments were predicated on pragmatic incommensurability insofar as they used both semantic tenants, such as differing definitions of “theory”, “evidence”, and the “scientific process”, and contextual elements (e.g., design scientists’ admission of the validity of adaptation, or small-scale evolution; see Behe
2006, for a design scientist’s ideas regarding small-scale evolution) to conclude that evolution and design science were fundamentally different and therefore incomparable. Current legislation exhibits a slightly different incommensurability. Post-ID legislation uses semantic incommensurability.

Semantic incommensurability is incomparability that arises due to linguistic variation (Harris 2005). Linguistic variation refers to a situation where two, often opposing groups have different definitions for terms that leads to varying situational interpretations. This relates to current legislation in two ways. First, creationists, in implicating evidence against evolution, alluding to alternative views of the role of evolution, and suggesting teachers teach the controversy, use semantic differences regarding scientific terminology to substantiate charges of discrimination and solutions that include teaching evidence against evolution and the controversy. Typical terms that carry varying definitions include “evidence” and “theory”. Creationist ideas of “evidence” and “theory”, articulated in legislation and the artifacts, diverge from scientific meanings of the terms in that the empirical requirements required to constitute scientific evidence and theories are different than those required for creationist evidence and theories (Attie et al. 2009; Condit 1998; Scott 1997). Second, even common terms hold semantic differences. The word “discrimination” in the Discovery Institute’s template bill carries a different denotation. Undoubtedly, the creationists who drafted the template feel students and teachers subscribing to extra-naturalistic views regarding biodiversity are discriminated against. Yet, scientists and teachers who subscribe to evolution do not feel individuals are discriminated against simply by presenting evolution. The High Courts agree; the Segraves (Perluss 1981), Webster (Marovich 1989), and LeVake (Borene 2000) decisions all outline precedent that explains the presentation evolution does not infringe on the rights of teachers or students (Scott
1997). This fundamental lexical difference highlights the function of semantic incommensurability. Creationists in current legislation use semantic incommensurability to suggest that simple difference between the way creationists and evolutionists define certain terms for their theory is not enough to justify limiting science education to only evolution.
The argumentative analysis of the artifacts suggests that the values and hierarchies function in a strategically ambiguous way, and the missing premise in each artifact suggests that creationists found current arguments on semantic incommensurability. This observation reveals a few things regarding this phase of the evolution-creationism controversy. First, it uncovers similarities and differences between this phase of the controversy and historical phases of the controversy. Next, it shows hidden assumptions and a fallacy inherent in current creationist legislation. Finally, it highlights some implications of creationist legislation for future science education.

The analysis of the artifacts coupled with the function of ambiguity and incommensurability show two distinct similarities and two fundamental differences between this phase of the controversy and historical phases. Like other phases in the controversy, current creationist legislation preserves the overarching goal of the antievolution campaign: undermining the teaching of evolution. This goal is most apparent in the TEACHES campaign and the Discovery Institute template artifact, where limiting science instruction to evolution alone renders science education incomplete and discriminatory, respectively. The Santorum Amendment uncovers this goal in a more subtle way, where the artifact would take away from the instruction of evolution by allotting time to teach the controversy. The second similarity is noticed between the “individual rights” phase of the controversy (i.e., where creationists felt their right to religious freedom was infringed upon by the teaching of evolution) and the Discovery Institute’s template. The template mirrors “individual rights” complaints issued by creationist during the second phase of the controversy insofar as it argues creationists’ rights are abated;
however the template drops any religious connotation noticed in the second phase. This process of eliminating language and evidence deemed non-secular is not new to the controversy. The creationist tendency has been to adopt different language after legal defeats (Blancke, Boudry, and Braeckman 2010).

The final commonality is between this phase and the Creation Science-ID phase of the controversy. During the Creation Science-ID phase of the antievolution legal campaign, creationists argued that evidence against evolution should be presented in the science classroom. The parallel between the Creation Science-ID phase and the current phase is most notable in the TEACHES artifact, where the only difference between the two forms of legislation is the omission of the terms “Creation Science” and “Intelligent Design”. This is perhaps not surprising, given that the TEACHES campaign began near the end of the Creation Science-ID phase of the controversy. In addition to this similarity, the way Creation Science-ID proponents argued for the addition of evidence against evolution to science curricula varied in a fashion not dissimilar to that noticed in the current phase. Scott (2005) points out that neocreationist attempts to weaken the teaching of evolution were less consolidated than previous attempts and used varying approaches and rhetorical tactics to advance creationism. This varied approach is apparent in the current phase with creationist think-tanks like the Discovery Institute issuing template bills and pursuing public support and the Santorum amendment arguing that the controversy, and not necessarily evidence against evolution, be taught. However, these similarities to historical forms of creationism are somewhat expected given the limited number of legal outlets preserved by numerous court decisions against the creationist cause and the proximity of this phase and the Creation Science-ID phase.
The differences between this phase of the controversy and historical phases are twofold: First, this phase uses a more rhetorically ambiguous approach than historical phases; and second, the current phase uses a novel form of incommensurability. All of the artifacts analyzed use ambiguity, evidenced by the inclusion of agreeable and disparate values and hierarchies, and semantic incommensurability. Other phases of the controversy were more consolidated, with each phase exhibiting a common argument (Haarscher 2009). This phase, however, argues three fundamentally different points as uncovered in the argument analysis. In addition to using a three-front approach, the current phase uses ambiguous rhetoric to advance arguments. The artifacts all include values that promote ambiguity, omit any non-secular language prominent in historical phases, and lack any definitional language permeating some legislation and legal cases in other phases (e.g. The Butler Act’s description of evolution in the first phase and Arkansas Act 590 in the Creation Science-ID phase).

The current phase also utilizes a unique form of incommensurability to sustain its three arguments. As discussed, the artifacts all function on semantic incommensurability, where lexical differences in terms are used to substantiate claims of unfairness, incompleteness, and discrimination. The other phases use different forms of incommensurability. This shift in strategy has important implications for the controversy. First, because creationist legislation has shifted to semantic incommensurability, the bills can take advantage of lay interpretations of terms of like theory, science, and evidence. Instead of using scientific terms in a more scientific context, creationists can use words like evidence to misrepresent science and the scientific process in order to validate their arguments. Second, this shift in strategy implies that creationists have simply built on or abandoned previous argumentative tactics. By using semantic incommensurability, creationists avoid legal pitfalls experienced in previous phases of the
controversy. For instance, creationists can use terms like “evidence” and “alternatives” to evolution to give the impression of empiricism and limit argumentative reliance on non-secular tenants such as Creation Science or ID.

Aside from showing rhetorical evidence of the significance of current legislation for the overall controversy, the argumentative analysis and the considerations of ambiguity and incommensurability uncover hidden assumptions. Each artifact includes a hidden assumption, and all of the artifacts share a ubiquitous fallacy. The TEACHES’s and the Discovery Institute’s arguments hinge on the existence of evidence against evolution. This hidden assumption is obvious in the TEACHES’s argument, but more subtle in the template’s argument. The Discovery Institute’s template bill uses the existence of evidence against evolution to substantiate the claim that teachers and students are discriminated against by the teaching of evolution. However, this assumption may be invalid because of the questionability of evidence against evolution. Evidence against evolution generally falls into one of two related categories as follows: negative evidence or evidence generated by Creation and ID scientists (Scott 2005, 1-70 and 92-133). Whatever the form, this evidence has been scrutinized by a number of scientists. For most observations creationists make to discount evolution, there are in fact naturalistic explanations (Scott 2005). Attie et al. (2009) suggest that evolution is one of the best studied theories in science, claiming “150 years of biological, geological, and physical science supports the modern synthesis of Darwin’s theory,” (1136) and that creationists’ evidence is nowhere to be found in peer reviewed, scientific journals. Gishlick and Padian (2002), in their review of Jonathan Well’s, *Icons of Evolution: Science or Myth?*, suggest that certain creationist arguments (e.g., Gishlick and Padian explain Well’s skepticism regarding peppered moths and the seemingly disparate relationship between color pattern and natural selection) are easily explained
by evolution. Dawkins (1996) contends that complex biodiversity is explained sufficiently only by evolutionary theory. Blancke, Boudry, and Braeckman (2010) suggest irreducible complexity, a line of creationist evidence against evolution postulated by biochemist and Discovery Institute senior fellow, Michael Behe, is incoherent and has been refuted by a number of naturalistic observations. Forrest and Gross (2007) posit that most biochemical evidence against evolution is simply postulated and not tested. The number of scientists supporting evolution and the evidence amassed in favor of evolution make a strong case against any alternative. Thus, both the TEACHES campaign and the Discovery Institute template rely on a largely unfounded hidden assumption.

The Santorum Amendment’s hidden assumption is slightly different. Instead of relying on evidence against evolution, the Santorum Amendment uses critical thinking as a foundation for its argument. The amendment relies on the presumption that critical thinking would improve by introducing the controversy in the science classroom. However, introducing alternatives to evolution or teaching the controversy would not improve students’ critical thinking skills because, scientifically, evolution and supporting evidences and creationist arguments against evolution are not of equal merit because of a lack of empirical data supporting alternatives to evolution (Scott 1996). In addition, the argumentative tenants of the artifacts may suggest the use of the definist fallacy. The definist fallacy is the logical fallacy of defining a term in a way that favors a rhetor’s position (Bunnin and Yu 2004, 172). As analyses of the hidden assumptions reveal, a possible lack in empirical evidence supporting creationist alternatives and the questionability of improved critical thinking skills by introducing the controversy suggests creationists use different definitions of “evidence” and “critical thinking” from some scientists and educators. This fallacy adds legitimacy to creationists’ arguments in current legislation
because it insists there is creationist evidence and a legitimate controversy among scientists regarding evolution, as the Discovery Institute contends there is (Discovery Institute 2011). This fallacy also takes advantage of a lay understanding of the scientific process and education, in the sense that the public may not be able to distinguish between scientific evidence and theoretical suppositions or between educational agents that actually bolster critical thinking skills and those that do not.
CONCLUSION

The values and hierarchies, the utilization of ambiguity and incommensurability, and the hidden assumptions and definist fallacy, taking advantage of a misunderstanding of scientific and pedagogical processes, all substantiate and significantly broaden the appeal of current creationist legislations. In fact, current creationist legislation is so appealing that bills have been passed in Louisiana (SB 561 and 733 2008) and Tennessee (HB 368 2012), despite Supreme Court rulings outlawing the teaching of creationism in science classrooms. Part of the reason current creationist bills enjoy success is due to public support rooted in acceptance of current creationist arguments. Moore (2000) explains, “Creationism’s widespread appeal, combined with many scientists’ dismissal of the controversy, ensures that it will remain popular, that creationists will continue to win the public debate, and that evolution will continue to be rejected or poorly understood by the public” (20). With US science instruction regarding evolution already suffering (see Lerner 2000 and Moore 2002a for appraisals of American evolutionary education), public support for creationism in the classroom holds ominous implications for evolutionary education, and science instruction as a whole.

Among the consequences of passing law aimed at undermining the teaching of evolution, the skewing of the scientific process is perhaps the greatest. If public support for creationism grows and the rate at which antievolution legislation is introduced increases, textbooks and teachers will continue to shy away from evolution instruction, clearing room for creationist alternatives (Scott 1997). Given the lack of creationist evidence published in scientific journals (Attie et al. 2009), the presentation of creationist alternatives to evolution in the science classroom challenges the scientific method. If creationist alternatives were allowed in the science
classroom, evidence to support a scientific theory would no longer be necessary, the money required to conduct scientific research would decrease to the cost of paper and an individual’s time, and the only remaining metric for the scientific merit of a theory would be community acceptance. This would effectively remove the foundation of science, hampering, if not killing, scientific instruction. However, the fate of science is not lost. Informing teachers regarding evolutionary principles and law surrounding the instruction of evolution (Moore 2004; Moore, Jensen, and Hatch 2003), increasing the public’s understanding of evolution (Scott and Branch 2003), amending religion and evolution (Scott 1996), and treating students’ views regarding origins respectfully (Reiss 2011) are four promising ways to improve the teaching of evolution and deflect the onslaught of antievolution legislation. However, all four responses require an effort investment on behalf of scientists who have, until recently, remained somewhat quiet during the debate (Scott 1996 and 1997). This public scientific silence regarding creationism and evolution is interesting and may provide a foundation for future research.
APPENDIX

1. Bills Spawned by the TEACHES Campaign¹:


Whenever the theory of the origin of humans or other living things that might commonly be referred to as “evolution” is included in the instructional program provided by any school district or educational service center, both scientific evidence and related arguments supporting or consistent with the theory and scientific evidence and related arguments problematic for, inconsistent with, or not supporting the theory shall be included.

Georgia HB 1133 (1998): Same as Ohio HB 62 and 697

Arizona HB 2585 (2000): Same as Ohio HB 62 and 697

2. Sense of the Senate amendment to the Elementary and Secondary Education Act Authorization Bill²:

It is the sense of the Senate that (1) good science education should prepare students to distinguish the data or testable theories of science from philosophical or religious claims that are made in the name of science; and (2) where biological evolution is taught, the curriculum should help students to understand why the subject generates so much continuing controversy, and should prepare the students to be informed participants in public discussions regarding the subject.

3. Discovery Institute Template Bill³:

SYNOPSIS: Existing law does not expressly provide a right nor does it expressly protect tenure and employment for a public school teacher or teacher at an institution of higher education for presenting scientific information pertaining to the full range of scientific views regarding biological and chemical evolution. In addition, students are not expressly provided a right to positions on views regarding biological and chemical evolution.

This bill would expressly provide rights and protection for teachers concerning scientific presentations on views regarding biological and chemical evolution and students concerning their positions on views regarding biological and chemical evolution.

A BILL
TO BE ENTITLED
AN ACT

Providing teacher rights and protection for a public school teacher or a teacher at an institution of higher education to present scientific information pertaining to the full range

¹Bills accessed in Scott (2005, 203-204)
²Amendment accessed in Scott (2005, 201)
of scientific views regarding biological and chemical evolution in applicable curricula or in a course of learning; providing employment and tenure protection and protection against discrimination for any public school teacher or teacher at a public institution of higher education related to the presentation of such information; and providing student protection for subscribing to a particular position on views regarding biological or chemical evolution.

BE IT ENACTED BY ____________:

Section 1. This law shall be known as the "Academic Freedom Act."

Section 2. The Legislature finds that existing law does not expressly protect the right of teachers identified by the United States Supreme Court in Edwards v. Aguillard to present scientific critiques of prevailing scientific theories. The Legislature further finds that existing law does not expressly protect the right of students to hold a position on views regarding biological or chemical evolution. The Legislature further finds that the topic of evolution has generated intense controversy, lawsuits and threats of lawsuits, where some lower courts such as Kitzmiller et al. v. Dover Area School Board, have created confusion about the rights of teachers and students to hold differing views about scientific controversies and express those views without fear of adverse employment or academic consequences. Finally, the Legislature finds that school districts and school administrators should not bear the primary burden of defending the academic freedom of teachers and students to discuss the topics of biological or chemical evolution. It is the intent of the Legislature that this act expressly protects those rights.

Section 3. Every K-12 public school teacher or teacher or instructor in any two-year or four-year public institution of higher education, or in any graduate or adult program thereof, in the State of ___________, shall have the affirmative right and freedom to present scientific information pertaining to the full range of scientific views regarding biological or chemical evolution.

Section 4. No K-12 public school teacher or teacher or instructor in any two-year or four-year public institution of higher education, or in any graduate or adult program thereof, in the State of ___________, shall be terminated, disciplined, denied tenure, or otherwise discriminated against for presenting scientific information pertaining to the full range of scientific views regarding biological or chemical evolution in any curricula or course of learning, provided, with respect to K-12 teachers, the [insert official title of state’s science standards] has been taught as appropriate to the grade and subject assignment.

Section 5. Students may be evaluated based upon their understanding of course materials, but no student in any public school or institution of higher education shall be penalized in any way because he or she may subscribe to a particular position on any views regarding biological or chemical evolution.

Section 6. The rights and privileges contained in this act apply when the subject of biological or chemical origins is part of the curriculum. Nothing in this act shall be construed as requiring or encouraging any change in the state curriculum standards in K-12 public schools, nor shall any provision of this act be construed as prescribing the curricular content of any course in any two-year or four-year public institution of higher education in the state.

Section 7. Nothing in this act shall be construed as promoting any religious doctrine, promoting discrimination for or against a particular set of religious beliefs, or promoting discrimination for or against religion or non-religion.

Section 8. This act shall become effective on the first day of the third month following its passage and approval by the Governor, or its otherwise becoming law.
REFERENCES


