Questioning the Role of Evolution in Understanding Ourselves

A Critical Discourse Analytic Study of Scientific Articles in TIME Magazine

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Except where reference is made to the work of others, the work described in this thesis is my own or was done in collaboration with my advisory committee. This thesis does not include proprietary or classified information.

A Thesis Submitted to the Graduate Faculty of Auburn University in Partial Fulfillment of the Requirements for the Degree of Master of Arts

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Thesis Abstract

QUESTIONING THE ROLE OF EVOLUTION IN UNDERSTANDING OURSELVES: A CRITICAL DISCOURSE ANALYTIC STUDY OF SCIENTIFIC ARTICLES IN TIME MAGAZINE

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This study is a critical analysis of language-use in scientific cover stories in TIME magazine over the course of the past 15 years. It focuses specifically on articles that apply concepts of evolution to aspects of human wellness. My launching point for this study is Jacque Ellul's (1990) model of the ideology of science, which shows how historical events have buttressed the cultural value of science as the preeminent institution of truth. TIME magazine is one place where Ellul's model is particularly visible.

Treating the text of the articles in TIME as discourse (Fairclough, 2001), my analysis follows Fairclough's (1995b) method of critical discourse analysis, which aims to uncover hidden power structures through close examination of language-use. The central argument for my paper is that the language-use in TIME cover articles is hegemonic by demystifying meaning in the human experience and naturalizing deterministic explanations of complex human conditions. The analysis describes three functions of language-use that support this claim. One is the shaping of ideas about what it means to be human. Another is the establishment of interpersonal relationships between the media source and the audience. The third is the appropriating of what Pearce and Branham (1978) call "ineffable" experiences by locating them, validating them, and framing science as a servant to them. My concluding comments discuss the implications of the power of science and the extent to which our needs as human beings are being met.

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This thesis is dedicated to Stanley Shaheed, algebra teacher extraordinaire:

"I think I got the (symbolic) signs right!"

Style manual or journal used: Publication manual of the American Psychological Association (5^{th} ed.)
Computer software used: Microsoft Word for Windows XP

List of Tables

Table 1 — Examples of Cover Headlines and Supporting Sub-Headlines in *TIME* Magazine
Table 2 — Examples of Cover Headlines and Cover-Story Titles in *TIME* Magazine

I. Introduction: A Glance at Modern Humanity

> [The] new Philosophy calls all in doubt, The Element of fire is quite put out;
>
> The Sun is lost, and th'earth, and no man's wit Can well direct him where to look for it. And freely confess that this world's spent When in the planets and the firmament They seek so many new; they see that this Is crumbled out again to its anatomies 'Tis all in pieces, all coherence gone ...
>
> — Donne
> An Anatomy of the World

Could the luminaries of the scientific revolution have forseen the deep and lasting impact their radical ideas would have on the psyche of humankind? In An Anatomy of the World, Donne (1990) describes the implications of the new cultural skepticism brought about by the scientific revolution. The shift from Ptolemy's Earth-centered universe to a Copernican sun-centered universe and the birth of Bacon's scientific method forced humans to rethink their place in the cosmos and closely scrutinze all that was once considered unexplainable, mystical, and sacred. Donne laments this dissection of the natural world into its anatomical parts and reflects on its meaning. With the rise of this new philosophy, the parts are explained at the expense of the whole; we come to know the mechanisms of nature but not its meaning.

In the modern age, despite Donne's lament, we have come to embrace science as integral to understanding not only the universe but ourselves. From evolution to modern medicine, science is an oracle that tells us where we come from and how we function. It is a tool for creating technologies that sustain us and take us where we want to go. Science, with its value for replication and falsification, is also seen as democratic and has the capacity to solve all the problems that trouble us. Science helps us know ourselves and our reality in a way that allows us to grow, to improve, and progress.

The foundation of my thesis questions this view of science in two ways. First, this view sees science as a cure that emphasizes how we function while obscuring the meaning in our existence. We revere science for the myriad ways in which it improves and sustains our quality of life. We look to science to address many of our physiological, psychological, and intellectual needs. For instance, popular literature armed with equations, worksheets, and strategic plans explains how to be better, transform, and go

further. New technologies like Prozac and xenografts help us maintain our momentum. We see ourselves as machines that can be improved, altered, and optimized based on our needs. However, this cultural reverence of science and technology is unnecessarily narrow. Can science attend to the more complex human needs of identity, satisfaction, and personal fulfillment? It is logical to lean on science for the best explanation of our physical selves, but does science best explain and address the intangibles of love, altruism, ambition, and happiness? By focusing on the mechanisms of human nature, we lose sight of the larger meaning of our lives and the purpose that these mechanisms serve. The more we learn about our parts, the less attention we give to our whole.

Second, this cultural reverence of science is socially constructed and complicated by how we learn about ourselves. In a general sense, we learn by interacting with our reality and with others through language (Berger & Luckmann, 1966). In particular, media act as a source for the definitions and images of social reality that we widely embrace as a legitimate view of our shared identity (McQuail, 2000). For science, specifically, what we see in a science article or watch on a documentary is based on more than just facts regarding critical aspects of human life. The information has been filtered through an array of individual and cultural predilections. The mediated source obviously has a viewpoint, but so do the audience and the culture in which the message is produced and distributed. Explanations of human nature, including those offered by scientists and scientific institutions, incorporate layers of interpretation influenced by many views of reality and reinforced by the cultural power structures to which they belong. As Horkheimer and Adorno (1944/2002) suggest, the result is typically a culturally preferred view of science and rationality as unquestionably valuable in our understanding of human nature and human needs.

Since Donne wrote those prophetic words questioning the impact of this new philosophy, science has indeed become institutionalized and culturally embraced as a lens for understanding our own humanity. It is also viewed as the key to solving our problems as well as meeting our needs and desires. The cultural value of science and reason as critical to understanding ourselves can be traced back hundreds of years. To address human needs, as we have for generations, we learn the mechanisms that drive these needs and then intervene with technology or scientific skill to alter the mechanism itself. We, as a culture, supply the vision while the scientific method dictates the formula and the plan. Science and rationality help us make sense of the human machine and the human condition, allowing us to transform ourselves into who we want to be.

In this thesis I critically investigate how, though language, science becomes culturally valued as a preferred way of knowing who we are as humans. In particular, through a critical discourse analysis of key articles in TIME magazine, I shed light on the roles that cultural attitudes in media play in our popular scientific understanding of human nature. I focus on articles related to evolution theory, the area of science that is most often linked to human nature, and illuminate the communicative acts that reinforce its prominence as the preferred explanation of human behavior. I argue that in explaining the mechanisms of human nature, these articles obscure the significance

of the human experience. In a genuine effort to improve our lives, modern evolution theory as depicted in popular media texts dissects and demystifies human nature such that it ultimately robs us of our humanity and perpetuates science as the dominant framework for knowing. In short, specific language practices in scientific reporting are hegemonic.

In chapter two, I review the literature regarding science as an ideology, modern cultural perspectives on mass media, and modern evolution theory as an ideological perspective grounded in 17^{th} century debates over Cartesian dualism. The third chapter is an explanation of critical language studies (Fairclough, 1989) as the methodology of this thesis and a specific method known as critical discourse analysis (CDA) (Fairclough, 1995a, 1995b, 2001). I also describe the materials for analysis and explain how I plan to critically analyze TIME magazine's coverage of topics pertaining to human needs. The fourth and fifth chapters make up the analysis of the articles. In the conclusion, I suggest further research that could be investigated regarding the complex relationship between the cultural value of science and our understanding of human nature.

Donne's elegy to the mysteries of the universe may be even more relevant today than when it was penned. Science is pervasive in our modern understanding of the world and of our lives. This thesis builds on the literature in a manner that helps illuminate the ways in which we understand ourselves and our world implicit to the cultural value of science. I am hopeful that it will spawn new questions and new ideas regarding the role of science in reinforcing, instead of undermining, our humanity.

II. Literature Review: Media, Science, and Ideology

The relationships among media, science, and ideology have been studied extensively in the historical, sociological, and communication literature. This chapter gathers together insights from these bodies of knowledge. The aims are to show how science has emerged as a significantly valued way of knowing reality and to seek out an analytical space where science's role in culture can be further explored. In reviewing the relationships among media and science in society, the cultural value of science can be better understood, illuminating science as a powerful and dominant lens for seeing reality and showing how this lens has been maintained and reproduced.

This chapter is divided into four parts. The first part is a review of the research regarding the rise of science in society and the role that media play in the relationship between science and culture. This part features an elaboration of Ellul's (1990) theory of the ideology of science. The second part is an explanation of hegemony as a concept closely related to ideology, followed by a review of communication research that focuses on the relationships between media and science as ideology. The third part turns to a specific corner of science — evolution — most often linked to human nature and yet largely unexamined in terms of its relationship to media and society. Specifically, I describe modern evolution theory as a product of Enlightenment materialist arguments against Cartesian dualism. I also review defining principles of modern evolution theory and explain how evolution has become the preferred framework for understanding human nature. I conclude this chapter by arguing that evolutionary science is also ideological and, through discourse practices in the media, works to limit our understanding of human nature.

The Rise of the Cultural Ideology of Science

History shows that science and technology have unquestionably become culturally salient. It has been extensively argued that the values of the ruling class combined with several significant events in European history (such as the Reformation, the Scientific Revolution, the rise of the printing press, and the Industrial Revolution) fueled the emergence of science as a key component in the ideologies of modern life (Ellul, 1990; Gouldner, 1976; Weber, 1930/2001). This section describes the cultural history of science and explains Ellul's model of the modern ideology of science. This will show how

pivotal historical events have buttressed the cultural value of science as the preeminent institution of truth, communicating all of the knowledge necessary to understand human nature and meet human needs.

Cultural History of Science

Modern cultural attitudes and values of science can be traced back to the revolutionary religious attitudes that propelled the Protestant Reformation (Weber, 1930/2001). When Lutherans and Calvinists separated from the Catholic Church, they established an ethic which they believed was in contrast to the Catholic religious-political machine of the time. This ethic rewarded honesty and hard work and also allowed people to exercise rationality through their own, often literal, interpretations of the Bible. Over the next century, this outlook sowed the seeds for the emergence of a savvy and skeptical middle class whose members came to develop skills for rational problem solving and created the conditions necessary for significantly increasing their standards of living. It is this ethic, with strict devotees such as the founder of the scientific method, Bacon, which led to western civilization's scientific revolution (1550–1700) (Manzo, 1999).

As the educated middle class grew in stature, so too did the prominence of its ethic and worldview. This led to the birth of the modern privileged upper class. This group, predominantly male and Caucasian, possessed the skills to raise capital inspired by a philosophical view that valued objectivity, promoted skepticism, and coveted a world free of idols and biases (Weber, 1930/2001). From the 19^{th} century forward, objectivity and the scientific method took center stage in the search for truth and consequentially in the management of practical issues, the dissemination of knowledge, and the acquisition of power and prestige.

The printing press was one of the most critical technological milestones in the birth of popular skepticism and the ideology of science (Howard, 2005). This new technology made information widely accessible to the masses for the first time, eliminating the need for the public to rely on others (such as priests within the Catholic Church) for knowledge. Gouldner (1976) suggests that the significant increase in printed material during the Reformation led to a cultural reliance on rationality to make sense of all the new information. Challenges to knowledge and understanding shifted from simply acquiring information to acquiring meaning. This shift led to a new worldview ushered in by the Enlightenment. The educated were now encouraged to understand their world through the new lens of rationality.

In the modern era, accessible information is found in many forms. A rational and scientific understanding of reality is facilitated — even filtered — through the mass media. Gouldner (1976) argues that mass media decontextualize scientific news so that it can be made understandable and meaningful to a diverse audience with members who may or may not interact with the content. This decontextualization ultimately spawns particular ways of describing and explaining scientific content. To succeed at

using media to engage the public in technical subject matter is to establish a cohesive cultural discourse that can evolve into ideology. Gouldner further asserts that new facts and examples that confirmed previously established viewpoints also work to reinforce them. Media users are easily persuaded to accept new information as valid and accurate since new facts often refer to information and interpretations that people already share. As a result, particular viewpoints eventually become dominant as mass media provide a distorted reflection of history and the social structures that created it. Audiences are exposed to the most valued viewpoints of the time through media and reinforce those viewpoints culturally, inadvertently reinforcing the power of the cultural elite as well (see also, Ellul, 1990). It is often under these conditions that dominant cultural ideologies can emerge.

The next section expands on this process, discussing the notion of ideology and Ellul's (1990) theory of media. Informed by cultural and historical insights of the 20th century, Ellul's theory offers an informative framework for understanding the modern the ideology of science.

Ellul's Ideology of Science

Enlightenment ideals have not always been embraced as the preeminent way of knowing. As popular acceptance of the scientific method grew, so did its critics. Many 20th century historians and philosophers have questioned Bacon's scientific method, which has been viewed for centuries as almost infallible, from historical (Kuhn, 1962), sociological (Bloor, 1976; Collins, 1985; Gilbert & Mulkay, 1984), and methodological (Feyerabend, 1975, 1978; Latour, 1987; Latour & Woolgar, 1986; Popper, 1959) perspectives. Ellul (1966) first considered the role that media play in fostering our modern cultural attitudes toward science. Ellul provides a historical framework that links science to the power of the cultural elite exercised through the media. Ellul believed that media serve as a propaganda tool to promote the virtues of science. Ellul claimed that in the post-World War II era, media no longer worked to inform or persuade the public. Rather, it facilitated and maintained deeply rooted cultural myths that reinforced the desires of the cultural elite and the social institutions of power.

In order to better understand the implications of Ellul's theory, it is helpful to consider the nature of ideology and its relationship to culture. Marx (see Strinati, 1995) describes ideology as the set of predominant ideas of a capitalist society that are constructed and circulated by the ruling class in order to secure their power. Ideologies are not simply dictated by the ruling class through cultural forces and the events of history in an effort to mobilize people on behalf of certain principles or ideals (Gouldner, 1976). The ideals of the ruling class evolve culturally and historically, while being reinforced over generations, resulting in ever-evolving and ever-strengthening ideologies. Ellul (1990) suggests that these ideological dynamics have specific implications for the ever-growing value of science and rationality in our society. As the accepted cultural

ideologies of science take root, a human type is created that is recognized as normal. Accepted norms are then reinforced, becoming integral to the ideology and to the proper conditioning of human behavior. As individuals acting within a society that values science, people choose to conform or resist. To conform is to become the human-machine ideal; to resist is to become inferior. As the way of understanding the self becomes more rational, humanity becomes rational in turn (Ellul, 1990).

Though critical in tone, Ellul's (1966) theory is philosophically aligned with the early "direct-effects" perspective of media studies. To Ellul media acts as a form of propaganda with an agenda to reinforce the cultural value of science in order to maintain the power of the elite. However, as media theory has developed over time, this linear, one-way view has not held up to critical scrutiny (McQuail, 2000). While the one-way influence of media in reinforcing cultural ideologies has been largely modified and/or rejected, Ellul's historical insights regarding the emergence of the modern ideology of science are still useful in explaining how science and rationality have come to be culturally embraced and revered.

Ellul's (1966, 1990) main argument is that the cultural ideology of science was established during the Enlightenment and has evolved through four phases during the 20th century. The first was Scientism of the late 1800s, which viewed science as the arbiter of truth. By the early 1900s, in the second phase, science was viewed with optimism and expected to bring happiness. The third phase began during the later part of World War II, the time during which the atomic bomb introduced a popular skepticism about the intentions and uses of science. Finally, the most recent phase, beginning in the 1970s, renewed popular faith in the promise of science for improving society. Each of these periods reflects an ever evolving cultural ideology of science comprised of key ideas that are central to the ways in which people understand themselves and their environment in the 20th century.

Phase One: Scientism

Ellul (1990) described the first phase as the turn-of-the-century cultural embrace of scientism. Scientism provided the seeds for the cultural institutionalization of science. For adherents of scientism, science discovers truth. According to Ellul, during this time the world was seen as a finite entity that could best be understood using the tools of science. However, the extent to which science served society wasn't always clear. A strong debate broke out among intellectuals of the mid 1800s weighing the merits of science as a professional institution that served the needs of all classes rather than just serving as a leisure activity for the curious elite (Berman, 1975). While the upper class poured their resources into science as a leisure activity, the middle class adopted the same upper class curiosity with the determination to improve their own standards of life. This ultimately led to the formal institutionalization of the interdisciplinary sciences and the idea of science as a harbinger of truth was slowly born. With the industrial revolution gathering steam, this wide cultural embrace of scientism began to overlap

with Marx's (Berman, 1975) critique of class at the time. Intellectuals who were not scientists came to consider science-inspired empiricism as a way to further illuminate and cure class problems. Rationalism could do more than provide for practical needs; it could help address social woes as well.

Phase Two: The Age of Happiness

Ellul's (1990) second phase of the ideology of science was described as an age of happiness. During this period, which ran through the 1920s into the early part of World War II, science was seen as the key to personal growth and happiness. Progress in technology spawned from the industrial revolution, including medicine and surgery, gave science a significant authoritative quality. This progress caused a cultural shift in the perceived source of human happiness. Where spirituality and idealism were once considered the keys to bliss, it was during this period that science offered solutions to problems tied to a practical sense of well-being.

The industrial revolution's flourish of technology was linked directly to wellbeing through a strong ethic of consumption. During the New Deal, people believed that wide consumption of products and services provided by the industrial revolution led directly to their welfare and happiness (Cohen, 2003). Advertisements, advertising trade magazines, and editorials in the Saturday Evening Post during the period promoted transportation, materials, and chemical products as not only good for readers' lives, but good for the war effort (Young, 2005). Messages oriented around consumption generated during the war also linked the cultural value of technology and science to core American ideals. Democracy was reinforced in media by a pro-technology ideology tied to free enterprise and mass consumption.

By this period, academics had solidly embraced the philosophies of objectivity and liberalism spawned by the Enlightenment, while social scientists in particular began to explore how natural laws and scientific principles could be applied to social problems. Social researchers of the 1920s used science to transform the events of history into events of nature using models to explain cultural discord and promoting scientific law as a way to ease tension (Ross, 1993). In modeling their theories on natural law, social scientists collectively adopted the strongly positivist position that science provided a superior view of reality. As a result, science and rationality ruled popular and academic cultures. With its promise to solve individual and social problems, science remained a largely unquestioned institution until the final years of World War II.

Phase Three: Doubt and Defiance

Phase three is characterized as science suffering an identity crisis. Toward the end and after World War II, with the emergence of positive and negative applications of technology, science faced cultural doubt and defiance. Applications of science widened, leading to less focus on the advancement of the human cause. Instead, science could

be used to try anything and explore everything, no matter the intention. During this period science was seen as a tool for gaining power instead of discovering truth or happiness.

Many historical examples reference the negative and positive uses of technology during and after the war. In a book on Nazi human experimentation during World War II, Spitz (2005) details the gruesome testing of new technologies on political prisoners. Spitz describes many scientific experiments uncovered from original Nazi prisoner records that involved physiological testing (e.g., rewarming, bone transplantation, sterilization through x-ray), disease testing (e.g., malaria, typhus, and hepatitis), and chemical exposure (e.g., mustard gas, polygala, and phenol). History also tells of the Allies' use of destructive technologies. In the years following the war, the creation and detonation of the atomic bomb led to a scientific and popular debate about the use of atomic energy for large scale destruction. The destruction of Hiroshima and Nagasaki made society more aware of the power of science, and made scientists more aware of their responsibility to society (Badash, 2005).

Positive applications of technology toward the end of the war included the discovery of penicillin, still considered one of the world's wonder drugs. The advent of penicillin was a boon for the medical sciences and society at large since it was one of the first antidotes for infection that did not require invasive treatment (Hamdy, 2006). Penicillin could be administered easily during illness and saved lives within only a few days. Another positive technology to emerge from the war was nylon. A material that was used solely for manufacturing parachutes and cording during the war became the staple fiber for numerous consumer products in postwar America (Westervelt, 2000). By the end of the war, Dupont was able to expand its production capacity of nylon dramatically, and by late 1949 sales reached nearly 100 million pounds per year (Hermes, 1996). At this point in American consciousness, science was considered both dangerous and beneficial depending on the intentions of its user and the application of its use.

Phase Four: Science Supports Economic Development

Starting in the mid 1970s, and continuing into today, Ellul (1990) states that science was (and currently is) seen as practiced for the sake of development. It is a tool for economic prosperity viewed as serving a critical service to the economy. Dickson and Noble (1981) discuss how science and technology policy became central to the political economy of the U.S. with the emergence of a strong science-based industry rooted in policies developed deep within the Reagan administration. The authors describe how these policies, insulated from the popular electoral process, have worked in recent years to solidify the authority of science over national issues of health, communication, and transportation. Advances in biotechnology and information technology that have emerged as a result of these policies have led to a renewed faith and hope in the prospects of science. However, Ellul (1990) warns that this optimism has led to a

cultural dependence on the promise of science "as not just the discovering of nature, but the response to everything that disquiets or troubles us" (p. 182).

This historical framework for understanding science as an ideology is informative because, as Ellul (1990) argues, it illustrates not only how society embraces and internalizes radical ideas through critical events of history, but also how such ideas dramatically shape the way we understand ourselves and our place in the world. In the early phases of the ideology of science, science was a window on the universe and a tool for improving our view of reality. In the modern phases, this tool has been transformed into an extension of ourselves, a way of controlling the outcomes of reality and ensuring our progress. As a result, society has internalized the core ideas implicit to science — rationalism and objectivity — in ways that have transformed how we behave, how we understand ourselves and how we understand each other.

From early in its history, science has assumed a dominant role in the making and governing of society. It should be noted, however, that science is fundamentally founded on faith — a faith in progress, objectivity, and rationality (Ellul, 1990). Putting faith in science means putting faith in its social power, how it is applied, and how its insights are managed. Understanding a culture's faith in science is a good way to understand the culture's underlying power structure. Thus, the second part of this chapter describes how ideologies implicit to the power structure (i.e., dominant ideologies) are maintained and reproduced in popular culture. For the ideology of science, in particular, mass media plays a pivotal role.

Media and the Dominant Ideology of Science

The media plays a strong role in the reproduction of dominant ideologies due to the ways in which it facilitates a special relationship between the ruling and subordinate classes. Strinati (1995) explains that the subordinate classes gain most of their knowledge of the world through mass media. However, the imagery, values, and information circulated by the mass media are controlled by those who share in the wealth and power of the dominant class. Because the ruling class most benefits from this inequality, only information and imagery that reinforces its power will be circulated. However, the management of this imagery through the media is not overtly oppressive. By masking the mechanisms of oppression through frames that make ideology appear natural, the subordinate classes are inclined to submit to the preferred view of reality of the ruling class, thus reinforcing its power. This is in line with Ellul's (1966) ideology of science. In its service to economic development, science is managed in many of the same ways as other dominant ideologies in the mass media.

This section of this chapter discusses hegemony and its role in the emergence of science as a dominant ideology. The literature regarding how science is maintained and reproduced as a dominant ideology through the mass media is also reviewed with special emphasis on examples and case studies in modern mass media. Taken as a

whole, this body of knowledge informs our understanding of the communicative forces that facilitate the ideology of science.

Hegemony and the Media

Ideology is intimately tied to history and to power. The maintenance of ideology among the ruling and subordinate classes is governed by what Gramsci (1971) calls hegemony, a form of consensual power exercised by the elite over the subordinate classes of society (Fairclough, 1995b). In this view, the subordinate classes provide consent, though their true interests may not always be met, while the power of the elite is maintained and reinforced. The modern ideology of science brought about originally by the scientific revolution lends itself easily to hegemony. For Gramsci hegemonic power is directly linked to the ethical functions of the state governed by the elite (Fairclough, 1995a). Gramsci describes how ethical states use power in ways that seek to elevate the population to a particular cultural or moral level. In order to achieve this goal, the state must encourage the subordinate classes to adhere to acceptable moral or cultural norms to ensure that all needs of production that act in service to the political economy of the time are met. This ensures that the basic needs of the subordinate classes are fulfilled and the ultimate interests of the elite class are reinforced.

The modern ideology of science fits the hegemonic profile with its required commitment of vision, resources, and rational zeal in return for the promise of a better life for all classes. Widespread acceptance of such a view requires a deep and widespread cultural consent; it requires a dominant ideology. But how is that consent gained? Fairclough (2001) suggests that ideological power is exercised through a cultural discourse. The notion of discourse in this sense is useful since language is a "material form of ideology" comprised of socially influenced sources, audiences, and mediated texts that is captured and facilitated by the mass media (Fairclough, 1995b). For Fairclough (1995b, 2001) ideology is facilitated by a social discourse grounded in language-use among media sources, audiences, and texts.

Like many prominent critical theorists of media (Carey, 1989; Hall, 1977, 1980), Fairclough believes that ideology is pervasive and located in the mediated relationships between sources and audiences which are subject to the outcomes of history and current cultural conditions. The mass communication research literature has examined the relationship of source and audience in the context of culture. Critical-cultural models of media, especially, do much to help us understand how hegemony is maintained and dominant ideologies are reinforced. If we consider the emergence of science as an ideology in terms of Gramsci's hegemony, we should see it in the contributions made by media sources, audiences, culture, and the relationships among them.

When we consider the role of communication in hegemony, patterns of languageuse can reveal how relationships between the elite and subordinate classes are maintained

and reproduced through ideology rather than domination (Fairclough, 1995a). Linking ideology to prominent social discourses is a primary mechanism for fueling cultural hegemony. These discourses are often propagated through mediated texts, not as truth coming down directly from those in power, but as what Fairclough (2001) calls "an interpretation of an interpretation" (p. 67). Critical and cultural scholars often assume that the seemingly objective nature of media makes that power hidden because it is embedded in the industrial and economic practices of media rather than directly stated in the media text itself (Fairclough, 1995b). However Fairclough extends this view suggesting that the media operate as a powerful means for the reproduction of the dominant ideology through language-use practices. Media practices such as language choice, repetition, assigning causality, managing agency, and framing all work over long periods of time to establish a preferred point of view that reinforces the power of the elite.

In addition to specific language-use practices, hegemony requires a relationship between audience and media text. Media bring distorted views of reality, again, "interpretations of interpretations," according to Fairclough (1995, p.67), that often reinforce the institutional powers driving our cultural value of science. Audiences bring their interests and needs, as well as their previously reinforced assumptions of the way the world should work. When media communicate information that audiences need and use, a hegemonic connection emerges. This communication reproduces reality in a way that privileges not only the new information, but the institutional frameworks that support its production.

Hegemonic discourses can be found in popular media coverage of science. The relationship between sources and audiences, as facilitated through media within the context of culture, can be seen as working to promote the interests of the ruling class, and undermining alternative points of view. To provide a window into this dynamic, I review more specific research regarding ideology, hegemony, and the mass media. In addition to illuminating the relationship between sources and audiences in science-related media, it will help provide an analytical context for the textual analysis of the ideology of science in this study of TIME magazine articles.

The Role of Sources in Science Journalism and Media

Scientific experts are considered valuable resources in science journalism, but science journalists and editors also bring important points of view to their own media texts. Media effects research (Nisbet, Scheufele, Shanahan, Moy, Brossard, & Lewenstein, 2002; Viswanath, Kahn, Finnegan, Hertog, & Potter, 1993) suggests that media writers and editors not only use language to facilitate audience understanding of science content, but they also employ tactics to manage audience perceptions of scientific content. For example, in a comparison of newspaper, television, and magazine coverage of science, Nisbet et al. (2002) found that language-use, framing, priming, and agendasetting generally reinforce positive perceptions of science. Thus, the writing and

editorial choices made, as well as the choice of authors' expert sources, have profound effects on the ways that science is perceived by audiences.

Writing and Editorial Choices. Language choice and writing style are found to have the most direct effect in fostering the understanding and value of scientific content with audiences. In an early study of the effectiveness of science journalism, Funkhouser and Maccoby (1971) found that audience attitudes toward scientific content are directly related to readability and understanding. For instance, percentage of lines of activity words and examples are elements of readability that positively affected information gain and article enjoyment. Examples, concrete words, non-scientific ideas, and parallels to everyday life were found to promote scientific literacy among the public. By giving science a context to which audiences can relate, that which starts out as unfamiliar becomes not only materially useful, but valued.

However, in using these stylistic strategies, scientific accuracy is often abandoned. Dornan (1990) describes multiple research studies that show how inaccuracies in science journalism have led to science headlines and stories that the scientific community believes do not accurately reflect the true nature of the scientific news. For instance, Dornan refers to studies that have investigated the media coverage of colorectal cancer as compared to a recent National Institutes of Health (NIH) report on the disease. These studies found that media coverage underreported the actual incidence of cancer, emphasized dying rather than coping, and provided little coverage to a test for early detection that could lead to treatment. In this case, the story reported not on the NIH findings regarding colon cancer but on other aspects of the disease and the patients' experiences.

Instances of weak scientific coverage have resulted in a push for special training for science journalists, separate coverage of scientific topics and encouragement by the scientific community for scientists to bypass journalists altogether and report science directly to the public (Dornan, 1990). Dornan (1990) argues that policies like these are entirely based on the assumption that the institution of science has authority over any story with scientific content. These policies make the institution of science the judge of truth, removing the critical eye of journalists. Often due to the weaknesses of well-intentioned language-use by journalists who are trying to maintain credibility and promote understanding, the claims of expert sources are never questioned. This practice cedes critical control over the quality of scientific content to the powerful institutions that fund science. Dornan believes that this strategy promotes hegemony, ultimately contributing to the reinforcement of science as a dominant ideology.

Framing, or how issues and situations are constructed by media in ways that give them value to the audience (McQuail, 2000), plays a prominent role in audience understanding of scientific advances, issues, and policies. According to Entman (1993), framing influences the selection and salience of news content that ultimately promotes a particular definition, interpretation, evaluation, and recommendation for the problem. In a book-length research study devoted to the public presentation of science, Kreighbaum (1967) suggests that by sensationalizing scientific inquiry for the purpose

of highlighting the problem and spurring audience interest, public understanding is thwarted and democracy is ultimately undermined. Recent research supports Kreighbaum's contention. In a study of the media coverage of acid rain and whale stocks, Roll-Hansen (1994) found that journalists' focus on the most interesting information regarding environmental problems leads to a lack of balance on the public understanding of core issues. These preferred frames influence how audiences construct the scientific event in their minds, leading to a distortion of the reality of environmental problems. With regard to acid rain in particular, Roll-Hansen (1994) argued that this phenomenon led to a deeply entrenched public alarm with regard to the destruction of Norwegian forest land. Although environmental data was never produced to support the alarm, scientists later produced data showing that the damage to forest land incurred by acid rain was low and the spruce population had been relatively stable for years. Due to this initial media-facilitated alarm, the discrepancy between public opinion and the scientific community persists.

Distorted frames can also result from the use of popular culture references and metaphors by journalists to help facilitate understanding. In an analysis of the Dolly cloning controversy, Huxford (2000) found that American and British newspapers relied heavily on literary science fiction frames, including Shelley's Frankenstein and Huxley's Brave New World, to characterize the scientific dimensions of cloning. These frames, and their overwhelmingly negative points of view, fed the public frenzy surrounding the experimental feat. Huxford suggests that this dark and menacing imagery reflected the widespread cultural fear associated with cloning and the prevalent distrust of the rouge scientists who were attempting it.

However, some media frames work to reverse cultural fear. Lessl (1987) showed how Sagan's television documentary, Cosmos, frames science in terms more akin to religion than secular activity in an effort to show viewers how science can situate humans within the greater order of the universe. Cosmos minimizes jargon while using various rhetorical techniques to frame science mythically as positive and approachable. The program, Lessl argues, was part of an effort to reverse popular distrust in scientific endeavor and endear science to the masses.

Framing of scientific content is not limited to the micro-level strategies of metaphor and comparison. Whole narratives have been employed as part of elaborate organizational structures to subtly control audience perceptions of, and subsequent reactions to, scientific events and personalities. For example, Sullivan (1994) investigates the NOVA television documentary regarding the chemists Pons and Fleischmann and the cold fusion debate. Sullivan showed that NOVA's story followed the same excommunication narrative as the Gospels of the Bible. As a result, the narrative ultimately marginalizes Pons and Fleischmann as irresponsible researchers and shuts down academic discussion of the issue. Audiences are left with the impression that the institution of science can "clean its own house," thus reinforcing the dominant ideology that traditional science is the guardian of truth.

In an analysis of magazine coverage of the environmental pioneers Carson and Colborn, Corbett (2001) found that media framing of gender was used in different ways to undermine Carson's and Colburn's research. In the 1960s media coverage was critical of Carson's outward display of feminine personality traits while conducting research as a scientist. Similarly, in the late 1990s, popular scientific magazines framed Colburn's thesis on the environmental dangers of endocrine-disrupting chemicals to the reproductive ability of females as a threat to males without regard for its impact on female health. Corbett suggests that the portrayals of both women reflect a tension between the media's call for social change and its conservative support for the social institutions (in this case, the institution of science) that subvert change. In both the Carson and Colburn articles, the culturally accepted identity of the scientist and the institution of science are never questioned.

Influence of Expert Witnesses in Science Media. In addition to the tactics of science writers, it has also been argued that preferred points of view are promoted by the expert witnesses and sources that journalists access for information — the scientists themselves. In a general analysis of BBC's coverage of science topics and events, Rose (2001) found that scientists featured as experts on BBC television consistently resist critical probing of their findings. By deflecting journalists' inquiries regarding alternative interpretations of scientific results, guest scientists are able to control the framing of science coverage. Rose argues that the result is not only a distorted account of the value of science, but an affirmation of the powerful institutions that fund the work of scientists. In addition, Hilgartner (1990) found that scientists often blame media distortion for popular, though often inaccurate, views of science. Drawing from an analysis of media coverage and public debate regarding a research paper explicating the causes of cancer, public comments from skeptical scientists were not only critical of the technical assumptions of the research, but of the oversimplification of those assumptions by media. In effect, these comments worked to mobilize the scientific community against the popularization of science, reinforcing scientists' public identity as experts.

If science journalism is "an interpretation of an interpretation" of scientific phenomenon (Fairclough, 2001, p.67) then two important questions can be asked about how science is reported in the media. Whose interpretations do these reports reflect? To what extent are those interpretations accurate? To answer these questions, we must consider that interpretations are not only based on the perceptions and constraints of media writers, editors, and experts as sources, but also on how their identities are portrayed in reports. For example, the cultural identity of the scientist as an expert source is critical to understanding the power of audience interpretation. In a study of how technical frames dominate coverage of the R-DNA debate, Altimore (1982) found that technical language gives credibility to scientists and decision-makers even though it does little to address the core public concerns regarding genetic technology. This discrepancy has led to a cultural deference to the opinions of scientists as experts who adamantly state that their objective points of view are not clouded by the relativities of value, philosophy, and politics. Altimore (1982) ultimately argues that since science

and rationality have been culturally adopted as highly meaningful measures of credibility, the truly meaningful, ethical and social effects of genetic technologies are never openly explored.

Hornig (1990) contributes to the cultural implications of viewing the scientist as expert in an investigation of PBS's documentary program, NOVA. Focusing on the social construction of the life and work of scientists, the study found that the program reinforces the cultural role of science and scientists as acting in service to industry. This narrative structure serves as strong approval for the idea that scientists are special and should be regarded as part of an esteemed class who are working for the economic good of society. Hornig suggests that the program reveals how diligent scientists work for humankind, thus viewers are compelled to revere them as privileged, and leave their opinions unquestioned. Fursich and Lester (1996) also argue for this cultural view of scientists in their analysis of the New York Times science section entitled Science Times. They say that scientists, even when they are framed in terms of the cultural context of scientific endeavor, are seen as more than talented citizens. They are elevated to the level of cultural elite who best exemplify the capitalist values of competition, hard work, and persistence.

Understanding the impact of sources to the cultural value of scientific messages in the media is complicated. Research shows how scientific experts and the journalists who write about scientific work reinforce a preferred cultural view of science. Through the use of language, frames, and narrative structures, mediated messages can be structured to reinforce a view of science as the arbiter of truth and scientists as human elite acting as guardians of that truth. However, sources do not provide the only perspective on science. Audiences also play a role in the reproduction of science as an ideology through their interaction with scientific media content. Audiences use media and scientific knowledge to identify methods and technologies that best meet their needs, whether those needs involve their health and well being or the physical and social environment in which they live. In the next section I consider how audiences contribute to the hegemony of science. Audience demographics, as well as individual needs and interests of audience members, work to influence how the ideology of science is internalized and reproduced by media audiences.

The Role of the Audience in Science Journalism and Media

With regard to the production and distribution of science news and information, the public is not a mass that can be willingly controlled by the media. According to McQuail (2000) audiences are comprised of individuals, communities, and cultures that have needs, interests, and desires that often turn to mediated information to address their public and private issues and make sense of the world. McQuail offers us a useful perspective on the role of audiences in the evaluation of scientific content. Media audiences must balance the social promise of science with a sense of personal

pragmatism. Both individual and social needs come into play when people determine the value of science in their lives.

Audience studies research shows that people do not just passively consume media. They respond to messages and use content in characteristic ways. While directeffects researchers have identified socioeconomic trends in attitudes toward content (Gerbner, 1987; Tichenor, Donahue, & Olien, 1970), a large portion of the descriptive literature on media use and attitudes is captured in the uses and gratifications body of knowledge (Blumler, 1985; Katz, Gurevitch, & Haas, 1973; Lull, 1980). In their central work on media use and social and psychological needs of audiences Katz, Gurevitch, and Haas (1973) found that needs pertaining to the self are associated with different media types. For instance, books are generally used by audiences to gain knowledge and understanding about themselves as individuals and members of society, as well as to cultivate a personal experience and/or to reinforce personal credibility and status. Films, television and books are used by audiences for entertainment purposes and newspaper use correlates with self-maintenance and developing confidence. However, these patterns of use may not always be driven by a person's interest level. They can also be influenced by social identity. Blumler (1985) suggests that researchers should begin to investigate the relationship between audience and content, specifically focusing on the social identity issues that audiences bring to the situation. Direct effects and uses and gratifications research both reveal that individual needs, whether grounded in personal gratification or socioeconomic factors, play a role in audience perceptions of media messages in general and scientific journalism in particular.

Socioeconomic characteristics of audience identity can influence the value that audience members place on media messages regarding science and technology. For example, interpretations of the value of science have been shown to be different between men and women. In an analysis of responses to news articles concerning new developments in science and technology, Hornig (1992) found that women and men respond to science news differently. Women tend to associate greater risk and correspondingly less benefit to advances in science than do men. The significance of these findings lies in the assumptions that men and women make about themselves and the role of science in their lives. Hornig says that these assumptions may involve the historical division of labor between men and women and the implications emerging from the more recently exposed feminist critique of the institution of science itself. Both of these can distort how men and women value technology. However, possible distortions are not limited to gender. They have also been tied to race. In a study concerning public attitudes on widely publicized environmental issues, Mohai and Bryant (1998) found that African Americans show more concern for local environmental issues than do Whites. The authors suggest that this result may be due to the disproportionate number of African Americans versus Whites living in poor urban environmental conditions in which pollution is a major issue.

Audiences may also respond to science and technology-related policy in terms of personal and social values. An example of this audience reaction can be found in the

European response to genetically modified crops. Gaskell, Bauer, Durant, and Allum (1999) reported that Europeans showed a strong resistance to genetically modified agricultural technologies due to the public's negative attitudes toward regulation. Media coverage of issues such as bovine spongiform encephalopathy (mad cow disease) and the dangers of industrial farming fostered a public distrust in regulatory agencies with regard to how the risks of genetic technology were being managed. This distrust resulted in a rejection of agricultural biotechnology policy. Also, if the audience fails to make a connection between their own needs and the new technology on which the policy is based, they will not seek out information. Brossard and Shanahan (2003) found that, in contrast to Europeans, the American public has little interest in participating in the agricultural biotechnology debate. They suggest that this attitude may be due to the complexity of the technology and the belief that the issue currently has little impact on their lives.

In order to make sense of a whole text, the audience must establish what Fairclough (2001) calls "coherence" with the message. Coherence is the connection that audiences make between the sequential parts of the text and between the text and reality. Fairclough suggests that these connections are not inferred by the text itself, but by the assumptions and norms audiences bring to their interpretation of media texts. While these assumptions have been shown to be grounded in socioeconomic features of an audience such as gender, race, and status, they can also be grounded in the language people use to describe their own identities and the institutions to which they belong.

A strong example of coherence can be found in Berry's (2004) analysis of the struggle between the Free Software Foundation (FSF) and the Open Source Movement (OSM) for primacy in the free software code movement. Berry found that the ways each group values democracy and freedom plays a key role in how each movement uses language to maintain its power and how that language reflects different ideologies of freedom and independence. In promoting its source coding movement, the FSF community used language that referred to free software as a human right and a moral norm that is central to the future of human progress and power. To describe their mission, coders used language such as "power," "progress," "community," and "rights." In contrast, the OSM community used language that was identified with a more political view of source code that promoted the idea of choice within a marketplace. To OSM members, who used language such as "market," "efficiency," "property," and "individual," freedom meant that source code developers should be able to choose their own licensing agreements and consumers should be able to choose their own software. Through a critical analysis of language, Berry showed how language practices within the OSM movement established a hegemonic discourse within the software engineering community that linked the production of source code to prominent economic values in a way that continues to undermine the legitimacy of the FSF community. As a result, coherence among the personal values of coders and the ideological messages within the coding community that reflect those values has played a pivotal role in the ways software is competitively managed and distributed in the market.

To summarize thus far, understanding the cultural value of scientific messages is complicated not only by the explanations offered by the source, but also by the personal and cultural predilections that audiences bring to their interpretations of scientific media. Research shows that audiences approach scientific content with their own interests in mind and may readily adhere to the dominant ideology of science if it helps meet needs that pertain to those interests. However, sources and audiences are not the only factors in considering how science becomes the dominant ideology. Cultural factors also contribute to the media source-audience relationship, further facilitating the maintenance and reproduction of science as a dominant ideology.

The Role of Culture in Science Journalism and Media

Critical-cultural models of media help describe how cultural norms used to generate and interpret media often reinforce the values of the dominant ideology and limit the audience frame of understanding regarding media content (Hall, 1977, 1980; Horkheimer & Adorno, 2002). The critical-cultural framework is especially useful for understanding the relationships among science, media, and culture. In this framework, the interpretation of scientific messages is not dictated by the source nor directly influenced by the characteristics of the audience. It is instead mediated by the dominant cultural values — including rationalism, objectivity, and capitalism — inherent to both. This mediation can allow for alternative viewpoints to be undermined or lead to the popular embrace of new viewpoints by linking them with existing ideologies.

Media have been found to undermine alternative views of science in favor of traditional viewpoints that reinforce the current power structure. In an analysis of scientific ideologies communicated in both Star Trek and Star Trek: Next Generation, Banks and Tankel (1990) argue that these popular science fiction programs link advances in science and technology to social progress, reinforcing the importance of technology in industrial societies. The programs not only use prominent characters to allude to equality among people of different race, class, and gender, but they promote the notion that the superior civilization represented by the cast members was able to escape the uncivilized woes of Earth through science. This point of view promotes a vision of progress that science seeks to achieve while also preserving the cultural primacy of technology in modern culture and maintaining the industrial capitalist power structure that produces it. Also, in an analysis of the cultural themes of the fictional television series, The X-Files, Westerfelhaus and Combs (1998) argue that the program describes and reinforces the tension between science's rational skepticism and an irrational faith in those phenomena that science cannot explain. The authors found that The X-Files privileges science despite allowing alternative perspectives to exist. By using modern character-types that acknowledge faith but still depend on science in order to resolve problematic issues, the plot lines marginalize alternative viewpoints thus strengthening the dominant ideology of science.

Hegemonic texts can also be found in what Iyengar (1989) refers to as two types of accounts of news media — thematic and episodic. Thematic accounts contextualize public issues within a general condition, attitude or set of outcomes while episodic accounts focus on the conditions of specific events. In an analysis of thematic articles regarding the subject of nature in the New York Times, Simpson (1987) found that the newspaper reinforces two central tenets of political liberalism. One is faith in human progress through science. The other is that such progress requires active involvement from government. Simpson suggests that progress through science is not implicitly stated but assumed to be part of the benefit of liberalism. Reinforcing this claim, Eveland and Scheufele (2000) found that the power of this link between progress and liberalism is palpable with newspaper audiences. They show that, in relation to other forms of media, newspaper users tend to be more highly educated, demonstrate higher levels of political participation and have a more positive view of science, all of which are key demographic features related to modern liberalist political attitudes.

Episodic accounts can also facilitate the emergence of ideology. In an historical analysis of newspaper and magazine coverage of Darwin's theory of evolution, Caudill (1987) found that the tone of news coverage and the cultural response to the theory were first linked together and then periodically shifted between 1860 and 1925. For instance, when the theory first emerged, evolution was presented as a challenge to accepted standards of biological science as well as popular religious beliefs. After Darwin's death in 1882, coverage became more sympathetic and the theory was legitimized through media discussion of Darwin's life and impact on people's thinking. By the time of the highly publicized Scopes trial in 1925, Darwin's theory received critical support and was portrayed in the media as a legitimate scientific theory. These findings illustrate how cultural attitudes are linked to media coverage that may in turn influence and reflect the direction, tone, and social value of a scientific topic.

Fairclough (2001) indicates that media texts are often constructed around the common ideals of a mass audience, though producers generally have very limited information about the characteristics and distribution of those ideals within the heterogeneous mix of audience members. Producers generate content with at least some speculative common interests in mind, leading to a targeting of what Fairclough calls an "ideal audience." It is the job of the actual audience to negotiate their own needs and interests with the ideal audience to which the text is targeted. To accomplish this, actual audiences work to find common ground with the assumptions made in mediated texts and then use these common assumptions to make sense of the information. One strategy for facilitating these connections is by linking cultural ideologies together. Texts that reference previously accepted attitudes prime audiences to rely on those attitudes in order to make sense of new information.

Examining audience ideals and the evolution of a social discourse of computeruse between the 1960s and the 1990s, Reed (2000) found that computer discourse transformed most dramatically in the 1980s when the computer was linked to middleclass family ideals of efficiency, fun, learning, and freedom. From US News and World Re-

port's description of society as a "new generation of people-oriented computers" to Newsweek's guidelines for "how to stop worrying and love your computer," media reinforced a growing understanding that computers were beneficial for individuals and society. Due to the plentiful media coverage, computer enthusiasts emerged, building their own computers with the help of Science Digest, Popular Science, and Popular Mechanics. In the short term, this cultural phenomenon was immensely valuable to the institution of science for the attention that it brought to science and engineering. In the long term, this media-influenced movement ushered in the dawn of a new information era, planting the seed for the ubiquitous techno-industrial culture we live in today (Reed, 2000).

In sum thus far, exploring the relationship between media sources and audiences in the context of culture offers a better understanding of how science has become and remained a dominant ideology. Reviewing these three parts also suggests that while the subordinate classes see the potential that science has for their own lives, it is the economic elite who ultimately gain from maintaining science as a dominant ideology. As described at the start of this chapter, this relational dynamic is fueled by the ways in which we depend on media's coverage of science to provide information that best helps us address our personal and social needs. One particularly attractive corner of science that is commonly seen as useful in meeting personal and social needs focuses on biology and human health. The heritage of this scientific corner can be traced to theories of modern evolution. The next section explores this corner of science for the ways in which it may contribute to the dominant ideology of science.

Evolution Theory and the Ideology of Science

Evolution theory sees the human being as an interface between the genetic potential of humans and the human capacity to respond to the environment (Vanelli, 2001). As this body of knowledge has developed over the past 150 years, many advances in medicine, health technologies, biotechnology, and pharmaceutical science have emerged. People have used these advances to better understand themselves, satisfy their needs and maintain an optimum relationship with their environment. Though these principles have been widely embraced by popular culture, little media research has examined how these messages contribute to the modern ideology of science. This section, divided into three parts, seeks to carve out an analytical space for a cursory examination. The first part explains the historical foundations of evolution. The second part discusses the principles of modern evolution theory and how they specifically address human needs. The third part concludes with a review of the philosophical assumptions inherent to evolution theory that influence our understanding of human nature. It is my belief that a consideration of evolution theory as part of the larger ideology of science may yield clues as to how science has become culturally valued and how that value affects how humans understand themselves and their humanity.

Foundations of Evolution

The roots of evolutionary thought can be found in Descartes' (1641/1993; 1649/1989) thesis on mind-body dualism which suggests that the mind and body are two separate entities (Dilman, 2002). These entities are comprised of two substances that are bound by a causal relationship in which the mind instructs the body on how to behave. For Descartes, the mind is an immaterial consciousness and the body is the mind's tool in the execution of acts of will. The dualistic human "is a mind and has a body" (Dilman, 2002). In this model, laws of biology and chemistry do not rule the body. It is the human consciousness of the mind — set apart from all other animals on Earth — that governs the body and its mechanisms of behavior. Three major questions emerged from this radical idea. How can an intangible mind tell a tangible body how to act? What are the properties and source of the substances that makes up the mind and the body? How distinct are these substances and what is the nature of their interaction?

La Mettrie's Theory of Materialism

For centuries after Descartes introduced the dualist model, intellectuals feverishly grappled with these questions and the assumptions that grounded them. The most influential approach used to test these ideas was the scientific method. Formalized by Bacon (1621/2002) this framework for rational and objective inquiry transformed intellectuals into researchers seeking to prove and disprove the intricacies of mind and body. In a cultural embrace of the scientific method, the 18th century ushered in the Age of Enlightenment. Bacon's method was expanded philosophically and methodologically by the likes of Boyle (1661/2006), Hume (1748/1955), and Lind (see Carpenter, 2003). Of particular note was French physician La Mettrie who used the scientific method to support what became known as a materialist understanding of human consciousness (Smith, 2002).[(1)]

In Man a Machine, La Mettrie (1750/2003) questioned Cartesian dualism, discounting the idea that the complex machinery of the body is governed by the ethereal notions of the mind. La Mettrie believed that human nature is tangible and that a material view of the body and soul offers a better understanding of the mechanisms of human behavior. La Mettrie was troubled by Descartes' dismissal of the material elements

[(1)] The term "materialist" has come under scrutiny in recent years as a term linked to the views of antievolution religious conservatives. As a result, the scientific community has more recently adopted the term "physicalism" to describe the material foundations of human behavior in terms that are reductionist, traditionally more positivist, and allude to a loyalty to science and the field of physics in particular. For details see Neurath, O. (2001) and Stoljar, D. (2001). However, as of the time this thesis was published, this term has yet to be formally adopted within the social sciences academic literature as a descriptor of the traditional materialist perspective. As a result, I maintain the usage of "materialism" that is employed throughout the cited literature.

of human life as subservient to an unobserved consciousness. La Mettrie defended the view that humans and animals were living elements of the same material world and that the living behaved as if they were complex machines responding instinctively within that world (Smith, 2002). This view eliminated the need to understand the soul since it was merely an intellectual construction that characterized an as yet unexplained system of biological events that induced sensation (Smith, 2002). La Mettrie's materialist understanding of human nature suggested that these biological mechanisms were as complex as any theologically-explained soul. La Mettrie believed these mechanisms were measurable and should be investigated in order to understand the fundamental workings of the human being. To critics who saw these views as heretical and unsophisticated La Mettrie responded that "matter is not vile" except to those who "fail to comprehend its brilliant works" (Smith, 2002, p. 118).

Darwin's Theory of Evolution

With the scientific method in tow, a new generation of researchers hailed the ideas of La Mettrie and sought to better understand the fundamental mechanisms of human life (Richards, 1979). Darwin also adopted this devotion to materialism to explore and explain the gradual change in population traits of animal species over time (Palmer & Palmer, 2002). Darwin's theory of evolution emerged as a thoughtful, rational investigation into the materialist workings of species reproduction and survival. Evolution theory was born.

In The Origin of Species Darwin (1859/1996) describes evolution as the result of the processes of natural selection, a phenomenon in which all species acquire specific traits over time due to random biological mutations that ultimately determine the extent of an organism's survival. This materialist theory of human and animal change challenged the idea of divine design (Mayr, 1984). Even today, after much scientific criticism, modern biologists generally define evolution as the natural process by which life emerged, though several different approaches to this definition have developed (Simpson, 1960). To a significant degree, modern evolution theorists believe this process determines who we are. The subtle gap in perspectives (e.g., random versus progressive emergence of traits) is primarily due to the relatively recent discovery of the genetic mechanisms that govern natural selection. However, as evolution theory developed and became more refined, its roots have remained as materialistic as Darwin's original ideas.

Among modern intellectuals, evolution has become the single most influential theory to the academic understanding of human existence and to the popular understanding of biological life (Carroll, 2004; Mithen, 2006; Stanford, 2001). Thanks to modern technology and advances in the emerging fields of genetics, biochemistry, and mathematics, Darwin's successors have been able to elucidate many of the mysteries of inheritance, offering a complex material understanding of what were once considered exclusively human qualities and behaviors. Modern, often conflicting, frameworks that expand

Darwin's theory — such as neodarwinism/modern synthesis (Stebbins, 1950), population genetics (Hartl & Clark, 1997), and evolutionary philosophy (Sober, 2003) — have since surfaced. While these theories may differ on the nuances of natural selection, they all reinforce a materialist understanding of human life. Together, they form the dominant paradigm for understanding human behavior that is prevalent among modern western scientific academia.

Modern Theories of Evolution

Modern evolution theories universally accept that the adoption of new traits in all life forms is governed by three mechanisms: mutation, natural selection, and genetic drift (Charlesworth & Charlesworth, 2003). Mutation functions at the most basic chemical and atomic levels within the biological processes of all living beings. Natural selection functions at the organism level, managing the interaction between organism and environment. Genetic drift functions at the population level, resulting in the adoption of particular traits by large groups of organisms. Together, these principles explain the complexity and diversity of all living beings, including the intricacies of human nature.

Three philosophical assumptions that relate specifically to human behavior underlie the body of modern evolution theory. The first is that humans are considered a common animal species that descended from other animals through mechanisms of evolution that can be evidenced using the scientific method (Oldroyd, 2002). Modern biologists agree that humans are a common descendant of related animal species. The discovery of the genetic code makes the descent of humans from animals indisputable (Mayr, 1984). Studies showing similarities among the structural, physical, and behavioral features of humans and animals have been used to support the notion of descent (Charlesworth & Charlesworth, 2003). As a result, modern biologists frequently rely on empirical studies of animals to yield clues to human behavior that would otherwise be difficult to measure.

The second of these principles is that all of human nature can be explained in terms of biological and chemical mechanisms (McLaughlin, 2002). This principle is aligned with La Mettrie's (see Thomas & Thompson, 2003) materialist understanding of humans as complex systems of biological and chemical processes. Modern biologists have embraced this view and are content to believe in a materialistic basis for even the most complicated features of human nature, including consciousness (Charlesworth & Charlesworth, 2003). This principle is founded in the most basic evolutionary assumption that all living beings are the product of self-replicating molecules formed by the natural laws of chemistry over three billion years ago (Charlesworth & Charlesworth, 2003).

The third principle is that all human intellectual and emotional responses to the environment have been imprinted biologically and behaviorally into the psyche of humankind in an effort to ensure survival (Weber & DePew, 2003). This principle is

grounded in theories of evolutionary psychology. These theories explain how biological mechanisms guiding human nature lie between genes and behavior and seek to illuminate the ways in which humans respond to adaptive situations (Barkow, 2006). Humans generally respond to their environment through their senses, making rational sense of what they perceive, while responding to problems accordingly. However, evolutionary psychologists do not see this process as creative or mystical. They see the mind as a machine that processes information and is designed to solve problems (Palmer & Palmer, 2002). Human behavior is determined in large part by a series of programmed responses offered up by our evolutionary ancestors. Evolutionary psychologists understand that the shared evolution of these mechanisms within the human species "make for the psychic unity of our species, our human nature" (Barkow, 2006, p. 27).

These three assumptions work in interrelated ways as part of the modern cultural ideology of science. These assumptions are linked together through a materialist understanding of behavior and they are linked to the larger cultural ideology of science through their dependence on rationalism, objectivity, and scientific observation, fitting with Ellul's (1966, 1990) framework discussed earlier. There is still much debate about the intricacies of inheritance between different modern theories of evolution.[(2)] But the generally accepted framework of modern evolution, based on these three philosophical assumptions, serves the purpose of this thesis as the specific corner of science used to help understand how the media reinforces an ideology of science in order to narrowly explain and address human needs.

Conclusion

This literature review provides a window into the cultural phenomenon of science and its relationship to our modern understanding of our selves. Media sources, audiences, and history all play critical roles in the cultural value of science. However, through language, media can unnecessarily obscure alternative and competing viewpoints and give unquestioned authority to the institutions and economic elite that govern the norms of science. As a result, we are left to believe that science is the only way of knowing ourselves and the only path to answering our needs. As Ellul (1990) describes, science becomes our savior.

As this chapter has shown, science has been investigated as an ideology. Evolution theory is one area of science that has yet to receive significant attention. It is also a useful corner of science because it offers relevant information about how peoples' personal and social needs can be met. Echoing the elegy of Donne, Berger and Luckmann (1966) state that science not only removes the sacred from the world, but leaves the

[(2)] These include how natural selection technically leads to the emergence of specific traits and behaviors in a species (Miele, 2005) and how the theory leads to critical implications regarding popular culture's understanding of itself (Simpson, 1960).

average person conceptually lost within their own reality. This view, indelibly linked to how we understand ourselves as humans, reveals a problem worthy of investigation.

How then is science pertaining to evolutionary issues discussed in the media in ways that perpetuate science a dominant ideology? How are media messages about modern evolution theory communicated in ways that maintain the culturally preferred materialist understanding of human nature? This thesis answers these questions by examining cover articles in TIME magazine that cover topics related to theories of modern evolution. I argue that the language in these articles demystifies human nature in ways that may appear to explain human behavior as a way to advance the human cause, but ultimately subtly undermines the meaning and value of human life.

III. Methodology: Critical Language Studies & Critical Discourse Analysis

The method of analysis for this study, critical discourse analysis (CDA), fits within a broad methodology known as critical language study (Fairclough, 1995a, 1995b, 2001; Fowler, Hodge, Kress & Trew, 1979). In this chapter I first explain the major principles of critical language study and how it involves the close analysis of media texts as a form of discourse. I then introduce the primary material for analysis, TIME magazine, and argue for its appropriateness as a reasonable reflection of the cultural values of the American middle class. The chapter concludes with a description of the data set for a critical discourse analysis of TIME magazine cover articles from 1990–2005 regarding evolution and human behavior.

Critical Language Studies/Critical Discourse Analysis

Critical language study is a broad approach to analyzing the relationship between language and power that sees language as a facilitator of consent among the subordinate classes for the sake of the interests of the ruling class (Fairclough, 2001). This methodology seeks to uncover how language practices facilitate the cultural embrace of dominant ideas as socially natural, acceptable and, in many ways, expected, leading to the emergence of a dominant ideology. Fairclough (2001) believes that these practices act as a form of persuasion — rather than force — at the level of language and work to integrate people into the institutions of power, making them feel like they are a part of a participatory social framework. In actuality, however, this participation maintains and reproduces a social structure that serves the interests of those in power.

Foundations of Critical Language Study

Critical language study is rooted in Saussure's distinction between langue and parole. Langue refers to the structure of language itself, specifically regarding the words, syntax, rules, conventions, and meanings of language-use while parole refers to the ex-

pression of langue by an individual (Strinati, 1995). Sassure's approach sees langue as the linguistic elements of communication that are given by society, taken for granted by the speaker and generally found to be unitary and uniformly understood throughout a culture. Parole is seen as the sum of these linguistic elements involved in specific acts of communication (Strinati, 1995). To Saussure, the distinction between langue and parole is the difference between the elements of language and the act of speaking, suggesting that it is possible to study langue outside of parole (Strinati, 1995).

According to Fairclough (2001), one of CDA's original developers, critical language studies modifies Saussure's langue/parole model in a way that sees langue as more than the given elements and structure of language. Instead, these elements and structures have complex, culturally influenced meanings. Langue represents a system of culturally framed codes that reflect the social rules and conventions of language-use. Parole, then, refers to actual language-use which is influenced by the speaker's social identity, social purpose, and social setting. Fairclough refers to the expression of parole as "discourse" or language-use as a social practice that is determined by social structures. In this model, langue and parole together serve as the structural and contextual framework for language-use. This contextual framework serves as the foundation with which audiences find common ground and seek to make sense of the information. Assumptions in texts become natural and common sense for an audience. This is a process by which assumption sows the seeds for the emergence of dominant ideologies (Fairclough, 2001).

Discourse in Critical Language Study

Critical language study treats discourse as a combination of what Gee (1999) calls "little d" discourse and "big D" Discourse. "Little d" discourse is language in action and interaction. It is the language used in everyday talk found in interpersonal, group, and institutional settings. Conversation analysis (see Cameron, 2001; Pomerantz and Fehr, 1997), discursive psychology (Edwards & Potter, 1992), action-implicative discourse analysis (Tracy, 2005), and other forms of discourse analysis (Tracy, 2001, 2002) are methods of analysis that study what would be considered "little d" discourse. In these types of analytic methods, researchers typically transcribe talk and look for discursive patterns with specific meanings embedded in naturally occurring interaction (Tracy, 2002). Analysis focuses on language-in-use (see Cameron, 2001) and inductively generated claims about issues that the participants implicitly and explicitly reveal.

"Big D" Discourse, or social discourse (Foucault, 1972; Gee, 1992), refers to language practices that combine with different forms of imagery, symbols, behaviors, values, attitudes, etc. that express a broad, culturally known activity, such as the discourse of medicine or the discourse of education. In this type of analysis, researchers typically look to much larger social and cultural frameworks in order to understand the meaning of discursive messages (Gee, 1999). While "little d" focuses more on the practice of language, "big D" concerns itself with everything related to it (Cameron, 2001).

Combining the interactional nature of "little d" discourse and the cultural nature of "Big D" Discourse is useful for critical language studies as it turns its analytic focus to the media. "Discourse" goes beyond the realm of social interaction and into the interaction in relationships between sources and their audiences sustained by texts embedded within culture. This relationship is not interactional in the same way that conversational discourse is traditionally approached. However, as Fairclough (2001) argues, a reader engages a text and an interaction occurs between the source and the ideal/actual audiences. According to Tolson (1996) the term "discourse" describes this interaction by focusing on what the text does (rather than just what it says) to invite reader participation in the maintenance and reproduction of cultural practices. From this perspective, discourse is a form of language reflected in a media text that is socially determined, managing the relationship among the source, the ideal audience, and the actual audience in culturally preferred ways (Hoey, 2001).

Studies of mass media that have taken a critical language studies approach reveal that the influence of social power structures on the production and interpretation of media texts allows analysts to see media discourse in a socially determined way (Van Dijk, 1997). Social power structures also have the ability to shape the types and ways in which social discourses are available to media audiences while people interact with media texts in socially conditioned ways (Van Dijk, 1988). Although the media research reviewed in the previous chapter focuses on the singular role of sources, audiences, or cultural influences, together they suggest that texts are the result of and reflection of a relationship among these components. Theorists of critical language study contend that language-use practices embedded within texts can provide clues to the nature of this relationship. From this perspective, a cultural discourse of science would be comprised of two parts. The first includes how readers literally interpret the language of mediated texts with science content. The second includes the social conditions related to the languageuse practices that determine the production of those texts as well as the social forces that influence the interpretation of those texts at the language level (Fairclough, 2001). As a methodology, critical language study exposes the ways in which language-use practices "little d" reinforce prominent "big D" social discourses facilitated by the media.

According to critical language studies, language is central to the maintenance and management of institutional power in how it binds social discourses. Once a discourse has been established between sources and audiences through media texts, it often becomes naturalized. Naturalization is the process by which specific language practices make social discourse common sense for media audiences and is implicit to hegemony (Fairclough, 2001). When a discourse becomes naturalized, audiences have grown so accustomed to the dominant message, and have been so insulated from opposing viewpoints, that negotiation with a text is no longer necessary. Wide embrace of the discourse evolves into a common-sense way of knowing reality. Over time this common sense grows and leads to an implicit acceptance of a dominant ideology. Naturalization reinforces the existing power relations by working within the framework of culture to

lead text producers to reproduce their texts in characteristic ways and lead audiences to interpret them in ways that reinforce the power structure. The audience considers it natural to subscribe to and conduct oneself according to the dominant ideology because it is considered the way to properly understand reality (Fairclough, 2001). Theorists within critical language studies have investigated the language-use practices that reinforce the process of naturalization regarding issues of gender (Dabbous-Sensenig, 2006; Lee, 2004; Pienaar & Bekker, 2006) as well as race and ethnicity (Downing, 1985; Gaudio & Bialostok, 2005; Meer, 2006). With respect to the formats of media texts specifically, research focuses on the ways in which ideologies regarding such issues are managed through language-use practices specifically in newspapers (Kress & van Leeuwen, 1998) and television (Carter, Branston & Allan, 1998), as well as more generally in domestic and international news (Fowler, 1991; van Dijk, 1988).

Critical Discourse Analysis

Critical Discourse Analysis (CDA) is a specific method of critical language study. Its primary aim is to uncover the mechanisms of hegemony at work in social discourse through language-use. While CDA is often employed to analyze talk in interaction (Ehrlich, 1998), it has also been useful in studying media texts (Eldridge, 1995; van Dijk, 1991). Fairclough (1995b, 2001) refers to this focus on media as "text analysis." It should be noted here that CDA as a type of text analysis in critical language studies is distinct from cultural studies and its use of textual analysis. Though distinct, these approaches are similar. First they both share an interest in the ways that ideological messages are maintained and reproduced culturally. With regard to media texts, specifically, both approaches reveal how sources and audiences construct and understand texts based on their social position and conditioning. However, text and textual analyses are different in the ways that they approach content, context, and ideology. Textual analysis sees text as a cultural artifact possessing a combination of symbols, images, and language with multiple and often conflicting ideological meanings for audiences (Strinati, 1995). The primary focus in textual analysis is on how those ideologies are communicated within a specific context. This contrasts with text analysis in which text is seen as product of and facilitator for social discourse. Since social discourse often defines context, the more language-oriented approach of text analysis is valued as the primary method for uncovering how ideas become naturalized and eventually transformed into ideology (Fairclough, 1995b). This focus on language-use practices can reveal traces of the culturally influenced production of that text and can also reveal cues as to how that text should be interpreted (Fairclough, 2001). With its focus on language-use practice and its normative approach, text analysis in CDA relies on features of discourse that other critical or cultural studies of media do not. In CDA, language exposes how ideas are represented, how identities are managed and how phenomena are explained in mediated texts through content, writing style, and

overall organization. Fairclough (2001) describes these as the ideational, interpersonal, and textual functions of language.

The ideational function of language refers to linguistic representations of social practices that carry specific ideologies (Fairclough, 1995b). In this function, language is used to shape the ideas that audiences have about the content. To uncover the power of this function, analysts focus on the value derived from the audience experience that deals directly with the relationships among content, social knowledge, and beliefs embedded in media texts (Fairclough, 2001). The ideational function of language can be expressed through lexical, grammatical, and textual elements (Fairclough, 1995b). Lexically, it is often expressed through ideological wording. These practices refer to how words represent particular concepts and ideas in ways that carry ideological implications. For example, Fairclough (2001) describes how the use of "subversive" versus "solidarity" to describe a political movement can place a text within a right or left political ideology. Grammatically, the ideational function is often expressed through the use of nominalizations, which is the transforming of a process usually stated as a verb into a noun, thus hiding the agent in the process. This practice shapes how ideas are framed and bounded for the reader in ideologically important ways. For instance, Fairclough (2001) describes how a newspaper uses the headline "Quarry load-shedding problem" to describe the problem of a particular quarry owner's trucks that shed rocks while traveling on the roads because their contents are not sheeted. The nominalization keeps causality hidden and makes it difficult for the reader to understand exactly what problem the article investigates. Other practices that work ideationally include active/passive voice and how processes and participants are constructed in texts in ways that dominate the discussion. At the textual level, the ideational function is found in the overall organization of elements or larger structures of the text, such as through the use of narratives or the structuring of introductions and conclusions.

The interpersonal function of language refers to the ways in which the text constructs the reader's and writer's identities and manages their relationship (Fairclough, 1995b). This function of language possesses two types of analytical value. The first is the relational value between the source and audience. Relational value reflects how the audience sees the credibility and the worthiness of the source. The second is expressive value. This value of the interpersonal function regards the source's evaluation or meaning of the source-audience relationship (Fairclough, 2001). Both work to show how the text manages the source-audience relationship in ways that can affect the ideological power of the text. Resources for examining this function are also lexical, grammatical, and textual elements. Lexically, this function can be found, for example through euphemistic language. Grammatically, the interpersonal function can be found in the use of pronouns and the structuring of statements (e.g., use of declarative, interrogative, etc). At the textual level, the interpersonal function is typically found in dialogue-type texts and deals specifically with turn-taking and control of contributions from the source and audience.

Finally, the textual function of a media text refers to the more complex structural forms of language used to facilitate the larger ideological force of the combination of ideational and relational functions. These structures possess connective value in how they work to link parts of a text together and work to link the ideational and relational elements to the text (Fairclough, 2001). Lexically, the textual function is often reflected in the use of extended metaphors and analogies. Grammatically, the textual function is captured in how simple sentences are linked together and how logical connectors are used within the text.

Some examples of CDA are helpful in illuminating the analytical value of this method. These examples show the ways in which language functions to reinforce dominant cultural ideologies of poverty and terror. They also highlight the lexical, grammatical and textual elements of media texts that work to promote naturalization and reinforce dominant ideologies for readers. In a study on British newspaper coverage between 1860 and 1931 concerning the plight of the poor, Hartley and Montgomery (1985) found that media texts use language and structural strategies to ascribe poverty to blind luck and poor decision making on the part of members of the lowest socioeconomic class. The authors describe how the newspaper articles grammatically and textually position the reader within the condition of poverty using a combination of "you" and direct questions or narratives. This alignment distances audiences from the problem, creating a "we/they" dichotomy in the minds of the audience. This context reinforces the dominant ideology that the poor themselves are to blame rather than the social system.

De Beaugrande (2004) found that devices such as repetition and framing in security laws reinforce a positive ideology of secrecy. In an analysis of language used in documents pertaining to the Patriot Act and the Department of Homeland Security, language practices are used that polarize the public and promote an ideology of secrecy for the sake of security. By referencing a number of mediated texts including speeches, media interviews, laws, and policies, the study reveals how government secrecy is reinforced as good while any action counter to the government is bad. These government documents strengthen the idea of "terrorism" through repetition of the term, even in contexts that would normally be considered unethical or unintentional. Also, repeated use of phrases like "diverting valuable resources" reinforces the idea that keeping people informed has little value within the larger cost-benefit analysis of waging the war on terror. By equating acts of protest against government action with words like "unpatriotic" or "in aid to terrorists," the documents reveal how language not only secures, but extends the power of the government. Conservative political hegemony in an age of fear is reinforced.

In sum, CDA can be useful in identifying the ways in which language works to reinforce dominant ideologies. Because of its focus on language-use practices in texts that help reveal relationships between source, audience, and culture, it is especially useful for analyzing the coverage of scientific ideas in the media. As the literature review describes, the cultural discourse of science has evolved in ways that continue

to influence our social and private lives — from policy decisions to consumer preferences and even our entertainment. However, how does this discourse influence how we understand ourselves? The analysis for this thesis looks for the relationships among source, audience, and culture in TIME and examines how their presence in specific scientific contexts constructs an ideology of science that naturalizes how we see ourselves and our role in modern society. Focusing specifically on ideas of evolution as directly related to how humans understand themselves and their needs, it is my belief that a critical discourse analysis can reveal how language is used in the media in a way that gives science cultural power.

Materials: TIME Magazine

The materials for analysis are cover articles from TIME magazine regarding topics that pertain to human evolution. TIME was chosen as a focus for two reasons. First, as one of the most popular newsweeklies in the world, it is regarded historically as the media text that did the most to influence the self-perception of the post-World War II American middle class (Brinkley, 2003). With its focus on progress, TIME provided a window into the ways in which Americans should understand themselves, their social and economic progress and their role in a progressive society (Brinkley, 2003). TIME was established in 1924 by Luce and Hadden at Yale University. According to Baughman (2001) the highly visual newsweekly format was a response to the structure of popular print news at the time. Luce and Hadden believed that most news media buried details of events and phenomena under dull and dry copy that required too much time from the audience to understand. This format, combined with the contemporary media's lack of spirit and personality, left audiences disconnected from the text, and subsequently, from the events of the world.

Luce and Hadden promoted TIME as print news that offered a summary of progress (Baughman, 2001). Its pages reflected the new found optimism of the postWorld War II America where the industrial age was thriving. After World War II, Luce coined this notion of progress led by American interests, The American Century (Baughman, 2001). Luce believed that America was the world insurer of freedom and should assume leadership in world trade. Furthermore, moving into the 1950s and beyond, Luce believed America should serve as an international model of social progress. Baughman describes how this progress was defined in terms of industrial and technological prowess and the international promotion of democratic government and society.

The ideals of economic and social progress are captured and communicated in TIME in characteristic ways that appeal to the middle class. In terms of organization, TIME has historically been fact-based and sparing in its use of superfluous description and imagery. This approach has evolved little over the past 80 years. Baughman (2001) explains how news pieces focus on condensed coverage of the news events of the week. This works to keep audiences efficiently informed while maintaining their interest. Also,

Baughman explains how early issues of TIME frequently employed a personality frame, which involved building stories around an individual and how that individual most influenced the prominent news of the week. In the 1960s, cover stories moved explicitly from the human face of an issue to a conceptual face, which was shown by a combination of graphics and text that emphasized an issue. However, most cover articles still retain the personality frame as part of the article itself. For Luce and Hadden, people explained events. This style has evolved little over the decades and is still enormously popular among newsweekly readers. In the first half of 2006, TIME ranked as the number one U.S. newsweekly with a paid and verified circulation of over four million subscribers (Project for Excellence in Journalism, 2006). The average age of TIME readers is 45, and the average income is $66,000 per year (Project for Excellence in Journalism, 2006).

The second reason TIME magazine was chosen for this study is that it has been shown to be a rich area of American media for the study of the rise of ideologies within the context of history, economy, and language. For example, during the World War II era, with regard to science specifically, Marlin (1987) found that TIME served as an artifact of positive cultural propaganda in its coverage of the Sputnik launch in 1957. Through its use of loaded vocabulary and personality frames, TIME reinforced an ideology of American superiority over the Soviet Union. Nikita Khruschev's response to the launch of Sputnik was characterized as arrogant and described using the terms "crowed," "jaunty," and "aggressive." In stark contrast, the American response was described as "partisan" and "frenzied." Though this language is not entirely complimentary, the American response to the Sputnik launch was positively linked to the leadership of then-President Eisenhower who was framed as someone who "representing the free world, rose to meet the challenge" of the space age (Marlin, 1987, p. 549).

The structure and voice of TIME when it debuted were unique to news media of the 1920s and were later found to have an ideological affect on the audience. TIME was most characterized by its omnipresent voice. For decades, articles in the newsweekly did not quote multiple sources nor did they contain an author byline. According to Wulfemeyer (1985) this strategy was used to appear nonpartisan and impartial to particular political ideologies. To the critical reader, however, there was little to suggest a balanced view of the issue. With regard to gender, Johnson and Christ (1988) found that few women have been featured on the cover of TIME. The authors determine that between 1923 and 1987, only an average of 14% of annual covers depicted women, the majority of which were identified as artists and/or entertainers. Furthermore, Christ and Johnson (1985) identified the characteristics of the person most featured in TIME's Man of the Year: middle-aged, male, Caucasian, born in the United States and elected to a political office. They say that "the faces of TIME's Man of the Year have been the faces of the world" (p. 892) and that these characteristics certainly reinforce a particularly narrow ideology regarding leadership and progress.

For its coverage of technology in particular, Stahl (1995) shows how framing strategies in TIME articles extend beyond personality type and into religious imagery in

order to control audience attitudes toward new technology. In an analysis of articles concerning computer technology, Stahl found that TIME used language indicative of magic as well as religious metaphors to describe the advent of computer technology in the early 1980s. After computers were accepted into the industrial fold in the late 1980s, magic metaphors and religious language were replaced by more utilitarian language. Though studies of language-use and ideology in TIME like these are relatively sparse, these examples illustrate how TIME uses language and imagery to reinforce hegemonic relationships between the elite and the economically-influential middle class.

Materials for Analysis

The specific data set for this study includes TIME cover articles between 1990 and 2005 that featured topics related to evolution theory. I chose this time period since it is historically part of Ellul's (1990) latest phase in the cultural ideology of science in which science supports economic development and is described as "salvation." This time period is also helpful in that it makes the analysis of a significant number of TIME cover articles more manageable. To identify the specific articles for my data set, I conducted a keyword search in the EBSCO Academic Search Premier database for all TIME cover articles during the time period that referenced "evolution," "biology," or "Darwinism." I cross referenced this list with a keyword search generated using the TIME online archives in order to ensure that all relevant articles were captured in the data set. This yielded a set of 52 cover articles regarding the relationship between evolution and human life. Individual articles central for this analysis were chosen for their variation in topic, and wide representation of the time period. Articles were then closely examined for specific language practices that reveal ideational, interpersonal, and textual functions.

These articles explore a range of topics that can be loosely classified into three groups. The first group, origins of humankind (eight articles), focuses on the origins of life, the rise of humans within the animal orders and how qualities that were once believed to be distinctly human are not unlike the behaviors of other animal species. The second group, advances in science and technology (10 articles), reference evolution theory to explain the value of new scientific and technological advances as well as how evolution informs visions of the future. The third group, human health and behavior (34 articles), features evolution theory to explain human health and behavior. This group focuses on the specifics of diseases such as obesity and addiction, but also devotes several articles to notions of God and spirituality, consciousness, and the power of the mind in healing. In these articles, TIME investigates the evolutionary aspects of everyday life like sleep and love, as well as the biological roots of nefarious behaviors such as anxiety, depression, and teen angst. Laboratory experiments and testimonies from prominent theorists are also highlighted to explore these conditions. In keeping with my the research question, specifically, how language-use reinforces

dominant ideologies of science in mass media in ways that influence how humans understand themselves and their reality, I narrowed this set to include only those articles in the third group (see Appendix for a list of articles that comprise the data set along with all relevant dates, authors, and descriptions).

An analysis of cover articles during this period will help illuminate how an ideology of science is reinforced through language in the media and how messages regarding science and human life are linked to the values inherent to our economic power structure and the systems of production. It is my belief that this analysis may help reveal how language-use in media that is situated within the context of a modern technological culture shapes how we understand ourselves as human members of society and how we understand the nuances of the human experience.

Conclusion

This chapter explained how critical discourse analysis, as a specific method of analysis within the larger theoretical framework of critical language studies, is appropriate for analyzing how ideologies are reproduced in mediated texts. The different language-use functions serve as a guide for analyzing how an ideology of science is reinforced in TIME magazine's coverage of evolution and human behavior. The following analysis reveals how these functions can be found in the language-use practices in TIME that shape how readers understand themselves as human and understand the role of science in reinforcing that identity. By identifying these structures at the language level, I hope to reveal a better understanding of how language works to reinforce the dominant ideology of science and how that ideology narrowly defines our understanding of human nature.

IV. Analysis I: Ideational and Interpersonal Functions of Language-Use

This chapter describes the results of my critical discourse analysis of TIME cover articles between 1990 and 2005 regarding evolution on the topic of human health and behavior. Using Fairclough's (2001) functions of language-use as a guide, the ideology of science as illustrated in the application of evolution theory to human phenomena in TIME articles comes into focus. The analysis reveals discursive patterns found in lexical, grammatical, and textual resources that reinforce a limited, materialist understanding of human nature. As described in chapter three of this thesis, Fairclough identifies three important functions of language-use to consider in critical discourse analysis: ideational, interpersonal, and textual. This chapter describes language-use practices that accomplish the first two — the ideational function and interpersonal function.

Before analyzing the functions of language in TIME, it is helpful to provide an outline of the general form and structure of articles in the data set. Cover articles in TIME are showcased to potential readers using a short headline, followed by a more descriptive, lengthier title on the cover of each issue. Some examples are:

- The New Science of Sleep: Fresh clues to why we need it — and how much is enough
- The Chemistry of Love: Scientists are discovering that romance is a biological affair (Happy Valentines Day)
- The Secrets of Ambition: A surprising look at what separates life's go-getters from its also-rans.

In some issues, the cover includes a list of supporting sub-headlines that refer to the topics of the cover-story articles. Table 1 below gives some examples. Issues contain one to four cover stories related to the headline, as illustrated in Table 2 below. Coverstories and related articles are generally found in the middle of the magazine and are part of a single unit. That is, the article is not split at an arbitrary point and continued in another location later in the magazine. The longer articles are typically divided by subheadings. For example, the cover-story for "The New Science of Sleep" ("Why We

Sleep: You may think ...") includes sub-headings: "Those shifty eyes," "New tools, new ideas," "Hidden tricks," "Slow wave learning," "A theory of sleep," and "How much is enough." The argument each article makes is fairly easily discernable from the titles, though the overall purpose of the articles is to describe and inform the reader on new advancements and/or discoveries regarding the topic. The appendix shows the issue-date, authors, headlines, cover-story titles, and synopses for each of the articles in the data set.

Table 1. Examples of Cover Headlines and Supporting Sub-Headlines in TIME Magazine

Headline	Supporting Sub-Headlines
How Your Mind Can Heal Your Body • The Link Between Mental and Physical Health • Is Happiness in Your Genes? • Women, Men, and Depression	• New Ways to Beat the Blues
How Your Love Life Keeps You Healthy • Couples Therapy That Can Save Your Marriage • Plus: An A-to-Z Guide to the Latest Medical Advances	• Sex and Your Brain
Overcoming Obesity in America • The Anti-Fat Crusaders • Weight-loss Heroes • What to Tell Your Kids • A Guide to Diet Books	• Why We Eat So Much

Table 2. Examples of Cover Headlines and Cover-Story Titles in TIME Magazine

Headline	Cover-story Title(s)
The New Science of Sleep: Fresh clues to why we need it – and how much is enough	Why We Sleep: You may think it's for your body, but it's really for your brain. The latest research is full of surprises
The Chemistry of Love: Scientists are discovering that romance is a biological affair (Happy Valentines	

Day) | The Right Chemistry What is Love? |

How Your Mind Can Heal Your Body “ New Ways to Beat the Blues “ The Link Between Mental and Physical Health “ Is Happiness in Your Genes? “ Women, Men, and Depression	A Frazzled Mind, A Weakened Body What's Sex Got to Do With It? Your Mind, Your Body Is there A Formula for Joy?

The Ideational Function of Language: Shaping Ideas in TIME

As discussed earlier, and as the name suggests, the ideational function of language shows how language is used to shape ideas, concepts, and knowledge in ways that embed ideology into the text. This stands out in the headlines of cover articles when a contrast is made between science and what would ordinarily not be examined scientifically. Examples include the "The Science of Happiness," "The Chemistry of Love," "The God Gene," "Infidelity: It May Be in Our Genes," and "What Does Science Tell Us about God?" In these examples, scientific terminology in headlines primes the reader for the article's perspective on the content. Other examples of headlines that prime the reader for a scientific perspective, though in a less strikingly contrastive way, are: "The New Science of Sleep," "The IQ Gene," and "How Your Love Life Keeps You Healthy." This initial use of scientific terminology in TIME headlines implicitly introduces the complexities and mysteries of human phenomena as explainable, predictable and controllable biological mechanisms.

Three more specific ideational functions of language-use can be identified in the TIME articles. The first is the classification of the human being using biological terminology. The second is the reframing of everyday experiences through rewording practices. The third is the containment of the human being through shifts in agency in the writing. These functions reinforce specific ideas about human behavior in ways that focus understanding and meaning on scientific aspects of the human experience.

Classifying Humans with Biological Terminology

TIME uses biological terminology to describe humans as one of a subset of biological organisms. This practice transforms and simplifies highly complex human behaviors into an easily captured, studied, and labeled laboratory item. The result is a conception of human beings as fitting within the same general biological taxonomy as any other living being. Classifying the human is grounded in biological terms used to identify the human being in general, describing the human condition, and describing human social phenomena.

Identifying the Human

Perhaps the most obvious practice of this mechanistic language-use involves the various ways in which TIME uses biological terms to identify human beings. "Homo sapien" is one term used in a wide variety of contexts, including articles on the topic of human physiology as well as those less biological and more humanly complex topics such as anxiety and love. The term "Homo sapien" is an identifier that places people, regardless of their individual decisions and factors into a biological classification system (species, genus, family, order, class, phylum, kingdom, and domain) in which other living things can also be found. Identifying what the human being is in terms of this classification becomes a nominal task that deemphasizes the uniqueness and complexity of the human experience.

In one example TIME uses "Homo sapien" as a referent for people in examining their sleep habits and behaviors. The article describes how modern advances in sleep research reveal the importance of sleep to human health and suggests that people should pay more attention to how much sleep they receive. After offering several examples in the opening narrative of how humans behave when deprived of sleep, Gorman (The New Science of Sleep)[3] states that:

> Excerpt 4.1: Gorman (The New Science of Sleep); ¶4
>
> You do not need to pull an all-nighter, work 24-hour shifts or hold down a couple of jobs to know that at some point you just have to crash. All through the animal kingdom, sleep ranks right up there with food, water, and sexual intercourse for the survival of the species. Everybody does it, from fruit flies to Homo sapiens.

While the article as a whole is about the sleep habits of human beings, sleep is generalized as a subset of behaviors, expected from a much larger classification of living things (kingdom, phylum, etc.). The reader only needs to understand that within the "animal kingdom" (versus the plant, fungi or bacteria kingdoms) sleep is relevant. In this context, sleep is "ranked" among other primary needs such as food and water, things that all members of the animal kingdom require (i.e. "everybody does it"). The human need for sleep is differentiated only by the narrower biological classification of species (fruit fly = drosophilia malanogaster; human = Homo sapien). "Everybody" as an inclusive term for all members of the animal kingdom, along with "Homo sapien," places people in a category in which they are viewed as no more primitive or evolved, and thus no more significant or insignificant, than a fruit fly. A member of one of

[3] Articles and excerpts from articles will be identified by the cover story author(s) and the cover headline in parentheses. In this chapter, since excerpts are relatively short, line numbers will not be used. In chapter five, since excerpts are much longer, line numbers are used. Since articles were retrieved from TIME's online archive (www.time.com) page numbers are not applicable, though the paragraph number in the article in which the excerpt can be found will be identified.

the least complex species is equated with one of the most complex. This limits reader understanding of what it means to be human, at least in terms of sleep habits, and minimizes human uniqueness among living beings.

Classificatory conceptions of humans are reflected in TIME's use of paleontological and archeological terms to help label the evolutionary progress of humans. Much like the development of computer software, the human is treated as a series of "versions," identified using different species names depending on the time and place of their existence. Two articles refer to humans as "Homo erectus" and "Homo ergaster." However, these terms do not simply identify humans that existed within their specific pre-historical period. They are treated as the prehistoric cousins of the Homo sapien who have passed their behaviors onto modern humans through the forces of evolutionary psychology. In the articles, these forces explain how our ancestors provided us with favorable behaviors that have over time been imprinted onto the psyche of modern humans because they help ensure survival.

Classifying the human being using this type of terminology provides a context for the relationship between anxiety and health in Lemonick's (How Your Mind Can Heal Your Body — A Frazzled Mind, A Weakened Body) article. After explaining how disturbances in the brain affect the well-being of the body, Lemonick describes how modern humans are sensitive to the pressures of modern life because of the psychologically engrained notion of fight-or-flight that we inherited from our prehistoric cousins. Lemonick writes:

> Excerpt 4.2: Lemonick (How Your Mind Can Heal Your Body – A Frazzled Mind, A Weakened Body); ¶2
>
> Humanity's physical reaction to stress, known as the "fight or flight" response, probably evolved to help our primitive ancestors deal with a treacherous world. When confronted with imminent danger–a sabertoothed tiger, say, or a club-wielding enemy Homo erectus–the body had to be instantly ready either to defend itself or to run like hell ... In the modern world, stress usually takes other forms. But the fight or flight response hasn't changed.

The phrase "the fight or flight response hasn't changed" links the behaviors of early humans (Homo erectus) to those of modern humans in stressful situations. Modern humans are seen as extensions of prehistoric humans who have internalized the behaviors of our ancestors because they help ensure our survival. This narrows the reader's understanding of anxiety to exclude the role of modern social and cultural factors in the prevalence of anxious behavior and limit it to evolution and biology.

Another article, focusing on the evolutionary roots of obesity, argues that modern humans are content to embrace behaviors that lead to obesity because of the positive outcomes of the dietary habits of their prehistoric ancestors. After introducing the idea of evolutionary psychology and how behaviors of prehistoric humans influence the behaviors of modern humans, Lemonick (Overcoming Obesity in America) describes

how meat provided nutrients critical to evolution and eating meat was the behavior required to become tall and smart. The Lemonick writes:

> Excerpt 4.3: Lemonick (Overcoming Obesity in America); ¶11–12
>
> Our love affair with sugar–and also with salt, another crucial but not always available part of the diet–goes back millions of years. But humanity's appetite for animal fat and protein is probably more recent. It was some 2.5 million years ago that our hominid ancestors developed a taste for meat. The fossil record shows that the human brain became markedly bigger and more complex about the same time. And indeed, according to Katherine Milton, an anthropologist at the University of California, Berkeley, "the incorporation of animal matter into the diet played an absolutely essential role in human evolution."
>
> For starters, meat provided a concentrated source of protein, vitamins, minerals and fatty acids that helped our human ancestors grow taller. The first humans were the size of small chimps, but the bones of a Homo ergaster boy dating back about 1.5 million years suggest that he could have stood more than 6 ft. as an adult. Besides building our bodies, says Emory University's Dr. S. Boyd Eaton, the fatty acids found in animalbased foods would have served as a powerful raw material for the growth of human brains.

Modern humans are linked to Homo ergaster by way of dietary habits common to both. Both are laid alongside a "hominid" (in first paragraph) lineage. A meat diet is the driving force of growth particularly of the brain over the course of about one million years — from 2.5 million years ago when "hominid ancestors developed a taste for meat" (in second paragraph) to 1.5 million years ago when an Homo ergaster was 6 feet tall. This linking of the Homo ergaster to modern humans through fundamental survivalistic behavior (i.e., eating) reinforces a conception of modern humans as an extension of their prehistoric cousin. This deemphasizes the role of personal responsibility as well as modern social and cultural factors in the modern problem of obesity.

In these cases, the use of classification language neatly characterizes humans as a component of an archeological genealogy that has evolved to influence our behavior over time. Though the overtness of this systematic characterization varies across these examples and across the data set, modern humans are understood to be no different than the other members in the animal order. Through classification language the articles focus on the human necessity and instinct for survival and the resulting genetic influence on the human psyche. A conception of human nature as just another example of living nature is reinforced.

Describing the Human Condition

In addition to identifying the human, terms such as "Homo sapien," "hominids," and the like are featured in explanations of who we are as humans and aspects of life generally considered unique to the human condition. These aspects include conditions such as being anxious (The Science of Anxiety), ambitious (The Secrets of Ambition), happy (The Science of Happiness), and spiritual (The God Gene). Describing these complex conditions in biological terms strips their meaning by de-emphasizing or overly simplifying their multidimensional value to the human experience. The physiological aspects of these conditions are given prominence in the articles, leading the reader to assign more value to the biology of these conditions and less value to the complexity of the conditions themselves.

In an article on the biological roots of anxiety, Gorman (Understanding Anxiety) points to the part of the brain called the amygdala as the source of anxious behavior in humans. First, Gorman describes the behavior of a woman with a defective amygdala in order to illustrate how people behave abnormally without an understanding of or regard for fear. Gorman writes:

> Excerpt 4.4: Gorman (Understanding Anxiety); ¶20
>
> Owing to an unusual brain disorder, [a woman known only by her research number] SM046 has a defective amygdala. As a result, her behavior is abnormal in a very particular way. When scientists show SM046 pictures of a series of faces, she has no trouble picking out those that are happy, sad or angry. But if the face is displaying fear, she cannot recognize the feeling. She identifies it as a face expressing some intense emotion, but that is all. Her unusual condition strongly suggests that even in Homo sapiens, fear takes hold in the amygdala.

Writing "even in Homo sapiens" suggests that fear, and thus anxiety, as it is generated in the amygdala, is an issue for all animals, including the Homo sapien, no matter its complex cultural climate. In other words, a complex human emotion is described as a biological inevitability. Rather than complicating the issue with a more complex description of the potential for human anxiety, as well as sources of anxiety that could be rooted within social and cultural contexts, the description of the abnormal behavior is rooted in a neurological mechanism that all animals possess, Homo sapien or otherwise. This simplifies the complex human condition — in this case, the human as an anxious being — that could be seen as influenced by factors other than those that are physiological.

"Homo sapien" is not the only scientific term that functions ideationally. Genetic terms such as "DNA" also serve the ideational function. An example of this practice can be found in an article on ambition which argues that the roots of ambitious desire can be traced to the evolutionary psychology of survival. It is suggested that ambitious

people are the result of ambitious ancestors who, over time, psychologically imprint those attitudes onto the genes of their progeny. Comparing the evolutionary roots of American ambition to that of other countries, Kluger (The Secrets of Ambition) states that:

> Excerpt 4.5: Kluger (The Secrets of Ambition); ¶29
>
> Other countries — where the acreage is smaller and the pickings are slimmer — came of age differently, with the need to cooperate getting etched into the cultural DNA.

Americans are seen in this excerpt to have developed ambitious desires as a result of the ways in which they developed culturally. This is contrasted by the author against other cultures who came to value cooperation instead. To say that cooperation (or ambition) is "etched into the cultural DNA" has a variety of implications that automate the human experience. The chemical term "DNA" refers to a molecule that carries the key instructions of human life and can ensure that those instructions are passed to future generations. However, "DNA" in this case is used to describe the complex nature of culture as it evolves over time, rather than the capacities that an individual person or being may possess to express certain traits. The use of "DNA" in this excerpt suggests that culture has discrete (albeit numerous and complex) components and is seen as a survival mechanism that supports the people that comprise it. Also, the term "etching" in this case conjures the idea that culture is a blank slate that is permanently marked by its members' genetic capacities. "Etching into the cultural DNA" suggests that culture can be catalogued with a permanence that further denies its dynamic nature. Readers are left to interpret cooperative or ambitious desire as a biologically-determined response to threats against survival that are applied for practical purpose and valued only when needed. The human is seen as automated in the ways that people are conditioned to understand themselves only in terms of their current living conditions and the conditions of their ancestors.

Describing Human Social Phenomena

In addition to language-use that describes the human and its condition, classification practices found in TIME also involve shaping the idea of the human as a social creature. These practices treat social activity as flat and mechanized, deemphasizing the complex influence of cultural forces. The contexts for this practice in TIME can be found in explanations of the relationships among human touch, love, and sex.

In an article on the biological roots of human sexual behavior TIME uses the term "Homo sapien" to describe how people use physical contact to manage intimacy. Kluger (How Your Love Life Keeps You Healthy) writes:

Excerpt 4.6: Kluger (How Your Love Life Keeps You Healthy); ¶3

> Physical contact–the feeling of skin on skin, the tickle of hair on face, the intimate scent drawn in by nose pressed to neck–is one of the most precious, priceless things Homo sapiens can offer one another. Mothers and their babies share it one way, friends and siblings share it another, teams and crowds in a celebratory scrum share it a third. And of course lovers share it in the most complex way of all.

The term "Homo sapien" colors the excerpt in a way that contradicts the emotional, individualized social experiences that people feel when another's skin is on theirs, the tickle of hair on their face, or the scent they draw in when their nose is pressed against another's neck. These are not expressions of the human touch; they are the "physical contacts" of "Homo sapiens." Providing a subsequent list of social roles to which intimacy applies (mothers, babies, friends, siblings, teams, crowds, and lovers) suggests that regardless of whose "skin," or whose "tickle," or whose "scent," intimacy is a physiological response to the act of touch. While terms such as "precious" and "priceless" are positive evaluations of this act, they serve to emphasize the importance of the scientific take on sex and physical intimacy by describing "physical contact," or the individual behavior of touch, rather than on the interpersonal meaning or value that touch represents.

In sum thus far, a close examination of language-use that describes human behavior shows that word choice can strongly influence the ideas that are communicated in a text. In TIME, human behavior is often seen as common to all living beings. In the case of physiological behaviors, this is to be expected. However, to characterize the human capacity for anxiety or the human behavior of love as solely physiological phenomena is to condense the robust experience of the human condition to a set of automated responses. This practice contributes to an ideology that limits our own understanding of self and society. These terms limit reader understanding of themselves as instinctual beings responding to environmental stimuli and adopting behaviors as a mass in order to survive. To do this is to dismiss the complexity of the human being and the opportunity it affords to recognize reality and act in ways that can enrich the human experience.

Reframing Everyday Experience through Rewording

Rewording is another practice that functions ideationally. This is akin to Linell's (1998) notion of interdiscursive recontextualization in which language used in one context is transformed and used for another. Linell describes recontextualization as an explicit discursive practice implicit to reframing (Goffman, 1974), which is the transformation of the way readers understand ways of seeing reality and ways of reacting

to it. In the case of TIME, reframing through the practice of rewording influences the ways that highly complex human experiences are understood by the audience. Such experiences are generally said to be unique for every individual person. Rewording is a practice that reframes complex human experiences from seeing everyone as having their own unique experience to seeing everyone as equally predictable due to having the same set of physiological parts. I look specifically at rewording who we are and what we do to help show how reframing is accomplished.

Rewording Who We Are

One way that TIME reduces the complexity of the human experience is through the rewording of the human condition in ways that simplify who we are. In an article on the prevalence of mental depression in the late 20th century, Wright (20th Century Blues) describes how mental health is a product of the genetic traits we inherit as individuals and the collective behaviors we learn as members of a social community that seeks to sustain itself. As part of an introductory narrative about the stressful nature of modern life Wright writes:

> Excerpt 4.7: Wright (20th Century Blues); ¶2–3
>
> VCRs and microwave ovens have their virtues, but in the everyday course of our highly efficient lives, there are times when something seems deeply amiss. Whether burdened by an overwhelming flurry of daily commitments or stifled by a sense of social isolation (or, oddly, both); whether mired for hours in a sense of life's pointlessness or beset for days by unresolved anxiety; whether deprived by long workweeks from quality time with offspring or drowning in quantity time with them–whatever the source of stress, we at times get the feeling that modern life is not what we were designed for.
>
> And it is not. The human mind — our emotions, our wants, our needs — evolved in an environment lacking, for example, cellular phones. And for that matter, regular phones, telegraphs, and even hieroglyphics — and cars and railroads and chariots ... Getting genes into the next generation was, for better or worse, the criterion by which the human mind was designed. Mental traits conducive to genetic proliferation are the traits that survived. They are what constitute our minds today; they are us, we are designed to steer genes through a technologically primitive social structure.

Here, understanding what it means to be human is being reframed from a state-orientation to a traits-orientation. In terms of states, the human is seen as dynamic, responding to the relatively temporary, highly contextualized conditions of a situation. The first paragraph provides a long list of these types of conditions ("burdened by," "stifled by," "mired for hours in," and "deprived by"). But understanding the human in

terms of states (state-orientation) beings to be reframed to traits (trait-orientation) in the transition between the two paragraphs. The phrases "modern life is not what we're designed for" (¶2) and "the human mind evolved in an environment lacking" (¶3) simplify what the mind is about. Understanding the human is thereafter framed in terms of traits. Traits are context-free. All the experiences that stimulate the mind are stripped away. This second paragraph foregrounds mental traits ("Mental traits conducive to genetic proliferation are the traits that survived") to explain why we experience stress, anxiety, and the like. That is, the mental traits we possess are not designed to handle the modern social complexities of life. In minimizing the ways in which humans are constructed by the external world, this view undermines the dynamic nature that defines the relationship between humans and their environment.

Reframing through rewording can also be found in characterizations of ourselves in relation to our environment. In Gorman's (Understanding Anxiety) article on anxiety, for instance, several theoretical perspectives of anxiety are compared and contrasted, from Freud's psychological approach to modern day physical perspectives. As part of the claim that the modern take on anxiety has grown to more strongly value the role of biology over psychology, Gorman states:

> Excerpt 4.8: Gorman (Understanding Anxiety); ¶8–9
>
> Sigmund Freud was fascinated with anxiety and recognized early on that there is more than one kind. He identified two major forms of anxiety: one more biological in nature and the other more dependent on psychological factors. Unfortunately, his followers were so obsessed with his ideas about sex drives and unresolved conflicts that studies of the physical basis of anxiety languished.
>
> In recent years, however, researchers have made significant progress in nailing down the underlying science of anxiety. In just the past decade, they have come to appreciate that whatever the factors that trigger anxiety, it grows out of a response that is hardwired in our brains.

Gorman's account of Freud's followers' primary interest in "sex drives and unresolved conflicts" (¶8) alludes to their focus on the personal and interpersonal variables that contribute to the human state of anxiety. However, these personal and social variables are reframed in paragraph nine as neurological factors that "trigger" anxiety. This invites an understanding of anxiety as a classically conditioned response to a biological stimulus, much like the way that Pavlov's dog responded to the bell in a series of famous behaviorist experiments (see Babkin, 1949). The term "hardwired" (¶9) evokes an electromechanical understanding of brain function equating the brain to an electronic component that responds characteristically and predictably to inputs. Together, these terms build the framework for a mechanical conception of the human response to anxiety. Notice that the excerpt de-emphasizes the source of stress (including environmental, social, and cultural factors) as "whatever the factors" (¶9) and

focuses instead on the human response that is subsequently "triggered." Humans are seen as simple machines that respond in predictable and instinctual ways to stress.

Rewording also reframes human self-awareness of mortality. In an article about the complex relationship between faith and healing, Wallis (Faith and Healing) quotes Harvard psychologist, Benson, who explains the source of human faith. Wallis states:

> Excerpt 4.9: Wallis (Faith and Healing); ¶14–15
>
> In his latest book, Benson moves beyond the purely pragmatic use of meditation into the realm of spirituality. He ventures to say humans are actually engineered for religious faith. Benson bases this contention on his work with a subgroup of patients who report that they sense a closeness to God while meditating. In a five-year study of patients using meditation to battle chronic illnesses, Benson found that those who claim to feel the intimate presence of a higher power had better health and more rapid recoveries.
>
> "Our genetic blueprint has made believing in an Infinite Absolute part of our nature," writes Benson. Evolution has so equipped us, he believes, in order to offset our uniquely human ability to ponder our own mortality: To counter this fundamental angst, humans are also wired for God.

In this excerpt, technical language reframes the condition of spirituality from a state of being, accessed through meditation and often characterized as symbolic and meaningful, into a mechanism of survival that serves the needs of a highly developed brain. Spirituality is typically seen as a highly personal condition defined by one's relationship with the unknown and is often complicated by ethereal notions of faith, personal attitudes toward death and one's approach to symbolic expressions of these concepts. This is described in the excerpt by patients as "feel[ing] the intimate presence of a higher power" (¶14). However, spirituality is reframed through technical language like "blueprint," "equipped," and "wired" (¶15) into something that is built and practical. A blueprint gives instructions for building, re-building, and even analyzing for reverse engineering. Suggesting that spirituality is documented on our "genetic blueprint" and part of our "nature" (¶15) reduces its complexity from something highly personal and creative to a practical component of our psyche. Furthermore, the term, "equipped" and phrase, "wired for God" (¶15) evokes the notion that spirituality is instinctual and not unique between humans or among humans as a species. It is an urge that is necessary in the sense that it is part of our "nature," a genetically engrained behavior adopted habitually over thousands of years in order to ensure survival. The meaning and various contexts of the experience of spirituality are never addressed. As a result, human spirituality is seen as a physiological and evolutionary function that serves the practical needs of survival rather than a highly developed state of being that serves to enrich the human experience.

Rewording What We Do

Rewording also reframes human behavior in ways that shape how humans understand what they do. In an article on the role of sex in human health Kluger (How Love Life Keeps Your Healthy) describes how sexual urges within relationships help reinforce survival instincts:

> Excerpt 4.10: Kluger (How Love Life Keeps Your Healthy); ¶9

Part of what makes touch–and by extension, sex–such a central part of the species software is that hedonism simply makes good Darwinian sense. It's not for nothing that hot stoves hurt and caresses feel nice, and we learn early on to distinguish between the two.

In this excerpt, the experience of touch is aggregated into two categories, which reduces its emotional value and nuance. The complex emotions that come with touch and sex have been divided and labeled into what feels good ("caresses feel nice") and what feels bad ("hot stoves hurt"). Categorizing these feelings into "good or bad" and linking them to behaviors that are considered instinctual — embracing another person or removing the hand from a stove — reduces the symbolic and personal meaning of touch (and, by extensions, sexual relations) into a flat and clinical behavior. Though the rest of the article describes sexual behavior in terms of loving relationships and the practical value it offers to long term health, sex is characterized as nothing more than a simple biological command passed to the limbs from the brain. Furthermore, suggesting that these good and bad feelings related to touch are the product of "species software" further reinforces the mechanical frame. "Species" is a classification term used in biology that describes a particular group of organisms with specific traits. "Software" is a computer technology term that describes a pre-defined set of commands that a computer executes under a certain set of conditions. Together, the use of the descriptor "species software" reframes the source of sexual behavior — touch — from an emotional source to a physiological one so that it can be understood in terms of static inputs and outputs. While "species software" may reference the logical source of sexual desire, its connotations ignore the complex character of human "touch" and simplify the complex nature of human sexual relations.

Later in the article, "hugging" is reworded more explicitly than touch. Kluger (How Love Life Keeps You Healthy) explains how sexual urges arise in humans because of the physical contact we experience as children. Kluger states:

> Excerpt 4.11: Kluger (How Love Life Keeps Your Healthy); ¶12 A wailing child with a cut knee gets a long hug first, even though it's the bleeding wound that needs attention. In uncounted thousands of such tactile transactions, kids learn to use touch as a means of connection at least as expressive as–and certainly more satisfying than–anything so detached as speech.

In this excerpt, the act of hugging is reworded as a "tactile transaction." Hugging and embrace are a form of social and familial interaction that most often carries strong emotions. They are a form of physical affection between two people that are most frequently employed during times of heightened emotional awareness (e.g., those in which physical or emotional distress, passion or pleasure is present). However, Kluger's rewording focuses on the physiological aspects of embrace. In effect, this rewording neutralizes the emotion implied by the motherly act described in the first sentence. "Tactile transactions" is a technical term that describes the physical act of touch within an interaction between two individuals that is sanitized of all emotional connotations. The emotional richness of hugging and its potential for healing power is reduced down to a simple "means of connection," a tool that children learn and use as a foundation to explore more physiologically complex forms of sex later in life.

Other highly complex and meaningful behaviors such as problem solving are also reworded and thus reframed. In an article describing the relationship between gender and how thought patterns are constructed by the mind, Gorman (In Search of the Mind) explains how men are better able to perform spatial tasks like problem solving because they use only one side of the brain rather than both. Gorman states that:

> Excerpt 4.12: Gorman (In Search of the Mind); ¶3
>
> Studies have shown that when men are confronted with problems that deal with spatial orientation — a function that can be handled by both the right and left hemispheres — they tend to use the right hemisphere only. Thus there are not any distracting messages coming from in from the left hemisphere, which concentrates on language. This cerebral division of labor could also explain why there are so many more male architects and chess champions. Their brains may simply be better able to concentrate on solving problems involving spatial relations.

In this excerpt, the contextual act of problem solving is reframed as a purely intellectual act. Solving a problem is a highly complex behavior that is influenced by how and what we think about the issue. However, the process is also influenced by the context of the problem, cultural factors that influence the construction of the problem and the constraints of the solver, as well as how the solver's identity relates to his or her interpretation of the problem and potential solution. Suggesting that problem solving is a "cerebral division of labor" disregards these factors and grounds the process in the mechanical behaviors of the brain that are unique only to our physiology. Furthermore, framing spatial behavior in terms of activities that are culturally dominated by men such as "architects" and "chess champions" gives strength to the mechanical claim. As a result, problem solving is not seen as a rich and creative endeavor performed by individuals. Instead, it is framed as a flat process that follows predictable patterns based on physiological characteristics linked to biological sex.

In two articles, interestingly, the term "bonding" is reframed but not reworded. This practice is closest to Linell's (1998) description of interdiscursive recontextualization in which language used for one context is transformed for the use of another. In Wright's (Infidelity: It May Be in Our Genes), "bonding" is a significant term in a pivotal discourse moment that reframes infelicitous behavior, or a lack of "pair bonding," as a desirable evolutionary outcome. In the article, Wright explains how evolutionary mechanisms play a role in infelicitous behavior among men and women in committed relationships. In the beginning of the article humans are described, along with various species of birds, as a "pair bonding species" in which "the evolutionary purpose of human sexuality is to strengthen the pair bond and maintain the family unit" (¶1). Wright claims that the label "pair bonding" has been found by evolutionary theorists to be misleading because "bonding" is not necessarily linked to the sexual or emotional tie that binds families. Instead, the act of bonding takes other forms, specifically when females are driven to act infelicitous for reasons directly linked to survival. For example, Wright discusses research which posits that women "copulate with more than one man to leave several men under the impression that they might be the father of the particular offspring. Then, presumably, they will treat the offspring kindly" (¶23). This description frames bonding as a sexual act that ignores the family unit and ensures survival of the mother and offspring. In this article, "bonding" is originally framed as a complex interpersonal expression that links emotion and human sexuality to maintenance of the family unit. However, it is reframed into a set of positive behaviors adopted via forces of evolution by women that serves the purpose of survival, is observable and measurable by scientists, and can be generalized to many different species within the animal kingdom.

In another article, one on the roots of romantic love, "bonding" as a description of romantic love is reframed as a series of chemically-induced feelings pre-programmed in the brain. In the article, Lemonick (How Your Love Life Keeps You Healthy) discuss how "oxytocin is involved in deeper bonding" (¶27) not only for the prairie vole which exhibits strong fidelity to its mate, but for humans whose "oxytocin release may help us bond to certain features in our partners" (¶28). In this article, "bonding" is described as a chemical reaction that all animals share. Rather than considering the complex roles of emotion, intellect, social norms, and culture in the experience of love, "bonding" becomes a physiological function that is "chemicalized" by the prominence of oxytocin in the bloodstream that works to biologically ensure that we find and maintain meaningful relationships. These examples show that the meaning of "bonding" does not rest in the complexities that give meaning to a relationship, but on the evolutionary purpose of ensuring reproduction. This perspective reduces the complex nature of human relationships to the outcomes of biological mechanisms that serve the purposes of evolution and survival.

Language-use that reframes through rewording narrows the conception of the human condition to mechanical and biological concepts that undermine the complexity of the human experience. To see behavior as the product of biology removes the influence

of free will, social, and cultural factors as well as leaves readers with a flat mechanistic conception of behavior. Rather than understanding the deep layers of complexity that influence behavior, we are left to understand the finer points of the physiological mechanisms that propel it. In the end, the only insight on human nature impressed on the reader is that which is grounded in biology rather than in the array of other factors — social, intellectual, and emotional — that give meaning to the human experience.

Containing the Human Being through Shifts in Grammatical Agency

Grammatical agency refers to the ways in which subjects, verbs, and objects are oriented in the text. Shifting agency in grammar changes the subject of a sentence. This practice is subtle but significant in that it changes the idea of who we are and what we do from living beings acting in the world around us (the human as an acting being) to the physiological or evolutionary processes that express the being. Humans are thus seen as contained, restrained, and stifled, by nature as another simple being trying to survive in a complex world, rather than as a complex, dynamic, and unhindered being with the capacity to live vitally. For example, in Nash's (How We Get Addicted) article on the addictive nature of humans, the article explains that addiction is governed by the chemical dopamine. In reference to research conducted by Read Montague at Baylor College of Medicine using a computer model that uses a dopamine-like reward system to simulate the nectar gathering behavior of bees, Nash writes:

> Excerpt 4.13: Nash (How We Get Addicted); ¶21
>
> What does this [model] have to do with drug abuse? Possibly quite a lot, says Montague. The theory is that dopamine-enhancing chemicals fool the brain into thinking drugs are as beneficial as nectar to the bee, thus hijacking a natural reward system that dates back millions of years.

This excerpt represents the primary claim in the article such that the agent of addictive behavior is not the addict that abuses stimulants due to a combination of individual, social, and cultural factors. Instead, the agent is the chemical dopamine. Trickster language such as "fool" and "hijacking" makes dopamine appear to act autonomously on the brain, just as a person exercising free will would, in ways that are destructive. Dopamine is seen as an enemy combatant that works on the human brain in ways that undermine our better wishes. This places humans in a position of weakness against their own behavior and in subservience to imbalances in chemicals acting on the brain. This makes the human being appear powerless against addictive behavior and restricted by its effects. While the role of neurochemistry is emphasized, the roles of free will, society, and culture in addictive behavior are diminished. This example and other TIME data show that agency shapes the human as being contained by the

biological systems that express behavior, rather than as a being that possesses the free will and unlimited capacity to act on reality. In doing so, this practice privileges the role of biology in defining the human condition just as it would be defined for any other animal. Shifting agency can be examined in terms of what the text emphasizes after the shift is made — physiological mechanisms and evolutionary forces.

Emphasizing Physiological Mechanisms

For TIME cover articles, shifts in agency most often involves shifting ownership and responsibility of behavior from the being that expresses it to the physiological mechanisms that allow for its expression. Note, for example, the following excerpt from Gorman's (Understanding Anxiety) article that explains human anxiety in terms of studies done on laboratory rats:

> Excerpt 4.14: Gorman (Understanding Anxiety); ¶11
>
> You cannot ask a rat if it's anxious or depressed. Even most people are as clueless about why they have certain feelings as they are about how their lungs work. But fear is the one aspect of anxiety that's easy to recognize. Rats freeze in place. Humans break out in a cold sweat. Heartbeats race, and blood pressure rises. That gives scientists something they can control and measure.

The article first describes the trouble that scientists have identifying anxious behavior by comparing a human's and a rat's lack of awareness to anxiety. Then, it narrows the scope of interest to the behaviors that rats and human exhibit that can be measured.

This is followed by a statement that shifts the agency of anxiety from the rat and the human to their common biological mechanisms that elicit the measurable behaviors. Agents shift from "rats" (in "rats freeze") and "humans" (in "humans break out in a cold sweat") to "heartbeats" and "blood pressure." Also, behaviors such as "freezing" and "breaking out in a cold sweat" are changed to match the shift. Agency shifts from the human or animal to the activities of the physiological system. In this sense, the idea that anxiety rests in physiological mechanisms that create a response in humans and rats is emphasized. This shift restricts how readers understand human anxiety. By focusing on the measurable outcomes of physiological processes, and placing agency on those processes, the causality of anxiety is seen as biological, rather than social or cultural. Also, the shift in agency from the human or rat to the physiological processes that express anxiety ensures that the conditions for anxiety are inclusive to all living beings within the animal kingdom. Thus, the complexities of the human experience of anxiety are not seen as being any more unique or meaningful as those of a rat. As a practice, shift of agency ultimately emphasizes the role of material forces that

are innate to all living beings while de-emphasizing the role of uniquely human social and cultural factors that contribute to the rise of anxiety in humans. The unique human potential for overcoming obstacles through awareness, reflection and action is diminished.

Shifts in agency can also shape how the foundations of love and sex are viewed. In one example from Gibbs' (What is your EQ?) article on the emotional quotient (EQ), love is treated as a more developed form of reproductive lust that is ultimately the product of the entangled nerves of the neocortex. In a contrast and comparison of reptile and human maternal love, Gibbs states:

> Excerpt 4.15: Gibbs (What is your EQ?); ¶13
>
> Animals like reptiles that have no neocortex cannot experience anything like maternal love; this is why baby snakes have to hide to avoid being eaten by their parents. Humans, with their capacity for love, will protect their offspring, allowing the brains of the young time to develop. The more connections between the limbic system and the neocortex, the more emotional responses are possible.

The difference in parent/offspring relations between reptiles and humans is contrasted, though, in the first two sentences, animals and humans are both written as agents in behavior. As a side-note, notice the scientific language. Love is described in terms of the neocortex, explaining why baby snakes hide from their mothers and humans have the capacity for love. Further, human mothers are not described as having the ability to love their children. Rather they are described zoologically as "protecting their offspring." The last sentence reveals the shift in agency. In it, the agent is removed altogether by correlating a relationship between physiological systems and behaviors. It is not the organism (the snake or the mother) that is the agent of the maternal behavior, but the physiological connection between the limbic system and the neocortex of the brain that elicits the behavior. In this example, by shifting the source of maternal love from snakes or humans as living beings to the neocortex of the brain, the human capacity for love is contained and simplified into an instinct based on the presence or absence of a neurological mechanism found in some species and not in others.

Emphasizing Evolutionary Forces

In addition to physiological mechanisms, shifts in agency also emphasize evolutionary forces. One such example occurs in Lemonick's (Overcoming Obesity) article on obesity that introduces the notion of evolutionary psychology as an explanatory mechanism for the phenomenon. Lemonick explains the dietary behaviors of prehistoric humans over generations in ways that have come to influence the eating habits of modern humans. Regarding the eating patterns of pre-historic humans, Lemonick states:

Excerpt 4.16: Lemonick (Overcoming Obesity); ¶10

> Our earliest ancestors probably ate much as their cousins the apes did, foraging for fruits, shoots, nuts, tubers, and other vegetation in the forests and savannas of Africa. Because most wild plants are relatively low in calories, it took constant work just to stay alive. Fruits, full of natural sugars like fructose and glucose, were an unusually concentrated source of energy, and the instinct to seek out and consume them evolved in many mammals long before humans ever arose. Fruit wasn't always available, but those who ate all they could whenever it was available were more likely to survive and pass on their sweet tooth to their progeny. Our love affair with sugar–and also with salt, another crucial but not always available part of the diet–goes back millions of years.

The excerpt describes how early humans and their pre-human primate relatives consumed the same types of food and passed those behaviors onto modern humans. In the opening, "our earliest ancestors" and "their cousins the apes" are agents. Lemonick explains how they "ate" and "foraged" for food. However, agency shifts with the description of those food sources, their availability, and what they provided to both organisms. The author states that "fruits were an unusually concentrated source of energy," where fruit is the agent of energy and that "the instinct to seek and consume evolved," where instinct is the agent of consumption. Notice how the agent of consumption is transferred from the human being, to what is eaten, and finally to the evolutionary behaviors that cause us to eat. As a result, eating becomes an agentless activity in which access to high calorie foods becomes more important than consumption behaviors. This shift shapes the idea of modern obesity. Specifically, primates and early humans who were able to consume greater amounts of sugar were more likely to survive and then pass on the desire to consume high calorie foods. Thus modern obesity is considered a by-product of very reasonable and survival-enhancing behaviors inherited through evolutionary psychology rather than as a product of social (e.g., stress, etc.) or cultural (e.g., modern food industry, etc.) factors. This shift in agency de-emphasizes the role of factors other than biology, while framing obesity as a product of inherently instinctual behaviors that have become engrained in the human genome. Humans are seen as being contained by these factors in ways that assign the blame for obesity on nature rather than on the individual, social, and cultural factors that influence over-eating.

The role of touch in the expression of sexual relations in humans is described similarly in TIME. In detailing the role of nursing in the evolutionary development of human sexual desire and behavior, animal and human nursing practices are compared. Kluger (How Your Love Life Keeps You Healthy) writes:

Excerpt 4.17: Kluger (How Your Love Life Keeps You Healthy); ¶11

> Nursing alone is a powerful reinforcer. The mechanics of animal nursing can be a utilitarian business, with wobbly-legged newborns standing up to drink from Mom as if she were a spigot. Human nursing, by contrast, requires flesh-on-flesh cuddling.

In this example, had the descriptions in sentences two and three stood alone in the article, animals and humans would be the agent of touch and the source for their offspring's budding sense of reproductive sexuality. However, the first sentence, stating that the physiological aspects of nursing are the primary agents in fostering the seeds of adult sexual behavior, assigns agency of the behavior in each being to the evolutionary instinct of nursing. That is, the method of nursing is the agent of early sexual understanding, not the mother. In the case of humans, this assignment of agency contains the role of the mother by removing the manner of a nurturer and the emotional act of nurturing as important aspects of sexual relations. Rather, sexual behavior in humans is rooted in the mechanics of touch that is first experienced during nursing.

Shifts in agency are language-use practices that shape the idea of what the source of behavior is and the importance of different factors that influence human experiences. Shifting agency from the being — animals or human — to the biological mechanisms that express behaviors, shifts the relative importance of free will, social, and culture factors for readers who wish to better understand basic human experiences. When we conceive of the human as a product of physiological or evolutionary functions, the complexity of the human condition and human behavior is undermined. Though the human being is certainly biologically complex, emphasizing that may be at the expense of recognizing other factors — social and cultural — that also contribute to the significance and meaning of human life.

Scientific language, reframing, and the management of agency, serve the ideational function in this critical discourse analytic study of these TIME articles. They reinforce a materialist understanding of human nature by emphasizing conceptions of human behavior as rooted in the mechanical, physiological, and neurological aspects of the body. They further contribute to undermining alternative explanations for the human condition and human behavior. The result is a narrow conception of human nature as a product of material forces with little regard for the purpose or meaning of the human experience.

The Interpersonal Function of Language: The Source-Audience Relationship

In addition to practices that shape ideas, language-use in TIME articles also shapes the relationship between source and audience. In this section I describe several practices in TIME that help to establish and maintain two dimensions of this relationship. Predictably, the first dimension regards establishing credibility with the audience. In-

terestingly though, this dimension of the source-audience relationship is not accomplished with scientific support, but rather through the strategic use of verb forms. The second is in the interpersonal rapport established between the source and audience, using informal language throughout the articles especially as part of opening narratives.

Establishing the Voice of Authority through Verb Usage

Since this analysis focuses specifically on a media text, examining how the writer creates a voice through writing would be useful in understanding the relationship between the source and the audience. In TIME, language manages the interpersonal relationship between the author and the reader by influencing how the reader perceives the truthfulness of an author's claim. Using verbs strategically gives TIME a voice of authority that builds credibility for the audience. Taken as a grammatical resource, Fairclough (2001) would refer to this practice as a form of modality. Using auxiliary verbs (e.g., will/would, may/might, shall/should, can/could, and must), linking verbs, and verb tense in ways that help express the writer's judgment or opinion establishes the voice of authority. This authority is established in TIME through strategic verb usage in two ways. First, verb usage makes scientific claims sound plausible, often without reference to sources of evidence. Second, it strengthens the author's credibility as the authority over the validity of those claims.

Specifically, scientific claims sound plausible through the use of auxiliary verbs. These claims are followed by supporting statements using present tense verbs to strengthen the author's certainty of the scientific claim. Working together, these steps create a truth claim and reinforce the authority of the author over that truth while no reference to specific scientific evidence is given. The claim remains scientifically unsubstantiated, yet the credibility of the writer is established. An example of this can be found in an article on addiction, in which Nash (How We Get Addicted) describes the role of dopamine in addictive behavior. Nash explains how the body's regulation of dopamine allows researchers to see drug and alcohol dependence as a disease with a clear biological basis. Nash states:

> Excerpt 4.18: Nash (How We Get Addicted); ¶12
>
> That new insight may be the dopamine hypothesis' most important contribution in the fight against drugs. It completes the loop between the mechanism of addiction and programs for treatment. And it raises hope for more effective therapies. Abstinence, if maintained, not only halts the physical and psychological damage wrought by drugs but in large measure also reverses it.

The author's use of the auxiliary verb "may" with "be" in the first sentence indicates that the possibility exists for dopamine to contribute to the fight against drug

addiction. This possibility is treated as truth when the statement is followed by descriptions employing active, present-tense verbs — "completes" (in "It completes the loop,") "raises," (in "it raises hope,"), and "halts" and "reverses it" (in "Abstinence, if maintained, not only halts the physical and psychological damage wrought by drugs, but in large measure reverses it"). These verbs maximize the certainty of success that dopamine therapy could offer in the treatment of addiction. Though no specific scientific evidence is indicated, and the descriptive statements do nothing more than suggest that dopamine may have practical value, the truthfulness of the dopamine claim is reinforced. Verb usage in this excerpt establishes the authority of the author regarding the mechanistic claim that the body's management of dopamine is at the root of addictive behavior and that continuing dopamine research will be most critical in addressing addiction as a physiological illness.

In another example, in an article on the role of the mind in healing the body, Lemonick (How Your Mind Can Heal Your Body — Your Mind, Your Body) writes about how negative thoughts and emotions are the result of misfires of the brain:

> Excerpt 4.19: Lemonick (How Your Mind Can Heal Your Body — Your Mind, YourBody); ¶3
>
> The thoughts and emotions that seem to color our reality are the result of complex electrochemical interactions within and between nerve cells. The disembodied voices of schizophrenia and the feelings of worthlessness and self-hatred that accompany depression, although they seem to be based on reality, are no more than distortions in brain electrochemistry.

In this case the author offers a sense of plausibility with "seem" as a linking verb that joins "thoughts and emotions" to "color our reality." But the article quickly negates this notion using the more certain verb "are" to indicate that thoughts and emotions are actually only outcomes of electrical impulses in the brain, suggesting that there is no inherent meaning in their existence. The contrasting uses of "seem" and "are" create the author's authority over the truthfulness of the claim. Further, this is done so without reference to sources. Using these particular verbs in such a way to describe the relationship between thoughts, emotions and reality, strengthens the author's claim that distinctly human impressions such as thoughts and feelings are no more than functions of brain chemistry.

The paragraph from Lemonick (How Your Mind Can Heal Your Body — Your

Mind, Your Body) described above suggests that this two-step process can be seen in terms of two sides of an argument. That is, the plausibility suggested in the first step acts as the first side of an argument while the second step acts as its rebuttal.

A clearer example can be found in Gray's (The Chemistry of Love) article in which Gray dismisses an irrational and emotional view of love and positions the reader to be receptive to a more biological explanation. In the article Gray describes how love is a rational expression of a basic evolutionary need rooted in far more subtle and complex processes than we recognize. Gray writes:

> Excerpt 4.20: Gray (The Chemistry of Love); ¶11
>
> When people in love come to their senses, they tend to orbit with added energy around each other and look more helplessly loopy and selfbesotted. If romance were purely a figment, unsupported by any rational or sensible evidence, then surely most folks would be immune to it by now. Look around. It hasn't happened. Love is still in the air.

In the first half of the paragraph, the author describes what people "tend" to do when they realize they are in love. "Tend" has a tentative connotation, particularly when put against the use of the more certain-sounding "surely" adverb in the second sentence. This contrast of "tend" in the first sentence and "surely" in the second sentence is important because the second sentence rebuts the first. If love were irrational, the author essentially says, it would be a meaningless feeling since we have been exposed to it for so long. This argument is followed by strong statements of support, though utterly unscientific. The phrase "Look around. It hasn't happened. Love is still in the air" employs active verbs based on everyday observation such as "look," (in "Look around") and active verbs used as part of a colloquial phrase such as "is still" (in "Love is [still] in the air").

In another example, the authors devalue the traditional academic understanding of the role of women in prehistoric life and propose that an alternative theory may be more accurate. Ehrenreich and Maddux (The Truth about Women's Bodies) undermine the traditional perspective that pre-historic women were not hunters within their communities and instead advocate a new theory that suggests that women, children, and men hunted together in pre-historic times as a group. The article describes the traditional scientific understanding of hunting behavior stating that:

> Excerpt 4.21: Ehrenreich and Maddux (The Truth about Women's Bodies); ¶16
>
> The thinking that led to man-the-hunter was largely inferential: If you bring the women along on the hunt, the children will have to come too, and all that squalling and chattering would surely scare off the game.

Using auxiliary verb phrases like "will have" (in "children will have to come too") and "would surely scare" (in "chattering would surely scare off the game") builds speculation into their argument against the traditional hunter-gatherer model. This suggests the idea that explanations of traditional hunting behavior are based on flawed assumptions.

The statement that follows then describes an alternative communal hunting theory in terms of active verbs. The authors write:

> Excerpt 4.22: Ehrenreich and Maddux (The Truth about Women's Bodies); ¶16
>
> But there is another way to get the job done known as 'communal hunting,' in which the entire group–women, men, and children–drive the animals over a cliff or into a net or cul-de-sac. The Blackfoot and other Indians hunted bison this way before they acquired the horse–hence all those 'buffalo jumps' in the Canadian and American West–and net hunting is the most productive hunting method employed by the Mbuti people of the Congo today. When driving animals into a place where they can be slaughtered, noise is a positive help, whether it's the clashing of men's spears or the squeals of massed toddlers.

Notice the lack of auxiliary verbs and prevalence of active verbs in these supporting examples. Phrases like "group drive," (in "the entire group — women, men, and children"), "Indians hunted," (in "other Indians hunted bison this way before"), and "noise is" (in "when driving animals into a place where they can be slaughtered, noise is a positive help") all employ active verbs that strengthen the validity of the communal hunting theory and undermine the validity of the traditional hunter-gatherer model. This practice of verb usage subtly weaves examples, quotes, and logic together in a way that strengthens the author's claims while undermining the competing perspective.

Establishing the voice of authority through verb usage in this two-step process does significant relational work in TIME. It places the reader in a position to accept unproven conclusions from the author as true and reinforces a faith in science. In the case of human nature, accepting these mechanistic claims regarding human behavior as fact ultimately narrows reader understanding of human nature and minimizes the reader's own logical contributions to the claim. Authority, however, is not the only aspect of the source/audience relationship that reinforces science as a dominant ideology. As the next section shows, rapport is also significant.

Establishing and Maintaining Rapport through Informal Language

Informal language in TIME is used to create a relationship between the source and audience in a way that establishes common ground and builds rapport. This practice is found throughout the articles, but is most notably present in the opening narratives. This practice includes the wide use of second person pronouns such as "you," "your," "we," "our," and the use of colloquial expressions. Building rapport in these ways supple-

ments the identity of the author as a credible expert on expressions of human behavior by sounding like a "regular," non-scientific person.

An example of building rapport using these practices can be found in an article regarding the role of evolution in our desire to feel pleasurable sensations. Consider again, Kluger's (How your Love Life Keeps You Healthy) description (from earlier in this chapter) of how sexual urges within relationships help reinforce survival instincts. Kluger says:

> Excerpt 4.23: Kluger (How your Love Life Keeps You Healthy); ¶9
>
> Part of what makes touch–and by extension, sex–such a central part of the species software is that hedonism simply makes good Darwinian sense. It's not for nothing that hot stoves hurt and caresses feel nice, and we learn early on to distinguish between the two.

The pronoun "we" (in "we learn early on") combined with the informal phrase "it's not for nothing" establishes the claim that selfish needs related to touch and, by extension, sex, are good for the survival of the species in a way that makes it sound like common sense. In this example, the pronoun and the informal phrase create common experiences (e.g., the pain of a hot stove) as a form of evidence to support the author's claim. The author references common experience to defend an evolution-based argument while the relational language supplements the author's identity as an authority on the subject.

In TIME, informal language builds rapport in ways that give the reader a kind of implicit interpersonal experience with the source. These experiences are generally established in the opening narratives that orient the reader to the topic. Opening narratives build rapport in three ways. One reflects a sense of inclusion between the source and audience in the narrative. Another is in the way opening narratives place readers in familiar situations. A third is in the way they position readers to see the central phenomenon covered in the article through the eyes of a scientist.

First, language is used in opening narratives to establish an attitude of inclusion toward the audience. This practice positions the audience close to both the source and the phenomenon described in the article. It is used in articles that cover many different topics including the basic activities of the body such as sex (How Your Love Life Keeps You Healthy) and eating (Overcoming Obesity) to more socio-emotional (or at least cerebral) issues such as love (The Chemistry of Love), depression (20th Century Blues), happiness (Science of Happiness), and spirituality (Faith and Healing). Consider the opening to Wright's (20th Century Blues) article on depression and anxiety:

> Excerpt 4.24: Wright (20th Century Blues); ¶1–2
>
> "[I] attribute the social and psychological problems of modern society to the fact that society requires people to live under conditions radically different from those under which the human race evolved ..." –THE UNABOMBER

> There's a little bit of the unabomber in most of us. We may not share his approach to airing a grievance, but the grievance itself feels familiar. In the recently released excerpts of his still unpublished 35,000-word essay, the serial bomber complains that the modern world, for all its technological marvels, can be an uncomfortable, "unfulfilling" place to live. It makes us behave in ways "remote from the natural pattern of human behavior." Amen. VCRs and microwave ovens have their virtues, but in the everyday course of our highly efficient lives, there are times when something seems deeply amiss. Whether burdened by an overwhelming flurry of daily commitments or stifled by a sense of social isolation (or, oddly, both); whether mired for hours in a sense of life's pointlessness or beset for days by unresolved anxiety; whether deprived by long workweeks from quality time with offspring or drowning in quantity time with them–whatever the source of stress, we at times get the feeling that modern life is not what we were designed for.

After quoting the 1990s high profile, American anti-technology terrorist Kazinski's (the Unabomber) manifesto on the perils of a high technology society, the narrative begins with the informal and inclusive phrase "there's a little bit of the Unabomber in most of us" (¶1) that acts to cynically affirm the difficulties of modern life, an attitude to which the middle-class audience of TIME could relate. This is followed by the use of "we" and framing modern problems as common among all of us (in "We may not share his approach to airing a grievance, but the grievance itself feels familiar "). This inclusively acknowledges the frustrated sentiment in the Unabomber's viewpoint, without condoning Kazinski's radical rejection of modern society. Cynicism aside, there is a sense of inclusion in these statements that suggests that the author can relate to the Unabomber's (and TIME demographic's) aggravation with the pressures of modern life. This is followed closely by the emphatic term, "Amen," a colloquial statement typically heard in religious contexts that works to strongly reinforce the validity of an idea. As part of the introductory narrative of this article, these statements build a rapport between the source and audience based on an understanding that we all live in an anxious world. Further, the pronouns "we" and "our" are used throughout the narrative as part of examples of daily life that question the true value of everyday technology (in "but in the everyday course of our highly efficient lives, there are times when something seems deeply amiss") and middle class malaise (in "we get the feeling that modern life is not what we were designed for") in a way that maintains a mutual understanding between the author and the reader. These moments of informality lend a collective and inclusive feeling to the tone of the article that builds rapport.

Another way narratives build rapport is by placing readers in a situation or specific environment so they can relive a familiar experience. This practice is used in articles that include explorations of the physiology of sleep (The New Science of Sleep; The Sleep Gap,) anxiety (Understanding Anxiety,) addiction (How We Get Addicted,) and

ambition (The Secrets of Ambition). In one article on the biological roots of anxiety, Gorman (Understanding Anxiety) opens with a familiar situation that any typical TIME reader would or could have feasibly found him or herself experiencing:

> Excerpt 4.25: Gorman (Understanding Anxiety); ¶1
>
> It's 4 a.m., and you're wide awake — palms sweaty, heart racing. You're worried about your kids. Your aging parents. Your 401k. Your health. Your sex life. Breathing evenly beside you, your spouse is oblivious.

Extensive use of the personal pronouns "you" and "your" throughout the excerpt, combined with references to the everyday concerns of TIME's demographic, gives the reader a sense of the experience of anxiety. Any upper-middle class, middle-aged reader of TIME could easily identify with episodes of worry over their security, health, and relationships even if they have never experienced them directly. Using "you" and "your" also personalizes the issue for the reader and makes it his or her own individual experience. This sense of identification reduces the distance between the source and reader and builds the credibility of the author. Because this excerpt was used to introduce the article, the authority of the source regarding matters of anxiety is established.

A third way narratives build rapport can be seen in the way the reader is placed directly in the position of the laboratory scientist. This frequently-used practice can be found in several articles, including biological investigations of emotional intelligence (What is your EQ?), IQ (The IQ Gene?), the role of genes in gender difference (Why Are Men and Women Different?), as well as evolutionary investigations of faith (Faith and Healing), consciousness (In Search of the Mind), and spirituality (The God Gene.)

For instance, in an article (What's Your EQ?) on the role of emotion in human intelligence, the opening narrative describes an experiment given to young children that tests their ability to delay satisfaction. The reader watches the experiment unfold just as the researcher would:

> Excerpt 4.26: Gibbs (What's Your EQ?); ¶1–2
>
> It turns out that a scientist can see the future by watching four-year-olds interact with a marshmallow. The researcher invites the children, one by one, into a plain room and begins the gentle torment. You can have this marshmallow right now, he says. But if you wait while I run an errand, you can have two marshmallows when I get back. And then he leaves.
>
> Some children grab for the treat the minute he's out the door. Some last a few minutes before they give in. But others are determined to wait. They cover their eyes; they put their heads down; they sing to themselves; they try to play games or even fall asleep. When the researcher returns, he gives these children their hard-earned marshmallows. And then, science waits for them to grow up.

The reader is positioned to see the manipulation as if the reader were in the laboratory setting listening to and directly observing the researcher manipulate the child. Notice that in the first paragraph (in "You can have this ... , But, if you wait while I run an errand, you ... ") the reader is even provided the exact words of the scientist. This positioning draws the reader close to the source and into the science supporting the claim much like a laboratory assistant or an invited observer would witness the experiment. In the second paragraph, the statements of the behaviors of the children after the researcher has left use the pronoun "they" (in "They cover their eyes; they put their heads down; they sing to themselves; they try to play games or even fall asleep") in a way that is seemingly annotative, as if the researcher would capture these behaviors as measurable variables in this type of scientific manipulation. To a strong degree this narrative allows the reader to experience what the researcher experiences.

Through rapport, a relationship between the author and the reader is fostered that serves as a foundation for trust in the validity of scientific claims. This practice helps build a sense of inclusion into the text and facilitates the understanding of technically complex concepts by making them familiar to the audience. Rapport-building practices supplement the voice of authority that is established in the articles through informal language-use and verb usage. The relationship between the reader and the author is controlled in a way that makes readers more easily persuaded by scientific claims regarding human behavior. Practices that establish authority manage the identity of the source as expert through verb usage in ways that make scientifically unsupported claims seem reasonable. Furthermore, rapport building practices provide the reader with an experience that minimizes the relational distance thus making the source appear more trustworthy. Ultimately, these interpersonal practices work together to make the reader subordinate to the authority of the source regarding content and controls active reader involvement in the evaluation of scientific claims. As a result, the reader's understanding of human behavior is largely limited to a mechanistic view of human nature.

Conclusion

Discursive practices in TIME reflect the ideational and interpersonal functions of language. Ideational practices shape reader understanding of ideas regarding humans and human nature in the ways they classify human being and human behavior, reframe everyday experience and shift the source of who we are and what we do from living beings to mechanical processes based in biology. Interpersonal practices in TIME act on the relationship between the reader and source in ways that establish the source as the voice of authority over scientific explanations of human experiences and build rapport with the reader. In combination, these practices establish the ideological power of science within the text and manage reader perception of human life and uniquely human experiences. However, these practices do not work alone. The next chapter

discusses how ideational and interpersonal practices work together as part of more complex textual practices to reinforce the ideology of science in TIME. The result is a more complete picture of the power of the ideology of science in maintaining and reinforcing a materialist understanding of human nature.

V. Analysis II: The Textual Function of Language — Ideas and Relationships in Action

In the previous chapter, ideational and interpersonal functions of language-use were shown to give media texts ideological lift in the ways that TIME explains and describes the human being, the human condition, and human behavior (social and otherwise). In this chapter I examine the TIME articles with an eye on larger language structures that combine ideational and interpersonal practices to strengthen the ideological agenda of the text. Fairclough (2001) describes these structures as discourse practices that serve the textual function of language. The textual function goes beyond the shaping of ideas and the establishment and maintenance of source audience relationships. More complex language structures such as figures of speech and metaphor that weave ideas and source audience relationships together such that a stronger ideological picture can be painted.

In exploring the textual function in the TIME articles, I hope to reveal how science as a dominant ideology is reinforced. Specifically, I show how science is treated as a confirming mechanism for uniquely human qualities and experiences that are often also considered indescribable, intangible, and what Pearce and Branham (1978) would call "ineffable." These experiences are characterized as moments of mystical insight and akin to Maslow's (1964) "peak experiences" that prove difficult to capture in a tangible way using language or symbols, and are thus, difficult to study. However, people with ineffable experiences often recognize them as ineffable only when they are forced to describe the experience within a social context. Pearce and Branham (1978) state that social construction leads individuals to "superimpose the socially constructed reality on direct experience" thus constraining how these experiences are communicated (p. 359). More specifically, the authors suggest that these social conditions influence the ways in which the experiences, and the conditions necessary for the presence of the experience, are constructed in terms of social norms and rules. However, the language and description implicit to their construction may have no relation to the experience itself. Pearce and Branham suggest that science is one framework for communicatively managing the ineffable. They say that science works systematically to refine the language of society by "increasing the precision of its use and verifying truth claims" (p. 356). The textual function of language reveals how science refines the language we

use to describe the ineffable and may constrain how we understand these uniquely human experiences. It shows science as locating, validating, and serving these types of experiences, thus naturalizing science as the primary way we conceive of our self.

This chapter is divided into four parts. The first three analyze the TIME articles for the textual functions of language-use, revealing their practices. One is the act of locating complex human experiences within the physiological body, making them appear natural rather than illusory. The second is in validating human experiences as worthy of scientific investigation. The third is convincing readers that scientific research serves as a facilitator for human progress and is the preeminent way of understanding human nature. The fourth section discusses how these practices work hegemonically to naturalize the relationship between science and human life in a way that leads to a particularly imposing cultural ideology of science.

Locating Human Experiences in the Physical Body

One message communicated in TIME related to the ideology of science is the notion that science locates ineffable human experience (e.g., love, consciousness, spirituality, etc.) and then places it within the body, giving it substance and minimizing its illusory quality. In the scientific study of the universe, locating and identifying a phenomenon is a prerequisite for observing and measuring it. Locating an experience "pins it down," finds, or identifies it as something. Placing the source of the experience in the body gives it practical relevance and importance. There is a sense in these articles that if human experiences are not grounded in the functions of body, then they cannot be observed or measured. They are considered, otherwise, no more than fantasy. For the reader of TIME, the process of locating these phenomena within the natural mechanisms of the body reinforces the ideology of science, narrows the frame for understanding these phenomena and dilutes the richness of the human experience.

One example of this practice of locating can be found in TIME's explanation of romantic love in a Valentine's Day issue. In the following excerpt, Gray (The Chemistry of Love)[4] takes an historical survey of the origins and nature of romance. Gray states:

> Excerpt 5.1: Gray (The Chemistry of Love)
>
> 80 For one thing, there is the chicken and the egg dilemma. Which
> 81 came first, sex or love? If the reproductive imperative was as
> 82 dominant as Darwinians maintain, sex probably led the way. But
> 83 why was love hatched in the process, since it was presumably
> 84 unnecessary to get things started in the first place? Furthermore,
> 85 what has sustained romance — that odd collection of tics and
> 86 impulses — over the centuries? Most mass hallucinations, such as

[4] Also recall from the previous chapter the informal language that builds rapport in "Love is still

the 17th century tulip mania in Holland, flame out fairly rapidly when people realize the absurdity of what they have been doing and, as the common saying goes, come to their senses. When people in love come to their senses, they tend to orbit with added energy around each other and look more helplessly loopy and self-besotted. If romance were purely a figment, unsupported by any rational or sensible evidence, then surely most folks would be immune to it by now. Look around. It hasn't happened. Love is still in the air.

And it may be far more widespread than even romantics imagined. Those who argue that love is a cultural fantasy have tended to do so from a Eurocentric and class-driven point of view. Romance, they say, arose thanks to amenities peculiar to the West: leisure time, a modicum of creature comforts, a certain level of refinement in the arts and letters. When these trappings are absent, so is romance. Peasants mated; aristocrats fell in love.

But last year a study conducted by anthropologists William Jankowiak of the University of Nevada-Las Vegas and Edward Fischer of Tulane University found evidence of romantic love in at least 147 of the 166 cultures they studied. This discovery, if borne out, should pretty well wipe out the idea that love is an invention of the Western mind rather than a biological fact.

In the first paragraph, love is discursively located using a miniature, informal question and answer session. The questions are notably closed and progressively pin down the elusive state of romantic love as an outcome of physiological processes in the body. The first question, "Which came first, sex or love?" (lines 80–81), following the form of the well known question "what came first, the chicken or the egg?" makes love and sex as inter-connected as the circle of life and death. Interestingly, though, while this type of question ("which came first...") usually has no answer, evolutionary theory provides one to the love/sex counterpart in "If the reproductive imperative was as dominant as Darwinist's maintain" (lines 81–82). Love is pinned down and in tow to sex. Note that conversational phrases such as the tentative "sex probably led the way" (line 82) and "to get things started" (line 84) help build rapport with the reader. Making the experience of love appear to be a natural phenomenon gives it analytical importance to the institution of science. Grounding love in the evolutionary make-up of humans, rather than within the more abstract mind or soul gives purpose and practical meaning to the maintenance and survival of humankind.

In the second question, "But why was love hatched in the process, since it was presumably unnecessary to get things started in the first place?" (lines 82–84), love is presumed to be a by-product of sex. Love is "hatched" and "sustained" or fed by sex. The idea that an experience as complex as love would emerge from an egg like a newborn chick evokes a natural understanding of the origins of love. Love is identified as an outcome of sex that is maintained biologically (presumably through genetic mechanisms) in order to ensure that reproduction occurs.

In the third question, "what has sustained romance — that odd collection of tics and impulses — over the centuries?" (lines 84–86), love is placed within the biological mechanisms of the body by being renamed and reframed as a behavior. That is, "love," as an ineffable connection between two people, is now "romance," a series of measurable and observable courtship behaviors that ensures that sex takes place. Further, romance is reframed into a robotic "odd collection of tics and impulses." (lines 85–86). Love, despite its oddity, can still be understood as a physiological response to evolutionary instincts linked to survival. This rewording and reframing places love within the biological systems of the body by mechanizing the experience and linking it to a practical need.

The remaining portions of the excerpt also show how, over time, love has become located within the physiology of the body. Like the previous questions, these explanations for the presence of love are compared to other activities in a way that first locates love in nature then identifies it as a behavior and finally places it within the body. One example can be found in lines 86–87 where love is compared and contrasted as other mass hallucinations. In both cases, people lose their senses. However, since (unlike mass hallucinations) people in love do not return to normal as in "[they] orbit with added energy" (lines 90–91) and "[they] look more helplessly loopy and self-besotted" (line 9192), love is not deemed a temporary irrational phenomenon, but rather is made "real." Note too, how informal language helps with this. In the sentence, "If romance were purely a figment, unsupported by any rational or sensible evidence, then surely most folks would be immune to it by now" (lines 92–95), the informal term "folks" and language such as "sensible" and "surely" reinforce an attitude of common sense that builds rapport with the reader and locates love in the rational world.

Related to the comparison of love to a hallucination, the sentence "Those who argue that love is a cultural fantasy have tended to do so from a Eurocentric and class-driven point of view" (lines 98–99) compares love

in the air."

to a leisurely pastime or a "cultural fantasy" in which only the wealthy could afford to participate. This comparison identifies love as a behavior by reframing it from a dream into a set of actual behaviors that are renamed as "romance" (in "[Love is] leisure time, a modicum of creature comforts, a certain level of refinement in the arts and letters. When these trappings are absent, so is romance," lines 100–102). This, despite love's illusory qualities, identifies it as a behavior that is observable and tangible.

Finally, the sentence "This discovery, if borne out, should pretty well wipe out the idea that love is an invention of the Western mind rather than a biological fact" (lines 106–108) sees love as an invention of the mind. Love is found to reside in the body since anthropological data (in "[Researchers found] evidence of romantic love in at least 147 of the 166 cultures they studied," lines 105–106) is cited suggesting that love is a universal behavior among many different cultures. In observing and measuring the behaviors of romance, science is able to describe the ineffable experience of love.

In this excerpt, science locates love from illusion in hallucination, dream states, and figments of the imagination. It identifies love as real and finds it in a specific place — in the body. This is done so through complex language structures that allow for comparisons and informal language that manages the relationship with the reader. These practices reinforce the soundness of the author's logic and make science appear to give love its purpose and meaning by linking it to our physiological well-being. This example shows how language in TIME locates human experience as part of a first step in being able to scientifically examine it. By locating complex human phenomena within nature, the analytical value of such experiences to human progress may become apparent.

*** Validating Human Experiences as Worthy of Study

A second message communicated in TIME that serves a textual function in the ideology of science is the notion that science validates ineffable human experiences as worthy of critical investigation. In TIME science frames these experiences as irrational and then transforms them into more palatable, comfortable, and manageable behaviors. In validating their expression, these irrational experiences are described as having practical value in the ways they contribute to individual and social problems. Science is understood to reveal the purpose of these experiences in our lives. Without validation, however, these experiences are seen to have no value in human life.

Consider for instance, Wallis's (Faith and Healing) article about the role of spirituality in the management of people's health. Early in the article Wallis explains how researchers are beginning to consider the usefulness of spiritual healthcare options for technology-weary consumers who are trying to manage chronic illnesses. This following excerpt reports on the increasing popularity of spiritual options:

<verse>
Excerpt 5.2: Wallis (Faith and Healing)

Twenty years ago, no self-respecting M.D. would have dared to propose a double-blind, controlled study of something as intangible as prayer. Western medicine has spent the past 100 years trying to rid itself of remnants of mysticism. [Clinical Director of Psychosocial Oncology Research at California Pacific Medical Center, Dr. Elizabeth] Targ's own field, psychiatry, couldn't be more hostile to spirituality: Sigmund Freud dismissed religious mysticism as "infantile helplessness" and "regression to primary narcissism." Today, while Targ's experiment is not exactly mainstream, it does exemplify a shift among doctors toward the view that there may be more to health than blood-cell counts and EKGs and more to healing than pills and scalpels.

"People, a growing number of them, want to examine the connection between healing and spirituality," says Jeffrey Levin, a gerontologist and epidemiologist at Eastern Virginia Medical School in Norfolk. To do such research, he adds, "is no longer professional death." Indeed, more and more medical schools are adding courses on holistic and alternative medicine with titles like Caring for the Soul. "The majority, 10 to 1, present the material uncritically," reports Dr. Wallace Sampson of Stanford University, who recently surveyed the offerings of every U.S. medical school.

This change in doctors' attitudes reflects a broader yearning among their patients for a more personal, more spiritual approach to health and healing. As the 20th century draws to an end, there is growing disenchantment with one of its greatest achievements: modern, high-tech medicine. Western medicine is at its best in a crisis-battling acute infection, repairing the wounds of war, replacing a broken-down kidney or heart. But increasingly, what ails America and other prosperous societies are chronic illnesses, such as high blood pressure, backaches, cardiovascular disease, arthritis, depression and acute illnesses that become chronic, such as cancer and AIDS. In most of these, stress and life-style play a part.

"Anywhere from 60% to 90% of visits to doctors are in the mind-body, stress-related realm," asserts Dr. Herbert Benson, president of the Mind/Body Medical Institute of Boston's Deaconess Hospital and Harvard Medical School. It is a triumph of medicine that so many of us live long enough to develop these chronic woes, but, notes Benson, "traditional modes of therapy–pharmaceutical and surgical–do not work well against them."

Not only do patients with chronic health problems fail to find relief in a doctor's office, but the endless high-tech scans and tests of modern medicine also often leave them feeling alienated and uncared for. Many seek solace in the offices of alternative therapists and faith healers–to the tune of $30 billion a year, by some estimates. Millions more is spent on best-selling books and tapes by New Age doctors such as Deepak Chopra, Andrew Weil, and Larry Dossey, who offer an appealing blend of medicine and Eastern-flavored spirituality (see following story).

Some scientists are beginning to look seriously at just what benefits patients may derive from spirituality. To their surprise, they are finding plenty of relevant data buried in the medical literature. More than 200 studies that touch directly or indirectly on the role of religion have been ferreted out by Levin of Eastern Virginia and Dr. David Larson, a research psychiatrist formerly at the National Institutes of Health and now at the privately funded National Institute for Healthcare Research. Most of these studies offer evidence that religion is good for one's health.

In this excerpt spirituality is discursively validated by science and constructed as no longer stigmatizing (lines 29–49), a welcomed antidote to the inadequacies of western medicine (lines 50–67), financially viable (lines 68–76), and even scientifically interesting and relevant (lines 77–85). These are accomplished through a concert of language-use practices that also serve ideational and interpersonal functions.

Science validates the idea that spirituality is no longer stigmatizing in the first two paragraphs of the excerpt using a life/death metaphor. First, stating that "no selfrespecting M.D. would have dared to propose a double-blind, controlled study of something as intangible as prayer" (lines 29–31) suggests that any medical researcher seeking to scientifically study the intangible would be stigmatized, leading to the end of his or her career. However, later describing this type of research as "no longer professional death" (line 44–45) due to the growing popular interest in alternative therapies, reframes the idea of research regarding spirituality and health as life-giving and helpful. This attitude among members of the medical establishment is supported in the text using a pseudo-statistic in lines 47–48 ("the majority, 10 to 1, present the

material uncritically") that characterizes the increasing level of objective treatment these therapies receive in medical schools. Line 61 ("Anywhere from 60% to 90% of visits to doctors are in the mind-body realm") is also a statistical type of language used to validate further scientific research since popular — and academically established — attitudes toward medicine are changing.

Science also validates spirituality by incorporating it into its regiment. Note in lines 50–67, modern medicine is described as losing its luster and appeal because it is not high tech enough for modern illnesses and injuries such as "chronic illnesses and acute illnesses that become chronic" lines (57–59). This struggle to resolve traditional problems and manage new ones has stretched traditional medicine to its limits; "Western medicine is at its best in a crisis" (line 54). In this respect, the adoption of spirituality as a viable therapy is not a rejection of science. On the contrary, medicine is still praised as "a triumph" (line 64) because, ironically, modern medicine has helped people live long enough to experience these acute and chronic illnesses. Science is framed as looking outside of itself in order to sustain itself.

Later in the excerpt, science validates spirituality as a reasonable healthcare option due to its financial viability. Stating in lines 71–72, "many seek solace in the offices of alternative therapists and faith healers–to the tune of $30 billion a year, by some estimates", emphasizes the amount of money being spent on such therapies in ways that establish the measurable economic impact that spirituality could have on the medical industry. Further, the article reports on the amount of money being spent on supporting materials such as books and other media published by people with credentials in both traditional and alternative medicine as in, "Millions more is spent on best-selling books and tapes" (lines 73–74). This strengthens the case for the validation of such approaches by science in a way that expands the bounds of traditional medicine in order to meet people's needs and allow the establishment to economically benefit.

Finally, in the excerpt, science validates the investigation of spirituality as a viable alternative therapy by making it medically relevant. Stating that "relevant data [regarding spirituality] is buried in the medical literature" (lines 79–80) suggests that a seemingly intangible therapy like prayer has actually been scientifically studied many times in the past. In this case, science is not conceding to spirituality. Rather, it just forgot about all of the relevant knowledge it already has about the value of spirituality to health. Studying the impact of prayer now would just be a continuation of an already established line of research (albeit out of fashion for sometime). Science validates the study of spirituality because, in a way, it always has.

In this article, science is shown to validate intangible alternatives to traditional medicine using language practices that remove the stigma of spirituality and reframe the boundaries of medicine to include therapies such as prayer as viable alternatives due to their popularity, economic feasibility, and relevance. This example shows how languageuse serves a textual function that validates those human experiences typically deemed ineffable. Validation is such that experiences like prayer and the role of spiritu-

ality in health care are recognized as having value and are meaningful behaviors that deserve study.

Science in the Service of Human Understanding and Progress

Language practices in TIME often position science in service to human understanding and progress. Once people understand the intangible aspects of their nature and have come to see them as meaningful, science is described as providing them with the means to manage these experiences in ways that improve their condition and their lives. The practice of showing science as serving human progress is framed in TIME in two ways. The first sees science as expanding the boundaries of how reality can be understood. The second sees science as a necessary evil that tells the truth and ultimately helps to better expand our understanding of intangible experiences whether we would actively choose to act on that understanding or not. The following examples illustrate these practices.

First, science is shown to serve the cause of human progress through the positive ways in which the continued scientific study of consciousness is framed. In Lemonick's (In Search of the Mind) article, a travel metaphor is used in the closing of the article to defend more scientific study of the mind. The article reminds the reader that consciousness is intimately linked to chemical processes in the brain that have already been explained scientifically. However, Lemonick asks:

> Excerpt 5.3: Lemonick (In Search of the Mind)
>
> 420 Does this mean that science is on the verge of understanding
> 421 consciousness? Not necessarily. San Diego's Churchland compares
> 422 the search for answers to a canoe trip into the wilderness. Every
> 423 time the canoe rounds a bend in the river, the landscape changes.
> 424 She believes the journey has barely begun and that there are bound
> 425 to be surprises in store. Certainly, science has finally started to
> 426 shed light on a puzzle that is not just abstract and philosophical,
> 427 but intimately familiar to anyone who gives it a moment's thought.
> 428 But as physicist Penrose has suggested, the notion that the human
> 429 mind can ever fully comprehend the human mind could well be
> 430 folly. It may be that scientists will eventually have to acknowledge
> 431 the existence of something beyond their ken-something that might
> 432 be described as the soul.

The overall construction of science in this excerpt humbles science and recognizes its room to grow. The researchers themselves (Churchland, a professor and philosopher of science and Penrose, a physicist) support this claim by blatantly indicating in lines

420–421 that science has yet to master the workings of consciousness and that this may be beyond the grasp of science (lines 428–430). However, the metaphor that compares scientific inquiry to a canoe trip in the lines in between (lines 420–425) gives science purpose. Much like voyaging down a winding river, surprise findings in scientific exploration are likely. This sense of discovering the unknown and charting new territory beyond the horizon gives science a reason to pursue its efforts. In the case of consciousness, it is even more relevant since "certainly," as line 6 indicates, "science has finally started to shed light on a puzzle" that is not only abstract and intangible, but one that is familiar to everyone.

Science is not always framed positively, though. In some TIME articles, it is discursively constructed as a necessary evil that must be embraced in order to maintain human progress. For example, in an article on love, Gray (The Chemistry of Love) claims that we need science in order to be understand and appreciate love. In the closing of the article, Gray elaborates on the value of scientifically knowing how love works. Gray warns:

Excerpt 5.4: Gray (The Chemistry of Love)

122 Among the things anthropologists — often knobby-kneed gents in
123 safari shorts — tended to do in the past was ask questions about
124 courtship and marriage rituals. This now seems a classic example,
125 as the old song has it, of looking for love in all the wrong places.
126 In many cultures, love and marriage do not go together. Weddings
127 can have all the romance of corporate mergers, signed and sealed
128 for family or territorial interests. This does not mean, [University
129 of Nevada anthropologist William] Jankowiak insists, that love
130 does not exist in such cultures; it erupts in clandestine forms, "a
131 phenomenon to be dealt with."

132 Somewhere about this point, the specter of determinism begins
133 once again to flap and cackle. If science is going to probe and prod
134 and then announce that we are all scientifically fated to love — and
135 to love preprogrammed types — by our genes and chemicals, then a
136 lot of people would just as soon not know. If there truly is a
137 biological predisposition to love, as more and more scientists are
138 coming to believe, what follows is a recognition of the amazing
139 diversity in the ways humans have chosen to express the feeling.
140 The cartoon images of cavemen bopping cavewomen over the head
141 and dragging them home by their hair? Love. Helen of Troy,
142 subjecting her adopted city to 10 years of ruinous siege? Love.
143 Romeo and Juliet? Ditto. Joe in Accounting making a fool of
144 himself around the water cooler over Susan in Sales? Love. Like
145 the universe, the more we learn about love, the more preposterous
146 and mysterious it is likely to appear.

While the claim in the excerpt is that love is mysterious, tricky, and even "preposterous" (line 146), it could also be argued that science is described as disciplinary — or even nagging — to our thinking. Lines 122–131 suggest that we have been misleading ourselves by looking for love in behaviors that we call love rather than in unexpected and "clandestine" (line 130) forms — in other words, "looking for love in the all the wrong places" (line 125). In the second paragraph science helps discipline our thinking. Much like a parent who scolds a child before touching a hot stove, science reminds us (indeed, "flaps and cackles," line 133) that we cannot think that way (lines 132–133). It offers a more reasonable alternative that will keep us from assigning love to behaviors and institutions such as "courtship and marriage rituals," (line 124) that, in reality, may have little to do with love at all. Science is described as — and more and more popularly accepted (lines 137–138) as — biologically preprogrammed even though it may be insight that we do not initially want to accept ("a lot people would just as soon not know," line 136). It serves us by revealing the "clandestine" places in which love resides. These include the "genes and chemicals" (line 135) and the various phenomena described in the closing call-and-response type of monologue (lines 140–144) that we would not normally consider forms of love.

Discourse practices in TIME that serve the textual function reinforce ideas that reside at the core of the cultural ideology of science. In order to be understood, a phenomenon must first be identified, observed or made measurable. This idea is realized by the practice of locating ineffable human experiences within the natural world. After being located, it must be determined if the phenomenon is worth the time and effort to investigate it. This is accomplished through the practice of validation, in which science validates the study of these experiences for their role in the survival and maintenance of life. At all times science should be understood as serving the human causes. This is shown by describing science in ways that serve human advancement. As a result of these practices, science sees human behavior as rooted in biological phenomena that are automatic and impersonal, rather than as complex organic experiences influenced by the social and cultural contexts of their expression.

Discussion: The Hegemonic Nature of the Ideology of Science in TIME

As discussed in the literature review, hegemony is a form of consensual power in which the subordinate classes provide consent, though their true interests may not always be met, while the power of the elite is maintained and reinforced (Fairclough, 1995b). Ideology accomplishes the work of consent through messages that claim to meet the needs of the subordinate classes while still maintaining the interests of the elite at the expense of the subordinate. "Elite" and "subordinate" in this regard are constructed socially (Fairclough 1995a) and are found in the relationships among people

of unequal institutional power (e.g., teachers/pupil, doctors/patients, employers, and managers/workers). Echoing Gramsci, Fairclough (1995b) contends that consent from subordinates is ensured since the elite serve in an ethical capacity to provide the social and economic norms that raise the standards of life in a way that meets their own needs and the basic needs of the subordinate classes. However, the subordinate class may not be fully aware that their interests are being undermined while their needs are being met. Fairclough (1995a) suggests that this can occur through the ways in which ideology naturalizes particular ways of seeing reality that can be detrimental over the long term.

Two questions need to be asked and answered in order to understand how this hegemonic process can be seen in TIME. The first is how TIME articles show that science meets the interests and needs of readers. How is science described as a natural way to meet whatever need we have? The second is how TIME articles, as a source of credible knowledge, reinforce the interests of those in power at the expense of the reader. How is science described in a way that reinforces larger social frameworks? In TIME, language is used in ways that value definitiveness and practicality with regard to human life. In locating human experiences in nature, validating their worth as subjects of study and claiming to serve human progress, science appropriates the ineffable, gives us a tool for making it effible (Pearce & Branham, 1978), and helps us understand ourselves and our needs. But it ultimately reinforces its own power to construct and define the natural world. Science becomes the dominant way of knowing and understanding reality.

Science in TIME: Meeting the Needs and Interests of the Reader

Maslow (1943) first posited that people possess different types of needs that must be satisfied in order to fulfill their potential as humans. Maslow organized these needs into a hierarchy and showed how people progress through different levels, from physiological needs to self-actualization, as their individual and socio-cultural circumstances change. Often, a person will consider their needs in order to determine the value of information they receive, from others and from media, in their daily lives. Maslow (1943) argues that one of the implicit roles of culture is to reduce the frequency of lower order needs and encourage the positive satiation of higher order needs. Maslow further suggests that the social implications of gratifying the higher order needs are great. This is due to the fact that people who achieve the higher levels tend to possess more sophisticated personal and interpersonal traits including loyalty, friendliness, and civic consciousness which ultimately leads them to become "better parents, husbands, teachers, public servants, etc" (Maslow, 1948, p. 435).

In TIME science meets human needs by describing what those needs are, offering ways to address them, and making them manageable. For example, in Wallis' (see Excerpt 5.2) article on spirituality (Faith and Healing), people beset with chronic illness have a need to be cured. Science, through technology, identifies problems such as blood pressure, cardiovascular disease, cancer, and AIDS (lines 24–26) that would otherwise silently lead to death. Scientific studies tell us that these illnesses are linked to lifestyle (lines 26–33). Scientific methods, like statistics, tell us that many people are looking to methods other than traditional medicine and that people are spending large sums of money for information on alternative therapies (lines 34–41). Scientific research shows that prayer and spiritual approaches can help us manage chronic illness and give us approval for their use (lines 42–49). We come to appreciate science for these achievements and the insight it provides in order to understand how we can maintain our health. Further, in Lemonick's (see Excerpt 5.3) article on consciousness (In Search of the Mind) science confirms our need to address practical problems regarding how we view ourselves and our world and addresses nagging abstract questions about the nature of consciousness that have haunted us for millennia. Stating that science "has finally started to shed light on [this] puzzle" (line 6) suggests that science is an invaluable tool that can be wielded in ways that answer many types of questions.

These examples illustrate how science makes human needs manageable and solvable. This is important because, in doing do, we are behaving in a healthy way. Readers want to know if prayer can help their backache. They want to know if the random thoughts they have about life are supposed to have meaning. They want to know if love is real. Thus, it is in the reader's interest to use the information provided in TIME in order to address their own needs.

Science in TIME: Meeting the Interests of the Elite at the Expense of the Reader
However, if we consider the language practices of TIME critically, the interests of the elite are also reinforced at the expense of the reader. The social elite serve an important function in society. As described earlier, they have an ethical responsibility for providing guidelines that help sustain themselves and the subordinate classes. Examples from medicine include the professional and political organizations that guide medical policy (e.g., American Medical Association, National Institutes of Health, etc.), formal institutions that contribute knowledge to our understanding of medicine (e.g., research universities, non-profits research organizations, etc.), and the individuals/groups who use this information to address the needs of people (e.g., doctors, medical experts, science journalism, etc.). In regard to human needs, science and capitalism inform the social practices of these elite. The ideology of science meets the needs of these elite economically by guiding the consumption practices of the subordinate classes with regard to health. However, because the ideology strongly values practicality and usefulness, this ideology undermines the potential that all humans — and especially the subordinate class — possess to understand their condition, transform the conditions of their reality and nurture their long-term vitality.

Maslow (1964) explains that in valuing the rational, mechanistic, and material world, the true potential for achieving the higher order needs is thwarted. Maslow states that in "concretizing all of the symbols, words, and processes" we lose sight of the original meaning and sacred purpose of science (p. 16). Early thinkers and scientific explorers were obviously concerned with practical needs and interested in improving their lot. But, in tension with that was a need to be thrilled, dazzled, and challenged to explore the fringes of human life and the universe. The modern ideology of science restricts the latter by making definite the ways in which we see ourselves and the universe. Maslow (1964) believes that when we become culturally obsessed with strict methods and procedures for exploring ourselves and the world, we are caught in a catch-22 in which we depend on experience in order to achieve new experiences. To rely on experience is to rely on the ways in which we construct that experience. If humans never give themselves opportunities to construct new ways of knowing, then new experiences will never materialize.

For readers of TIME, this view undermines their practical and humanistic interests. On a practical level, by privileging science for the ways in which it helps us understand and explain humans and their environment, we strengthen our dependence on science for explaining all related human phenomena. In TIME science has become the normal and acceptable way to address all levels of human need on Maslow's (1943) hierarchy. Audiences would consider it logical and relevant to apply science to lower level needs. The lower needs — physiological needs, such as health and sleep, as well as the safety needs such as anxiety and addiction — can be explained and attended to through biological and chemical means. However, this perspective undermines the potential for readers to understand the richness of humanity by limiting the ways that it aggregates the potential causes of these behaviors. This leaves audience members to perceive themselves as passive to these mechanisms and minimizes their personal responsibility for the outcomes. Readers are left to conceive of themselves materially, with the only clearly described solutions linked inextricably to biological function, such as pharmaceuticals, psychological therapies, and other advanced technologies that manage biological response.

Unfortunately, these solutions do not serve the population in an entirely democratic way. The notion of depending on science and technology — an industry riddled with economic and access-related gaps — to ensure one's health removes power from the subordinate classes and shifts it to the elite who manage the industrial, academic, and political institutions that control how science and technology are used, critiqued, and reported. Furthermore, it is reasonable to ask if science is really necessary in these cases. What happened to counting sheep in order to sleep or meditating in order to reduce anxiety? What happened to community and family support? With regard to the ideology of science, these approaches are not natural. These "non-scientific" strategies do not leverage the biology of man. They may be seen as coping mechanisms rather than answers. They require individual effort, responsibility, focus, and direction. They are often social and cultural, but hardly considered scientific. From a critical

perspective, these alternatives assume that the power of health belongs to individuals who may choose to radically change their lives, change their consumption patterns, and change their perspectives in ways that reject the norm. This is not in the interest of the elite since rejecting the norm and establishing new patterns may threaten their social power. The ideology of science quells the instinct to take control of the conditions that define the norm before it can even be established. The overarching message is to "take a pill," "get therapy" or "get this procedure" to fix one's individual problems in a way that maintains the status quo. As a result, the subordinate class provides consent rather than considering why the social and cultural conditions — and possibly even the ethical solutions proposed by the elite — are creating these problems for them.

On a more humanistic level, potentially negatively impacting long-term human vitality, the ideology of science addresses needs located high on Maslow's (1943) hierarchy. TIME's coverage of love, consciousness, and spirituality are examples with particularly troubling implications. In naturalizing these phenomena, science undermines the potential for these experiences to be understood in ways that can expand what it means to be human. For example, though inherently interpersonal and social, TIME sees love selfishly. It is an extension of sex that is expressed to maintain the individual's and the species' survival. Selfless forms of love are ignored. Compassion, patience, virtue, ethic are all acts of love that could serve the practical needs of people in these turbulent, modern times. Yet, the ideology of science as communicated in TIME leaves little room for their consideration. Further, consciousness filters and defines all that is human existence, though TIME sees it as effervescent, illusory, impermanent, a flicker of the mind. All of the meaningful experiences that it offers humans are meaningless. As a result, we devalue what we cannot make concrete, rather than devaluing what makes us hard, inflexible, and intolerant. Even spirituality is seen as a mind trick. We need it to fool ourselves into believing that we can survive when we feel like we cannot. Science delivers the news whether we like it or not so that we can eventually manage the abstract in a concrete world. Rather than looking for a higher power (within or outside of ourselves) and stepping closer to the darkness of the unknown, we claim science as a supreme power for the flood of light that we bask under everyday. The ideology of science is imposing. It defines us and reinforces its own power to define the universe. We have come to need it for salvation more than it needs us for perspective.

Conclusion

Discourse practices in TIME that serve the textual function of language reinforce the power of the ideology of science by locating human experiences, validating their study and serving human progress. As a result of these practices, however, the human being loses its status as a concept with innate humanistic meaning and value. Locating human phenomena allows science to transform the richness of irrational and abstract human experiences into by-products of chemical and evolutionary forces that are ul-

timately self-serving in their purpose to ensure survival. Validating the ineffable in human nature gives science the authority to make abstract experiences more palatable and manageable. In serving human progress, science is seen as the penultimate way of achieving progress that invariably focuses on the practical and measurable rather than on the meaningful. In the modern world, science is the preeminent way of knowing and its ideology does not allow for alternative frameworks. It is valued by the subordinate classes for the ways that it comfortably addresses immediate needs. It is valued by the elite for the economic power it offers and the ways in which it can help address their ethical responsibilities to the subordinate classes. As a result, science becomes sacred. Unfortunately science undermines the practical and humanistic potential that humans posses. Maslow (1943) suggests that we may think we are progressing, when in reality we are "sharpening tools rather than discovering truths" (p. 26). In effect, the discursive practices linked to science undermine the richness of the experience of human life and communicate the message that we need science in order to maintain our individual and mass existence rather than exploring how it can give meaning and purpose to our lives. By emphasizing the role that these uniquely human experiences have in ensuring survival, TIME deemphasizes any intrinsic human value they may offer. The implication is that humans may seem to evolve socially and economically at the sake of evolving humanistically.

V. Conclusion: Insights, Limitations, and Closing Thoughts

> "Descartes was profoundly wrong, it appears, in his assertion that mind and body are wholly independent ... Consciousness may be nothing more than an evanescent by-product of more mundane, wholly physical processes."
>
> — Lemonick (In Search of the Mind); ¶10

The main purpose of this thesis was to identify how communication reinforces the dominant ideology in mass media. Specifically, I asked how language-use reinforces the ideology of science in TIME magazine in a way that influences how readers understand themselves and their reality. A critical discourse analysis of cover stories related to evolution and human needs revealed specific language-use practices that shape humans as containers of the various biological or chemical mechanisms and appropriate usually non-scientific aspects of the human experience for scientific study. In locating human nature within the body, validating its research worth, and serving progress, science transforms from a useful research tool into a cultural ideology with the power to link human life to economic and practical social progress. In other words, I argue that TIME's reports on science and human activities invite readers to embrace science as a means to cope with the difficulties they face in the modern world, even though that embrace reinforces the power of an elite class with a vested interest in scientific advancement.

This chapter first provides a brief overview of the findings. Second, it considers the insights and limitations of the discourse analytic approach. Finally, it offers suggestions for future research and considers the role that further investigation may play in discovering alternative ways to think and write about science and human needs that may lead to richer and more meaningful examinations of the human condition.

The roots of modern science can be traced back almost 500 years to the Scientific Revolution of Western Europe. Science's cultural value has been shaped by major events such as the Reformation and the emergence of capitalism, as well by major discoveries of the Enlightenment such the scientific method and the development of the printing press. The role of the press is critical. People who do not pursue science in higher education largely learn about scientific advancement through the media, which is necessarily conveyed through discourse practices.

Jacques Ellul (1990) offers a useful framework for understanding the modern media's role in this dynamic with the theory of the ideology of science. Suggesting that science

has now adopted the role of savior, the theory posits that, through the media, modern society has come to see science as the primary facilitator of prosperity and development. Although Ellul's model does not make a hegemonic argument about the ideology of science, evidence of hegemony can be found in media messages. Specifically, messages related to the value of science and its role in the human experience are based on a materialist understanding of human nature and facilitated the advancement of scientific theories of evolution.

CDA (Fairclough, 1995a, 1995b, 2001) is a discourse analytic method that focuses on language-use and helps reveal how this dominant ideology is reinforced in TIME magazine. This method sees language as simultaneously serving three functions in media texts. The first, the ideational function, addresses the construction of ideas, and how reality is represented. The second, the interpersonal function, addresses the relationship between participants in the discourse. The third, the textual function, sees the ways in which parts of a text work together to make a coherent whole and link the text to a broader context. CDA's strength lies in its focus on language-use that mediates the relationships among media, audiences, and culture. Though images, diagrams, maps, and charts have proven to be influential in the ways that readers make sense of information (Lester, 1998), it is primarily through language that popular reports on scientific topics are conveyed.

This analysis revealed that specific language-use practices in TIME provide evidence for a dominant ideology of science that favors a materialist approach to understanding the human being. The ideational function of language values classifying the human being as any other living being within a biological taxonomy, reframing everyday life from a context-dependent to context-free experience and containing the human being in deterministic ways so that the boundaries of the human are seen in terms of the biological and chemical functions of the body defined by evolutionary forces. Practices that serve the interpersonal function were shown to claim authority over the validity of scientific claims and establish rapport with the reader. Language-use that serves a textual function takes advantage and incorporates ideational and interpersonal functions. They were shown to describe science as locating the ineffable and placing it in the body, validating the study of the intangible, and as a service to the progress of humankind. These practices naturalize science in our cultural consciousness as the means for defining who we are and what our potential is. However, it has been the assumption in this study that the ideology that these practices reinforce is problematic. Descriptions of science using these practices certainly help in understanding the physical intricacies of human behavior. But they also narrow understanding of our own needs and constrain the ways in which we as a culture see and comprehend new indescribable, personal experiences. This confines the audience's conception of their own humanity. Further, these practices reinforce the economic and social power of the elite with a vested interest in the promise of technology.

Of specific note is the persuasive power of language in lieu of evidence or sources. The language practices described in this study show that language invites people to

participate in their own oppression. This insight is not only of value in studying the cultural power of science, but also in other contexts where ideology may play a significant role in establishing claims and making arguments (e.g., the political decision to go to war, the popularity of politically conservative media, etc.).

Since the aim of CDA is to describe language-use practices for the purpose of uncovering power structures, it is useful in the study of the ideology of science. CDA allows a close examination of text in a media context. In terms of interactional discourse between participants (i.e., "little d" discourse), CDA helps reveal how the ideology of science is grounded in language-use. However, it should be reiterated here that CDA is most frequently applied to actual interaction. Some conceptual work needed to be done to frame the reader and TIME magazine as participating in an interaction. In looking at how messages in TIME attend to human needs, the analysis showed that science is reported in characteristic ways that are managed by various lexical and grammatical elements. Identifying the nuances of these elements in practice allows the analyst to look for their presence in various contexts and in various forms.

In terms of the social discourse of science (i.e., "big D" Discourse), and in this study particularly, CDA helps reveal the hegemonic practices present in the reporting of scientific topics, particularly those that report on scientific solutions to the social and emotional problems that people face. CDA shows how science has become naturalized in modern society through language to the point that its power is often left un-checked. CDA helps show how this ideology is grounded in language-use patterns that can help better explain how hegemony is maintained.

CDA, however, is not without limitations. The nature of this method necessarily limits the amount of context that can and cannot be included in the analysis. CDA specifically focuses only on excerpts of text used for close examination at the expense of other text in the article. Further, text analysis in CDA leaves out close analysis of images, pictures, symbols, and charts that may also communicate messages. The language-use practices identified in this thesis were sought out as part of the purpose of the study and choices were made as to which excerpts would be isolated in order to describe those practices. In focusing specifically on excerpts as part of a single data set, capturing a range of authors can be limited. Without a meaningful variation in authors, a bias in the findings may arise in which the practices are less a reflection of hegemonic language-use and more a reflection of author writing styles. It should also be noted that, as a discourse analytic method, CDA does not aim to capture what readers think or believe about an article and it cannot account for what the source intends. However, to the extent that the language-use practices described in this study are used in other reports on science that explain and/or solve people's problems (e.g., physical, psychological, or spiritual), I do argue that media messages regarding the ideology of science are hegemonic.

Limitations naturally provide opportunities for future research. These practices could inform analysis of other media where the ideology of science is presumed to be maintained. This is not a recommendation to replicate this study, but studying

other news articles (e.g., TIME competitors) and newspapers that devote coverage to scientific content may offer alternative or additional practices serve that serve science. Useful insight could also be gleaned from a critical discourse analysis of editorials to scientific articles and editorial responses. A comparison of the ideologies reinforced in editorials versus those reflected in editorial responses could shed light on the hegemonic forces at work in the discourse of American mainstream print media. Also, this study focused on a relatively short period of time along Ellul's (1990) timeline of the ideology of science. It might be interesting to do similar analyses on epochs other than the one in this study or compare practices along one theme across time periods.

Studies of media content that include imagery and symbols could expand the bounds of CDA in a way that is inclusive of insights and approaches associated with traditional critical cultural studies. Studies that involve various types of imagery-rich media (e.g., television programs, educational software, and web sites) as well as other language-rich areas (e.g., museums, debates, and classroom lectures) could help serve this approach. One source of future research, and a potential answer to the hegemonic language-use practices of the ideology of science, could be popular literature that combines theories of science (specifically, physics) and the sensibilities of history and art to explain phenomena. Language-use practices in media written by scientists and non scientists that discuss the history of mathematics (Maor, 1998; Seife, 2000) and relationship between art and physics (Sefussati & Hamann, 2006) are potentially interesting areas.

Donne's lament in An Anatomy of the World may be even more relevant today than it was almost 400 years ago. Through the media and its influence on culture, science has become an almost unquestioned and unchallenged part of the fabric of western life. But at what expense? "The Sun is lost," writes Donne, "and no man's wit/Can redirect him where to look for it." While the methods of science have no doubt led to great advances in human life and civilization, it is important to consider the subtle ways in which it ideologically shapes our understanding of who we are and the meaning of modern life. Understanding the mechanisms of human nature may unlock the secrets of our lives, but we may need to probe beyond the atom to unlock the secrets of our souls.

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Appendix: TIME Magazine Cover Article Data Set 1990–2005

Date of Issue	Complete Cover Headline with SubHeadlines	Cover-Story Title(s) and Author(s)	Synopsis
12/17/90 *Too much to do too little rest*	The Sleep Gap: Drowsy America (Toufexis)	One article that reports on the effects of sleeplessness on behavior and physiological response of the body to sleep.	
1/20/92 *It is not just upbringing. New studies show they are born that way* Is Sex Really Necessary? (Nash)	Why are Men and Women Different? Sizing Up the Sexes (Gorman)		
Making Sense of la Difference (Ehrenreich)	Three articles that explain gender differences based on biological traits of the brain.		
12/28/92	What Does Science Tell Us About God?	Galileo and Other Faithful Scientists (Ostling)	One article that reports on how the major world religions have viewed science in the past and in modern times.
2/15/93	The Chemistry of Love: *Scientists are discovering that romance is a biological affair (Happy Valentines Day)*	The Right Chemistry (Toufexis) What is Love? (Gray)	Two articles that introduce evolutionary psychology and explain love as the result of processes involving naturally occurring chemicals in the body.
8/15/94 *It May be in Our Genes*	Infidelity: Our Cheating Hearts (Wright)	One article that explains how infidelity is rooted in the evolutionary psychology of natu-	

Date of Issue	Complete Cover Headline with SubHeadlines	Cover-Story Title(s) and Authors(s)	Synopsis
6/24/96 *Can spirituality promote health?*	Faith and Healing		
Doctors are finding some surprising evidence	Faith and Healing (Wallis)	One article that explains the chemical foundations of the relaxation response and its relationship to faith and health.	
5/5/97 How We Get Addicted *... and how we might get cured:* • *sex* • *drugs* • *drinking* • *smoking*	*Scientists are discovering the chemical secret to* Addicted: Why Do People Get Hooked? (Nash)	One article that introduces dopamine and its role in the process of addiction.	
3/8/99 *The latest research into the secrets of biology and evolution reveals that women are tougher, stronger, and lustier than anyone ever thought.*	The Truth About Women's Bodies: The Real Truth About the Female Body (Ehrenreich)	One article that explains the roles of testosterone and estrogen in female sexual behavior.	
9/13/99 *What Scientists Have Uncovered about* *Memory and How to Improve it*	The IQ Gene? Smart Genes? A New Study Sheds Light on How Memory Works (Lemonick)	One article that details the genetic and chemical foundations of memory.	
6/10/02 *Now more than*	Understanding Anxiety:		

Date of Issue	Complete Cover Headline with SubHeadlines Health	Cover-Story Title(s) and Authors(s)	Synopsis
• Is Happiness in Your Genes? • Women, Men, and Depression Your Mind, Your Body (Lemonick) Is there a Formula for Joy? (Corliss)	What's Sex Got to Do With It (Kluger)		
6/2/03	Are *you programmed from birth or does life change the program. A radical new look at…*		
What Makes You Special	What Makes You Who You Are (Ridley)		
Which is Stronger Nature or Nurture (Ridley)	One article that explains how genes turn on and off due to environmental changes and patterns of evolutionary psychology.		
7/28/03 *What new brain science reveals — and what parents can do*	Overcoming Dyslexia: The New Science of Dyslexia (Gorman)	One article that introduces dyslexia and reports on its prevalence in America. How technology such as functional magnetic resonance imaging has provided clues on proper therapies.	
1/19/04	How Your Love Life Keeps You Healthy		
• Sex and Your Brain • Couples Therapy That Can Save			

Date of Issue	Complete Cover Headline with SubHeadlines	Cover-Story Title(s) and Authors(s)	Synopsis
10/25/04 *Does our DNA compel us to seek a higher power? Believe it or not, some scientists say yes*	The God Gene: Is God in Our Genes? A Provocative Study Asks Whether Religion is a Product of Evolution (Kluger)	One article that reports on a series of research findings in evolutionary psychology regarding human spirituality.	
12/20/04 *Fresh clues to why we need it — and how much is enough*	The New Science of Sleep: Why We Sleep: You may think it's for your body, but it's really for your brain. The latest research is full of surprises (Gorman)	One article that explains how sleep restores the neural health of the brain.	
1/17/05 • Why optimists live longer • Is joy in our genes? • Does God want us to be happy? • Why we need to laugh	The Science of Happiness The New Science of Happiness: What makes the human heart sing? Researchers are taking a close look. What they've found may surprise you (Wallis)		
Dancing to Evolution's Tune (Wright)	Two articles that discuss the psychology of happiness and provide suggestions for increasing happiness.		
11/14/05 *A surprising look at what separates life 's go-getters from its also-rans.*	The Secrets of Ambition: Ambition: Why Some People are More Likely to Succeed (Kluger)	One article that explains the evolutionary psychology of ambition and	

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