REVIEW

The Meaning of Food in Our Lives: A Cross-Cultural Perspective on Eating and Well-Being

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ABSTRACT
Humans are biologically adapted to their ancestral food environment in which foods were dispersed and energy expenditure was required to obtain them. The modern developed world has a surplus of very accessible, inexpensive food. Amid the enormous variety of different foods are "super" foods, such as chocolate, which are particularly appealing and calorie dense. Energy output can be minimal to obtain large amounts of food. In terms of education (eg, in nutrition and risk-benefit thinking) and environment design, modern cultures have not kept pace with changes in the food world. Overweight and worrying about food result from this mismatch between human biological predispositions and the current food environment. The French have coped with this mismatch better than Americans. Although at least as healthy as Americans, they focus more on the experience of eating and less on the health effects of eating. They spend more time eating, but they eat less, partly because of smaller portion sizes. French traditions of moderation (versus American abundance), focus on quality (versus quantity), and emphasis on the joys of the moment (rather than making life comfortable and easy) support a healthier lifestyle. The French physical environment encourages slow, moderate social eating, minimal snacking, and more physical activity in daily life.

KEY WORDS: obesity, portion size, physical activity, food attitudes, French paradox

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BACKGROUND

Human Primate and Basic Food Choices

Humans have a long history as foraging primates and a relatively short history as settled creatures with a secure food supply resulting from the advances of agriculture and domestication. We are basically adapted to our ancestral environment rather than our contemporary environment. In our ancestral environment, securing enough food for survival was a serious challenge. In the process of searching for food, there is exposure to risks, such as predation, and the expenditure of energy. It is necessary to expend energy to procure energy. Given that foraging is essential but potentially dangerous and wasteful, and given that getting food is a very basic and persistent need, it is not surprising that there has been great evolutionary pressure to develop an efficient foraging system. Such a system, often described as optimal foraging, involves extracting the energy needed from the environment while spending as little energy as possible in doing so. A large literature has demonstrated the exquisite adjustments in foraging patterns and food choice made by all sorts of animals to minimize the amount of energy spent to obtain adequate energy. For example, research shows that mussel-eating crabs prefer the very size of mussels that produces the highest energy yield for the energy spent in extracting the meat from between the shells.[1]

Even when adequate food was available, humans, as omnivores or food generalists, faced additional difficulties. The natural world is filled with toxic plants, animals carrying infections, and edible foods that are nutritionally incomplete. It is not possible to identify a set of nutritionally complete foods that are nontoxic solely on the basis of their sensory properties. This is a daunting task, with a high cost for mistakes. Most of our food choice, in the ancestral environment and in the contemporary developed world, is based on learning. For modern humans, most of this learning is done second hand, by cultural transmission. But there are a few innate, genetically based guidelines for food selection that humans share with other mammalian generalists, such as rats. First, there is a tendency to be interested in new foods but cautious about trying

them. Second, there is a special ability to learn about the delayed positive or negative effects of eating a new food. Third, there are innate taste and texture biases that predispose the human primate (and other primates, as well as species such as rats) to consume edible entities and to avoid inedible ones. These include present-at-birth preferences for sweet tastes, which in nature are associated with fruit and, hence, energy sources, and an aversion to bitter tastes, which in nature are associated with toxic substances. There is probably also an innate preference for fatty textures, which are associated in nature with high energy density.

Beyond Nutrition

In the evolution of culture, by the evolutionary process of preadaptation, food comes to serve functions other than nutrition, which puts its nutritional aspects in a broader and more complex context. Food becomes a social vehicle, allowing people to make social distinctions and to establish social linkages, for example, by sharing food. Food assumes symbolic functions and takes on moral significance, as with pork for religious Jews and Muslims and beef for Hindus. And food becomes a medium for aesthetic expression, giving rise to elaborate food preparations and cuisines that cannot be justified solely in terms of nutritional factors.

Food in the Contemporary Developed World

Reversal of the ancestral environment. In contrast to the ancestral environment, in the contemporary developed world, (1) there is a surplus of food; (2) food is easily accessible, and it does not require significant energy expenditure to secure it; (3) there is an enormous variety of foods (which promotes greater intake); and (4) technology has developed "super" foods, such as chocolate, that are much more appealing and calorically dense than almost any food in nature. The human adapted to the ancestral environment but in the contemporary environment sometimes shows responses that are maladaptive. That is, there are mismatches between our biological predispositions and the new food environment that we have created. For example, in the ancestral environment, it is generally correct to assume that if something looks like a tiger, it is a tiger. Appearance equals reality, and we respond appropriately. But in the modern world of images, many of the things we see are images of things, not the things themselves. Certainly, we see many more harmless images of tigers than we see real tigers, so it is not always correct to think, "Looks like a tiger, *is* a tiger." We have shown that humans are reluctant to consume a piece of what they know is good chocolate but that is shaped to look like dog feces. Deep down, there is a potent thought that "Looks like dog doo-doo, *is* dog doo-doo."[2]

Lack of cultural compensation for food advances. In many ways, developed cultures in the late 20th and early 21st centuries have not compensated for food-related changes. One broad change has been the shift of many food risks from acute (eg, food poisoning) to long term (eg, links between diet and heart disease or cancer). This shift has been called the epidemiological revolution. Epidemiologists and other scientists frequently present findings that link long-term dietary practices and degenerative diseases. However, humans are not well adapted either to understand or act on information about distant and low probabilities. This type of risk was irrelevant in our ancestral environment. Modern cultures have not compensated for these changes and provide little or no education about nutrition, the balance of risks and benefits, basic probability, or the nature and progress of science. Consequently, modern humans are ill-prepared to make intelligent decisions regarding such matters. Faced with information overload about food risks, individuals tend to just categorize foods as good or bad and do not think in terms of amount of intake. As an illustration of this, 25% to 33% of a sample of Americans think that any fat or salt at all in the diet is less healthful than a fat- or salt-free diet. Similarly, many think that a tablespoon of ice cream has more calories than a pint of cottage cheese.[3] Most people think that evidence constitutes proof, that is, that a reported scientific finding establishes a fact or relationship rather than altering the probability that a claim is valid. They do not understand that in the realm of diet and health, individual studies are just little pieces of evidence that must be fit together and integrated into generally accepted guidelines. Lay people also do not realize that there is a sociology of science and that scientists tend to promote their favorite hypotheses and risks.

Consequences. The system that evolved in our ancestral environment to balance energy intake and energy output has been overwhelmed by other factors that influence eating. These include palatability and the easy availability and low cost of food. One of the consequences is that people often overeat, and with their reduced energy output, they get fat. And, with medical and aesthetic standards for thinness, they feel bad about it. What kind of evidence do we have for this? In a study of approximately 2100 college students in 6 locations in the United States, when asked about the frequency of concern about being overweight, 57% of females and 21% of males responded "often" or "almost always," and 13.5% of females and 4% of males indicated that they are embarrassed just to buy a chocolate bar in a store.[4] With that kind of orientation to food, the American ideal of "freedom" may take on new meanings, as shown in Figure 1.

Overeating and obesity have been attributed to 4 different types of causes: metabolic, for example, a tendency to deposit fat; regulatory, for example, having a high set point for weight; psychological, for example, using food for comfort or stress reduction; and environmental, for example, being in a highly tempting or "toxic" environment.[5,6] Environmental influences will be the primary focus as we explore differences between France and the United States in terms of weight, eating, and health. Environmental differences are very important[5-8] but have been given little attention.

Figure 1. New meanings of the word "free" in the United States.

FRANCE VERSUS THE UNITED STATES

The French "Paradox"

The French seem to be healthy, seem to enjoy food more than Americans, and surely have good and rich food. Many people are surprised that the French, if anything, live a little longer than Americans. In fact, as shown in Table 1, residents in 28 other countries have a longer healthy life expectancy than do Americans (69.3 years): at 75.0 years, Japan ranks first, and at 72.0 years, France ties with Canada and Norway to rank 11/12/13.[9] It is notable that in most of the world's countries with the highest average life expectancy rates, including many in Northern Europe, residents consume diets relatively high in animal fat. Overall, the prevalence of cardiovascular disease seems to be about 30% lower in France. The work of Renaud and de Logeril documented that among males 35 to 64 years old, age-standardized annual mortality rates from cardiovascular disease and related risk factors per 100 000 people were considerably lower in Toulouse and Lille, France (78 and 105, respectively), than in Stanford, California (182). Despite that fact, the subjects' mean serum cholesterol levels in the French cities (230 and 252 mg/dL, respectively) were higher than that of the Stanford subjects (209 mg/dL).[10] The French are thinner than Americans, as is readily apparent in any walk along American and French streets. As of 2002-2003, approximately 68% of American males and 51% of American females had a body mass index ≥ 25,[11,12] the accepted boundary for the designation "overweight," compared with 49% of French males and 35% of French females.[13]

So how do the French do it? Claude Fischler, a French sociologist who studies food, and I co-led a research team to seek answers to this question. We undertook several studies among college students and representative adult men and women in France and the United States. There are substantial differences in attitudes and in the environment.

Food Attitudes

Table 2 illustrates several major differences in attitudes toward food and eating.[14] For example, compared with the French study participants, much higher percentages of men and especially women in the United States (1) associated the words "heavy cream" with "unhealthy" rather than with "whipped," the other word association choice; (2) said that they would prefer consuming an inexpensive nutrient pill to eating; and (3) said that they would prefer, at the same price, a week at a luxury hotel with average food over a modest hotel with gourmet food. However, compared with US study participants, much higher percentages of the French agreed with a statement saying that they eat a healthful diet.[14]

Overall, we found that among our study participants (both college students and representative adults), compared with Americans, the French experience less stress and more pleasure in relation to eating. This is related, at least in part, to the French focusing more on the experience of eating and to Americans focusing more on the consequences of eating. The French seem to consider eating a more important part of life, and although they eat a diet somewhat higher in fat (but lower in calories), they think of themselves as more healthful eaters.

Variety and preference for variety also seem to be important factors. Although the French diet is more varied than the

Table 1. Healthy Life Expectancy* in 2002 for Selected World Health Organization Member States Worldwide†

Rank	Country	Healthy Life Expectancy (y)
1	Japan	75.0
2	San Marino	73.4
3	Sweden	73.3
4	Switzerland	73.2
5	Monaco	72.9
6	Iceland	72.8
7	Italy	72.7
8, 9	Australia and Spain	72.6
10	Andorra	72.2
11, 12, 13	Canada, France, and Norway	72.0
14	Germany	71.8
15	Luxembourg	71.5
16, 17	Austria and Israel	71.4
18	Netherlands	71.2
19, 20	Belgium and Finland	71.1
21, 22	Greece and Malta	71.0
23	New Zealand	70.8
24	United Kingdom	70.6
25	Singapore	70.1
26, 27	Denmark and Ireland	69.8
28	Slovenia	69.5
29	United States	69.3

*Healthy life expectancy includes an adjustment for time spent in poor health. It measures the equivalent number of years in full health that a newborn child can expect to live based on the current mortality rates and prevalence distribution of health states in the population.

†Life expectancy values are listed for the first 29 of a total of 192 member states.

Adapted from World Health Organization.[9]

Table 2. Attitudes Toward Food and Eating among College Students in Paris, France, and Philadelphia, United States, Based on Responses to Word Associations, Scenarios, and Self-Assessment

Word Association/Scenario/Self-Assessment	Location	Females (%)	Males (%)
Subjects selecting "unhealthy" as their choice when asked what comes to mind when they think of heavy cream: whipped or unhealthy?	France	28	23
	United States	68	48
Subjects preferring an inexpensive nutrient pill to eating	France	10	9
	United States	32	22
Subjects preferring, at the same price, a week at a luxury hotel with average food over a modest hotel with gourmet food	France	13	8
	United States	83	70
Subjects agreeing that they eat a "healthy diet"	France	76	72
	United States	28	38

Adapted from Rozin et al.[14]

US diet,[15] in terms of representation of major food groups, the French are less interested than Americans in the microvariety (ie, hundreds of different minor variations on a basic food) that is available in the United States. In a random sample of approximately 1000 adults in France and the United States, when asked about their preference for 10 or 50 choices of ice cream flavors, 68% of the French preferred 10 choices compared with 44% of Americans. When the same adults were asked about their expectations regarding the number of choices at a good restaurant, 92% of the French said that they expected a small number of choices, in contrast to 64% of the Americans, who expected a small number (P. Rozin et al, unpublished data, 2005).

Food Environment

In general, snacking is relatively rare in France, and food is not offered much between meals. The French eat more slowly and socially, even at McDonald's, where, according to our measures, the mean eating time is 22.3 minutes in France versus 13.2 minutes in the United States.[16] Also, if food is reasonably palatable, people will generally eat what is put in front of them, so portion size is an important consideration. French portion sizes seem to be about 25% smaller, judging by restaurant portions, individual portion-size foods in supermarkets (Table 3), and portions designated in cookbooks.[16] Rolls and Diliberti and colleagues directly demonstrated that people eat more when they are served larger portions in restaurants.[7,17] Since people eat what is in front of them, it is clear that smaller restaurant portions lead to lower intake. But for store-bought individual foods, such as yogurt or pieces of fruit, it is not obvious why people just do not eat 2 of the smaller portions. The reason seems to be that people tend to eat one of anything that is within the range of what might be considered a portion size. The cultural message seems to be that things are packaged such that one package or container is the appropriate portion. Geier and I call this "unit bias."[18] In addition, megasized American grocery products (such as 2 L bottles of soda), although not consumed entirely by one individual, increase intake. In studies in which people are provided with larger and smaller containers to serve from, Wansink showed that people serve themselves larger portions out of the larger containers or packages.[19]

Input and Output

As we all know, it is not just intake; it is also output. This is physics. Energy ingested is either expended (or wasted) or deposited as fat. You can play around with this fact any way you want and rearrange the terms, but it is always there, always the same. Diets work only insofar as they increase energy output with respect to energy input. So do the French expend more energy than Americans? We do not know yet, but we think so, even though the French "work out" less than their American counterparts. The difference appears to be that they have set up their world so that it is easier to walk or ride a bike and harder to drive. Figure 2, a diagram of the set-up of a common type of French garage and living arrangement, illustrates this point. This is, in fact, the set-up where I lived in Dijon, and if I wanted to drive to the store, I had to walk down

Table 3. Comparison of Portion Sizes of Selected Food Items in Restaurants and Supermarkets

Location/Item	Portion Size (g)		% Difference in Size in United States
	France	United States	
Restaurant			
McDonald's (7)*	189	256	+ 35
Quick/Burger King (5)	207	322	+ 56
Chinese (6)	244	418	+ 71
Supermarket†			
Yogurt (modal)‡	125	227	+ 82
Fresh fruit (mean, 4 types)	431	553	+ 28
Coca Cola (modal)‡	330	500	+ 52

*Numbers in parentheses indicate the number of different items in the meal assessed at each restaurant.

†The supermarkets surveyed were Carrefour in France and Acme in the United States.

‡Modal refers to the most common-size container available.

Adapted from Rozin et al.[16]

4 flights of stairs to the street level, where I walked over to my car in its own stall. I had to open the garage door, get into the car, back it out, get out of the car, close the door, get back into the car, drive to the entry gate, get out of the car, open the gate, get back into the car, drive the car out, get out of the car to close the entry gate, get back into the car, and, finally, be ready to go. But with this much effort and gas costing $4 a gallon, it just is not worth it to drive to a store 6 blocks away. And in most places in France, there are almost always a bakery, butcher shop, and grocery store a walk away from homes (although supermarkets are on the rise in France). Contrast this situation to the standard suburban setting in the United States, where the car is just outside the kitchen and the garage door opens automatically. One can park at the supermarket near the entrance and get a week's shopping done in one shot. And although many Americans work out, they will scoot around a parking lot for a long time to get a spot close to the store entrance! Remember that small, subtle differences can sometimes have a big effect: one more cookie or even an extra apple a day can lead to an 8-pound weight gain in 1 year, and an extra block walked each day also accumulates over a year.

Summary of Differences

Table 4 highlights a number of the differences between France and the United States in terms of food, eating, physical activity, and overall outlook. In general, in contrast to the United States, food portions and food containers tend to be smaller in France, the French tend to eat more slowly and to include more sociality and conversation with meals, and they snack less, partly because there are fewer opportunities to snack. Freshness and taste are more important food characteristics to the French than is shelf life, which is more important to Americans. The French see eating as a more pleasurable experience than do Americans, who tend to worry more about food. There are differences in the actual foods consumed (such as wine), and the French diet includes greater diversity. In terms of physical activity, environmentally, there is more of an orientation to walking and biking in France than in the United States, where people are more oriented to cars and driving to most destinations. One way to summarize many of the differences is this: the French have made pathways through life that cause you to confront food less often and to walk more.

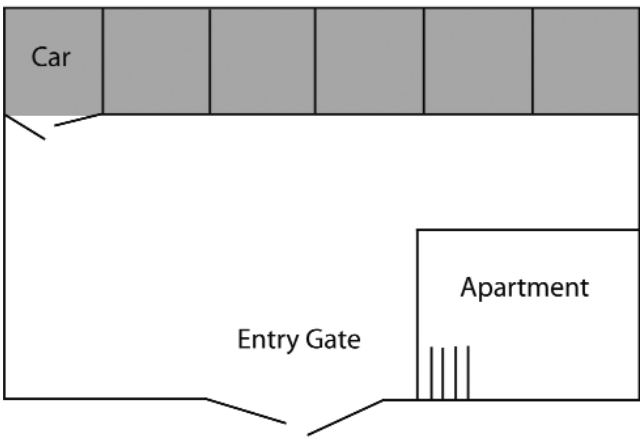

Figure 2. Set-up of a common type of French garage and living arrangement.

Table 4. Summary of French-American Differences

Food, eating, and physical activity
Portion size
Eating time
Eating sociality/conversation
Degree of snacking and snacking opportunities
Freshness and taste (vs shelf life) as priorities
Pleasure vs worry orientation to food
Actual foods consumed (eg, wine)
Variety of foods consumed
Walk or bicycle vs car orientation
Overall outlook on/orientation to life
Moderation vs excess/abundance ideology
Focus on quality vs quantity
Joy/pleasure vs comfort

The differences between the two cultures, however, are more far-reaching. "What we are seeing with these French-American differences about food and physical activity is probably more general in the French-American contrast. There is a tendency toward moderation in the French culture, in contrast to the American inclination toward excess"[20] or abundance. This also relates to the French focusing more on quality and Americans focusing more on quantity:

> Americans have a particular predisposition to spend a lot of money on making their lives easier and minimizing exercise or effort: microwaves, air conditioners, power windows, automatic garage door openers, driving to a store only a few blocks away. These are expenditures that the economist Tibor Scitovsky[21] calls "comforts." The French spend much less money on such things. They are more inclined to spend money on what Scitovsky calls "pleasures": unique experiences such as fine meals, plays, flowers, and conversation with friends. Scitovsky notes that these pleasures contribute more to happiness than do comforts. It's clear that French-American differences in milieu—such as reliance on cars and availability of snacks—have a lot to do with French-American differences in attitudes toward life and food. I doubt that the French hypothalamus—a part of the brain involved in food intake—is any different from that of the American. It's more a matter of cultural values and styles of life.[20]

IMPLICATIONS

We can learn from the French in this domain (although not in all domains). What might those lessons be? We should focus on the environment to try to reduce food intake and waist-

lines. That does not mean curtailing the pleasure of eating. Rather, it means making small changes that encourage more exercise and less eating.[6] We need to let the effects of these small changes accumulate and to enjoy what the French refer to as "petits plaisirs" (little pleasures)—to focus on quality and pleasure rather than quantity and convenience.

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