CHAPTER 17

Food and Eating

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Food and eating are central to human life in terms of time and money spent, and importance in human biological and cultural evolution. Food is also a foundational system in which adaptations arise and are then exported via enculturation to other domains, such as social relations and religion. Because humans are omnivores, enculturation and learning are the primary forces that generate food preferences, attitudes, and rituals. While some human preferences, such as the desire for sweet tastes, have a biological origin, others, such as the preference for spicy foods, reverse biological predispositions. Culture is a powerful force shaping the food domain, as evidenced by the widely varying cuisines in different countries. Food is an important part of the social world and religion. In the modern, developed world, many of the adaptations to the ancestral environment, such as the preferences for fat and sugar, have become maladaptive. Cultural adjustments to this change are incomplete. France has adjusted better to these changes than has the United States. In the modern omnivore's dilemma, concerns about sustainability enter into considerations about food, such as concerns about consuming meat. There is a new moral force operating in the food domain. We understand very little about how enculturation to cuisine occurs, how preferences and attitudes toward food develop, and the details of how to eat are instilled in children. Given the importance of food, it is surprising how little attention it has received in psychology.

Food and eating are central to human and animal life. Food choice is a major force in biological and cultural evolution. Food and eating, including shopping (foraging) and food preparation, occupy a substantial amount of time in the waking day of humans. Food is a distinctive feature of cultures, as evidenced by discussions of cuisine and restaurant lists in travel books, and the enormous variety of ethnic cookbooks. Food typically plays a central role in celebrations, such as marriage, and often in religion. Nonetheless, unlike the neighboring disciplines of anthropology and zoology, in which food is a central focus, food and eating have received little attention in the various branches of psychology. This is at least in part due to the process as opposed to domain organization of psychology (P. Rozin, 2006b). We attempt in this chapter to organize what we know about food and eating, from a cultural perspective. We believe food and eating should be a major concern for cultural psychology, both as a central domain of human life, a foundational system that extends into other domains, and as a route to understanding other areas, including social organization.
Of course, the large number of cookbooks representing the cuisines of different areas of the world illustrates a critical part of food and culture, but we do not list them here. We provide here a set of references to orient the reader to what is known about food in a cultural context: from the anthropological and/or evolutionary perspective, De Garine (1972), Diamond (1996), Harris and Ross (1987), Katz (1982), E. Rozin (1982), and Wrangham (2009); from the ethnographic perspective, Meigs (1984), Ohnuki-Tierney (1993), and Whitehead (2000); from a sociological perspective, Beardsworth and Keil (1996) and Maurer and Sobal (1995); from a psychological perspective, Shepherd and Raats (2006), Prescott (2012), and Spence and Piqueras-Fiszman (2014); and from an evolutionary perspective, P. Rozin and Todd (2015). A cultural—historical perspective is offered by Kass (1994), Leventhal (1993), Simoons (1991), and Whorton (1982). There are a few books that provide a broad, general perspective, including Barker (1982), Beardsworth and Keil (1996); Fischer (1990), Katz (2004), Kiple and Ornelas (2000), Meiselman (2000), and Anderson (2014). There is a series of books about food and culture (series edited by K. Albala), with individual books on food and culture for many countries (e.g., India; see Sen, 2004).

THE FOOD—EATING DOMAIN

Food involves one of the basic domains of survival. It is central in animal life: Food search, identification, and ingestion probably accounts for most of the waking time of most animals. Food selection is one of, perhaps the single most important force in animal evolution; if you want to know as much as you can about an unknown animal, the best thing to ask, other than its phylogenetic classification, is “What does it eat?” (P. Rozin & Todd, 2015). This single fact is highly informative about the sense organs, physiology of the digestive system, motor abilities, and learning or cognitive capacities. Animals that eat a very narrow range of foods are highly tuned to detect and appropriate their prey: Examples are anteaters, the carnivorous mammals, and specialized herbivores, such as pandas and koalas. More generalist animals have a broader but less specialized set of skills and structures, and are generally more well developed in what we loosely call “intelligence.” A generalist animal faces a great set of challenges: to find combinations of foods that are nutritious, balanced, and minimally toxic. So, a first reason to be interested in food in cultural psychology is that it is such an important part of our primate heritage, and it is closely linked to intelligence and social interactions.

A second reason is that food is one of the major sources of affect. Eating is at the same time satisfying and threatening. It is a necessary and frequent part of remaining alive. However, many of the possible edibles in the world are toxic or vehicles for dangerous microorganisms. People (and other animals) feel very strongly about what goes in their mouths; they are rarely neutral on this point. For humans, there is another dimension that amplifies the affective response to foods. It is widely believed in traditional cultures that a person takes on the properties of the foods he or she eats (“You are what you eat”). In this context, eating can have moral import, and can be believed to affect personality, and a person’s fortunes. “You are what you eat” is an eminently sensible idea; when we mix two things (in this case, a person and the food he or she eats), it is natural to believe that the product reflects both of the constituents. Although modern biological science makes clear that there are no grounds for believing that properties such as moral status or personality could be transmitted by the molecules that result from the process of digestion, it has been shown that even educated Westerners believe, implicitly, that one takes on the properties of what one eats (Nemeroff & Rozin, 1989).

There are other arguments for a cultural psychology of food and eating that derive directly from human issues, and human culture. Food selection and procurement figure prominently in almost all theories of the evolution of humans. First, there was a shift from a more plant-dominated forest diet to a diet with more animal protein in the savannah environment. Animal foods are generally harder to procure, so that more demands are made on motor capacities, sensory abilities, and cognitive/social processes, but a diet relying on animals does relieve a creature of the risks of dietary imbalance. All animals are made of roughly the same
molecules, so almost any animal is a good source of nutrition. This is less so for plants, which are often incomplete or imbalanced sources of nutrients for animals. For the human omnivore, seeking animal food but still consuming a wide range of plant foods, there are two challenges: procurement of food (most challenging for animal prey) and appropriate food selection (more challenging, the more the reliance on plant foods).

Second was the taming of fire, and the associated origin of cooking (Wrangham, 2009). Cooking increased the digestibility of many energy rich foods and also served as an effective way of killing microorganisms in the food. Third was the development of agriculture and domestication (Diamond, 1996). This development, made primarily some 4,000 to 10,000 years ago, provided humans with a steady and efficient food supply. This allowed for larger aggregations of humans, and for the specialization of labor inside and outside the food domain that prompted all sorts of technological advances. So food, in the evolution of human culture, provides a critical opportunity for extended development of other domains of life, including all sorts of crafts, aesthetic practices, morality, social organizations, religion, and high technologies (Diamond, 1996).

In contemporary human life, work and food—eating are usually the two major categories of waking activities. Activity logs from 14 cultures, painstakingly documented by Szalai (1972), reveal that for three cultures that we have tabulated: Peru, the United States, and France in the late 1960s or early 1970s, food at 13% of total time (including food-related activities: eating, shopping, preparation, cleanup), is third behind sleep (37%) and work (16%). More recent data from activity records kept by individuals in France and the United States, along with tabulation of some prior data on time spent in different activities from the two countries, indicate that eating occupies 5–7% of waking time in the United States, and 11–14% in France (Krueger et al., 2009). Furthermore, much of work is devoted to earning money or trade that is ultimately spent on food. Indeed, in most developing countries, food is the principal source of expenditures, amounting to over 30% of total expenditures (Table 17.1). The economic importance of food is itself a major cultural variable.

There are further, discipline-related reasons that make the study of food of particular interest to psychologists in general, and to cultural psychologists in particular. First, food is a major subject of thought, because the need for it is so compelling, and obtaining it is often challenging. It is therefore likely that many of the features of intelligence, so important for humans, arose first in solving problems in the domain of food. “What is edible and what is not” is one of the most critical problems facing the human omnivore (P. Rozin, 1976). Powerful, plastic adaptations to discover the effects of ingested food (e.g., conditioned taste aversions) stand out among learning abilities, and use of food as reinforcement is the central technique of the psychology of learning. More recently, in research on primate cognition, food choice is the dominant means for testing capacities (reviewed in Santos & Rosati, 2015). Siegal (1996) has argued that in child development, the first domain in which nascent intellectual abilities appear often concerns food and the detection of toxicity. Similarly, there are instances in primate cognition work (e.g., the endowment effect) where something can only be demonstrated in the domain of food (reviewed in Santos & Rosati, 2015). The search for food is central to the foraging literature, which has demonstrated exquisite and precise decisions as to when to abandon particular foraging sites, food selection within a site, and so forth (summarized in P. Rozin & Todd, 2015). There is even evidence that the way two different species of monkeys differ in response to spatial or temporal distance to food reward (temporal or spatial discounting) relates to their mode of foraging (reviewed in Santos & Rosati, 2015). Second, food and eating are most influential among our basic biological systems with respect to shaping human culture. The other systems, including breathing, excretion and sex, maintain much of their non-human primate character even in elaborated human cultures. The cultural elaboration of food and eating is the subject of Leon Kass’s (1994) remarkable book, The Hungry Soul, in which he documents the transformation of food and eating from a source of nutrition to a socially meaningful substance, from primate origins through European history. As Kass notes, “An activity that is inherently ugly is beautified by graceful deed and
TABLE 17.1. Food Expenditures in Selected Countries with Populations Greater Than 50 Million (In Order of Increasing Percent of Total Expenditures)

<table>
<thead>
<tr>
<th>Country</th>
<th>% of expenditures consumed on food at home</th>
<th>Total consumer expenditures per person ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>6.6</td>
<td>36,300</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>8.6</td>
<td>28,417</td>
</tr>
<tr>
<td>Germany</td>
<td>10.2</td>
<td>24,677</td>
</tr>
<tr>
<td>France</td>
<td>13.3</td>
<td>23,763</td>
</tr>
<tr>
<td>Japan</td>
<td>14.1</td>
<td>21,427</td>
</tr>
<tr>
<td>Brazil</td>
<td>15.6</td>
<td>7,111</td>
</tr>
<tr>
<td>Turkey</td>
<td>21.6</td>
<td>7,564</td>
</tr>
<tr>
<td>Mexico</td>
<td>23.3</td>
<td>6,934</td>
</tr>
<tr>
<td>China</td>
<td>25.5</td>
<td>2,794</td>
</tr>
<tr>
<td>Russia</td>
<td>28.4</td>
<td>7,225</td>
</tr>
<tr>
<td>India</td>
<td>30.7</td>
<td>983</td>
</tr>
<tr>
<td>Indonesia</td>
<td>33.1</td>
<td>2,005</td>
</tr>
<tr>
<td>Pakistan</td>
<td>41.4</td>
<td>1,082</td>
</tr>
<tr>
<td>Nigeria</td>
<td>56.6</td>
<td>2,227</td>
</tr>
</tbody>
</table>

Note: The data were computed based on Euromonitor International data extracted August 2016. Source: Economic Research Service, U.S. Department of Agriculture calculations based on annual household expenditure data.

A 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 form-ality of its own by the work of the human intellect. . . . We eat as if we don’t have to, we exploit an animal necessity, as a ballerina exploits gravity” (pp. 154, 158).

The fundamental role of food in cultural evolution causes it to play a major role in shaping thinking and behaviors in many domains, accounting for both cultural universals and distinct, major cultural differences. The holistic–analytic dimension, related to the interdependence–independence dimension, has been a dominant theme of cultural psychology. Varnum, Grossman, Kitayama, and Nisbett (2010) have argued that the social orientation dimension (interdependence–independence) has temporal priority to, and is in part causal, for the cognitive holistic–analytic dimension. The origins of the social orientation differences have been linked to food ecology differences. Talhelm et al. (2014) have presented evidence that rice-based subsistence promotes interdependent (collectivist) social orientations, while wheat-based subsistence promotes independent (individualist) social orientations. Cul-
tivation of the principal food staple (rice or wheat) creates different demands for cooperation, with rice growing requiring much more communal action. Talhelm et al. demonstrated that the more southern regions of China, with a rice-based food system, show more collective/interdependent tendencies than the northern regions of China, which rely more on wheat. They argue that this correlation cannot be attributed to climate differences, because the rice—collective link appears in regions of China that are geographically and climatically very similar to other regions that show a wheat-based individualistic orientation. While the great majority of people on earth show a more collective orientation, individualism predominates in Western Europe and North America, where wheat is the predominant staple grain.

Similar types of food—ecology arguments are suggested to account for differences in the culture of honor. According to Nishbett and Cohen (1996), a culture of honor is promoted by cattle, sheep, and pig raising, as opposed to farming. The vagueness of the borders of individuals' ranges and the threat of theft require more border patrolling and aggression toward intruders, and so creates a cultural premium on the defense of one's honorable reputation.

These two lines of work highlight the importance of cooperation as a variable in different types of grain production, and the importance of confrontation dependent on reliance on animal versus plants as the major source of nutrition. "Modernity" itself seems associated with individualism, and modernity is also associated with a substantial reduction in the economic importance of the food system (see Table 17.1).

**CUISINE**

Cuisine is one of the major distinctive manifestations of any culture. We can use the word *cuisine* to represent the body of shared rules, beliefs, and practices relating to food within any culture. Regularities are sufficiently great within cultures that we can usually identify the culture by examining what is eaten. The abundance of ethnic cookbooks, the space devoted to cuisine in travel books, and the centrality of food in ethnographies all testify to the importance of cuisine as a cultural "marker."

Eating involves incorporating substance; humans typically do something to the things they find in the world before consuming them. Some of this amounts to physical preparation, such as peeling or cutting, but much of it involves more elaborate transformations, including mixing, grinding, cooking, and flavoring. These behaviors, conveniently, often leave substantial records that can be examined by archaeologists.

At the level of the “dish,” Elisabeth Rozin (1982) points out that there are three components: the staple foods, the processing techniques, and the flavorings. She notes that most cuisines add a particular set of flavoring ingredients to most savory dishes, and calls these “flavor principles.” Thus, Southern Italian cuisine is characterized by tomato, sweet pepper, olive oil, and oregano as flavorings; Chinese cuisine typically flavors with soy sauce, ginger root, and rice wine; and Mexican cuisine characteristically uses chili pepper with either lime or tomato. Flavor principles provide a distinct identity to the foods of a particular group, and offer a sense of comfort and familiarity. They may also serve as a means to introduce a new staple food into a cuisine, by making it taste familiar via the traditional flavor principle (E. Rozin & Rozin, 1981). The meal is another component of cuisine. Meals have an internal structure, varying from a single dish of combined ingredients to sequences of foods, as in the appetizer—entrée—dessert sequence common in many Western cuisines (for an analysis of the British meal, see Douglas & Nicod, 1974). In many traditional cultures, the various meals are similar in content and structure, with breakfast as warmed-over last night's dinner. In many Western cultures, a separate first meal, breakfast, has its own foods and flavors. Howard Schutz (1989) has pointed out that cultures have "appropriateness" rules, having to do with what foods can be mixed or eaten together, proper sequences of foods, and foods for particular times or occasions.

The social eating situation is another aspect of cuisine. There are issues of who eats with whom, order of eating (e.g., children or esteemed older relatives first), rules for leaving the table, and rules for what is supposed to be discussed during the meal (or what
is distasteful to discuss). A final aspect of cuisine is the manner of food consumption. Cultures vary markedly on this point. For example, the principal means of conveying food to the mouth is the right hand in South Asia, chopsticks in East Asia, and spoons and forks in most of the Western World (B. Wilson, 2012).

THE BIOLOGICAL FOOD SYSTEM: THE HUMAN GENERALIST AND SOME FOOD UNIVERSALS

The biological/evolutionary foundation for food choice has been emphasized by evolutionary anthropologists (e.g., Harris & Ross, 1987), and is presented in a chapter in the Handbook of Evolutionary Psychology (P. Rozin & Todd, 2015). We summarize it briefly here.

The food generalist faces a daunting food choice problem (P. Rozin, 1976). Obtaining adequate nutrition involves satisfying the body's persistent need for some 40 nutrients, including water, essential amino acids, some fatty acids, vitamins, and minerals. In the course of satisfying these nutritional needs, the generalist must also attain adequate energy from a mixture of proteins, fats, and carbohydrates. This set of nutritional requirements can be met easily if there is a fair amount of animal food in the diet, or by choosing a broad diet among plant foods. However, the generalist faces a dilemma, because in the course of sampling the potential food environment widely, one is likely to encounter potential foods with toxic components or harmful microorganisms. The former are more likely in plants; the latter, in animal foods. The risks of eating broadly are high, as are the benefits resulting from the ability to survive in diverse environments. There are no simple ways to reliably avoid toxins and infective agents on sensory grounds, or to avoid potential foods that have minimal nutritional value. For the most part, this must be learned, and hence falls in the domains of development, cultural traditions, and the acquisition of culture.

However, there are some important inherited adaptations that help humans and other food generalists. There are innate biases, present at birth, to consume energy-rich foods, manifested as a preference for sweets (linked to carbohydrate content; Steiner, 1979) and fatty textures (linked to fat content). The combined sweet and fat preferences result in strong human adult preferences for mixtures of the two (Drewnowski & Greenwood, 1983). Finally, a bitter detection system allows for an innate rejection of entities that include common natural toxins. Sensory biases do not exhaust the innate behavioral repertoire of the generalist. It is in the nature of the generalist to be both interested in and cautious about new potential foods, since they may be new sources of nutrition, but also may be toxic or infected. This combination of risks and benefits manifests (in rats and humans, where it has been studied most) in an interplay between fear of the new ("neophobia") and attraction to the new ("neophilia"). What is familiar is safe, but it restricts the nutritional horizon in ways that may be maladaptive, because diversity in diet is healthy and allows adaptive responses to environmental changes. A common "solution" to this generalist's or "omnivore's dilemma" is the cautious sampling of potential new foods.

Finally, there is a set of adaptations to aid the generalist in discovering the nutritional consequences of things ingested. The basic problem is the long delay between ingestion of a food and its metabolic consequences. Conditioned taste aversions are an unusual type of learning that lead to rejection of foods that induce nausea, delayed up to a period of hours (Garcia, Hanks, & Rusiniak, 1974; P. Rozin & Kalat, 1971). There is a corresponding, usually weaker ability, to associate tastes with delayed positive (nutritional) consequences in mammals (Sclafani, 1999).

One cannot help but be impressed by the enormous variety of the foods and eating patterns across humanity. Indeed, there would be no appeal of ethnic cuisines if we all ate the same things in the same ways. But general metabolic requirements and inherited behavioral biases do result in a substantial number of food/culinary universals or near universals in humans. One should also be open to considering near universals, as human ingenuity has allowed the habitation of very inhospitable environments, like the Arctic, which severely constrain nutritional options.

Humans almost always eat rather energy-rich foods in concentrated periods of time,
called “meals” (Pliner & Rozin, 2000). The availability of animal foods, and elaborate preparations of foods, encourage organization of eating in terms of meals. Most human beings consume some combination of plant and animal foods. In most cultures, men are more involved in the procurement of animal foods, and women in the procurement of plant foods and in food preparation. Meals are usually a social occasion. Sharing of food is a form of bonding throughout the world; one shares food with those with whom one is close, and this sharing (“shared substance”) reinforces the closeness. Thus, food is interpersonally important. Although, to some degree, foods are consumed raw in all cultures, there is some processing of many foods before ingestion. This includes physical changes (removing shells, grinding), mixing of foods, and cooking. The cuisines characteristic of particular cultures, not surprisingly, involve combinations of ingredients and their processing to meet human nutritional needs (Katz, 1982).

THE CULTURAL TRANSFORMATIONS OF FOOD AND EATING: PREADAPTION AND THE FUNCTIONS AND MEANINGS OF FOOD IN A CULTURAL CONTEXT

Leon Kass (1994) captures the major transformation in eating by humans with the contrast between the German verbs fressen, used for eating by animals, and essen, for eating by humans. Unlike almost all other animals, humans bring food to their mouth rather than bringing their mouths to the food. As far as we know, humans alone eat using implements, have table “manners,” engage in complex social/informational exchanges during eating (at meals), elaborate foods extensively before eating them, and eat foods in specific orders. In short, eating is an expression of human civilization. Food has become much more than nutrition.

As noted earlier, food stands out among the biological domains in the degree to which it has been transformed culturally. “Preadaptation” is the process that accounts for the expansion of the food domain in the history of human cultures. Preadaptation was appreciated by Darwin (1872/1965), and has been expressed in fuller form by some more modern evolutionists, particularly Bock (1959) and Mayr (1960). It involves the use of an already existent (usually evolved) structure for a new purpose. According to Mayr, preadaptation is the main source of evolutionary novelties and the principal process in speciation. It essentially involves a recombination of existing structures and genes rather than creation of new genes by mutation.

One of the finest examples of preadaptation has to do with the food system. The mouth, with its elaborations of teeth and tongue, is an aperture designed to take in nutrients (and air). Clearly, the tongue and teeth have evolved to facilitate the processing of food. But in human evolution, the teeth and tongue, and the entire oral cavity and its link to the respiratory system, are utilized by the language system for the expression of speech. Teeth and tongue were preadapted for speech and were opportunistically used by the speech system. To take another example, a good argument can be made that the species of plants and animals that were domesticated thousands of years ago were selected by humans because they were preadapted, in terms of social organization, mode of reproduction, and so forth, to be useful to, and manageable by, humans (Diamond, 1996).

Preadaptation plays an even more striking role in cultural evolution than in biological evolution (P. Rozin, 1999a). This is because variation in cultural evolution can be directed by purpose, while in biological evolution, the occurrence of variations is dependent on random processes. If a cultural tradition, practice, artifact, or institution might be adaptive in a new context, it can just be transplanted. Thus, one can combine the virtues of the calculator and typewriter and create a computer, or apply a culinary technique discovered in one culture to another.

The expansion of food from nutrition to a complex expression of civilization (Kass, 1994) by preadaptation has taken place along a number of lines, presumably to different degrees and in different temporal orders of cultural evolution in different cultures (Figure 17.1). Early in human evolution, food became an entity of social significance. The meal became a center for social interaction. Food became central to important cultural events. Food sharing became an explicit and implicit form of expression.
of interpersonal intimacy. Food became a marker of the status of the individual (as in the Hindu caste system, or the public consumption of expensive foods) and a form of group identity. Note the pejorative descriptions of British sailors as “limeys,” Germans as “krauts,” and French as “frogs.” Food enters the aesthetic domain, as cuisine, taking its place next to other human activities with lesser links to our fundamental biology, such as literature, music, and art. Cuisines elaborate the flavors, the presentation of food, and the serving and eating of food in ways that can hardly be described as motivated by improved nutritional properties. Rather, it is appeal to the palate and the eye.

Food becomes an integral part of the moral/religious domain, for example, when it is used in religious ritual (e.g., taking the host in the Catholic church, the Jewish laws and traditions of kashrut). Among Hindu Indians, who comprise more than 10% of the world’s population, food can be considered a form of “moral currency”; Appadurai (1981) described it as a “biomoral” substance. The caste system ranked people according to moral purity and has become less important in recent decades. Caste was largely defined and defended in terms of food transactions, which prevented the food of those less morally pure from being consumed by those higher in the system (Mariott, 1968). In the West (e.g., the United States), the moral role of food is muted, though overeating, fast foods, fatty foods, and most clearly cigarettes, have come to take on moral overtones for some (P. Rozin, 1999b; Ruby, 2012; Stein & Nemeroff, 1995; Vartanian, 2015).

In addition to expanded roles for food as art form, moral, and social vehicle, the vocabulary associated with food is co-opted as a means of describing things that have nothing to do with food; that is, food has a metaphorical function. In fact, food is one of the major sources of metaphor (Lakoff & Johnson, 1980), such as when we say, “Janet is sweet,” or “Let’s get to the meat of the paper.” Metaphor is, of course, a quintessential example of preadaptation: export of a word from its original context to other contexts.

Because of its centrality in life, and because it is incorporated into the body, food is a major source for symbols and metaphors. The Jewish Passover celebration and the Catholic mass both use food to explicitly represent nonfood events. Rice plays a central role in Japanese life and thought, over and above its nutritional importance (Ohnuki-Tierney, 1993). Food is at the center of many rituals and taboos, many of which seem to serve functions outside the domain of nutrition (Douglas, 1966). Recently, an attempt has been made, in a systematic way, to demonstrate what it would mean to say that X is a symbol for Y, using the example of meat (X) as a possible symbol for maleness (Y) (P. Rozin, Hormes, Faith, & Wansink, 2012). Six different measures, two implicit, one explicit (rating maleness of foods), free associations, food preferences, and linguistic information all point to a relation between meat and maleness.

**DISGUST AS AN EXAMPLE OF PREADAPTATION AND THE CULTURAL ELABORATION OF A FOOD-BASED SYSTEM**

Disgust is a “basic emotion” (Ekman, 1992). Along with other basic emotions, disgust has three properties: (1) a particular hard-wired pattern of expression, which has the function of expelling mouth contents,
along with a communication value (e.g., “Don’t eat this”); (2) a psychophysiological response, in this case nausea, which is quite specific and serves to inhibit ingestion; and (3) a behavior, withdrawal. All three of these components clearly serve the purpose of rejecting foods, which suggests that the food system constitutes the origin of disgust (see P. Rozin, Haidt, & McCauley, 2018, for a more detailed discussion of disgust). In many mammals and newborn humans, a facial expression like that of disgust is elicited by bitter tastes. The bitter rejection face and system seems to be the preadapted basis for the elaboration of disgust.

The elicitors of disgust in humans include a wide range of events, only a minority of which can be traced to food. Elicitors include contact with death or filth, many body products, disliked individuals, and the experience of certain immoral activities (e.g., incest, or child molestation). One account for this expansion is based on preadaptation in cultural evolution (P. Rozin & Fallon, 1987; P. Rozin, Haidt, McCauley & Imada, 1997; P. Rozin, Fischler, Imada, Sarubin, & Wrezesniewski, 1999; P. Rozin et al., 2018). In this view, while the meanings and elicitors of disgust expand, the basic program (expression, behavior, physiological response) remains roughly the same.

In the posited first stage (see Figure 17.2), the bitter rejection system is preadapted for rejection of foods, not because of sensory properties but because of the nature or origin of the food (P. Rozin & Fallon, 1987). A particularly interesting feature of this ideational disgust, or “core disgust,” is that the elicitors (but not bad tastes, e.g., bitter) are “contagious”; that is, they follow the sympathetic magical law of contagion: “Once in contact, always in contact” (Frazier, 1890/1922; Tylor, 1871/1974; Mauss, 1902/1972; P. Rozin & Nemeroff, 1990). If a disgusting potential food (e.g., a worm or cockroach) touches an otherwise edible entity, it renders it inedible, and, in fact, disgusting. The contagion property appears to be universal among adult humans, but it is absent in animals or in children below about 4 years of age. It seems to be a universal cultural acquisition, perhaps supported by its adaptive advantage in discouraging consumption of infected foods. It is notable, as Angyal (1941) pointed out, that almost all core disgust foods are of animal origin. It is these same foods that have the highest risk of transmitting infectious agents. The existence of contagion and the focus on animals in disgust, plus other evidence, have encouraged some scholars to identify what P. Rozin and Fallon (1987) call core disgust as “pathogen avoidance disgust,” and to propose that this first phase of disgust is biologically evolved (Curtis, 2013; Tybur, Lieberman, Kurzban, & DeScioli, 2013).

Feces appears to be a universal core disgust substance. Of interest, it does not qualify as an innate distaste, because it is not rejected by infants, or by most animals (P. Rozin, Hammer, Oster, Horowitz, & Marmara, 1986b). Rather, it is a universally acquired human disgust, with its own fundamental developmental concomitant, toilet training. It is proposed that disgust is co-opted as a cultural tool, to establish culturally supported aversions or prohibitions, by endowing the relevant objects with disgust properties. If a forbidden entity becomes disgusting, it will be naturally avoided, and no rules or formal

![Figure 17.2: Preadaptation: Cultural evolution of disgust.](image-url)
punishments need be invoked. Such is clearly the case with the outcome of toilet training. By this account (P. Rozin, Haidt, & McCauley, 1993; P. Rozin et al., 2018), the range of disgust expands from its initial food base to include three other categories of events or elicitors. First, following the focus on animal foods, it is extended to a wide range of features that humans share with other animals. It is a frequent theme in cultural narratives, rituals, and beliefs that humans are not animals, but are superior to animals. Any reminder of the animal nature of humans then becomes undesirable. There is evidence that one animal feature, mortality, is a particularly important component of animal reminder disgust. The rejection of animal reminders fits with the nature of the civilizing process, as described by the distinguished culture historian Norbert Elias (1939/1978): “People in the course of the civilizing process, seek to suppress in themselves every characteristic that they feel to be animal” (p. 120).

The expansion of disgust (P. Rozin et al., 1993, 2018) elicitors extends to unfamiliar people (“interpersonal disgust”), which probably has the adaptive value of strengthening ingroup connections and weakening those with outgroups. The alternative account (Tybur et al., 2013) can also subsume this as a form of pathogen avoidance, with less adaptation to the microbes of other groups. The pathogen account has the advantage that it can explain what has been called core, animal-reminder, and interpersonal disgust with a single motive (Tybur et al., 2013). However, it is hard to deny that disgust may also serve as a means of denying mortality and strengthening ingroup bonds.

Finally, disgust is used, to one degree or another, depending on the culture, to support moral principles. Disgust may be engaged to reinforce a cultural-based prohibition. The degree to which this occurs seems to be related to the type of moral system. Following on the work of Shwedler, Much, Mahapatra, and Park (1997) on culture and moral taxonomies, disgust seems to be tied primarily to the divinity, as opposed to autonomy or community moral realms (P. Rozin et al., 1999). A comparison of the status of disgust in the United States and India is instructive. Disgust as a moral emotion is more prominent in India, because divinity morality is more important there.

In an alternative account (Tybur et al., 2013), there are three categories of disgust: pathogen avoidance, mate selection, and morality; moral, in this system, is not limited to divinity violations but includes the full range of moral violations. The nature of the mapping of disgust onto morality is still uncertain. William Miller, in The Anatomy of Disgust (1997), provides a rich description of the elaboration of disgust in Western cultures.

By the same process of preadaptation that expands disgust elicitors in cultural history, the process of contagion is carried along with the new elicitors. Thus, contact with an immoral person shows contagion properties (Nemoto & Rozin, 2000).

CIVILIZED EATING

One of the most striking things about the food world, varying a great deal across cultures, is the etiquette of eating, or table manners. As Kass (1994) and Elias (1939/1978) point out, the meal is one of the special areas in which humans display and celebrate the fact that they are civilized. Almost all contemporary adult humans do not eat like animals. They sit at tables, use utensils, respect and do not touch the food on the plates of others, refrain from calling attention to their bodily functions while eating, and observe complex rules of social interaction. Civilized eating is highly complex and requires great skill. In civilized eating, the biological aspects of eating are suppressed. Kass (1994) provides a particularly graphic illustration of food, disgust, and civilization. In a typical meal situation in many cultures, individuals face each other while eating. They place food into their mouths, the interior of which is regarded as disgusting by others. Furthermore, the mass of chewed food in the mouth is itself disgusting (both interpersonally, and because of its involvement with body secretions). Remarkably, due to the virtuality of eating as informed by table manners, this exchange goes on face-to-face, without either partner being exposed to any disgust stimuli. More remarkably, the individuals are often conversing while eating, using the same hole to speak that they use to ingest food; still, neither the inside of the mouth nor the ingested food are seen by the
partner! The learning of table manners by children is surely one of the more difficult aspects of growing up.

All of these civilizations of the daily meal are yet more elaborated in special food occasions, such as eating at restaurants, feasts, dinner parties, or weddings (Kass, 1994), and the etiquette and subtle meanings of eating are particularly elaborated in Hindu Indian culture (Khare, 1976). Disgust can reasonably be described as the emotion of civilization.

**CULTURE AND BIOLOGY: SOME FOOD CASE HISTORIES**

Following on the interactions of biological and cultural evolution in the understanding of disgust, we now briefly consider the history of some human foods to illustrate how biological, cultural, and psychological factors interact in the cultural evolution of foods (see P. Rozin, 1982, for a more systematic discussion of this issue).

**Sugar**

The history of sugar is a paradigmatic illustration of how a simple biological predisposition, the preference for sweet, is amplified and elaborated by culture (P. Rozin, 1982). The innate sweet preference encourages the search for this stimulus, and learning about where and when it may be found. In humans, in conjunction with the development of agriculture, the desire motivates the cultivation of some crops, primarily ripe fruits, sugar beets, and sugar cane, which provide this desirable taste experience. Much later in human history, the technology to extract the source of sweetness, sugars, allows for the experience of an even more desirable sweet experience.

The search for a source of easily extractable sugar (sugar cane) was a main motivation for the colonization of the tropical Americas by Europeans, and the availability of cheap sugar introduced it to the middle and lower classes. This transformed cuisine in many ways. The extensive culinary and social implications of the availability of inexpensive sugar are well documented by Sidney Mintz (1985) in *Sweetness and Power*. Cheap and available sugar led to the expansion of the domain of acceptable foods, since sugar can be added to foods that are otherwise much less palatable, such as coffee or chocolate, and to enhance the taste of traditional dishes. Finally, in the food-flooded developed world, where the calories signaled by the sweet taste are no longer sought, there is the development of artificial sweeteners, uncoupling the taste and the calories that usually go with it. This allows the experience of the pleasure of sweetness without the calories. All of these extensive advances, with major implications for cuisine and society, are motivated quite directly by the biological predisposition for sweet tastes.

**Chocolate**

One of the great creations of culture, chocolate, represents a more elaborate version of the amplification illustrated by sugar (P. Rozin, 1982). It illustrates the creation of a "superfood," motivated by twin biological predispositions for sweet tastes and fatty textures. The great appeal of chocolate has to do with its sweetness, fatty texture, aroma, and melt-in-the-mouth quality. Importantly, none of these features is obvious in the raw cacao bean, which is very bitter, not particularly aromatic, and does not have a smooth texture. Cacao beans were ground and consumed as a beverage in close to their natural form in several indigenous cultures in Mesoamerica well before the arrival of Cortez (See Coe & Coe, 1996, for the history of chocolate), but this beverage was inately unpalatable and an acquired taste.

Brought to Europe by the early Spanish explorers, cacao was transformed into a luscious food by Western Europeans, and later Americans, in a complex process that involves both modifying the natural product to enhance some of its properties and adding other ingredients (particularly sugar, sometimes milk and vanilla) to improve palatability and produce variety. So, unlike the case for sugar, the cultural evolution of chocolate involved discovery and development of potential in a natural product. The result is a food that is among the most popular in the Western World, and probably, presently, the most craved substance in North America.

The story of chocolate, even more so than sugar, is the story of the amplification and elaboration of biological predisposition.
tions. The difference is that the aspects of chocolate that satisfy these predispositions are not apparent in the natural product. It is of particular cultural and psychological interest that although chocolate is raised in tropical areas, particularly West Africa, South America, and parts of Asia, the great desire for it and consumption of it occurs in the very regions that cannot grow it, notably, Europe and North America. This may be explained, in part, on economic grounds; chocolate is expensive, and the tropical countries in which it grows are not wealthy.

**Chili Pepper**

Chili pepper is probably the most widely used spice in the world. It is eaten on a daily basis, usually as part of a seasoning sauce used with most savory foods, by most tropical and semitropical cuisines in the world. Chili pepper illustrates the reversal of an innate aversion, a case in which culture overwhels and reverses a biological predisposition (P. Rozin, 1990).

All chili peppers come from the Americas and were introduced to Europe by the early explorers of the Americas. They spread later to Africa and Asia. The innately aversive irritation of the peppers, caused by a family of chemicals called capsaicins, were bred out of the imported peppers. This probably happened first in Hungary, and the result was what we now call sweet peppers. The sweet peppers became a mainstay of Mediterranean cuisines. But in spite of the availability of such mild peppers, it was the “hot” peppers that spread to tropical and semitropical Africa and Asia. It is a remarkable feature of culinary history that such a “bad tasting” product achieved so much success, particularly when other foods from the Americas, including tomatoes and potatoes, experienced substantial resistance before adoption in Europe and other places.

The story of chili pepper, and the widespread adoption of other innately unpalatable substances, such as black pepper, ginger, tobacco, and coffee, is notable because in most cases, the very same properties that cause innate dislikes become liked, in what are called hedonic reversals. People do not consume chili pepper, like a medicine, because they think it is good for them. They consume it because they like it.

There is not an adequate account of how this happens (reviewed in P. Rozin, 1990), but given the generality of cultural adoption of initially aversive substances and other non-food-related activities discussed below, we briefly discuss the causes of hedonic reversal for chili pepper as a model system. A whole family of accounts links chili pepper ingestion to the many positive physiological effects it produces, including sweating and lowered body temperature, parasympathetic activity (including salivation, gastric secretion, and lowered heart rate), and endogenous opiate release in the brain. In order to learn from these effects (and somehow, via this learning, transform the hedonic response), repeated exposure is necessary. Normally, when an aversive event or substance is encountered, it is subsequently avoided. So one important effect of culture is to produce an environment, social and physical, in which repeated consumption of food with chili pepper in it occurs. Is this a sufficient condition (Zajonc’s [1968] well-documented process of “mere exposure”)?

The answer is clearly “no”; fieldwork and preference tests in the field (reviewed in P. Rozin, 199; P. Rozin & Schiller, 1980) indicate that while all Mexicans over about age 6 years in a village like the burn of chili pepper, not a single animal in the same village does so. However, the dogs, pigs, and chickens consume the daily garbage, which regularly includes stale staple foods and dishes, and excess salsa (the chili pepper-based sauce that is placed on most savory foods; P. Rozin & Kennel, 1983). The reversal of the innate aversion for chili pepper, and almost certainly other entities, seems to be an almost uniquely human accomplishment, and to involve culture as an essential ingredient.

Field measurements (P. Rozin & Schiller, 1980) indicate that very young Mexican children do not like chili pepper, and that liking for the burn sensation occurs somewhere around 4–6 years of age. There are two reasonable, nonconflicting, accounts. One is social; in the meal setting, the entire family consumes food with chili pepper in it, or with an accompanying sauce to be added to the foods. There is no overt pressure at the table to consume hot pepper. But the young child observes that older siblings and all adults consume it with gusto, and this
experience may in some way produce the hedonic reversal.

A second account, which we call “benign masochism” (P. Rozin & Schiller, 1980; P. Rozin, 1990; P. Rozin, Guillot, Finchler, Rozin, & Tsukayama, 2013), puts liking chilli together with a whole set of uniquely human activities, in which pleasure is produced by the elicitation of negative experiences and/or emotions (e.g., riding roller coasters, recreational parachute jumping, watching sad movies, and drinking black coffee). The idea is that humans, and only humans, seem to get pleasure out of the fact their body is signaling danger/rejection to them, but they know they are really safe. The case is particularly clear for roller coaster riding. We have some evidence that this might be the case for chilli pepper, because we have shown that the most preferred level of “burn” for chilli pepper for any individual is the level that is just slightly below the level of aversive pain (P. Rozin & Schiller, 1980; P. Rozin et al., 2013). It is worth noting that humor at experiencing disgust is another possible example of benign masochism.

The important lesson from chilli pepper, as an example of learned reversal of innate aversions, is that, at a minimum, it involves cultural mechanisms at three levels: (1) the availability of the substance or experience; (2) the continued exposure to it, in spite of its initial negative effects; and (3) in some yet-to-be-fully-understood way, the accomplishment of hedonic reversal.

**Milk**

Milk is necessarily the first food of mammals. Until the development of animal domestication and then dairying by humans, milk was a unique food available only to baby mammals. In the contemporary human world, milk and derivative dairy products form an important part of the diet in many cultures. It is notably absent from most East Asian and West African cuisines. The cultural history of dairy products shows how biological constraints affect cultural evolution and institutions, and, importantly, how culture affects our biology. It is this dual-direction effect that is the focus of this section on milk.

Since milk is unavailable as a food past nursing in the predomestication environment, it would be problematic to have adult mammals seeking their first food. A number of mechanisms have evolved to accomplish not just the weaning from milk, but some decline in its preference (reviewed in P. Rozin & Pelchat, 1988). The most relevant mechanism is genetically programmed lactose intolerance (Simoons, 1969, 1970). The principal carbohydrate in mammalian milk is lactose, a sugar that is the combination of two simpler sugars, glucose and galactose. Lactose is only found in milk. Lactase cannot be absorbed directly but is broken into its two utilizable subcomponents by the gut enzyme, lactase. This enzyme is present in the gut of virtually all mammals, and is reprogrammed, such that it gradually disappears at about the time of weaning of the species in question. Undigested lactose ferments in the hind gut, producing gas pains and diarrhea, and interfering with absorption of some of the nutrients in milk. These unpleasant symptoms very likely contribute to the weaning process. Preagricultural humans were like all other mammals and therefore unable to utilize milk effectively after weaning.

Domestication made milk available as an adult food. There is convincing evidence, largely from the work of Simoons (1969, 1970), that two very different types of adaptations occurred since the origin of domestication to encourage the availability of milk and its products in the postweaning human diet. First, cultural innovations adapted to a biological limitation (adult lactose intolerance) by digesting milk outside of the body, breaking down the lactose into its utilizable components before ingestion. This was done with microorganisms, resulting in products such as cheese and yogurt. These, appropriately termed “cultured” products, make the carbohydrate in milk utilizable and bypass the negative symptoms.

A second set of biological adaptations occurred subsequent to the rise of dairying. In a group of cultures, primarily from Northern Europe but also including some pastoral groups in Africa, the availability of dairy food set up a situation in which the adult ability to digest lactose was adaptive. There is a single gene mutation that, when it occurs, blocks the deprogramming of lactase production at weaning. In these cultures, the occurrence of this mutation...
III. ACQUISITION AND CHANGE OF CULTURE

improved survivability and gradually, the
gene frequency rose. The result is that most
people of Northern European origin (and a
few African groups) retain their lactase and
can drink uncultured milk throughout their
lives. Hence, a cultural advance changed the
adaptive landscape for humans, and induced a
genetic change in some groups of humans.

There are many issues related to dairy
products that may engage cultural psychol-
ogy, but we will not deal with them here. One
is why Chinese cuisine, one of the world’s
major and most innovative cuisines, includes
do no dairy products. This may have a cultural–historical account; the Chinese were
exposed to milk by the Mongol invaders, and
it may be that their aversion to the Mongols
extended to the food of the Mongols.

MEAT

Meat should be a subject of special interest
to psychologists, because in most cultures, it
is not only one of the most loved but also the
most tabooed categories of food, comprising
a quintessential example of the state of am-
ivalence (Fessler & Navarrete, 2003; Ruby et al., 2016). As a dense source of protein,
fat, and essential minerals, meat is highly
valued, and in many cultures, the ability to
consume large amounts of meat has traditaionally been a marker of wealth, power,
gender, and status (Adams, 1990; Fiddes,
1991). At the same time, meat is more likely
than plant-based foods to harbor microor-
ganisms that can infect humans, and these
pathogens are often harder to detect than
the toxins found in plants (Hladik & Sim-

Obtaining meat involves hunting and kil-
ing other animals, an act that requires great
skill, and is at the same time morally ques-
tionable. The anthropologist Stanley Tambi-
aiah (1969), elaborates some of these points in
a well-known article entitled “Animals Are
Good to Think and Good to Prohibit.” He
might as well have replaced the word think
with eat. Indeed, research suggests that in
many cultures, the killing of animals (for
meat) evokes feelings of guilt and tension
(Piazza et al., 2015; Ploor, 1993; Simoons,
1961/1994). People are often motivated to
deal with these negative feelings by demen-
talizing the animals that they eat, or by
dissociating meat from its animal origins
(Kunst & Hohle, 2016; Loughnan, Bastian,
& Haslam, 2014; Rothgerber, 2013; Ruby
& Heine, 2012).

Meat is the only general category of foods
that is widely prohibited across cultures. Al-
most all objects of food disgust, cross-
culturally, are animals or animal products
(Angyal, 1941; P. Rozin & Fallon, 1987).
This can, perhaps, be related to the role of
disgust in pathogen avoidance. Meat may
also enlist, more than plants, the “you are
what you eat” principle (eat an animal and
become animal-like; Nemerooff & Rozin,
1989). Of course, cannibalism, often the
most negatively regarded human food prac-
tice, is a special example of meat eating.

Across many cultures, meat (particularly
mammal meat) is linked with conceptions of
masculinity and is often considered a “man’s
food” (Adams, 1990; P. Rozin et al., 2012;
Ruby & Heine, 2011). In preindustrial soci-
cies, meat (particularly mammal meat) is
often preferentially distributed to high-sta-
tus individuals, typically middle-aged men.
In many developed countries, men hold more
positive attitudes toward meat, consume it
more often, and are more likely then women
to believe it is an essential part of a healthy
diet (for a detailed review, see Ruby, 2012).

Just as there is a long history of humans’
ambivalence about eating meat, there is a
long history of people choosing not to eat it
(i.e., vegetarians). “Vegetarianism” has
proved rather difficult to study, as defini-
tions of the term vary widely among both
researchers and laypeople. Although veg-
etarian is defined by the Oxford English
Dictionary as “the practice of not eating
meat or fish, especially for moral, religious,
or health reasons,” research from many cul-
tural contexts (e.g., United States, Canada,
Switzerland, United Kingdom) indicates that
many self-identified vegetarians report eat-
ing poultry and fish, and even sometimes red
meat. As such, the exact prevalence of veg-
etarianism is difficult to quantify, unless one
specifically defines the term when conduct-
ing polls and surveys.

In the Western World, abstention from
eating meat due to spiritual and ethical con-
cerns about killing and eating animals can
be traced back to the writings of Pythago-
ras and Plato, with arguments for the health
benefits of a meat-free diet only emerging
animal origins, Bastian, 2013; Ruby 1987), to the role of meat. Meat may the "you are an animal and (Spencer, 1992; Whorton, 1994). A broad body of research indicates that, compared to their omnivorous peers, Western vegetarians are more likely to be women; to be concerned about animal and environmental welfare; to more strongly endorse universalistic values (e.g., concern for equality and social justice); and to oppose authoritarianism, social hierarchies, and the use of violence. Although the prevalence in many Western cultural contexts has been growing (e.g., recent estimates: Germany ~9%, Canada ~8%, Ireland, ~6%, USA ~5%; Ruby, 2012), vegetarians (outside of India) remain a small minority, and most elect to become vegetarian at some point in their lives rather than being raised as such.

In contrast, vegetarianism in Indian cultural contexts has been a prominent practice for centuries and is far more common (recent estimates range from 20 to 42%), making it likely that there are more vegetarians living in India than in all other countries combined. Here, vegetarianism has historically been associated with purity, status, and tradition, with most vegetarians being born into the practice. The anthropological literature indicates that the avoidance of meat has mostly been motivated by ascetic and spiritual concerns, linked to the belief that eating meat can pollute the body and spirit, although, in more recent years, concern for animal welfare and environmental sustainability have been growing in prominence (Caplan, 2008; Preece, 2008; Ruby, Heine, Kamble, Cheng, & Waddar, 2013).

Despite the prevalence of vegetarianism in India, psychological research on the topic remains sparse, and is sparser still in East Asian, Latin American, and African cultural contexts.

INSECTS AS HUMAN FOOD

As concerns for food security, environmental sustainability, and animal welfare increase, more attention is being paid to the idea of making insects a major food source for more humans. A great deal of work has emerged in this domain in the past decade, covering this prospect from anthropological, economic, entomological, environmental, and nutritional perspectives (Paoletti & Dreon, 2005; Ramos-Elorduy, 2009; Yen, 2009). Arnold van Huis and colleagues (2013) provide a comprehensive account of this work. These and other sources indicate that many species of insects are nontoxic, highly nutritious (particularly in terms of protein, fats, and essential minerals), and more environmentally sustainable than conventional domesticated animals (e.g., more efficient conversion of plant to animal calories, less water usage, lower greenhouse gas emissions). People are generally less concerned about the ethics of killing insects compared to animals more commonly killed for meat. Also, insects can easily be raised in compact but "natural" settings, and death can be produced simply by cooling, a process that naturally occurs, temporarily, in places with cool evenings.

Although insects are a valued (and readily eaten) food source for about 1 billion people, for many, the idea of eating insects elicits intense disgust (Ruby, Rozin, & Chan, 2015). Recent work suggests that disgust is the main barrier to insects being consumed by a broader segment of the population. A growing number of scientists, chefs, and food manufacturers are experimenting with ways to make insect-based foods more psychologically appealing and integrated into familiar cuisines for nonconsumers. Currently, these foods are rather expensive, as are the insects themselves, and much work is being done to make production more efficient and scaleable (Derooy, Reade, & Spence, 2015; Ramaswamy, 2015).

FOOD AND RELIGION

Religions, often seen as divinely ordained, are also systems that may only be understood by integrating biological and cultural approaches, as religions themselves reflect biological influences (e.g., responding to local ecological pressures; innate avoidance of uncertainty) and cultural processes, which change over time via cultural evolution (Northover & Cohen, 2018; D. Wilson, 2002). Religions, as systems of rules, beliefs, values, and practices, may be conceptualized in the same way that cultures are (A. Cohen, 2009).
While there are hundreds or even thousands of religions, our thinking and examples below come from what typically are regarded as the major world religions, in terms of adherents. The one exception that we add is Judaism; although it has less than 20 million adherents, it is foundational for two of the world's major religions (Islam and Christianity), and, like Hinduism, engages food and eating in a prominent way.

A major part of many religions involves what one can or cannot eat (Muslims may eat beef but not pork), when one can eat or not eat (Muslims cannot eat during the day during Ramadan), what combinations of foods can or cannot be eaten (e.g., although meat and dairy products may be eaten separately by Jews who keep kosher, their combination is forbidden), who may eat certain food (only people in a state of grace can eat the communion wafer in Catholicism), what foods are sacred (prasad, food donated to a priest and hence to a deity in Hinduism, is then partially returned to the donor and is blessed or sacred), and some foods that have symbolic, ritual functions (e.g., the red wine in the Catholic Communion becoming the blood of Christ). Furthermore, eating (ritual) often rises to great importance, as well as the food itself. Catholic mass and Jewish Passover involve more than special foods; they involve the way they are presented and consumed.

People don't just vary in their food practices or thinking by belonging to different religions, but food practices and thinking might also vary based on whether people are fundamentalist/orthodox or not. In some ways, orthodox/fundamentalist practitioners of different religions (e.g., Hinduism and Judaism) may be more similar to each other than to less orthodox member of their own religion (Jensen, 1998). Thus, orthodox Hindu and Jews are similar in their great concern for food prohibitions and contamination. Orthodox Hindu and Jews might share a sense that food is related to divinity. On the other hand, less orthodox individuals in any particular religion may share some food attitudes or practices with more orthodox persons from the same religion. For example, even less orthodox Hindus may avoid beef. Even atheists commonly have food practices related to a secular and moral worldview, such as when they are vegetarian for environmental or animal compassion reasons.

An approach within evolutionary psychology concerned with "fundamental motives" might give some clues about why religions have certain food practices, and why some individuals adhere to them and others don't. This approach holds that all humans have a set of fundamental social motivations, including self-protection, disease avoidance, coalition formation, status seeking, mate acquisition and retention, and offspring care (Kenrick, La, & Butler, 2003). All of these have to be successfully managed to be Evolutionary successful. This framework has been applied to thinking about religion and food (Johnson, White, Boyd, & Cohen, 2011). As different ecologies have different affordances, this could help explain why religions that formed and evolved in different parts of the world have different rules (one might avoid specific food disease vectors if one is in a place with a lot of the relevant specific diseases), and why individuals show different levels of adherence (one hypothesis could be that immuno compromised people might adhere differently than people with robust immune systems). As we have discussed earlier, the disgust system is ideally suited through preadaptation to evolve into the moralization of purity (Horberg, Oveis, Keltner, & Cohen, 2009), and purity is often embodied in consuming or forbidding foods (see Wilson, 2002, for an excellent treatment of religion and cultural evolution).

However, disease avoidance and purity don't explain the bulk of religious food prohibitions and ritual, or why practices persist long after the threat can be effectively managed (to the extent that religious pork taboos have something to do with trichinosis, trichinella are killed by cooking, but pork avoidance is still practiced by many). Disease avoidance is just one reason why religions might have instituted some food or eating rules. Sometimes people avoid foods that would be "good" for them for religious or cultural reasons (e.g., among the Hua of Papua, New Guinea, adolescent men avoid eating soft, reddish fruits due to a belief that these fruits are female-related and could have a feminizing effect; Meigs, 1984).

Some religions seem to have many food rules (e.g., Orthodox Judaism) and others, relatively few (e.g., American Protestant Christian vant here of descend one is both religions; assents to Christiani is, 1996 pected to food con cause, in more acc of purity person actually Judaism; bitions nation of forbid deeply re purity, is food and Food the imp binding gether, a commun Gorvine, can offer ment to cooperat the grot ties. Furt to be ex versions, them to their reli seek con food ru with oth New f nalizing (e prohibi causes t within th a Muslim is truste who fol Meyer, adhering seen by commi good ch religious avoiding
One thing that may be relevant here is that some religions are religions of descent (e.g., Judaism, Hinduism), where one is born into the religion, and others are religions of assent, where one belongs if one assents to the appropriate beliefs (e.g., Islam, Christianity; A. Cohen & Hill, 2007; Morris, 1996). Descent religions would be expected to have more bodily/purity and hence food concerns. This might be the case because, in descent religions, one is likely to be more accustomed to thinking about issues of purity and contamination (e.g., “That person appears to be Jewish, but does she actually have Jewish biological parents?”). Judaism and Hinduism have many food prohibitions and a great concern with contamination of good foods by small amounts of forbidden foods. The Hindu caste system, deeply related to Hindu doctrines related to purity, is enacted primarily in the domain of food and eating transactions.

Food prohibitions and practices may have the important social function of socially binding people in a religious community together, and differentiating them from other communities (e.g., for Judaism; A. Cohen, Gorvine, & Gorvino, 2013). Food practices can often serve as a costly signal of commitment to one’s group, increasing within-group cooperation and trust, and differentiating the group from other religions/communities. Furthermore, the descent religions tend to be exclusive and do not encourage conversions, so their food rules would insulate them to some degree from those outside their religion. However, the assent religions seek conversions, so the absence of elaborate food rules might encourage more mixing with others, who are potential converts.

New findings indicate that even costly signaling (e.g., by avoiding certain religiously prohibited foods) by outgroup members causes them to be trusted more by people within the religion in question; for example, a Muslim who adheres to halal restrictions is trusted more by Christians than a Muslim who flouts those restrictions (Hall, Cohen, Meyer, Varley, & Brewer, 2015). Perhaps adhering to food restrictions is not only seen by the ingroup as a signal of ingroup commitment but also as a signal of general good character or self-control. Adhering to religious food practices, such as fasting or avoiding highly palatable foods, can take a lot of self-control (Mathras, Cohen, Mandel, & Mick, 2016). People vary in how much self-control they have, so this might be one reason why some people adhere to rules and others don’t.

These are just a few biological and cultural factors that might explain how religious food practices come to be, why they differ across religious or other cultural groups, and why some people adhere to them and others don’t. The area of religion and food is obviously fertile ground for cultural psychology.

SUSTAINABILITY AND THE MORALITY OF EATING: THE MODERN OMNIVORE’S DILEMMA

Michael Pollan’s (2006) best-selling book, The Omnivore’s Dilemma, brought to the fore a wide range of concerns about the consequences of our food choices, especially in the developed world. Since wealthier people (most of whom live in the developed world) spend a much lower percentage of their income on food, it is possible for them to stand back from daily meals and be concerned about longevity, as well as a range of potentially moral concerns about food choice. Issues of sustainability are also of great import in the developing world, but for many of these people, in or near poverty, nutritional survival, in a relatively short-term time frame, can dominate food choice, compared to thinking about the broader consequences of eating.

We enumerate here four basic, new concerns that constitute part of what we call the “modern omnivore’s dilemma.”

The first modern concern has to do with the effects of the modern food system on long-term health, well-being, and life expectancy. Barry Popkin and colleagues (Popkin, Adair, & Ng, 2012) have highlighted what is called “the nutrition transition,” affecting the whole world to varying degrees, in which traditional home-cooked food is replaced by eating away from home, with sharp increases in the intake of sugars and a number of processed foods. At the same time that this is happening, and partly as a consequence, malnutrition is declining; this is partly the result of disease control and wealth increase, but also because, through
modern agriculture, some foods have become cheaper. These same forces that operate to reduce malnutrition are also involved in the worldwide increase in obesity.

The second modern concern has to do with the ethics of eating animals, from the point of view of animal welfare. What is the place of animal rights in decisions about what animals to raise for food, how to treat them, and how to kill them?

The third modern concern has to do with the effect of food choice on the biosphere and the planet. Stern and Dietz (1994) measured three spheres of human concern: egoistic, altruistic and biospheric. Greater wealth allows more attention to the latter two spheres. This concern manifests most clearly in concerns about climate and pollution, related to food.

The fourth modern concern relates to what has been called “the industrialized diet” (Winson, 2014). This involves concentration of food production, marketing, and retail sales primarily under the control of a relatively small number of large corporations, with a reduction in fresh foods (which are hard to mass-market), and a focus on inexpensive processed foods, but at the same time, the creation of many “micro-varieties” (e.g., in soda or yogurt flavors). The modern food system, at the same time that it has increased food safety and decreased food prices, has also produced some outcomes that might be construed as moral: the decline of small, family-based farms; the possibility that efficiency and profit may displace care for the environment and animal welfare; a decrease in the formerly close relation between the origin of food and the consumer; and increased processing of food. For many people, at least in the Western World, “natural” has become a feature of food that has moral qualities, and that has produced a major increase in availability of food products labeled as natural or organic and gives rise to morally based opposition to genetically engineered foods (Scott, Inbar, & Rozin, 2016).

Some of the issues raised in The Omnivore’s Dilemma (Pollan, 2006) and other books (e.g., Goodman & Redclift, 2002; Thompson, 2015, Winson, 2014) can be debated in terms of the facts of the matter and whether the concerns are truly moral. For example, to what degree are we morally responsible for killing animals whose existence is a result of our intervention? Is animal food inherently more costly to the earth, even if it comes from natural pasture that cannot support traditional or modern agriculture? How do we compare the benefits of the pleasure of eating against the long-term health or moral effects? Is it okay to spend $50 for a meal, when if one spent $10, one could get adequate nutrition, and also feed 40 malnourished children in the developing world for a day with the other $40 (Singer, 2015)? Is it okay to grow and consume high-yield crops that result from genetic engineering?

In the developed, Western World, there is strong opposition by many people to the growth and consumption of genetically engineered food. This concern is higher in Western Europe than in the United States. Although consequential arguments are often invoked by opponents (e.g., unknown side effects), analysis of survey results suggests that the majority of opposition is moral: Genetic engineering of foods is just morally wrong (Scott et al., 2016). Nature can be conceived to be a sacred value; hence, interfering with it is immoral.

These are vexing questions that motivate major dietary changes (e.g., conversion to vegetarian or vegan diets) in some and are not compelling to others. These concerns vary in importance in different countries, as well as in people differing in education and social class. The modern omnivore’s dilemma is relevant to all humans, and the planet. As wealth increases, it will become part of the food-choice world for more and more people.

Globalization and the Role of the Environment and Social Class

The single most important determinant of food choice is the environment; if a food is not available, it cannot be chosen and consumed. Traditionally, before food transport capacities, international trade, and globalization, ecological/environmental factors almost completely determined availability. The idea that people eat what is available does not excite the imagination, and it does not encourage psychological theory. It has not been given much attention in the psychological study of food and eating, which
is perhaps a manifestation of a "fundamental attribution error," that is, a minimization of cultural environmental effects. In most psychological studies, what is at issue, given the presence of food or food choices, is how do people think and behave? However, recent work on food, much from within psychology, has focused on the environment (in particular, portion size) as a main determinant of food intake (e.g., Hill & Peters, 1998; Rozin, Kalbick, Pete, Fischler, & Shields, 2003b; Wansink, 2004). Cultural differences have been documented in portion size (Rozin et al., 2003b), and American historical trends towards larger portion size have been described (Rolls, 2003; Young & Nestle, 1995). Thus, portion size and more general issues of food availability and context (Meiselman, 1996) fall squarely into the domain of cultural psychology.

Through globalization, the food world is homogenizing, especially because of great advances in the storage and transport of foods. For complex reasons that are beyond the scope of this chapter, much of the world wants to be more like Americans, a desire that has become more concrete and informed by widespread exposure to the Internet. American and other Western foods are seen as desirable and prestigious. Recent research in a traditional, medium-size city in India (Vijayapura) indicates that adolescents consider Western foods eaten outside the home to be more prestigious than traditional foods (Maxfield, Patil, & Cunningham, 2016).

People also migrate more with increased globalization. Examining the dietary changes of people from Sri Lanka and Pakistan who moved to Oslo, Wandel, Røberg, Kumar, and Holmboe-Ottesen (2007) found that both groups reported certain changes, such as consuming less beans and lentils. Age was negatively correlated with more butter and margarine consumption, and higher integration correlated with consuming more high-fat foods.

Social class is a major determinant of food choice. Cultural psychology would do well to attend to social structure and social class, because these are psychologically important manifestations of culture (A. Cohen & Varnum, 2016; Kraus, Callaghan, & Ondish, Chapter 27, this volume). For example, the social class structure of Hindu India has enormous influences on food transactions, as historically mediated by the caste system (Appadurai, 1981; Marriott, 1968). Changes in food habits within any culture usually take place over decades or even centuries, and typically move from one class to another. For example, in Europe, chocolate spread from upper to lower classes, and in the United States, sushi has moved from upper to middle classes. Economic factors (initially high cost) partly account for these class shifts, as well as a general tendency for lower classes to imitate the behavior of higher classes. On the other hand, some foods, including chili pepper in the United States, and more generally, highly spiced foods, have often moved from lower to upper classes. The popularity of ethnic cuisines among high-socioeconomic-status Americans in recent decades represents a movement from lower to higher classes.

Finally, in modern American society, principally among more educated and wealthier groups (Leichter, 1997), the idea of healthy eating and exercise has taken hold. This often acquires a moral tinge, what Solomon Katz (1997) has called "secular" morality. There are indications that the attraction of healthy eating may spread across countries and class.

**THE INVERSION OF THE ANCESTRAL FOOD WORLD AND THE INCREASE IN OBESITY**

A particular problem of general interest to cultural psychology has to do with the stresses and dislocations that are occurring in human life as a result of major and rapid cultural changes, especially in technology. We are, both biologically and culturally, adapted more to our ancestral food environment than to our very recently developed world food environment. Technological advances, especially in the food systems of the developed world, have resulted in inversions of some biological adaptations that may be maladaptive in the modern food environment. Some of these changes are presented in Table 17.2. An ancestral environment in which food was in relatively short supply has been replaced by a modern environment in which cheap food is abundant and always available. An ancestral environment that offered a modest variety of potential
### TABLE 17.2. Contrasts between the Ancestral and Contemporary Developed World Food Environments

<table>
<thead>
<tr>
<th>Feature</th>
<th>Ancestral environment</th>
<th>Contemporary developed world environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability</td>
<td>Limited</td>
<td>Wildly abundant</td>
</tr>
<tr>
<td>Variety</td>
<td>Limited</td>
<td>Extraordinary</td>
</tr>
<tr>
<td>Super foods (e.g., chocolate, ice cream)</td>
<td>Nonexistent, except for animal foods</td>
<td>Widely available via technological advance (e.g., chocolate)</td>
</tr>
<tr>
<td>Energy expenditure necessary to obtain food</td>
<td>Substantial</td>
<td>Minimal</td>
</tr>
<tr>
<td>Cost</td>
<td>Substantial in terms of time and energy expenditure</td>
<td>Minimal</td>
</tr>
<tr>
<td>Consequences of foods: Epidemiological revolution</td>
<td>Apparent within hours of ingestion</td>
<td>Not apparent at all, culturally informed about effects decades later</td>
</tr>
<tr>
<td>Suitability for evaluating foods</td>
<td>Adapted to short-term consequence evaluation</td>
<td>Inability to process and understand complex, long-term food risk information</td>
</tr>
<tr>
<td>Food preparation</td>
<td>Extensive</td>
<td>Prioritizing of convenience</td>
</tr>
</tbody>
</table>

Foods mixed with many acutely dangerous potential foods has been replaced by an environment offering an extraordinary range of safe food choices. In the ancestral environment, the foods available were evolved under complex adaptation pressures and were rarely (except for animal foods) very calorie-dense; in the contemporary environment, foods with extraordinary calorie density and extraordinarily appealing sensory properties are available; chocolate is a prime example. There is nothing so palatable or calorie-dense in the natural plant world. In the ancestral environment, we had to work to obtain food; in the contemporary environment, minimal calorie expenditure is necessary.

In the ancestral environment, there was a rather close temporal link (measured usually in hours) between ingestion of a food and appreciation of its consequences (e.g., satiation and if it contained toxins or pathogens). In the contemporary, developed world environment, acute risks of imbalance or toxicity are minimized by cultural means, such as cuisine, sanitation systems, and preservatives. The food risks in contemporary, developed cultures are generally remote; diet is thought to affect differences in life expectancy that result from particular patterns of food choice; these are measured in decades, not in hours (e.g., heart disease). The epidemiological revolution is largely responsible for this change. Only in the contemporary environment do we get information, in the form of risks or probabilities, from epidemiology and other cultural resources of the long-term effects of dietary patterns. We have not evolved to appreciate or make this sort of evaluation; we didn’t originally live that long, and the short-term effects of foods were our predominant concern. Technology has advanced faster than our ability to adjust to it. Most individuals are not educated in even the basics of probability or about the nature of science; hence, they are unable to evaluate the importance of communicated information about risks. Thus, the cultural transformations that occurred largely in the later 20th century have rendered our biological heritage, finely tuned to our ancestral environment, either irrelevant or harmful.
Modern food technology and the modern car-based environment have fostered a situation in which convenience is a prime commodity. Time scarcity is another effect of modernization that affects food and eating. Feeling that time is scarce might make people less likely to prepare food at home, which, again, might mean less healthy choices; people are also increasingly likely to have meals as a family, which has important social implications (Jabs & Devine, 2006).

In these cases, it is likely that the inherent and biologically predisposed laziness of all animals, including humans, is being catered to more and more effectively. It may soon be possible to accomplish eating, entertainment, and other major activities with a minimum of energy expenditure. In the meantime, technological advances have greatly improved the safety and shelf life of foods, introduced a massive variety of highly palatable foods, cut food prices, and made it easy to deliver any type of food almost anywhere in the world. Food is a major area for the study of globalization. The successful penetration of McDonald's into vastly different cultures argues for important food universals (Watson, 1997).

The result of these mismatches, primarily in the developed world, has been an increase of obesity and degenerative diseases, and widespread dieting and concern about eating a healthy diet. In the ancestral environment, it is adaptive for all animals to expend as little energy as possible to obtain adequate nutrition. This is because energy expenditure requires more energy intake, and energy intake itself consumes energy and increases the probability of being prey for other species. Furthermore, in the natural world, there is generally a bias to consume food when it is available, since it is often scarce, and undernutrition is a greater threat than overnutrition. Our biological tendencies to eat when food is available, and to expend as little energy as possible, have become problematic in the modern developed world, where food is palatable, plentiful, and available with minimal energy expenditure.

One result of all of these forces, particularly in the United States, is a great ambivalence about eating, with concerns about obesity, long-term health, and appearing slim tempering the potential enjoyment of a highly palatable, omnipresent, and inexpensive food world (Rodin, Silberstein, & Striegel-Moore, 1985; P. Rozin, Bauer, & Cataneso, 2003a).

**France—United States Contrasts in Reaction to the Inverted Food World**

Fischler and Rozin, along with a number of students, have examined how France and the United States have dealt with the mismatch between the ancestral and contemporary, developed world food environment. They claim that France has been more successful in creating or maintaining compensatory cultural institutions (P. Rozin et al., 1999; summarized in P. Rozin, 2006a), because traditional features of cultural food-related and other institutions in France offer a better buffer to the changes in the food environment. The evidence for greater success in France is the substantially lower level of obesity in France (about half of the U.S. rate), and a notably lower incidence of death due to cardiovascular disease. The French situation is more successful than that in the United States for many reasons.

1. The French food environment discourages overeating by offering smaller portion sizes and making between-meal snacks less available (P. Rozin et al., 2003b).
2. The cultural geography of living styles in France, including especially the availability of food sources (stores) locally and within walking distance of most homes, and the greater inconveniences and expenses associated with the use of automobiles, probably lead to greater energy expenditure in daily life in France.
3. The traditional French attitudes toward food focus more on the experience of eating and less on the (health) consequences of eating, which leads to less conflict and worry about eating, and more pleasure (P. Rozin et al., 1999).

Certain deep differences in cultural values with respect to food tend to reduce the impact of the easy availability of inexpensive, varied, and highly palatable foods (P. Rozin, 2006a; Stearns, 1997). These cultural values include the following:
• An emphasis on moderation as the reigning principle for eating in France, as opposed to abundance in the United States (P. Rozin, Remick, & Fischler, 2011). There is a related emphasis on food quality in France and food quantity in the United States.

• Collective food values are more prominent in France, whereas individualized food values are prominent in the United States. This may result from the strong individualism/Protestant traditions in the United States (Markus & Kitayama, 1991). As a result, Americans prefer to be offered a much wider variety of minor variants of the same food and are much more inclined, in a restaurant, to do their own mixing and matching of main meat dish and vegetable accompaniments, and more individualized seasoning of foods (salt, pepper, ketchup, mustard, etc.). The nutritional wisdom in many cuisines, which has supported success across generations, is to some degree abandoned, under assault from very sweet, fatty, and salty foods.

• Americans are more motivated to spend money and arrange their lives to minimize effort and maximize convenience, which has the result of spending less energy. The French are more inclined to spend more money on maximizing joy, that is, having memorable and relatively unique experiences. This corresponds to the important distinction between comforts and pleasures made by Scitovsky (1976/1992) and P. Rozin et al. (2011). Americans are more inclined to conceive of health as heavily influenced by environmental influences (e.g., electric power lines, environmental toxins, foods), while the French see health more as a matter of internal balance (Leeman, Fischler, Rozin, & Shields, 2011; Payer, 1988). This framing appears in the beliefs of both doctors and laypersons.

• The family meal is a more central, perhaps even sacred entity, in France. Typically, main meals take longer, are not accompanied by accessory activities (e.g., watching television), and all family members above the age of infants consume the same food. These factors can increase the amount of food experience and pleasure, without increasing actual intake.

In short, the greater success of the French in resisting both inactivity and the promotion of overeating in the modern world results from a combination of differences in cultural values and in the arrangement of the environment. Most of the differences described earlier operate to preserve the pleasures of eating, reduce exaggerated worries about eating, and reduce the incidence of obesity in the French, as opposed to Americans. It does not seem that the French have developed better compensatory mechanisms for the modern food environment; rather, it is that food institutions already in place increase resistance to these changes, and these institutions are not as eroded by the modern world as they are in the United States.

**FOOD AND SEX**

Food plays a special role in cultural psychology because of the ways cultures have transformed the food domain. In contrast, sex plays a more prominent role in evolutionary psychology, because there are many basic similarities in sexual behavior in the ancestral and modern environments. Yet there are important and fundamental similarities between these two domains. From the point of view of behavior, food is the critical domain for individual survival, and sex, for species survival. In both domains, there is great sensitivity about what gets into the body; there is great pleasure when the "right" stuff gets in, and great aversion, fear, and disgust when the "wrong" stuff gets in. Contamination and purity are important in thinking within both domains. Both sex and food involve sharing substance with another person. This is obvious for sex (and may include shared saliva). For food, shared substance occurs in three senses: eating a food prepared by another person, eating together with another person (perhaps from the same plate or taking bites from the same entity) and, in societies that practiced cannibalism, eating another person. Alan Fiske (personal communication, 1990) has pointed out that eating is commonly used as a metaphor for sexual relations in many cultures, and that rules concerning food and sex are often either parallel or mutually determinative. Meigs's (1984) analysis of the food taboos of the Huia of Papua New Guinea is an exemplary demonstration of mixed nutritive and sexual meanings of foods. Foods are believed to riving bo who ha min tern ha be prote Hence, t food rais more valued, as the food of a sandals be pear ob English: exchang sexual sometin context high sebion by ing obj trusio women Gordon

**MEASURE THE METRIC AND M**

It would be sure al eating utu a gent goal of promis in the Europ Nielsen and et with f world and G styles count domaifo butes ing fo
believed to be vehicles for “vital essence,” deriving both from their origins and the people who have handled them. There is great concern that males going through pubescence be protected from feminization by foods. Hence, they are not allowed to consume any food raised or prepared by a fertile woman. Furthermore, a whole set of foods that are believed to be feminine, and hence feminizing, are prohibited during this period. Meigs assembled a list of such foods and notes that, as a group, they are reddish in color and soft in texture.

Sex and food each have their relevant aperture, though the mouth, in many cultures, is shared in its food and sex functions. Parallels between the vagina and the mouth appear obvious, including common terminology (labia and lips). At least in American English, there are important metaphorical exchanges of food and sex words. Eat has sexual connotations, and the word meat is sometimes used to refer to people in a sexual context and also to the penis. Finally, the high sensitivity of women to vaginal intrusion by foreign and potentially contaminating objects parallels the sense of oral intrusion for such objects for both men and women (P. Rozin, Nemeroﬀ, Horowitz, Gordon, & Voet, 1995).

MEASURING AND ASSESSING THE MOTIVATIONS, MEANINGS, AND MANNERS OF FOOD AND EATING

It would be desirable to have scales that measure all of the important aspects of food and eating in culturally appropriate ways. Culturally appropriate measurement has been a goal, so far not fully accomplished, goal of cultural psychology. There are some promising measures that represent progress in the food domain. Across a number of European cultures, Grunert, Dean, Raats, Nielsen, and Lumbergs (2007) have created and standardized a measure of satisfaction with food-related life. Examining the food world broadly, Scholderer, Brunns, Bredahl, and Grunert (2004) have developed a food styles measure and applied it across many countries in the European Union. The five domains sampled are shopping, the attributes sought in a food, the modes of preparing food, consumption situations, and pursuing motives. An influential measure of the motives for food choice, the Food Choice Questionnaire (FCQ), was developed in the United Kingdom and samples nine types of motives (Health, Mood, Convenience, Sensory Appeal, Natural Content, Price, Weight Control, Familiarity, and Ethical Concern; Steptoe, Pollard, & Wardle, 1995). Prescott, Young, O’Neill, Yau, and Stevens (2002) used this instrument with a sample of female consumers in Japan, Taiwan, Malaysia, and New Zealand. Confirming a common finding in prior studies, sensory appeal was the predominant motive in New Zealand, whereas price and health were more salient in the Asian samples. Measurement of the Steptoe et al. (1995) motives for eating were expanded and modiﬁed to include 15 motives (Liking, Habits, Need and Hunger, Health, Convenience, Pleasure, Traditional Eating, Natural Concerns, Sociability, Price, Visual Appeal, Weight Control, Affect Regulation, Social Norms, Social Image), and validated in Germany, resulting in The Eating Motivation Scale (TEMS; Renner, Sproesser, Strohbach, & Schupp, 2012). Lindeman and Våänen (2000) expanded the single ethical scale in the FCQ by introducing three subscales: Ecological Welfare (Animal Welfare + Environmental Protection), Political Values, and Religion. Across most studies, with data coming primarily from Western Europe, sensory appeal (liking), health, convenience, and price usually emerge as principal motives. Quality/freshness, probably related to sensory appeal, has emerged as important in a study of 15 European Union countries (Lappalainen, Kearney, & Gibney, 1998).

In a series of studies, Guerrero et al. (2012) used free associations, sorting, and other tasks to explore the idea of traditional foods, relating this particularly to their origins, across a number of European countries. In a study that extended well beyond Western Europe (Brazil, China, France, Portugal, Spain, Uruguay, and the United States), Ares et al. (2016) employed 31 questions that probed different ways that food may foster well-being (with respondents expressing degree of agreement with items such as “It makes me feel excited” or “It is good for my soul”). These 31 features were rated for each of nine common foods (e.g., coffee, fish). The largest differences across
countries were for items related to emotional and spiritual aspects.

We hope that the existing measures will be consolidated and used to assess a wider range of cultures, including more and more individuals who have not yet become connected to the Internet. We also note that two areas have not yet been assessed: the multiple meanings of food (but see Arbit, Ruby, & Rozin, 2017) and the highly variable manner of eating, or food etiquette.

**FOOD SOCIALIZATION:**
**LEARNING ABOUT FOOD AND EATING**

**Weaning and Toilet Training**

With breast-feeding and careful monitoring of the human infant by its mother, there is little that can go wrong in its food world in the first years. Evidence suggests that for the first year or two of life, children will put anything they find into their mouths (P. Rozin et al., 1986b). This potentially dangerous tendency is neutralized by familial vigilance. It seems that the most important thing a child has to learn in the early years is what not to eat.

Freud correctly noted two of the major events of early childhood: weaning and toilet training. One is about food, and the other is a consequence of eating. Weaning is a necessary event, and toilet training, though not literally necessary, is universal. Both involve denying a child a pleasure, and both present challenges to both parent and child. Both problems are solved in very diverse ways in different cultures, at different ages, with different degrees of attention and harshness. Because Freud saw these two events as central in the formation of personality, they received attention in a cross-cultural context for at least a generation in the field of anthropology (Whiting & Child, 1953).

The consequences of types of weaning or toilet training are not yet well established, but it does seem that the enormous variation in timing and the way different cultures do this does not result in the major types of personality differences that Freud predicted. Although weaning and toilet training are major milestones in early life, developmental psychology in the last part of the 20th century paid scant attention to these two fundamental processes (P. Rozin, 2006b).

**Eating**

The acquisition of table manners is another important aspect of food socialization that has been little studied by psychologists. Birch, Billman, and Richards (1984) reported that the category of special foods eaten at breakfast in the United States becomes distinctive and separate for children in the later preschool years. P. Rozin, Fallon, and Augustoni-Ziskind (1986a) reported that until the later preschool years, children in the United States do not understand or incorporate a variety of food-mixing prohibitions; thus, if the young preschool child likes food A (e.g., steak) and food B (e.g., ice cream), he or she will like A + B (steak and ice cream). Cuisine is not that simple, and there are many senses of "appropriateness" that must be acquired (Schutz, 1989).

**PREFERENCES: FORMATION AND TRANSMISSION**

Food is one of the domains in which preferences are particularly salient. It is quite remarkable that although preferences for food, music, and a wide range of activities are very important parts of life (and economics), they are studied little by psychologists, cultural or otherwise (P. Rozin, 2006b). The question for all preferences is, how do they get formed? What makes us like some things and dislike others? The food domain is a natural place to study this, because there are so many food preferences, they are public, and they are usually open for discussion (unlike, e.g., sexual preferences). Surely, one of the major distinctive features of a culture is its cuisine and associated food preferences. If we know someone is particularly fond of rice and soy sauce, we can make a good guess that they are from East or Southeast Asia. While there are large cross-cultural differences in food preferences, there is also wide variation within culture (for an informed and readable discussion of taste preferences in a cultural context, see Prescott, 2012), probably driven by a combination of genetic factors and learning history.

Given the generalist background of humans, it is unlikely that most preferences would be accounted for solely in terms of genetic endowment. A major alternative is...
Another notion that food preferences are formed, but exposure is necessary, and in some cases, may be sufficient (reviewed by Birch, Fisher, & Grimm-Thomas, 1996).

Peer influence is an obviously important factor in the development of food preferences, perhaps especially in adolescence, in some cultures. It is clear that a concatenation of forces, including genetics, parental, and peer influences, result in substantial cultural differences in food likes. Although there are genetic differences with respect to taste and smell, cultural differences in genetics probably are not the major cause of cultural differences (Prescott, 2012).

Of course, there is more to transmission than preference. There are attitudes to food and eating, including their importance in comparison to other activities, and the balance of worries and pleasures about eating. These are different between cultures (e.g., between France and the United States), but they also vary considerably within a culture. Recent ethnographic data suggests that some of the major differences in food attitudes between Americans and Southern Europeans may be traced to differences in the types of interactions that occur around the dinner table (Ochs, Pontecorvo, & Fasulo, 1996). The Italian family eating environment is much more oriented toward the shared pleasure of eating, and less to concerns about food and health, and coaxing children or making bargains to promote healthier eating. This work is a promising beginning for systematic studies of food socialization in a cultural context.

CONCLUSIONS

Food is deeply intertwined with biology, psychology, and culture. There are many universals, and many major culture differences. The cultural differences may be conceived as variations on a theme. Predaptation of foundational food system features is rampant, both within the food world and extending from the food world to other domains. The food system presents particular challenges and particular opportunities for cultural psychology. The cross-cultural and historical records are good, especially since food is so central in archeology and eth-
nography. The biological constraints and predispositions are well understood. What we need is for more researchers to take up the challenge of explaining a major part of human life, the center of human sustenance, and a major source of satisfaction.

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