Food Is Fundamental, Fun, Frightening, and Far-Reaching*

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THE theme of this paper is that food is fundamental, fun, frightening, and far-reaching. By far-reaching, I mean that food is foundational, that is, the system evolved to deal with problems of food selection is the source of many general behavioral and mental adaptations: with respect to the origin of adaptations, food is often first. After a brief introduction, I will expand on each of the concepts represented by the F words.

Freud and Food

Freud chose to frame the clash between our biology and society in terms of the mastering and socialization of our sexual impulses. It seems to me that he would have had a stronger case with eating. Although both food and sex are biologically basic, the need for food is more frequent, more compelling, and frankly, more important in both daily life and in the evolution of animals and humans. Our desire to promptly consume anything that looks appetizing must be tamed by the process of civilization; we cannot grab an attractive morsel of food that is in someone else's possession, just as we cannot engage in sexual activity with any person who appeals to us. The meal, with its elaborate culinary preparations and social conven-

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tions, is a far cry from wolfing down foods. There is actually a more elaborate cultural transformation of our relationship to food than there is to sex. This results, in part, from the fact that we are much more inclined to eat than to have sex in public.

The cultural evolution of the trajectory of food in human life has been described eloquently by Leon Kass (1994), in his magnificent book, The Hungry Soul. He describes this transformation as the change from fressen (feeding) to essen (eating). The dominating role that food plays in animal nutrition is supplanted, in large part in humans, by other functions of food. As Kass (1994, p. 71) notes, man is the only animal that does not move in the line of his digestive axis—which is an interesting consequence of our upright posture. The transformation, as described by Kass, from food for the body to food for the soul, is redolent with the raw materials that make for a veritable festival of Freudiana. Consider:

1. Much of the earth is potential food for some animal. Food is a relational concept; one species' food is another's mate.
2. Eating is a profoundly transformational act. According to Kass "Eating something means transforming it, chemically as well as physically. Eating comprises the appropriation, incorporation, and de-formation of a complex other, and its homogenization into simples, in preparation for their transformation into complex same" (p. 26).
3. On the one hand, it is the matter, and not the form, that matters in eating. All edibles are decomposed into a common set of molecules: glycine is the same glycine whether from a pig or corn.
4. On the other hand, what persists through the organism's lifetime is its form, not its substance (Kass, 1994), so the material transactions in eating are life sustaining at the same time that they have no permanent status in the flux of matter throughout the lifetime.
5. Finally, there is what Kass calls the great paradox of eating: "that to preserve their life and form living forms necessarily destroy life and form" (p. 12).

The reasons that food and eating undergo a more profound transformation, in the civilizing process, than sex, are:

1. From birth, food is a central part of life: indeed, even for Freud, weaning involves the first developmental crisis. We don't have to infer the desire for food in infants, as Freud asks us to do for sexual desires.
2. The great frequency of eating, the efficiencies of cooperation in food procurement and preparation, and the convenience of eating together, render eating into a social, or public act, for humans at most places and historical times. The simple solution of carrying out a biological function outside of the public eye, which works well for sex, does not apply to eating. Hence, the process of eating has to be transformed by the process of civilization, so that a basically messy process, in which others may look into our body via our mouth, and observe the transformation of food, must be controlled. As Kass points out, table manners show consideration of others, so that they will not be disgusted by our food incorporation, our moist and messy transformation of identifiable forms into a disgusting wad. He says: "No involuntary participation in someone else's digestion" (p. 152).

Food Is Fundamental

The most informative single piece of information about an animal species, other than its taxonomic position, is its diet: what does it eat? This has major implications for its pattern of life and abilities. Important taxonomic categories, such as the mammalian carnivores and insectivores, are named for their eating habits, and the terms omnivorous, herbivorous, and carnivorous are basic descriptors of animals. Animals that eat a wide range of foods (generalists) are typically quite different in appearance and behavioral repertoires from animals that eat only one or a few types of foods.

Homo sapiens is an omnivorous, generalist species. Around the world, almost anything that has nutritional value is consumed by humans. The virtue of being a generalist are obvious: more ways to obtain adequate nutrition, and hence more resilience in the face of blights or the presence of other species competing for some of the same foods. But there are prices to pay. Generalists can be less adapted, in their enzymes or their capabilities, to deal with problems specific to a particular type of food. Generalists risk ingesting toxins, because many toxins exist in nature, spread across a wide range of potential foods. And generalists risk nutritional imbalance. A koala that eats only eucalyptus leaves has no such risk; it is adapted to survive on the nutrients that eucalyptus has to offer. Similarly, a lion rarely risks imbalance, because the zebras it eats already contain the range of nutrients it needs. But the generalists happens upon many potential foods that have nutritive value, but are not complete nutrients. Appropriate combinations of foods must then be selected.

It is extremely difficult to compose a set of criteria that will, on the basis of sensory properties, determine the edibility of the wide range of objects in the environment that might be foods. For this reason, food identification for generalists is guided almost entirely by experience with the consequences of ingestion. Given the fundamental importance of food, there are surprisingly few genetically-based constraints and predispositions. In humans (and rats), genetic factors include: 1) biases to prefer sweet tastes and to avoid bitter tastes; 2) a tendency to be interested in new potential foods (neophilia), but at the same time to be cautious about trying them (neophobia); and 3) some special abilities that allow for learning the relationship between a food and the consequences of its ingestion, which may occur hours later (Rozin, 1976; Rozin and Schulkin, 1990).

According to many formulations of human evolution, the move from jungle to savannah, and the consequent change in foods, played a critical role in the evolution of the distinctive features of Homo sapiens. The challenge of procuring food, and selecting a

balanced diet, with low levels of toxins, was surely one of the major selecting forces in early human evolution.

In human cultural evolution over the last ten or so thousand years, perhaps the most fundamental advances had to do with food: the development of agriculture and domestication. These early advances freed humans from a day-to-day dependence on forces beyond their control, allowed for a population explosion, and as described eloquently by Jared Diamond (1996), became the foundation for many of the other great "advances" of human culture, most particularly in the domain of technology.

Of course, there is the quintessential apple exchange, a food act that sets the course of human history, according to the Old Testament. And there is the less disputable fact that the fetus has a principally nutritional tie to its mother, continuing in the nursing relationship following birth.

In modern human life, at the end of the 20th century, food remains a major source of pleasure and a major part of daily life. Unlike mammalian carnivores or herbivores, where the search for and ingestion of food probably occupy most waking hours, cultured human beings do not spend a majority of their waking time in eating-related activities. However, around the world, more money is still spent on food than on any other major category of activities (e.g., housing, leisure, protection) (Samuelson, 1990). As food becomes abundantly available and affordable in the developed world, proportionately less is spent on food (only 13% of income in the United States), and worry about excess, rather than shortages, may become the predominant theme. But among hunter gatherers or Americans, from infancy to old age, the pleasures and worries about food are many.

Food Is Fun

Eating is an act laden with affect. It involves an extremely intimate exchange between the environment and the self, two enti-

ties that are ordinarily quite separate (except in the act of breathing, as well as eating). The insulated, safe, self, protected by skin from the rest of the world, experiences a material breach of this boundary a few times every day in the act of eating. The world enters the self.

This is an act that be exquisitely pleasurable, but also frightening; an act that nourishes, at the same time as it increases the chances of death or illness by toxins and micro-organisms.

The intake of food happens at one and only one locus: the mouth. This largest of the breaches in the sheath that protects the body is the principal material incorporator of the outside world. It is the last defense, the point at which the critical decision of incorporation occurs: swallow it or spit it out. It is no wonder that people care deeply about what goes in their mouth: the mouth is interested in incorporation, but fearful of it; it is rarely neutral about what enters it (Rozin et al., 1995).

The physical risks of eating are amplified by the psychological risks (and benefits). On the basis of experience in the natural world, it is entirely reasonable that a person would expect that the foods one eats would influence what one is. Here, unlike the discussion in the introduction, it is the form, rather than substance of the food, that matters. Generally, when two entities "mix," the product displays some combination of the characteristics of the components. Why should this not be true for the mixing of a food with a person? In traditional cultures, this relationship is acknowledged in many specific beliefs, under the general rubric of "you are what you eat." This transfer of properties holds for physical properties such as color or growth rate, behavioral properties such as speed of movement, and intentional properties, such as the harm an enemy wishes or the good will wished by a friend.

Although "you are what you eat" is explicitly denied by adults in developed countries, on account of their knowledge of the process of digestion, the belief is present, implicitly. We were able to show, using an Asch Impressions design (Nemeroff and Rozin, 1989), that college students were more inclined to believe a cul-

tural group described as turtle eaters would have turtle properties than an otherwise identical group described as wild boar eaters.

Almost all potential foods are either liked or disliked; we are rarely neutral. Some food likes and dislikes seem to be culture-wide, while others vary within culture. For example, in American culture, there is a widespread liking for ice cream, a dislike for raw meat, and a wide split in degree of liking for lima beans or liver. Most people have substantial choice in foods, over and above the "choices" made by their culture. As a result, most people choose foods they like, and hence eating is, for the most part, a pleasant, positive experience. Over and over again, although it is true that some foods are consumed primarily out of necessity or for instrumental reasons (gaining nutrition, losing weight, or being a member of the group), the principal basis for food choice is liking for the flavor.

Although each person is a rather distinctive bundle of food likes and dislikes, we know surprisingly little about how these are acquired. Multiple forces are at work in shaping the attitudes to culturally prominent or culturally despised foods: availability, influence from parents, peers, teachers, and the media. Although we cannot specify how these work, the result, say a preference for French fried potatoes over tofu by Americans, is over-determined. However, the origin of the within-culture differences in likes, for broccoli, beets, or beef, for example, are obscure. While it is almost certain that social forces play a major role in the acquisition of likes and dislikes, the major early social inputs seem amazingly ineffective in producing life-long likes. Thus, the correlation between food likes of parents and their adult children is in the range of 0 to 0.3, in comparison to attitudes in the political-moral arena, where correlations are typically between 0.3 and 0.6 (Rozin, 1991). Furthermore, in spite of the greater role of the traditional mother in the process of food selection, preparation, and feeding, the mother-child preference correlation is no higher than the father-child correlation.

The array of positive food choices available to most earthlings is greatly expanded by culture. Transport and commercial advances allow for delivery of local foods to any part of the world. Guided by the innate and widely acquired dictates of the palate, cultural institutions such as food companies have been able to create foods more delectable than any that had existed naturally on earth: sweeter, as with coca cola or candy; fatter, as with ice cream and duck liver, salty as with smoked fish, and fatty and aromatic, as with chocolate. Catering to the pleasures of the palate has been a major business of societies, and it motivated such major historical events as both the colonizing of the Americas and the search for routes to Asia by Europeans for hundreds of years.

The more variety of foods available to us, and the variety in the first world is now extraordinary, the more we can select those morsels that are most appetizing.

Food Is Frightening

The frightening part of food, in the past, was largely the prospect of no food. There were also the possibilities of foods contaminated by micro-organisms or with high levels of toxins. A few things have happened in the middle to late 20th century that have turned the tables on food.

First, in the developed world, we now have an excess of food. The worry has shifted from having too little to eat, to having too much.

Second, the technology of food manufacture has allowed for an exquisite variety of highly palatable foods. The human biological urge for sweets, and probably fats, can be indulged with foods that are higher in both than any in nature.

Third, advances in microbiology and nutrition, often implemented by government regulations make the food supply very low in toxins or harmful micro-organisms. Nutritional supplementation and guidelines make it relatively difficult to consume a seriously imbalanced diet.

Fourth, as a result of what is sometimes called the epidemiological revolution, infectious and other acute diseases have been greatly reduced in incidence, and can be cured in the great majority of cases. The result of this has been a substantial increase in human longevity, and a shift from acute infectious to chronic degenerative diseases as the main cause of death.

Fifth, information about the health effects of different patterns of food intake, and different foods, has become widely available, through the media. These results are frequently reported, "as they happen," on the basis of single experimental or epidemiological studies. This availability of information has not been accompanied by education of the public on risks and benefits, basic concepts of probability, and on the gradual and rocky road, in science, from ignorance to knowledge. Hence, the public often takes findings to be facts.

This has led, at least among Americans, to frequent new concerns about particular dietary items, and has promoted tendencies to ignore it all, or to overact to it all, or to develop simplifying heuristics that take the uncertainty out of every bite. One unfortunate heuristic is that foods are either good are bad for health. The level of intake drops out of the equation. Thus, a substantial percent of Americans think of fat and salt as toxins: even a trace of each in food is considered unhealthy (Rozin, Ashmore, and Markwith, 1996). This belief establishes a goal that is both extremely unhealthy, and unattainable.

So, in modern life in the food world, we have many more opportunities for pleasure, and many more perceived opportunities for harm. Food is both a pleasure and a poison. In the balance of these beliefs lies much of the quality of life, and something of the quality of health, as well. It is my perception that the American upper and upper-middle classes have gone too far toward the poison end of the dimension, in their excessive worries about body weight, calories, the presence of toxins in foods, and the proper diet to maximize health. Every bite, for some people, is fraught with conflict. Many Americans, especially women, would seem to be willing to give up eating, one of our greatest pleasures,

rather than face the battle between pleasure and poison with every bite. This is less illustrated by the explosion of anorexia and bulimia among American women, than by their "normative discontent" (Rodin, Silberstein, and Striegel-Moore, 1985) about weight, body image, eating, and food. Thus, for example, in a recent survey of college students on six campuses across the United States, over 10% of women claim that they would be embarrassed to buy a chocolate bar in the store, and about 30% say they would be willing to opt for a nutrient pill, safe, nutritionally complete, and cheap, as a substitute for eating (Rozin, Catanese, and Bauer, 1999). These American phenomena are primarily expressed in individuals of upper-middle and upper classes, and serve to further increase class differences among Americans; we are creating a health as well as wealth aristocracy (Leichter 1997).

With this undesirable state of affairs in mind, I set out with some colleagues to study the way food functions in life in various parts of the United States and in a few countries (Rozin, Fischler, Imada, Sarubin, and Wrzesniewski, 1999; Rozin, Catanese, and Bauer, 1999). We developed a short, two page survey, that samples attitudes to food, eating, diet, and health. It was administered to college students and adults in four countries: Flemish Belgium, France, Japan, and the United States (Rozin, Fischler, Imada, Sarubin, and Wrzesniewski, 1999). A modified version was later administered to college students in introductory psychology classes at six American Universities (University of California at Santa Barbara; Arizona State University; University of Houston; University of Wisconsin; Pennsylvania State University; and the University of Pennsylvania—the only private school of the group) (Rozin, Catanese and Bauer, 1999). I will briefly summarize this as yet unpublished material.

Statistical analysis of the items revealed that they clustered into five to seven groups or factors (somewhat different in the two studies). One had to do with concern about weight and calories (dieting, etc.); a second with a health orientation to foods (eating foods from which salt or fat had been removed); a third was

beliefs about the relationship between diet and health; a fourth had to do with the importance of food in life (enjoyment of foods, anticipating good meals); a fifth with severe reactions to food such as obsessing about diet and exercise and purging; a sixth with the sense that one is a healthy eater; and a seventh having to do with default thinking about food, in terms of either nutrition/health or pleasure (e.g., when you think of pasta, does it make you think of bread [carbohydrate] or sauce [culinary, oriented to food as experienced], or when you think of fried egg, do you think of breakfast or cholesterol?).

On most of these factors, in comparison to Americans, the French showed a substantially more food/pleasure as opposed to worry oriented response (Rozin, Fischler et al., 1998). The only factor for which there was only a small difference had to do with beliefs about the importance of food for health. Generally, the Flemish Belgians were similar to the French, and the Japanese were somewhere between the Americans and the French. In all four cultures, women showed more worry about food, and men more of an orientation to the pleasures of eating. Ironically, although the Americans were the leaders in concern about food and health and modification of their diet to make it healthier, the French subjects considered themselves healthier eaters!

Another interesting difference between French and Americans emerges from an analysis of medical practice (Payer, 1988). French medicine conceives of disease as some kind of internal imbalance, as a weakness in what is called the "terrain." American medicine is more inclined to think of disease as caused by harmful external influences, such as germs or toxins. As a result of this distinction, American medicine prescribes more antibiotics, while the French are much more inclined to suggest rest, vacations, or a stay at a spa.

The data from six regions of the United States were surprising, in that no substantial regional differences appeared for any of the factors (Rozin, Catanese, and Bauer, 1998). Californians as a group did not seem more health oriented or worried about diet than midwesterners or easterners. On the other hand, there were

massive gender differences at all locations, confirming the well known fact that diet/weight concern is much greater in females, and establishing the less well-known phenomenon that women are much more concerned about food and health, over and above concerns about body image and weight. The magnitude of the U.S. female concern about eating is illustrated by the findings on embarrassment at buying chocolate or trading eating for a nutrient pill cited above.

The food-pleasure attitude of the French, in comparison to the food-poison attitude of Americans presumably leads to the popularity of all types of foods modified to be "healthier" (low fat, low salt, no additives) in the United States. These American concerns, which surely reduce the enjoyment of eating and increase the expense of foods, do not pay the obvious dividends they are intended to produce. Life expectancy is about the same in France and the United States (actually slightly higher in France), and cardiovascular disease, the main target of dietary modification, is substantially lower in France. In what is described as the "French Paradox," the French eat a higher fat diet than Americans, have higher levels of blood cholesterol, do not worry about health in diet, and yet have a cardiovascular disease rate about one-third less than Americans (Renaud and Logeril, 1992). It is of interest that aside from ignoring the French paradox (or being irritated about it), Americans and the American medical community (especially medical researchers), seek to explain it in dietary terms. The most popular account has to do with a protective effect of red wine or alcohol. This may well be a contributing factor, but it is interesting, especially in light of Payer's (1988) analysis of French versus American medicine, that the set of American proposed accounts of the French Paradox is almost entirely about protective things that the French eat. Consider a number of highly likely alternatives that are rarely if ever mentioned: 1) genetically based metabolic differences; 2) the lower stress of the French lifestyle, especially with respect to food; 3) the fact that French eat fewer calories per day than Americans; 4) the fact that the French diet is more varied (Drewnowski et al,, 1996); 5) the

possibility that the French exercise more (primarily by walking and bicycle riding); 6) the fact that the French eat more slowly and rarely snack.

It is hard not to conclude from the food attitude and health statistics from the French that they are doing something right, in comparison to the Americans; the trade-off between pleasure of eating and long term health is not nearly as stark as Americans make it out to be.

Food Is Far-Reaching

For non-human animals, food functions primarily as a source of nutrition. In the service of that goal, the food system is linked up with a pleasure-displeasure system, such that being without food causes displeasure, and finding it produces pleasure. It is this pleasure that helps to shape behavior such that, by the principle of reinforcement, acts that lead to food availability become more frequent.

For humans, the nutritional framing of food is only one of many frames. This broadening of the functions of food occurs through a cultural parallel to a fundamental principle of evolution: preadaptation (or exaptation). As developed by Bock (1959) and Mayr (1960), preadaptation may be the principal account for major changes in biological evolution. The basic idea is that many innovations involve re-using existing adaptations, rather than truly new adaptations. It is somewhat like the distinction between genetic recombination (like preadaptation) and mutation. A structure evolved for one function later assumes other functions. This change can result in the loss of the original function, as when the jaw articulation of reptiles is transformed into the middle-ear bones of mammals. Or, the result can be shared functions. A particularly appropriate example of this is the human mouth. It clearly evolved as an eating and breathing organ, with teeth and tongue adapted for food handling. But, with the advent of linguistic abilities, the mouth assumes a new function: as the output organ for speech. The teeth and tongue, evolved under selection

pressures having to do with optimal processing of food, become essential players in the articulation of speech: teeth and tongue were "preadapted" for language.

The transformations of food, by the process of preadaptation, extend to many domains. In the form of cuisine, food becomes a multivaried symphony of tastes and experiences, an art form. In the social domain, food becomes the center of family interaction around the dinner table, a means of welcoming others through the offer of food as hospitality, and a principal means of establishing ethnic identity and distinctiveness. Sharing food is one of the fundamental ways that one can display, establish, and maintain interpersonal intimacy. By contrast, lack of sharing expresses social distance. This is particularly clear in food transactions in Hindu India (Appadurai, 1981). However, even in American society, acts of food sharing carry strong implications for relationships (Miller, Fiske, and Rozin, 1998).

Food becomes a moral entity, such that what one eats, the past history and preparation of ones foods, and the contexts in which they are eaten, become statements about ones worth. Communion with religious entities and preservation of the purity of the body, a moral concern in some cultures, devolve around food. Food has been described as a "biomoral" entity in Hindu India (Appadurai, 1981).

Finally, food and, most particularly, food vocabulary, come to be used metaphorically to describe other aspects of life (Lakoff and Johnson, 1980). In this clear case of preadaptation, we say X had a bitter life, Y is a sweet person, and that we cannot stomach or digest Z's ideas.

The culinary, social, moral, and metaphorical transformation of food constitute food as a foundation for other functions, which is the final section of this paper. Many of these transformations, especially those in the social/moral domain, are abundantly described in Kass' *The Hungry Soul* (1994); indeed, the purpose of this book is to show how food is woven into the very fabric of civilization. The full title of the book (*The Hungry Soul: Eating and the Perfection of Our Nature)* captures his position. "The argument is

thus an ascent-from nature to human nature to human nature culturally clothed by the just, then the noble, then the holy—but an ascent that remains in touch with its beginnings..." Kass' thoughts about the central linkage between human food-relations and human civilization are illustrated in the following quotes or paraphrases from his book: Having established humanity with a cannibalism taboo and offering food to strangers, we now "sow the seeds of community in breaking bread together. Company (from com-, "together," and panis, "bread") comes to accompany the bread" (p. 131). "The manner of eating even more than what gets eaten, expresses the humanity of the eaters." At the table, we face each other, not the food. And unlike animals, we don't eat our food off the ground. We sit down and abandon mobility. "Under the table" means the opposite of upright conduct (Kass, 1994).

In the peculiar social situation of the world of food abundance in late 20th century developed cultures, the nutritive value of food has become a moral issue for some. Just as, in the past, drug use has taken on immoral status, and as currently smoking is entering into the immoral domain, we now see the beginning of the moralization of food indulgence (Rozin, 1997). There is recent evidence suggesting that for many American college students, consumption of a junk food diet has negative moral implications (Stein and Nemeroff, 1995).

The process of preadaptation, the exportation of a food system to other domains, is well illustrated by the cultural evolution of the emotion of disgust (Rozin, Haidt, and McCauley, 1993; 1999; Rozin et al., 1997). We presume that disgust derives from the food rejection system of mammals; one feature of the disgust expression, the gape, is characteristic of many mammals as a response to a bad tasting food. In our initial characterization of disgust, we presented it as a food rejection system centered not on the sensory aspects of a food, but on knowledge of its nature or origin (Rozin and Fallon, 1987). Thus, worms are disgusting because of what they are, rather than what they might taste like. Thus, the core of disgust is offensiveness; in accord with Angyal

(1943), a psychoanalyst who wrote a seminal paper on disgust, we define disgust as "fear of oral incorporation of an offensive object" (Rozin and Fallon, 1987). These offensive objects, such as worms, cockroaches, rotten meat, etc., are so negative that they have a contamination property: if they touch something edible, they render it inedible (Rozin and Fallon, 1987). We have incorporated this property into our definition of disgusting objects. This property sharply distinguishes disgust from rejection based on sensory properties (distaste), because distasteful foods are generally not contaminating.

Our sense that disgust is, at its core, a food-based emotion is confirmed by the interpretations of other emotion scholars, including Darwin (1876). The argument for the food origin includes the term itself (disgust meaning bad taste), the facial expression that features either oral expulsion or closing of oronasal apertures, and the distinct physiological sign of disgust, nausea. Nausea is a sensation that specifically serves to deter eating. Miller (1997), in a rich analysis of the nature of disgust, is unconvinced of the food origin.

For human adults, the domain of the word "disgust", and the sense of disgust, is much wider than food or potential foods. Our analysis of disgust elicitors suggests that many of the non-food elicitors fall into the category of properties shared between humans and animals; production of excretory products, sex, especially with inappropriate partners, gore or any indication that we have mushy insides, and death (Rozin, Haidt, and McCauley, 1993, 1999; Haidt, McCauley, and Rozin, 1994). In accord with the frequent observation that humans, in all cultures, seek to distinguish themselves from other animals, disgust can be understood as a form of denial that we are animals, a turning away from animal properties or reminders that we are animal. The animal property that is, perhaps, most threatening to humans, is mortality. In accord with Becker (1957), we conceive of mortality as the great dilemma of human life, and see disgust as a way to suppress concerns about death, by causing us to withdraw from contact with death, and more generally, from reminders of our animal nature.

We are persuaded of the centrality of death avoidance for disgust by two observations. One, the quintessential odor that elicits disgust is the odor of decay, that is, of death. Second, results from psychometric analyses of our disgust scale (Haidt, McCauley, and Rozin, 1994) indicate that death-related items are among the most predictive of total disgust sensitivity. Our general idea of rejection of our animal nature as a central part of disgust is very congruent with Miller's (1997) analysis in *The Anatomy of Disgust.*

There are two other categories of disgust elicitors that do not seem to relate to our animal nature. One is interpersonal disgust, elicited by close contact with people who fall outside relatives and friends. Interpersonal disgust explains why many people do not want to wear used clothing, or share food, or buy a variety of used products. It also forms the basis for Hindu food rules that are fundamental in maintaining the hierarchical structure of the caste system. Food prepared by people of lower caste has their essence in it, and hence will be depurifying or contaminating when consumed by someone of a higher caste.

The final category of disgust is what we call moral. Disgust is often used as an indicator of moral disapproval, as when we say that the way X treats his wife is disgusting. In general, our survey of such usage in a few languages suggest that the immoral act that is labeled disgusting is usually one that involves a physical act, such as murder or rape, as opposed to a more "mental" crime such as swindling (Rozin, Haidt, and McCauley, 1993, 1999; Haidt, McCauley, Rozin, and Imada, 1995). There seem to be two pathways through which, in cultural evolution or individual development, animal nature disgust could be extended to moral disgust. By one pathway, the word and sense of disgust generalize from body-oriented domains to any offensive situation, including moral violations such as lawyers chasing ambulances, or mail theft. By a second pathway, insofar as a culture deems disgusting/polluting acts to be immoral, then some of the range of normal disgust elicitors take on moral properties. Thus, as Haidt, Koller, and Dias (1993) have shown, while eating road-kill dog

meat is disgusting to virtually everyone, it is immoral only to some. Educated Westerners tend to restrict the term "immoral" for acts that harm other people, a definition that does not include eating road-kill dog. On the other hand, many people in the world believe that maintaining the purity of the body is a moral duty. Such a view is characteristic of Hindu Indians; a major feature of their moral system involves divinity and purity. Unlike the Western system, in which immorality is focussed on acts that harm others, in Hindu India, acts of disrespect or impurity are also immoral. Shweder and his colleagues (1997) have called this purity-oriented moral system the divinity moral code. We have suggested, with supporting data, that the emotion of disgust has a special linkage with the divinity moral code (Rozin, Lowery, Imada, and Haidt, 1999).

The range of disgust elicitors varies according to culture. We believe that in the United States, disgust focuses on food, animal nature, and interpersonal elicitors, whereas in Hindu India, it has evolved further from its origins, with central foci in the interpersonal and moral domains. The sense of contagion (contamination), as a property of disgust, shows the same spread of elicitors from body products and food to moral offense.

The cultural evolution of disgust is probably paralleled by the development of disgust, although there is little data on this point. Full food-related disgust (including disgust at body products) seems to develop first, present in full form somewhere between ages four and seven years, when one first sees the contamination response.

Food, Formality, and Finesse

The discussion of the elaboration of disgust to realms so far from food helps to frame disgust as the protector of the soul, instead of just the body; from out of mouth to out of mind. Disgust becomes, in many ways, the emotion of civilization, in the

sense that much of the civilizing process involves developing distinctions between animals and humans, and a special sensitivity. As Norbert Elias (1939/1978) summarizes this situation in his History of Manners in medieval Europe: "...people, in the course of the civilizing process, seek to suppress in themselves every characteristic that they feel to be 'animal' " (p. 120). Or, as Leon Kass notes "An activity that is inherently ugly is beautified by graceful deed and tactful speech. An activity that is violent and destructive is tamed by gentle manner that keeps its destructive character mostly out of sight. An activity that deforms and dissolves living forms is given formality of its own by the work of the human intellect" (p. 154).

The act of eating displays one of our fundamental biological functions. The open mouth is the only opportunity for another to look inside our bodies, and it is not a pleasant sight, the more so when we are chewing a moist mass of food. And yet, far from the privacy of sex and excretion, we are looking directly at the face of those who eat, at table, and opening our mouth to speak, as well. The challenge to being civilized reaches a peak in eating at table, as Kass points out. The challenge is to suppress disgust in others in a situation that is rich with potential disgusting events. Kass points out that table manners show consideration of others, so that they will not be disgusted by our food incorporation, our moist and messy transformation of identifiable forms into a disgusting wad. His "rule" is: "No involuntary participation in someone else's digestion" (p. 152).

Finale

I have tried to show the many functions of food in human life, a task made easier by Leon Kass' *Hungry Soul.* I have said all that I know, at the same time as I have run out of F alliterations. However, since I have not run out of alliterations in general, I will state that one of the great problems in understanding humans and food is to understand how humans, in the East and West, come to divide potential foods into the Yum and the Yuch. And finally, to summarize the theme of this paper with a concurrent non-F allit-

eration: EATING IS ESSENTIAL, ELATING, EMOTIONAL, AND EXPANSIVE.

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