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"Genetic Roulette: On the Cognitive Rhetoric of Biorisk"[1]

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0. Introduction

The study of discourse is not new. As a research enterprise, it no doubt began with rhetoric in the ancient world. In the present world it continues, for example, with critical discourse analysis in the social sciences and stylistics in the humanities. Oddly enough, despite the overlap of different disciplines in the study of discourse, cognitive linguists seem to contribute rarely to this burgeoning line of research. One reason for this may be that the sentence has often been taken as the traditional unit of analysis in linguistics. In that case, cognitive linguistics' roots in traditional linguistics may have eliminated larger units of analysis from consideration as the field began to develop. When analyzing much longer stretches of discourse, some might say, models designed for an analysis of one type of data cannot easily be adapted for an analysis of another type of data. However, it is precisely when such transpositions occur that new insights in general can be gained into the object of study. In this case then, bringing cognitive linguistics to bear on discourse studies may be fitting, especially when ideology is involved.

Connections between cognition and ideology can be found in many different ideological contexts. For example, the role of metaphor in press coverage of business mergers can be shown to reveal specific corporate ideologies (White and Herrera 2002). Likewise, the way certain social groups discursively resist domination can be understood in terms of image schema or metaphor negation (Perucha 2002). As regards that great modern laboratory experiment generally referred to as the "European Union," cognitive linguistic discoveries can shed light on the power of illness metaphors to depict or frame the Union's malfunctioning (Musolff 2002). In a similar manner, the impact of culturally-specific ideologies on the Union's attempt to create a pan-European sense of identity can also be clarified thanks to cognitive linguistics (Wodak and Weiss 2002). Indeed, because of the emphasis on natural language and natural language processing in cognitive linguistics, other aspects of cognitive linguistics should be quite useful to the study of ideological discourse.[2] Specifically, if we take conceptual integration or conceptual metaphor models from cognitive linguistics and apply them to the study of ideological discourse, we may arrive at a richer understanding of the connections between cognition and ideology. In this manner, as we shall see below in my analysis of recent debates over genetically modified food, an approach that weds discourse analysis to cognitive linguistics can prove to be effective.

1. On Classical and Cognitive Rhetoric

The study of discourse has its roots in classical rhetoric. Aristotle defined rhetoric as "the faculty of observing in any given case the available means of persuasion" (*Rhetoric* 1355b). While studying this art of persuasion is at least 2500 years old, as a mental faculty for our species it is no doubt older than that. Even so, rhetoric's fundamentals are as useful now to students of discourse as they were in classical times. The classical rhetoric curriculum was rather straightforward, with the result that rhetoric is relatively easy to explain today. Indeed, its main elements can be enumerated in just a few sentences. First, there are three elements in any given rhetorical situation: someone (a speaker) having something to say (subject matter) to someone else (an audience). Second, there are three functions to rhetoric: to instruct, to please, and to move. That is, rhetoric can be didactic, aesthetic, and persuasive. Third, there are three types of rhetoric: forensic (e.g., judicial), deliberative (e.g., political), and epideictic (e.g., literary). Fourth, three ways to bolster an argument are to make appeals or proofs based on ethos (character), pathos (emotion), or logos (reason). Fifth, there are five steps involved with constructing an argument: inventing what to say, arranging how to say it, choosing a style that fits the audience, memorizing what is to be said, and delivering the argument to the audience. Sixth, there are five positions or *stases* for categorizing arguments: fact/definition; cause/origin; evaluation; jurisdiction; and action. These stases may be formulated as answering a series of questions: What is the problem under review? What is its cause? Why does it need solving? Who can solve it? What is the best solution to the problem?

By Aristotle's time, the Greeks knew that rhetoric could be taught and that it was particularly useful to those bound to enter the civic sphere. The Romans went one step further by taking the Greek curriculum and systematizing it. Classical rhetoric, as we understand it today, was founded by the Greeks, reshaped by the Romans, and treated as a serious pedagogical matter for centuries. Whereas Aristotle in Greece identified the three appeals, Hermagoras of Temnos during the Roman era laid out the stasis framework because it was believed that a complete argument should move through all stases. Arguments that do not, by heading straight for the action stasis for example, presuppose that the previous four stases have been agreed to and that initial premises have been settled. In general, an argument that moves through all stases should solve problems in an effective manner. Students who study rhetoric can learn this so as to build better arguments for themselves and critique arguments from others. In this light, it is not hard to see why rhetoric has become pedagogically important again in English departments.

Persuasion is still rhetoric's main object of study, but a cognitive twist has been added by viewing communication itself as rhetorical. This cognitive turn came first in pragmatics, when Dan Sperber coined the term "cognitive rhetoric" in a 1975 article titled "Rudiments de rhétorique cognitive." Interpersonal communication certainly takes place, but the question is examining who does what, why, and how. This is what Sperber has spent years successfully describing although here he argues that, taken rhetorically, communication itself is a form of cognition. First, Sperber defines cognitive rhetoric by distinguishing rhetoric from linguistics, suggesting that linguistics studies sentences whereas rhetoric studies utterances (389). Second, he distinguishes "les rhétoriques taxonomiques" one finds in handbooks from his own "rhétorique cognitive" based, as it is, on identifying interpretive principles (415). In essence, Sperber's article concentrates

on the problem that inspired his later work on relevance: how, given minimal input like a single utterance, do we reach maximum semantic output? Here he proposes that "le couplage rhétorique de la représentation phonétique à la représentation conceptuelle est déterminé par un dispositif cognitif complexe, en fonction d'inputs nombreux et variables: la personne des interlocuteurs, leur situation, les signaux extra-linguistique, les énoncés antérieurs" (389).[3] Put another way, context counts, since what goes unsaid matters just as much as what is said. This is because what we communicate does not rely solely on being uttered. Sperber explains why this is so by distinguishing (a) utterances from (b) their interpretations and from (c) what is implied ("sous-entendu") in those interpretations. Thus, Sperber sees communicating at the very least as a three-step rhetorical process: utterance, interpretation, implicature.

Aside from Sperber's nine conditions of utterance interpretation that cannot be fully elaborated here, his two fundamental insights are that shared knowledge ("le savoir partagé") plays just as crucial a role in communication as do conceptual representations of discourse, figures, texts, etc. Sperber's argument, perhaps with structuralist literary critics of the time, yokes together that which belongs to a mind and that which belongs to a text. Suffice it to say that by introducing the conceptual system into the discussion, Sperber situates everything within the mind and turns language, figures, and texts into objects dependent on the mind. As he puts it, "la figure n'est pas dans le texte […] Elle est dans la représentation conceptuelle du texte" (415). Contrary to Derrida's infamous claim that nothing is outside the text, Sperber suggests that there is only mind, not text. For this reason Sperber concludes that cognitive rhetoric offers the best way of clarifying matters pertaining to language. Therefore, his notion of a complex cognitive device, which turns interpretation into a thoroughly extra-linguistic pragmatic exercise, is deeply embedded in the conceptual system. Sperber's conclusion: the conceptual system makes rhetoric, which is to say, communication possible.

In literary criticism, this conclusion would become Mark Turner's hypothesis some fifteen years later in *Reading Minds: The Study of English in the Age of Cognitive Science* (1991). For Turner, unaware of Sperber's earlier work in this area, cognitive rhetoric in literary criticism means "the analysis of acts of language, including literature, as acts of a human brain in a human body in a human environment which that brain must make intelligible if it is survive" (viii). While couched in Darwinian language, Turner's goal is to make rhetorical research more precise by yoking to it insights from cognitive science. In other words, Turner wishes to reconsider "the nature of certain conceptual connections and the way those connections are disclosed in language" so as to launch "an enterprise that might be referred to as 'cognitive rhetoric'" (148). By situating language squarely in the brain, Turner grounds linguistics in neurobiology. Then he turns to language as a means for studying the mind based on an analysis of "conceptual connections." As Turner puts it near the end of his book, "The imagination must move in a known space; these are the conditions upon its intelligibility. The attempt to ground literary criticism in cognitive rhetoric is no other than the attempt to map that space in which the imagination moves so that we can understand the performance of imagination within it" (246-247). Methodologically speaking, this means that to study language and to study literature is to study the mind. To study the mind through figurative language (i.e., conceptual connections) is to make major inroads toward a literary critic's ultimate goal: the imagination.

These were Turner's views some ten years ago. Since then, his research program, like Sperber's, has evolved to attract a lot of attention. But whereas Sperber seemed to view rhetoric in action in even the simplest of utterances, Turner understood rhetoric in a more classical sense. And yet, the question remains, what is cognitive rhetoric? For my part, cognitive rhetoric is the study of how *conceptualization* bears upon *persuasion* both pragmatically and figuratively. Cognitive rhetoric is therefore the study of the cognitive mechanisms of persuasion. Those mechanisms involve figures of speech à la Turner and our conceptual representations of them à la Sperber.[4] Now, how we make sense of utterances and how we analogize across domains are central research topics in cognitive rhetoric. That these two topics are deeply related, when persuasion is involved, means that focusing on one leads to clarifying the other. In this sense, for example, by analyzing how analogies and metaphors are used for persuasive purposes, we can study how it is that rhetoric provokes or persuades as effectively and as efficiently as it does. To make such an exercise concrete, in what follows I closely examine the recent debate over genetically modified (GM) food to see where and how cognitive rhetoric functions. Such an analysis first involves a discussion about language and ideology in section 2, followed by analyses of written and spoken GM discourse in the next two sections. Finally, in section 5, my discussion situates this cognitive rhetoric within the larger context of what the German sociologist Ullrich Beck (1992) has called *Risikogesellschaft*: the risk society.

2. GM Food: Language and Ideology

While only a recent problem in the United States, GM food has been a major concern in Europe for several years now. The number of stakeholders involved no doubt complicates the controversy. The more stakeholders there are, the more difficult a problem is to solve. At the very least, GM food implicates the following stakeholders: government regulators, farmers, corporate seed producers, consumers, consumer protection groups, and food processors and/or distributors. At each step, different parties voice different concerns and they frame those concerns conceptually and ideologically. Ideologies, according to rhetoricians Sharon Crowley and Deborah Hawhee, "are bodies of beliefs, doctrines, familiar ways of thinking that are characteristic of a group or a culture. They can be economic, ethical, political, philosophical, or religious" (76). Because these ideologies come into conflict in the GM food debate, it would seem tailor made for examining the conceptual frames that make manifest these ideologies. For instance, economically speaking, the European Commission argues that if biotechnology is chased out of Europe, more jobs and brains will move to North America (EU 8-10). Likewise, the biotechnology industry argues that keeping food cheap and feeding more people means increasing yields via GM crops. Environmental groups challenge this ethical ideology. They argue that it is unethical to destroy nature for the sake of profit and that world hunger is caused by too little money, not too little food. Religious ideology (e.g., "playing God") also appears so as to challenge the right of science to modify life when it apparently has no right to. Finally, politically speaking, ideology shapes competing points of view that seek to persuade governments to approve or ban GM food.

As these ideas suggest, the GM debate is saturated with ideology, but "rhetoric" and "ideology" have negative connotations in our culture. They are words that dare not

be used in so-called serious scientific debates. As the narrator from the television documentary I analyze below put it, "How much science was there behind the rhetoric?" in the GM food debate (18). However, science and rhetoric are not worlds apart. This is because science holds sway now as a credible explanatory tool for many things in our world. For instance, in the "Genetic Roulette" ad I analyze below, many have found that GM foods may raise toxicity (FDA), increase allergy risks (FDA, *New England Journal of Medicine*), reduce antibiotic resistance (British Medical Association), and increase cancer and immuno-suppression risks ("European scientists" and "twenty two leading scientists"). These claims are simultaneous appeals to ethos and logos since the authorities referred to are respectable in character. They are respectable in character because they are scientific in nature. For this reason, given the rhetoric of science, the research findings of the scientists ought to be believed. The question is, however, believed by whom?

The answer explains why the GM debate has gone public. To increase political pressure on regulators, stakeholders marshal public opinion through the press. They take the debate into the public arena, verbalize their ideologies, and cite the scientists who bolster their arguments in order to weaken those of others. This may no doubt oversimplify matters but this brief overview does reveal the heart of the debate. For certain, ideology exists in the GM food debate, with as many ideologies as stakeholders. However, it is striking that similar linguistic forms (i.e., similar conceptualizations) are used by rival ideologies. As the evidence I examine below demonstrates, similar figurative concepts are at work for all sides concerned. Perhaps this is to be expected, given the basic universal nature of cognitive processes like analogy, categorization, conceptual integration, and metaphor. On the other hand, friction occurs where the products of these cognitive processes clash. Such clashes can be found in written and spoken discourse. For an analysis of written discourse, I turn to some print ads from *The New York Times* in 1999 run by the Turning Point Project in Washington DC. For an analysis of spoken discourse, I turn to a more recent television documentary, "Harvest of Fear." In keeping with chronology, my discussion begins with the print ads before moving on to the television documentary.

3. Genetic Roulette, or the USA is the Iraq of Food Policy

The Turning Point Project is a non-governmental organization based in Washington DC that groups together nearly 60 organizations with environmental and technological concerns. It apparently does so for the purpose of gathering resources for major advertizing campaigns. Some of its members include Greenpeace USA, Friends of the Earth, the Sierra Club, the Foundation on Economic Trends, the Humane Society, and many others. Between 11 October and 15 November 1999, the Turning Point Project (TPP) ran a series of five ads on genetic engineering in section 'A' of *The New York Times*. The ads were well-written, sophisticated, and long. As rhetoricians say, the ads demanded attention by establishing exigence, seizing the moment (i.e., *kairos*), and drawing readers in with provocative titles, images, and themes.[5] The name of the Turning Point Project refers both literally to the turn of the century and to the crossroads we find ourselves at in terms of technological development in a capitalistic society. Our history and our lives, or so it seems, are journeys. The signposts on the road, however, involve many dichotomies as far as the TPP is concerned. Those dichotomies, as seen in the ads,

are as follows: adults / infants; people / companies; people / government; natural / artificial; safe / dangerous; known / unknown; sanity / insanity; native / foreign. These binary oppositions are shorthand for a wide range of fears, concerns, and questions that people have over GM food. They are also categories used for conceptually framing the debate and taking a position.

The first ad in TPP's genetic engineering series is titled "Who plays God in the 21st century?" The ad creates exigence by its shocking image of a human ear growing on the back of a mouse, and by its rhetorical question in the headline. Rhetorical questions, which are answered silently but not openly, are "an excellent device for involving readers in a dialogue" (Fahnestock and Secor 343). This suggests that TPP have selected their audience carefully and wisely. Starting a dialogue of sorts with readers of *The New York Times* is a good idea because of the political clout concentrated in New York City and because it is a respected newspaper that many other media outlets read daily for information. As we read the ad, we are told that an "infant biotechnology industry" "reshape[s] life on Earth to suit its balance sheets." This personification metaphor infantilizes the biotech industry, suggests that it is immature, and implies that profit is the industry's only motive. Later another rhetorical question is posed that keeps readers engaged: "Have we lost our sanity?" The preferred answer is that we are not insane but that biotech companies are. This occurs again later in the ad when we read of the effects of genetic engineering: "Nobody can be sure of the long term outcome. There have been few long-term tests. Shouldn't a sane government require those?" Here once again *we* are sane but *others* (this time the government) are not, a dichotomy that Wodak and Weiss would call a "fundamental dualism" (2002: 8). Since reason and sanity are preferable to their opposites, the value assigned to those who let genetic engineering occur is clearly negative. Likewise, the following simile also picks its negative terms carefully: "Biotech companies are blithely removing components of human beings (and other creatures) and treating us all like auto parts at a swap meet." Were our body parts called precious gems (e.g., diamonds) rather than cheap "auto parts," the simile would not have the same rhetorical effect. However, by downgrading body parts to the status of auto parts, the negative effect is achieved.

In this manner, value is conveyed linguistically, which makes manifest an ideology fighting against the cheapening of life. This thought reappears in the first ad in several forms. In reference to the 5-4 ruling in favor of Chakrabarty in the US Supreme Court in 1980, we read that "On that single vote, natural evolution gave way to corporate evolution." The vote in question allowed genes to be patented as intellectual property, but the repetition of the word "evolution" as modified by two contrary adjectives ("natural" and "corporate") clearly implies which form of evolution is the preferred form. Also, since farmers cannot keep seeds from year to year but must now buy new GM seeds every year for planting, the industry engages in "biopiracy." Farmers in India have protested the commodification and the patenting of seeds, and the categorical extension of "piracy" by the addition of the prefix "bio" creates a novel word for a novel situation (in much the same way the word "bioterrorism" has more recently). The implications are that piracy is bad, nature is being stolen from farmers, and that biotech companies are pirates. Personification returns when we read that GMOs, "these often weird life forms," are "alive" and "don't want to go back to their test tubes." Here the products are rebels, escaping the scientist's control, and they have dangerous minds of their own. Finally,

analogies are used to argue that just as past species from overseas have pushed native species out, so too will GM crops or GMOs: "Like the Gypsy Moth, Dutch Elm disease, and Kudzu vine, 'exotic organisms' can run amok, and cause unparalleled environmental destruction." What we have here are specific examples of a general phenomenon, with the word "amok" signifying an irresponsible lack of control. As TPP would have it, chaos is bad but order is good so the biotech industry should grow up and see the errors of its ways. If not, it will continue to "play God" in the play that is life on the stage that is earth.

The second ad in the series is titled "Unlabeled, untested…and you're eating it." In the second paragraph we read: "The Food and Drug Administration (FDA) and the biotechnology industry have prevented the labeling of GE [genetically engineered] foods, effectively subverting your right to know! *And so, every day, millions of American infants, children, and adults eat genetically engineered foods without their knowledge*." Similarly, in the penultimate paragraph we read, "*Don't let your children continue to be guinea pigs in this experiment*." In classical rhetoric, these statements are known as appeals based on pathos. Our normal emotions about infants and children are so strong that we shall always want to do something to save our children and our "children's children" (a favorite phrase of American politicians) from something terrible. Their vulnerability, innocence, and helplessness in the face of the world are valid reasons for protecting them. Likewise, ignorance is bad but knowledge is good. Labeling GM foods so that people know they are eating them is assumed to be better than the status quo of not labeling them. As for the complex processes of producing and regulating food, here the FDA and the biotech industry are reduced to simple actors preventing labeling from happening. What does this imply? Acting to prevent something bad from occurring, rather than simply letting the status quo hold, is dishonorable behavior. This is true a bit later when we read, "*Are these unlabelled foods dangerous*? Nobody knows. The FDA refuses to require any safety testing of genetically engineered foods." As has been shown with "forbid" and "allow" in Dutch public opinion surveys (Holleman), to "refuse to require" has stronger force dynamics than "does not require." As an agent refusing to do something that would seem to make sense, then, this picture puts the onus on the FDA. It ought to act rationally although it does not seem to be doing so here when painted in these terms by TPP. This becomes much more explicit when, later in the ad, we read, "Despite all these concerns and many more, *the government has decided it doesn't want you to know what's in the food you're eating*."

By portraying a US government agency as an actor acting against its citizens and keeping them in the dark, something seems to be terribly wrong with this picture. This feeds on common fears that the government, which may prefer lying to truth telling, is dishonest. Indeed, this is TPP's position. They claim that "By its policy of 'no labeling' of GE foods, the U.S. has become a rogue nation." The USA often calls countries like Iraq a "rogue nation," but here the USA becomes the Iraq of GM food policy by bucking the civilized trend on labeling. Finally, the last concepts marshaled for persuasion here are our human, animal, and plant categories. We read in the ad that vegetarians could eat vegetables with animal genes in them, that Muslims and Jews could eat foods with pig genes in them, and that humans could eat plants or animals containing human genes. In this final case, TPP asks, "Can we call this cannibalism?"

At this point there is a clear connection between language and ideology. I would even argue that ideas such as those evoked by the ads produce fear and anxiety for readers. The ads do so because *they put enormous conceptual pressure on our categories and on our cognitive capacity for categorization*. As Professor Charles Arntzen of Cornell University said,

> You can almost see their nose wrinkling up because there's something about a fishy smell to a strawberry. And it's a mental image. It's more than anything else just, 'Oh, I wouldn't like that.' It has nothing to do with the science, I believe. It's just the way we're wired in our brain. A fish is supposed to smell like a fish and a strawberry like a strawberry, and just superimposing words on each other gives us – we back off. We don't like that ("Harvest of Fear" 12).

By referring to a "mental image" and "the way we're wired in our brain," Arntzen may be right without knowing it when it comes to our conceptualization capacities. The very problem many people have with GM food is that it demands categorical extensions that we are not ready to make. This is the cognitive crux of the matter. Only by changing our categories can the "pressure" be relieved. However, that is hardly easy when it comes to GM food because prototype shifts when it comes to categories such as "corn" do not occur immediately.

The third and perhaps most interesting ad in the series is titled "Genetic Roulette." The image on this ad is that of a Monarch butterfly, a well-known butterfly that migrates between Mexico and North America every year. The caption under the image refers to a research team from Cornell University who discovered that milkweed pollinated by corn modified with *Bacillus thuringiensis* (i.e., Bt corn) was unusually fatal for Monarchs. The ethos of the Ivy League institution is important to the opening argument. The audience concludes that the research cited must be true since the researchers are not rogue scientists at an unknown college but a team at a major American university. If TPP had mentioned that the findings appeared in the 20 May 1999 issue of *Nature*, by Professor John Losey et al, even more ethos would have been gained for the ad because of that journal's own ethos. Now, as readers begin to read the ad, figurative concepts come into play immediately. For example, "genetic roulette" is a metaphor constructed by conceptual integration (Fauconnier and Turner 1995, 1998, 1999, 2002).

The genetic roulette metaphor assigns negative values to genetic engineering. What does it imply? First, biotech scientists are gamblers. Second, genetic engineering is gambling. Third, the stakes are genes rather than dollars. Fourth, the activity is reckless rather than principled. Fifth, the outcomes are unpredictable rather than predictable. The process that yields these implications reveals clear correspondences between the two major domains. However, the blend results in two crucial mismatches. Selective projection maintains that not all structure from the input domains will be projected into the blended mental space (i.e. the semantics of the metaphor).[6] Structure projected into the blended space will therefore not merely be the sum of all the related parts. Rather, some structure is salient for the blended space and some is not. The genetic roulette blended space therefore only includes those items most relevant to the gambling input domain, namely implications four (recklessness) and five (unpredictability) above. In this case those scientists who "play" at genetic engineering are undertaking work that is as

reckless and unpredictable as those who play roulette, perhaps the gambling game with the highest possible level of chance. The ad reinforces this concern when it comes full circle by telling us that "Earth's four-billion-year genetic legacy is at stake" in this genetic gamble.[7] While it may be fine to lose money, since a fool and his money are easily parted, this is not case with our "genetic heritage" or "genetic legacy." Indeed, TTP repeats its view that GM will "subject all of us and nature to a kind of *genetic roulette*." Just as the novel adjective "Russian" in "Russian roulette" completely changes the meaning of "roulette," so too does "genetic" change the meaning of roulette here. Now genetic engineering is a game, played by biotech scientists, who risk things that are far more valuable than money and who "subject" us to a game of chance that we may not want to play at all.

Similar metaphors built by categorical extension (i.e. conceptual integration) also appear in the third ad as "chemical pollution" gives way to "genetic pollution." As we read early on, "Chemicals will dilute over time or can be contained. But genetically altered life forms can multiply, mutate, and spread worldwide. Genes cannot be recalled by manufacturers." In other words, unlike automobiles that are recalled when problems with them are found, GM crops are different because they will somehow become uncontrollable. The lack of control is real cause for fear, since in the words of TPP, "the flow of transgenic organisms being released into the environment is about to become a torrent." The image of a rushing stream that is dangerous infers that nothing can stop what is happening, nor can the consequences be known in advance. This is what TPP call "collateral damage to the environment" when fields sown with GM crops cannot be stopped from pollinating other plants and allegedly tainting them in the process. In this context, "collateral damage" is not about bombing innocent bystanders, for instance, but about waging war on nature and accidentally causing harm. In using language like this, ideology becomes overt and direct. The natural is supplanted by the artificial, the normal by the abnormal, the predictable by the unpredictable, the intended by the unintended, and so on. Because it is imagined in highly charged ways like these, GM can only be scorned. After all, who could be in favor of pollution if this is indeed what GM is?

Like the first ad, the fourth ad also opens with a rhetorical question: "Where will the next plague come from?" Just as we saw insanity suggested in ad one, so too is it mentioned in ad four: "In a sane society the deliberate crossing of boundaries between animals and humans would surely be illegal. However, scientists and corporations now make their own rules, especially when there's profit to be made." Here the accusation is that profit motivates behavior although altruism would no doubt be a better motivation. At the very least it might be a sign of sanity. Ethos appeals also get made immediately in the ad, when a scientist named Claude Chastel is quoted. As Chastel writes, in the journal of *Emerging Infectious Diseases* 2.2 (1996) according to the ad, "We are preparing a new infectious Chernobyl ... Xenotransplantation does not simply pose an ethical problem; it concerns the survival of the human species..." As a frame of reference, Chernobyl is extremely powerful for its negative connotations. In terms of analogy, Chastel implies that xenotransplation (i.e. using animal organs or growing human organs in animals for implantation into humans) is akin to Chernobyl. Here, however, the radiation that kills humans is not radiation. Rather, the radiation consists of animal viruses that become human viruses. The second scientist quoted in the ad by TPP, one Dr. Peter Collignon, agrees. He writes, in the *Medical Journal of Australia* according

to the ad, "What we are collectively doing now and planning to do in the future with xenograft transplants creates the ideal conditions for animal viruses or infectious agents to cross the species barrier into humans and proliferate. Xenotransplants thus represent one of the best experiments we could devise to 'create' new infectious agents."

The purpose of quotes like these is two-fold. First, they define scientific concepts in a way that lay people can understand thanks to the use of figurative language (e.g., "a new infectious Chernobyl," "to cross the species barrier," etc.) and the existence of what Sperber calls our shared knowledge or "savoir partagé." Second, the statements lend tremendous credibility to TPP's argument. This is because they are apparently made by scientists in scientific publications and so, readers conclude, they must be accurate. Because of the power and the value we assign to science (the salary differences between chemistry and linguistics demonstrate this), the ethos of science *matters* as a logos-based enterprise.[8] If boundaries between species are accepted as hard and distinct, rather than soft and permeable, then crossing those boundaries is synonymous with doing what should not be done.[9] This is why xenotransplantation can only be defined in negative terms here by TPP. To continue, examples of barrier-crossing diseases are cited in the ad to make specific more general concerns. Swine flu (1918-1919), bird flu (Hong Kong, Malaysia), HIV, and vCJD are all mentioned. "These are only a few of many cautionary examples that show the dangers of animal to human disease transmission," we are told, "Yet even in the face of these health concerns, the biotechnology industry is spending billions to cross species boundaries between animals and humans. Until it is stopped, society runs the risk of causing another plague."

In essence, this is the ad's central argument and it is more or less in the stasis of definition. To define xenotransplantation as a "plague," no positive views of it are possible because, when viewed from whatever angle, a plague simply cannot be good. TPP continues along this path, stating, "In transplants from pigs or primates to humans, the opportunity is present for a crossover infection from a virus or from other pathogens. The infected patient could then transmit the disease to others, creating an epidemic that might kill thousands. Despite this unprecedented risk the U.S., under pressure from the biotech industry, continues to recklessly allow dozens of xenotransplantation experiments to proceed." As we saw with the example from the second ad over labeling GM food, here the industry and the government are compressed into a simple set of actors: one forces the other to acquiesce and prevents experiments from occurring. The force dynamics of the split infinitive phrase, "to recklessly allow," also serve their rhetorical purpose. Next, the nascent technology is infantilized again when TPP states: "Mature questions are rarely asked about the risks and benefits, such as the risks of deadly viruses emerging and racing their way through the human world." Since biotechnology is immature, its practices can be called "Relentless genetic tinkering in biotech labs all over the world" rather than an exercise in principled and sound scientific experimentation. Additionally, to define science as tinkering cheapens science because of the negative or amateurish connotations of the word "tinkering."

In the end, the ad really asks us to question how we want to define human beings: "When human beings are reduced to so many bags of chemicals, genes and body parts, and then sampled and intermixed with other species, will we finally lose sight of what is human, and what is not?" This quandary is perhaps best encapsulated by the phrase "pharm animal," which is a conceptual blend. According to TPP, "Just as

animals are being genetically engineered to be organ donors for humans, they are also being genetically modified with human genes so that they can produce pharmaceuticals in their blood or mammary glands." Animals like these are called "pharm" animals, a pun on "farm" as well as a blend of a farm animal and a pharmaceutical device that makes pharmaceuticals. In the blend, the animal on the farm becomes a drug-making machine. As such, it no longer fits nicely into our categories of farm animals and pharmaceutical making devices. The two become one in the blend in this scenario, but resistance to running the blend signifies latent fears about the technology. Lurking not far from here, of course, are animal rights issues, another obstacle in the quest to make science apparently more ethical.

The fifth and final ad from the series has the most provocative title: "Biotechnology = Hunger." One of the strongest things going for GM food is that it can mean increased yields for farmers, and hence increased food for the world. Here, however, TPP challenges this assumption by arguing that the contrary is indeed the case. As we read early on, "The biotechnology industry claims it holds the answer to world hunger: *high technology to increase production*. But according to the United Nations Food and Agriculture Organization (FAO), this badly misstates the problem. There is no shortage of food in the world. Per capita food production has never been higher. The real problem is this: In a globalized economy, the poorest countries of the world are exporting their food to the already well-fed countries." Within the stasis of cause/origin, this ad argues that hunger is caused not by a lack of food but by lack of money. This is exacerbated when countries export food that should be consumed domestically. Again, the reference to a credible organization that is in the know, the UNFAO, helps tremendously with the ethos of the argument. The action to be taken then is not to open up the world to GM food but to fix the real causes of hunger. As TPP states, "The issues are not merely about technology. The issues are: Who has access to land? Who grows the food? What food do they grow? To be consumed by whom? In a globalized economy, food self-sufficiency is replaced by food dependency." In this last clause, the adjective ("food") is repeated but what it modifies changes radically between the first instance ("self-sufficiency") and the second ("dependency"). This brings about the desired rhetorical effect of putting polar oppositions into the mind of the reader and stating just how bad things are in this situation. Thus, biotechnology is a problem, not a solution. And so, as TPP asks, "Is biotechnology the answer? No, it's part of the problem." Why? First, biotechnology threatens farmers through the biopiracy of seeds. Second, biotech "suicide plants" are "terminators" that leave no seeds for next season. This means that a farmer has to buy new seeds *every single season*, a practice never before seen in the history of agriculture. Third, GM farming is vulnerable to failure since yields can decrease, animals must get culled when sick, and monocultures discourage healthy biodiversity. Fourth, GM farming is "ecological roulette" since biotech companies boost seed and pesticide sales every year as farmers become overly dependent on these products. In this manner, TPP suggests, biotech firms are in a win-win situation when facing their customers (i.e., farmers). Again, the metaphor of "ecological roulette," prompted by the epithet before the noun, provides all the negative connotations we draw because of the value assigned to the inputs. If an example like "ecological investment" were alternatively put forward by the industry to counter TPP, then perhaps some positive connotations would follow. As it stands, negative metaphors overwhelmingly dominate

any positive alternatives that might be imagined. The same is true of the ad's central analogy: if "the infamous Green Revolution's chemical technologies that once promised to 'feed the hungry'" have ultimately failed to feed the hungry, so too will GM food.

4. Harvest of Fear

Now let us see how the biotech industry and others speak about GM food by turning our attention to "Harvest of Fear," a television documentary that aired on PBS in the USA on 23 April 2001. "Harvest of Fear" was originally based on a BBC 2 Horizon program in the UK, which aired on 9 March 2000, called "Is GM Safe?" In the USA, "Harvest of Fear" was aired in a very unique way. It carried the brand of the two most highly respected documentary series on PBS: Nova and Frontline. This no doubt ensured higher-than-average ratings for the solid 1-hour-long documentary that gave most stakeholders valuable airtime. "Harvest of Fear" began with the story of papaya farmers in Hawaii suffering huge losses due to the ring spot virus.[10] Dennis Gonsalves, from Cornell University, was asked to help find a solution, which he did by genetically modifying papaya that could resist the virus. The documentary ended with Gonsalves portrayed as the savior of Hawaii's papaya industry although Japan, the biggest buyer of the papaya, refused to buy papaya from Hawaii that was genetically modified. As Hawaii's papaya farmers returned to growing papaya that was vulnerable to the virus just to please Japan, the virus eventually returned.

Of some 42 participants on "Harvest of Fear" in one form (physical) or another (letter), 3 were farmers, 5 were current or former government regulators, 7 represented consumer groups, 12 were from industry, and 15 were academics (7 from Cornell University alone). As the numbers suggest, industry and academia contributed the most to the discussion, while farmers were dead last as stakeholder participants (as is often the case). That said, perhaps the four most important figures appeared pretty early on in the program. Jeremy Rifkin, author of *The Biotech Century* and head of the Foundation on Economic Trends, states at the very beginning: "This revolution affects the most intimate aspect of life on earth, our own biology, the biology of our fellow creatures. If ever there was a time when we human beings had to take personal responsibility for the future, this is it" (1). As to why GM is happening at all, Hugh Grant, Chief Operating Officer for Monsanto, states: "Further development of pesticides was no longer a viable business opportunity and, from an environmental point of view, didn't really make sense, either. So we stopped all chemical investment and really redirected our energy towards biotech" (3).[11] To counter the enthusiasm of Grant, Doug Parr, a scientist with Greenpeace UK, said: "The public are becoming quite skeptical about the ability of scientific evidence to tell us all we need to know about potentially irreversible innovations. And genetic engineering seems to be crossing those boundaries of what we can know and should do" (4). However, as Hank Jenkins-Smith, a political science professor at the University of New Mexico points out, that skepticism or mistrust is less evident in the USA: "The Department of Agriculture […] gets quite high ratings of trust. On a scale of zero to 10, where zero is not at all trusted and 10 is completely trusted, they rank close to a 7. And we don't see agencies that get that high very often. Not far behind them comes the FDA" (6). But as Jenkins-Smith later adds, "If there were to be some event that galvanized public concern, you can change an issue like this substantially, as Three Mile Island did, for example, with the nuclear technology policy debate. We haven't seen such a thing

yet. If it were to happen, it could be devastating" (7). Statements like the ones given above all set the tone for the rest of the program. They also brought to light the ethical, political, economic, and safety concerns over GM food.

As far as safety goes, the rhetoric became very interesting when the following question was asked: "Are GMOs safe to eat?" Grant's answer for Monsanto: GM crops "have been more widely tested than any other food product that came before them in history" (7). Likewise, Jane Henney, former FDA Commissioner, stated: "Most of these foods that are being changed are foods we know very well – corn, soybeans and the like. And what is being changed is usually something that is very – today has been something of very small difference" (8). But how exactly is food safety determined? For GM food, a mass spectrometer is used to compare the GM crop's molecular chemistry with that of the normal crop. As the program narrator puts it, "If the resulting graphs from a mass spectrometer line up exactly, the two products are chemically identical. This is what the regulators call 'substantial equivalence,' and it is one reason GM foods normally do not require special labels" (8). It is assumed here that the food Americans eat is already safe. Thus, a new food type simply needs to meet the existing benchmark to prove that it too is safe to eat.

Rhetorically, this involves a categorization argument. For example, the makers of GM corn want their product to fit into the current corn "category." Why? The current category is assumed to be safe. It is one thing to try to prove food safety. It is another to make a categorical argument and ask that a safe category simply adopt a new member. Aventis lost this argument over its Starlink Corn product, which was approved for animal consumption but not for human consumption. When this GM corn product ended up in taco shells, the products were immediately recalled. As Jane Rissler of the Union of Concerned Scientists put it, if "someone who was eating a taco shell […] got ill […] how would a person know? The absence of evidence is not absence of harm" (10). So if you were allergic to a GM food, how could you find the cause of your allergy when you thought you were eating the regular version and not the GM version of the food? Without a label, you have no idea, no "evidence" to argue that your allergy was caused by the GM corn product. However, there is no "absence of harm" if you still get an allergy: your body will react if you eat something you are allergic too, label or no label.[12] In this scenario, categories clearly matter.

Ethical concerns are next on the agenda when the television program asks, "Are we tampering with nature?" Just as "tinkering" in the fourth TPP ad carried amateurish and negative connotations, so does "tampering" here. In this part of the program, however, arguing in favor of GM food is the status quo. Joseph Hotchkiss, of Cornell University, states: "I don't like the word 'genetically modified food.' Virtually all of our foods have been genetically modified. If you take the apple, for example, there are literally dozens of varieties of apples. How did we get those dozens of varieties? We genetically modified the apple through conventional breeding. We crossed one kind of apple with another apple, and we produced very different apples – different color, different flavor, different functions" (11). Put another way, if the food production system is not broken, don't fix it. If we have always been genetically modifying food, then we can continue to do so.[13] Therefore, the status quo is just fine since we have not (categorically speaking) created or done anything new. To contrast this view, Rifkin states, "You can cross a donkey and a horse in classical breeding – they're very close

relatives – and you can get a mule. But you can't cross a donkey and an apple tree in classical breeding" (12). What Hotchkiss calls "conventional breeding," and Rifkin calls "classical breeding," is not necessarily new. However, the adjectives suggest that (prototypically speaking) "breeding" is synonymous with classical and conventional breeding. Whether GM falls into this category or not is what remains to be seen in conceptual terms. If a donkey and horse equal a mule, and two apples crossbred equal another apple, what do genes from a mule spliced into apple equal? The problem in answering this question reveals constraints on our categories now.

As is clear in these comments, status quo breeding is assumed to be ethical. But breeding by genetic modification, where species barriers matter little and where a strawberry's genome may "inherit" a few genes from a fish, seems somehow less ethical. One reason is that these mixtures would almost never naturally occur. Another reason is that our categories turn out to be less flexible than those of mass spectrometers that measure for substantial equivalence. The ethical concerns also involve issues about privatizing genomes. Rifkin puts it this way: "We have less than 10 life science companies in the world that have a virtual lock on the seeds upon which we all depend for our food and survival" (14). As the narrator in the program adds, "Monsanto was sitting on a mountain of intellectual property. They held 28 percent of all U.S. agricultural biotech patents. This knowledge had cost them an estimated $7 billion in research, and anyone wanting to use this technology had to negotiate a license" (14). Again, in conceptual terms, these issues involve categorization. As Greenpeace's Parr claims, "I think the problem the biotech companies have got is that they want to say they [GM foods] are extremely different so that the genetic material can be patented and that it's very novel, whilst at the same time saying, 'Well, they're pretty much the same' in order to get the foods through on the basis of substantial equivalence" (14). So if a GM food is novel, then it should not be regulated by traditional standards. But if it is not novel, then it should not be protected by patent or intellectual property law. While perhaps paradoxical for us, this is no paradox for the biotech industry. It has worked wonders by convincing the US government that its products fall simultaneously into two apparently mutually exclusive categories.

At this point "Harvest of Fear" stepped back from issues about human safety and asked the question: "Do GMOs damage the environment?" In the 20 May 1999 issue of *Nature*, a team of researchers led by John Losey of Cornell University wrote that Monarch butterfly caterpillars died when fed milkweed pollinated by *Bt* corn. Milkweed, which grows in and near cornfields, is a caterpillar's natural food but it becomes deadly when GM corn containing *Bt* pollinates it. The image of the threatened Monarch butterfly became a powerful one for environmental groups like TPP, who used the Monarch butterfly's image for their "Genetic Roulette" ad to argue that GM crops damaged the environment. As Charles Margulis of Greenpeace USA put it in the documentary, "We feel that this is a mass genetic experiment that's going on in our environment and in our diet. Nobody knows what the consequences are going to be, and the untoward side effects will be irreversible. You can't recall genes once they're released into the environment" (16). As Margulis's language suggests, "recall" signifies that GM foods are unlike other kinds of products that can be recalled if they pose risks. This is because of the nature of biology. By referring to genes in the language of products like automobiles, a rhetorical effect occurs: viewers think like companies by treating genes as products. With this

mental framework in place, Greenpeace visited companies like Kellogg's in Battle Creek, Michigan, to ask where they stood on GM foods.

> MAN IN TIGER SUIT**:** What have you done to my cereals? They're fake!!
> RECEPTIONIST: Sir, you can't say that here.
> CHARLES MARGULIS: See, this is Frankentony. He's very upset because he's genetically modified (17).

The man in the tiger suit parodies "Tony the Tiger," the animated cartoon mascot for Kellogg's Frosted Flakes Cereal. His cry of "They're fake!" parodies Tony's cry "They're great!" in Kellogg's television ads for the cereal. The effect is hilarious, which draws pathos into the argument and wins sympathy from audiences. It also makes Kellogg's look bad because it will not talk to Greenpeace on camera. And while Tony the Tiger becomes "Frankentony," the narrator says "the $600 billion food industry [did not want] their brands to be tarnished with the image of Frankenfood" (17).

Exactly why rhetoric is cognitive becomes evident here. Turning Tony into *Frankentony* and food into *Frankenfood* involves conceptual integration. For example, when we blend together through selective projection a "Frankenstein" input space with a "Tony the Tiger" input space, the resulting emergent structure in semantic terms gives us the mascot with the traits of the artificially produced literary character. These traits belong to Frankenstein, but they are imagined now to pertain to Tony the Tiger (hence the negative associations). Likewise, when we blend a Frankenstein input space with a food input space, the negative associations with Frankenstein tarnish the image of food as that new structure emerges in the semantics of the blend. Even if one has never read Mary Shelley's *Frankenstein* (1818) or seen the endless film adaptations of it, some sense of Frankenstein's artificial "birth" and his evolution into a murdering monster all symbolize good intentions gone wrong thanks to science. *From this general cultural frame, the consequences of genetically modifying food can only be negative ones, so powerful is the concept of Frankenstein in our culture.* The food industry knew this, which is why it asked Gene Grabowski of the Grocery Manufacturers of America to reply on its behalf to groups like Greenpeace. As Grabowski states, "Food companies have learned that the groups are not intent on having a reasoned debate about biotech or helping consumers find out about biotech. It seems that their motive is to scare people. I don't dispute some of their research. I don't dispute their motives. What I dispute, and I think what the industry questions, is the tactics, the street theater, the antics, the attempts to gain publicity at the expense of truth" (18). In this sense, the value of the *Frankenfood* blend is "false" since Grabowski rejects Frankenstein as being an honest or truthful input space with which to blend the food input space. However, in terms of the public's understanding of science, a blend like this can become immediately recognizable, compact, convincing, and difficult to supplant with a more positive blend from the industry's viewpoint. For cognitive linguists looking to theorize the relationship of basic mental operations like conceptual blending to culturally specific frames of knowledge, *Frankenfood* and *Frankentony* provide wonderful examples for study.

That said, perhaps the strongest argument the industry can make in favor of GM food is that it can reduce the amounts of chemical pesticides being used. This is because the "pesticide" is placed directly into the genome of the crop when genetically modified.

As Monsanto's Hugh Grant claims, "*Bt* cotton has really been a breakthrough in how insects are controlled in the crop. Historically, the crop is sprayed 8 to 10 times with insecticide, usually flown over the top of the crop. Today the cotton crop is grown with one or two applications" (19). While everyone might agree that putting fewer chemicals into the ground is a good thing, there are skeptics. Rifkin states, "Monsanto says, 'This is a leap forward. We're ending pesticides.' Well, yes and no. Yes, they're ending the use of the pesticides, but now they're introducing more toxin than they ever introduced with pesticides. You have to think of that corn now as a factory producing toxin" (21). Rifkin's negative metaphor is evoked to combat Monsanto's point of view. By calling corn "a factory producing toxin," incongruous images of cornfields and chemical factories clash, which leads to negative associations from the domain of factories being mapped onto the domain of farms. A similar thing happens in the "Genetic Roulette" ad when we are told of *Bt* corn that "*The plant itself has become a permanent pesticide*."

It may be far fetched to call a plant a pesticide but some skepticism over pesticide is warranted. DDT in the 1940s was not thought of as dangerous until twenty years later. As Jane Rissler from the Union of Concerned Scientists states, "these same people who once told us that pesticides were good for us are now saying, 'Well, those pesticides, they're dangerous. But you take these biotech products. They're much safer'" (20). In this case, the industry's track record from the past still casts a long shadow into the present. Not surprisingly, when people are asked to choose between organic food, food grown with pesticides, and GM food, "people choose organic food time after time in survey after survey" (20) according to Margulis from Greenpeace USA. But voting for organic food in a survey, and voting for it with your wallet at the supermarket, are two very different things. As Normam Borlaug, a Nobel prize winner at Texas A&M University, states, "This organic movement is ridiculous. For those who want to go the organic route, God bless them. Let them spend more money for their food. But looking at the world at large, this is an impossibility. […] Most of the people who are opposing biotechnology, they've never known hunger" (23).

The implications with this line of reasoning are that poorer countries might use GM foods to feed their populations, but richer countries might not because they can afford more expensive organic foods. This would no doubt suggest to the poorer countries that GM food is unsafe. If it were safe, the rich would eat it, right? It is precisely over this issue that ideology resurfaces, especially when the following question is raised: "Do we need GMOs to feed the world?" Ethically speaking, GM food makers imagine they can reduce world hunger by boosting crop yields. Economically speaking, groups like Greenpeace argue that lack of money and not lack of food causes world hunger. As Margulis states, "We live in a world today where 800 million people a year are going hungry, in a world that produces enough food for almost 9 billion people. Yet we only have 6 billion people on the planet" (26). On the contrary, says Kenyan food scientist Florence Wambugu, people like Margulis "don't have a clue what they're talking about because most of those people who talk like that get all of their food from the supermarket" (26). If such cultural differences make it impossible to agree over the causes of the problem, the use of analogy is by no means limited to a specific culture. As Wambugu adds,

> To build this house where we are today, there was a designer, there was an architecture, there were people. It took some time to build this house. It needed expertise. To build GM technology has taken years, has taken resources, has taken time. Now, if you want to destroy and bring down this house, you don't need expertise. All you need is some people from the streets, hooligans [….] Greenpeace and […] those activists are just beating down a house that took years to build, years of research (26).

Here GM technology is a house build by scientists who are akin to architects. It takes brains to build a house, but no brains to destroy one. Wambugu's analogy implies that anti-GM activists are hooligans tearing down a house. But the accusation rests on the value we assign to the concept we have of a "house." We tend to value houses in many significant ways, so tearing them down cannot be seen in a positive light here. In this manner, Wambugu's analogy makes the point it does by relying on terms like "house" or "hooligan." These terms are *not neutral* although it is clear which term is believed to belong most closely to the semantic field of food.

Finally, the last question asked by "Harvest of Fear" is this: "What does the future hold?" In this segment of the documentary we learn of a Canadian fish company called Aqua Bounty Farms, "the Monsanto of the sea" (29). As Turner noted recently, "YZ compounds" of the "NounPhrase-of-NounPhrase" type (1998: 54) are essentially compressed analogies. If Aqua Bounty Farms [X] is the Monsanto [Y] of the sea [Z], simply providing the YZ elements is enough to evoke the rest of the conceptual network. In other words, Aqua Bounty Farms [X] is to the sea [Z] what Monsanto [Y] is the land [W]. In terms of conceptual integration, we form the analogy almost immediately by putting the terms X and Z into a relationship that is analogical to the relationship between the terms Y and W. What does this mean? Elliot Entis, the CEO of Aqua Bounty Farms, states, "We'll be a little bit like seed suppliers in other industries. So it's our hope to run a hatchery or several hatcheries in which we will produce eggs, and those eggs will be sold to existing [fish] farmers" (29). In turn the narrator calls his company "the Monsanto of the sea" because the analogy has already been suggested by Entis. This assumes that the narration is added last once the talking heads are filmed for the documentary. A related analogy is suggested when the narrator later states, "Unlike *Bt* pollen drifting a few feet into a neighboring field, an escaped transgenic salmon can spread its new genes throughout the ocean. The FDA is expected to rule on GM fish by the end of 2002. But even if the U.S. doesn't allow it, other countries in the developing world will still go ahead. And their ecological problems could, in time, become ours as well" (30) Here analogy becomes disanalogy when GM corn pollen in a field is supposed to be different from transgenic salmon in the sea. On every level the analogy works except for the distances traveled by corn pollen (a few yards) and sea salmon (many miles). The exception creates disanalogy.

Because of the power of analogy to frame the unknown in terms of the known for us, it is not surprising to find it used regularly in rhetorical situations. For instance, Nicholas Kalaitzandonakes, from University of Missouri-Columbia, states in the program, "If you think back to the first airplane that the Wright Brothers flew, the speed was seven miles an hour. So technology in the very early stages is crude. [Also] Biotechnology is much like information technology. It's a very broad technology with

very broad applications. Agriculture and food is just one application of it" (32). On this view, Monsanto and Aventis are the Wright Brothers of GM food production. What the Wright Brothers did for flying, these companies will do to dinner. Depending on how one feels about flying, this analogy can be good or bad. Still the analogy is powerful for demonstrating the stage of development that GM food is in. The EU decision to end the ban on GM crops in February 2001 was no doubt aided by politicians like David Bowe, a British member of the European Parliament. According to Bowe, "Some of the campaigns that Greenpeace are running have run out of a bit of steam […] You know, after a while, if you cry wolf again, people ignore you" (32). Here, tried and true ways of thinking in the past frame how we are to think of the future for GM crops. Bowe thinks that the green groups are "running out of steam" because they have "cried wolf" for too long over the issue.

Ironically, if GM food is entering the EU, it may not last in the USA. As Margulis at Greenpeace USA sees it, "The biotech industry is scared to death of labeling. In fact, biotech industry representatives have said putting a label on genetically engineered foods is like putting a skull and crossbones on it" (33). On the one hand, to imagine GM food within the same category as poison is no doubt one reason why the industry fights for the ban on labels. Who would want to eat poison? On the other hand, to imagine GM food as "food" but to imagine GM-free food as something unique explains why "negative" labeling is preferred to "positive" labeling by those who want customers to be able to distinguish the products at the supermarket (Winrock 8). Positive labeling means labeling GM food as "GM food." Negative labeling means the opposite. Negative labeling means that food with no GMOs (genetically-modified organisms) is called "GMO-free food." Because there are more products in supermarkets that would have to be labeled positively rather than negatively, the negative labels are preferred by the industry. Such a view, of course, signals a radical categorical shift. Within perhaps a single decade, GM food has become simply "food" while food that is not genetically modified now takes on the onus of the modifying adjective or epithet. It is like Church of England churches in England that simply come with word "Church" on them or on the signs pointing to them, whereas various other denominations must spell out their distinction (e.g., "Methodist Church" or "Baptist Church"). Indeed, what may be happening with GM food is that a peripheral member of a category is now becoming the prominent default or prototypical member. If this is the case, then we are witnessing a prototype shift. GM food has become food while non-GM food (notice that term) has become something else.

5. Rhetoric and Biorisk

The metaphors, analogies, and blends discussed so far are those "conceptual connections" (to repeat Turner) that are inherent to rhetoric and that make argumentation possible. Likewise, the "conceptual representations" (to repeat Sperber) that we have of these figures are describable in terms familiar to many cognitive linguists: domains, mappings, inputs, projections, conceptualization, constraints, and emergent meaning. One of the constraints I have suggested here is a value constraint of *negativity* based on the data analyzed. Corporate evolution, genetic roulette, ecological roulette, genetic engineering, genetic manipulation, genetic modification, genetic altering, food dependency, and so on, are examples of a cognitively negative tendency for framing the

debate against GM food. Creating positive alternatives to them will be the job of the industry, its corporate communicators, and its ad agencies. However, it seems fair to say at this point that the kind of cognitive rhetoric looked at here is a cognitive rhetoric of biorisk. The negativity is no doubt inspired to some extent by ideology for the crafters of the words I have studied here take firm positions on biotechnology. Sophisticated audiences (e.g. readers of *The New York Times*, viewers of PBS) are the prime targets although intentionality can vary. The ads, for example, are far more carefully crafted than are the utterances of the talking heads on the television program. From this it follows that the rhetorical situations of speakers and audiences changes from context to context, or from format to format. However, the rhetoric is still deliberative and, despite these gradients of intentionality or conscious motivation, the concepts relied on to prompt the tropes of biorisk are similar and necessarily figurative. People often think and speak figuratively. The same is true here. Indeed, the similar figures that different stakeholders use demonstrate quite clearly Sperber's sense of a shared knowledge, a "savior partagé," that undergirds communication in this debate.

This shared knowledge, however, involves a complicated social context that can only be briefly discussed here: the context of the risk society. Just as we saw that "biopiracy" was a categorical extension superficially created by adding a new prefix to an old noun, so too is "biorisk." But what in fact is risk? Ullrich Beck, a German sociologist, published *Risikogesellschaft: Auf dem Weg in eine andere Moderne* in 1986 and its English translation (*Risk Society: Towards a New Modernity*) in 1992. Beck's book has become a landmark in sociology for it stresses that global capitalism is now profiting from the production of risk with untold consequences. According to Beck: "*Risk* may be defined as a *systematic way of dealing with hazards and insecurities induced and introduced by modernization itself*. Risks, as opposed to older dangers, are consequences which relate to the threatening force of modernization and to its globalization of doubt" (1992: 21).[14] By modernization, Beck means industrialization and technological development. Whereas hazards of the past might have been perceptible to our senses, today's risks may be invisible or imperceptible, hence the need to measure risks in new ways.

The risk society of today is unlike the class society of the past. Whereas ending hunger or scarcity in the past was one aim of industrialization (via the creation of wage labor and a buoyant middle class), now the creation of dangerous products that profit producers and poison consumers has undermined social advancement. Science, by measuring away risk or by interpreting away risk, has begun to lose its credibility. People and governments who want to know how dangerous the world is becoming are less and less confident that the scientists have the answers. For example, scientific experts give advice to governments for setting safe standards for pesticide levels in foods. However, their data are based on experiments with rats or mice, not humans. This may be ethically necessary but it matters little to human safety. Just as the psycholinguist Jean Aitchison once summarized Chomsky's critique of Skinner as "the irrelevance of rats" (9), so too is the same true here when defining how much of a given chemical a human can "safely" ingest.

Beck's thesis is that today's society is quickly becoming a *risk society*, a society unlike any other we have ever seen. Ironically, the things that are threatening us are also the very things we make and consume as middle class members of western consumer

societies. In this sense, our material comfort (e.g., automobiles) and our diseases (e.g., lung cancer) form a vicious circle we seem unable to escape. Another irony: we may like risk but not if someone profits from it. As Professor Jenkins-Smith of the University of New Mexico puts it in "Harvest of Fear," "Many people accept risks. We ski. We ride mountain bikes […] people like taking risks, but they like to choose their risks. People don't like to have others imposing risk upon them, particularly if they are imposing the risk for purposes of generating a profit" (34). However, as Beck would argue at this stage in the game, there is no escape now from an economic system that manufactures risk precisely *because* it is profitable. Consider the example of land fills.

> Die chemische Industrie produziert giftige Abfallstoffe. Was mit ihnen tun? "Lösungen": Deponien. Mit der Konsequenz: aus dem Abfallproblem wird ein Grundwasserproblem. An diesem kann die chemische Industrie und andere durch "Reinigingszusätze" für Trinkwasser profitieren. Wo das Trinkwasser durch diese Zusätze die Gesundheit der Menschen beeinträchtigt, stehen Medikamente zur Verfügung, deren "latente Nebenwirkung" durch ein ausgebautes medizinisches Versorgungssytem zugleich aufgefangen *und* verlängert werden können. So enstehen – entsprechend dem Muster und dem Grad der Überspezialisierun – *Problem-Lösungs-Problem-Erzeugungs-Ketten*, die dann das "Märchen" der ungesehenen Nebenfolgen immer wieder "bestätigen" (Beck 1986: 295).[15]

Beck describes here a rhetorical situation that has completely broken down. Problems are incorrectly identified, their causes mistaken, and the "solutions" lead simply to more problems. At absolutely no point has there been consensus within stases. Thus, chemical waste goes into land fills, the waste contaminates ground water, the water in turn is treated by more chemicals for purification purposes, those chemicals make people ill when they drink the water, and medicines given to the sick may have terrible side effects, and so on and so forth. In this fashion, the risk society produces risks. It also shuffles the deck to move solutions further and further away from appropriate answers. On the one hand, this is done to profit someone, but on the other hand it ends up poisoning everyone. The question to ask now is whether or not GM food is part of the dangerous chain Beck describes above.

Since the risk society identifies the latent context within which this debate over GM food is taking place, it may form a shared knowledge for stakeholders. Groups like the Turning Point Project would certainly see GM food as the needless production of risk for the immoral profit of corporations. Clearly, GM food is a very thorny issue. For example, regulatory jurisdiction of GM food in the USA is deeply complicated. Three American governmental agencies regulate GM food just as they regulate normal crops. The Department of Agriculture (USDA) makes sure they are safe to grow, the Food and Drug Administration (FDA) decides if they are safe to eat, and the Environmental Protection Agency (EPA) inspects GM crops like *Bt* corn because they in fact contain pesticides ("Harvest of Fear" 8). This division of labor and scientific overspecialization is precisely what Beck sees as paralyzing governments in the face of science: "Die Industrie besitzt im Verhältnis zum Staat einen doppelten Vorteil: die *Autonomie der Investitionsentscheidung* und das *Monopol des Technologieeinsatzes*" (Beck 1986: 342).[16] Because the state can only act after industry decides how to invest and where to

use its technology, the state is always plays catch-up with the technology that it is forever required to regulate belatedly. Even the removal of risks from our immediate societies solves few problems. For example, we export our chemical factories to the third world, encourage farmers there to use pesticides made in those factories for their crops, and then demand that those crops return to our markets so we can have cheap food. The foods therefore return to the first world with risks spliced into them, the very risks we thought we got rid off by moving the chemical factories overseas. So just as profits are repatriated from poor countries to rich countries whenever multinationals invest abroad, so too are risks repatriated when what we try to get rid of simply returns through another door.

There is not enough space here to fully analyze the rhetoric within Beck's tome, but suffice it to say that a lot of his brightest prose is highly figurative. For instance, at one point Beck calls the factory "der Kathedrale des Industriezeitalters" (1986: 353). This XYZ metaphor, where the factory [X] is the cathedral [Y] of the industrial age [Z], is far cry from Jeremy Rifkin calling GM corn a "factory producing toxin" ("Harvest of Fear" 21). The difference is in the domains. On the one hand, it is not negative for a factory to be a cathedral, especially if industrialization is our modern religion. On the other hand, it is negative for a natural plant to be turned into a toxin factory. The negativity stems directly from the clash between domains and the values our culture attributes to those domains. Those values may need some serious revising, however, if Richard Lewontin is correct. In a recent essay on GM food, Lewontin took the Turning Point Project to task for its series of ads. He called TPP "a bunch of Luddites" and suggested that they come to grips with the fact that farms are now what the poet William Blake once called "dark Satanic Mills" (Lewontin 84). So GM technology is simply a continuation of industrialization, or business as usual as it happens in every other walk of life.

In conclusion, the rhetoric of biorisk will be with us for the foreseeable future, but the debate over GM food may be ending. GM food has so thoroughly permeated the US market now that Gerber, who wanted desperately to market GM-free baby food, could find no guaranteed GM-free food suppliers after an 18-month-long effort recently. Therefore, the only debate in the US now is really over labels, but as Professor Jenkins-Smith's research shows, people will still eat GM food even if it is labeled because they label gives them the *illusion* of choice (the ultimate form of discrimination for the consumer in the supermarket). In Europe, the debate may not yet be over, but because Brussels does not want the industry to move elsewhere GM food will be made here too. Here, however, it will be labeled and probably traceable although the toughness of this task is seen in the slowness with which the policy is implemented. In 2002, the European Union should finalize legislation and its "strategic vision" for the biotech industry (EU 2001: 3) with the hope that these can remain unchanged up to 2010. This call for a cease-fire between consumer groups and the biotech industry may help restore the trust lost over food safety in Europe. That trust was lost in part with mad cow disease (BSE) outbreaks in the 1990s. Because of the political aftermath of the BSE scandals, the biotech industry here has had to pay a steep price for GM food. Clearly, in the face of "genetic roulette" or "*Bt* corn is a pesticide factory," what positive options are available to counter these metaphors with equally effective rhetorical strategies? At any rate, it is interesting to observe the categorical extensions demanded by GM food and other biotechnological developments in order to see how cognition of this sort relates to emotional reactions.

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Notes

[1] A version of this paper was initially presented on 28 March 2002 at the 29th International LAUD Symposium in Landau in der Pfaltz, Germany. This chapter will soon appear in *Cognitive Linguistics and Ideology* (Edited by René Dirven). Amsterdam: John Benjamins Publishers, 2003.

[2] To learn more about cognitive linguistics itself as an ideology, please see Peter Jones (2000).

[3] In English (my translation): "the rhetorical coupling of the phonetic representation to the conceptual representation is determined by a complex cognitive device functioning with many variables: the interlocutors themselves, their situation, extra-linguistic signals, and their previous statements."

[4] For a clearer overview of the links between work by Sperber and Turner (and their respective colleagues), please see Mendoza and Velasco (2002).

[5] Readers may view the ads first before reading my analyses of them. The ads in the Turning Point Project's "Genetic Engineering" series can be found online at http://www.turnpoint.org

[6] Exactly how selection works is not yet entirely understood (Glucksberg 2001: 34).

[7] Professor Jenkins-Smith, in "Harvest of Fear," also uses the gambling metaphor when he states, "The stakes are high. Food is such an intimate thing for most people. We consume those items. We take them into our bodies. We're dependent on the producers of those foods to make sure that they're safe, that they are of high quality" (5). For a related view, please see Silva, Jenkins-Smith, Vedlitz, and Whitten (2002).

[8] Curiosity drove me to inspect the credentials of Chastel and Collignon. Dr Peter Collignon, Director of Microbiology and Infectious Diseases at The Canberra Hospital in Australia, is Clinical Associate Professor in Infectious Diseases at the Canberra Clinical School of the University of Sydney. Dr. Claude E. Chastel is emeritus professor of virology at the Université de Bretagne Occidentale in France.

[9] Of course, nature herself sometimes crosses the boundaries as *Pfisteria piscicida* shows. Pfisteria, which lives in the mud at the bottom of rivers, killed thousands of fish near the Cheseapeake Bay in Maryland in 1997. Pfisteria is a dinoflagellate, which means that it is a microorganic animal that can nevertheless photosynthesize like a plant.

[10] Benefits of transgenic papaya were recently celebrated misleadingly in an ad in *Maclean's* magazine (29 Oct 2001) sponsored by the Council for Biotechnology Information (http://www.whybiotech.com).

[11] Later in the program, Gordon Conway, President of The Rockefeller Foundation, puts it more bluntly than Grant: "One of the things you have to realize is that the big biotech companies were originally agro-chemical companies making pesticides. They still do. The reason why they got into biotechnology is that they could see the end of the market for pesticides" (17).

[12] In terms of policy, the implications of this way of thinking can be substantial: "The approval process for release of transgenic crops differs dramatically between the United States and the European Union. U.S. policy has been permissive in approving transgenic plants for market release; EU policy has been quite restrictive. The difference lies not in the science used—which is fundamentally the same—but in different social values and political conditions for agriculture. The U.S. regulatory structure uses a 'science-based' risk approach, which essentially means that a transgenic crop will be approved for market if there is no firm evidence that it causes harm. The EU's 'precautionary' approach reverses the priorities: a transgenic plant can be approved for market only if there is firm evidence that it does not cause harm" (Winrock 6). In rhetorical terms, the EU and US disagree within a stasis of cause/origin.

[13] Traditional cross breeding methods meant gene transfers on the order of 10% of an organism's entire genome would pass from one organism to another (e.g., between apples). GM techniques now are much more refined, inserting a gene or two out of say 50,000 genes needed to make corn.

[14] The paragraph in Ritter's translation from which this definition is from does not appear in the 1986 German edition of Beck's book, where one would expect to find it on page 29.

[15] In English (Ritter's translation): "The chemical industry produces toxic wastes. What is to be done with them? The 'solution': dumps. Its consequence: the waste problem becomes a ground water problem. The chemical industry and others can profit from this through 'purification additives' to drinking water. If the drinking water with these additives impairs people's health, there are medicines available, whose latent 'side effects' can be intercepted and prolonged by an elaborate medical care system. In this way, chains of problem solution and problem production come into being – according to the degree of overspecialization – and these 'confirm' the 'fairy tale' of unseen secondary consequences all over again" (1992: 178).

[16] In English (Ritter's translation): "In relations to the state, industry possesses a double advantage, that of the *autonomy of investment decisions* and the *monopoly on the application of technology*" (1992: 212).