

### **Résumé/aperçu en Français :**

**La sur-réaction au risques perçus : La peur et l'intimidation déforment la prise en compte correcte de l'information disponible.**

#### **Pourquoi est-ce que les mauvaises compréhensions sont aussi répandues ?**

Il y a une dimension émotionnelle qui entraîne une surestimation des risques invisibles, technologiques, inconnus, etc.

Les facteurs d'aggravation de l'incompréhension du public sont :

- L'incertitude et l'ambiguïté.
- La mise en opposition et la culpabilisation
- Le désir de retourner dans la pureté et l'innocence de l'enfance
- La manipulation.
- Les « cascades informationnelles » : les fausses croyances collectives : « ce qui est dit trois fois est vrai »

**Quelles leçons concrètes tirer** de tout ceci pour les professionnels de la santé et de l'alimentation qui ont besoin de communiquer les bénéfices et risques de nouveaux produits ou moyens techniques ?

Du savoir, des explications simples et scrupuleusement honnêtes.

Réaffirmer d'appuyer les politiques publiques sur la méthode scientifique

Arrêter de tolérer l'utilisation des déformations et des mensonges dans les débats scientifiques.

Trop souvent, les décideurs politiques ont accueilli avec bienveillance les activistes anti-technologie dans les comités consultatifs, les auditions, les conférences et les esprits.

#### **Extrait d'AgBioView du 27 février 2009**

[http://www.agbioworld.org/newsletter\\_wm/index.php?caseid=archive&newsid=2869](http://www.agbioworld.org/newsletter_wm/index.php?caseid=archive&newsid=2869)

#### **Overreacting to Perceived Risks: Fear and Intimidation Distort the Accurate Assessment of Available Information**

- Henry I. Miller, M.D. Genetic Engineering & Biotechnology News Feb 15 2009 (Vol. 29, No. 4)

From rubber duckies and plastic bottles to pesticides used in agriculture, the world often seems full of lethal hazards. Many of these concerns are completely bogus, however, while most of the others represent only de minimis (that is, negligible) risks. Moreover, the attention paid to them and the wrong-headed (and often very costly) actions taken to prevent or ameliorate them, can themselves, be harmful.

Misapprehensions about the magnitude of risks can lead to the squandering of societal resources. For example, the EPA's land disposal restrictions when toxins are present impose annual costs of approximately \$205.5 million, in order to avoid 0.22 cases of cancer annually from groundwater contamination and 0.037 cases from air pollution (that is, about one case of cancer every four years) and \$20 million annually from property damage.

**Why are such misunderstandings common? One reason is the emotional dimension of concerns about a technology's potential risk to public health or the environment.** A case in point is the use of the most precise, state-of-the-art gene-splicing technology to craft new varieties of microorganisms, plants, and animals, which has been abusively and excessively regulated by federal agencies.

As the government makes decisions about consumer products, **fear and intimidation from several possible sources may distort the accurate assessment of risks, benefits, and possible alternatives. This can lead to decisions that are harmful from both an economic and humanitarian perspective.** A better understanding of the emotional dimension can help health and food professionals, scientists, and opinion leaders to address largely emotional responses by the public and to make better decisions.

Several factors that can affect the perception of risks have been prominent in various controversies about biotechnology (among these factors are uncertainty and ambiguity, information overload, splitting and projection, desire to return to a childlike world of purity and innocence, manipulation of environmental anxieties, and informational cascades).

**Uncertainty and Ambiguity. Studies of risk perception have shown that people tend to overestimate risks that are unfamiliar, hard to understand, invisible, involuntary, and/or potentially catastrophic (and vice versa). Thus, they tend to underestimate risks that are relatively clear and comprehensible in their nature, such as using a chainsaw or riding a motorcycle, while they overestimate invisible threats such as electromagnetic radiation or trace amounts of pesticides in foods, which inspire uncertainty and fear.** Contributing to these emotions may be poor scientific literacy in general and unfamiliarity with the statistical aspects of risk in particular. For example, exactly what does it imply for an individual if we learn that eating a high fat diet increases the probability of bowel cancer by 15-20%? Is that a big risk?

In the case of new biotechnology, several factors are at work. First, among nonexperts, there is sparse knowledge of the long, safe history of conventional biotechnology, or older techniques of genetic engineering, to produce vaccines, enzymes, and antibiotics, as well as virtually all of our domesticated crops. In fact, unless you're restricted to a diet limited to wild berries, wild mushrooms, wild game, fish, and shellfish, it's virtually impossible to get through a day without eating food that has been genetically engineered.

Second, when genetic engineering moves genes between organisms, some people fear that somehow it disturbs evolutionary sanctity or the natural order of things. Also, many do not understand the concept of alternative risks; for example, although there are theoretical risks of using biocontrol agents to eliminate plant pests, there are real and nontrivial risks of not using them (namely, the need to rely on chemical pesticides or to endure vast losses of crops).

**Information Overload.** At best, nonexperts are likely to understand only a limited number of aspects of a risk-analysis problem, and they are easily overloaded with data. **Information overload of the public is a strategy often used by those who would elicit fear about or disparage new technology.** In one short diatribe on biotech-derived foods, for example, an antitechnology activist might address the consumer's right to know via product labeling, the vegetarian issue of fish genes introduced into tomatoes, the safety and socioeconomic issues of bovine growth hormone, and the alleged dangers of herbicide-resistant plants.

Antibiotechnology activists deluge the public with irrelevant, untrue, or partly true information that leaves the nonexpert bewildered, and this can lead to snap decisions and poor judgment.

**Splitting and Projection.** A common response to fear and uncertainty is to split those involved in controversy into opposite camps (us vs. them) and to project onto them culpability and iniquitous intentions. Psychologically, this is an attempt to reduce anxiety and to reimpose certainty and clarity. These defense mechanisms may be activated especially easily when the enemy is painted as faceless, profit-hungry, amoral, multinational companies that will benefit handsomely from the sale of products. But such mechanisms are unproductive, because they polarize thinking and actually distort sound decision making.

**Desire to Return to a Childlike World of Purity and Innocence.** This romantic, puerile view of the physical world, reflecting a wish to escape from complex realities and choices, can give rise to a kind of puritanical, antitechnological view of the world. Purity and simplicity become desired ends in themselves, to the exclusion of other goals such as feeding and sheltering the inhabitants of the planet.

**Manipulation of Environmental Anxieties.** The hidden agenda of many of those who promote the greening of American society and government (environmental organizations, political leaders, and the media) is their own self-interest. But a by-product of their disinformation is progressively more widespread acceptance of junk science. Clouding the public's understanding of the development of new, biotechnology-derived varieties of crop plants, certain environmental organizations and the media have raised misinformation to an art form. What has been lost is the ability to discriminate between plausibility and reality.

**Informational cascades.** "The wisdom of crowds," the belief that collective sound judgement trends toward the right answer and is superior to the predictions of individuals (even expert individuals) is a popular idea. But there is an opposing force at work as well: "informational cascades," which occur when individuals are swayed by knowing the views of others which may be incorrect. **A corollary of this phenomenon has been captured by an old inside-the-Beltway quip, "Anything said three times becomes a fact."**

**Many informational cascades give rise to erroneous conclusions even if most people started out knowing better. This helps to explain why so many people (including policymakers and opinion leaders) have misapprehensions about the risks of products or technologies such as biotechnology, nuclear power, and chemicals.**

**What, then, are the take-home lessons for health and food professionals and scientists who need to communicate the risks and benefits of new products or processes?**

**First, while emotional responses to questions of technological risk may be inevitable, they can and should be tempered with knowledge.**

**Second, that knowledge needs to be imparted in a way that is scrupulously honest but also simple enough to be understood. Concrete examples, especially relevant historical analogies, are often useful.**

**Third, in both public forums and (especially) as advisors to government, experts should insist**

**on the inextricable linkage between science and public policy.** At every opportunity, they should reinforce the importance of science and the scientific method (for science is organized knowledge, and knowledge is power).

**Fourth**, there has been far too much tolerance of outright misrepresentation and mendacity in what are fundamentally scientific dialogues. **Far too often, government policymakers have welcomed anti-technology activists to their advisory committees, hearings, conferences, and bosoms.** (An example is USDA's Advisory Committee on Biotechnology & 21st Century Agriculture, which boasts an astonishing array of antibiotechnology ideologues and activists and organic food advocates who have a blatant conflict of interest. The selection of this committee is outright malfeasance by USDA officials.) **Often, bureaucrats use the high-profile demands of antiscience groups to justify extreme (and unnecessary) regulatory nostrums. This strategy has been perfected by the EPA.**

**Although freedom of expression and vigorous debate are conducive to science and science policymaking, we must distinguish science from pseudoscience.** Organizers of academic conferences on evolutionary genetics do not, after all, invite Creationists; and applied-physics meetings do not include sessions on the newest designs for perpetual-motion machines.

**There are also well-intentioned members of the academic, government, industrial, and nonprofit communities who would attempt rational public dialogue with biotech's antagonists, but I advise against it.** The hidden agenda of many of these activists is to impose their will over others' and to dictate what scientific research may be done, how it may be done, and which types of products may be produced and marketed.

**Whether the issue is the use of a new agricultural technology or chemical, or the siting of an oil refinery or nuclear power plant, knowledge is power : the power to avoid the tyranny of small, vocal groups of zealous activists.**