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"Core disgust" is a food related emotion that is rooted in evolution but is also a cultural product. Seven categories of disgust elicitors have been observed in an American sample. These include food, animals, body products, sexual deviance, body-envelope violations, poor hygiene, and contact with death. In addition, social concerns such as interpersonal contamination and socio-moral violations are also associated with disgust. Cross-cultural analyses of disgust and its elicitors using Israeli, Japanese, Greek and Hopi notions of disgust were undertaken. It was noted that disgust elicitors have expanded from food to the social order and have been found in many cultures. Explanations for this expansion are provided in terms of embodied schemata, which refer to imaginative structures or patterns of experience that are based on bodily knowledge or sensation. A mechanism is suggested whereby disgust elicitors are viewed as a prototypically defined category involving many of the embodied schemata of disgust. It is argued that each culture draws upon these schemata and its social and moral life is based on them.

Body, Psyche, and Culture: The Relationship between Disgust and Morality*

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In the words of Clifford Geertz (1973), "man is an animal suspended in webs of significance he himself has spun, [and] I take culture to be those webs". But from what do we spin those webs? In this paper an attempt will be made to analyse the surprisingly complex emotion of disgust and show how the web of culture might be spun, in part, from some aspects of human bodily experience. Further, an attempt will be made to show how the emotion of disgust, which may have evolved to help our omnivorous species figure out what to *eat* in the physical world, now helps our social species figure out what to *do* in the cultural world.

This paper is divided into four parts. First, an emotion we call "core disgust" will be described. This is followed by a discussion of the way core disgust has been expanded and elaborated in an American population. Then an attempt will be made to examine how core disgust has been elaborated cross-culturally. And finally, drawing upon the first three parts it is discussed how disgust is based on a set of "embodied schemata" that are extended in culturally variable ways from the issues of core disgust to a broader set of physical and social issues.

Core Disgust

Many animals are born knowing what to eat, and they instinctively seek out the visual image, scent, or taste of a particular food (for instance, koala bears eat only the leaves of a few species of eucalyptus trees). Human beings, however, must learn what to eat. Like rats, pigs, herring gulls and cockroaches, we are omnivores. The omnivorous strategy has the advan-

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tages of flexibility and freedom from dependence on any one food source. But omnivores face the attendant risk of consuming toxins or a nutritionally unbalanced diet. These two opposing facts create the "omnivore's dilemma" (Rozin, 1976). The omnivore's strategy seems to be a kind of fearful interest: new potential foods are explored, but they are subjected to scrutiny and tasted cautiously. People therefore have a strong ambivalence about food, manifested in two competing goals, or motivations. On the one hand, people are sensation seekers (Zuckerman, 1979), motivated to seek out novel forms of physical experience, including new foods. On the other hand, people are "neophobic", or cautious about new foods, particularly animal foods. In our efforts to construct a scale to measure disgust sensitivity (Haidt, McCauley, & Rozin, 1993), we have repeatedly observed that individual differences on Zuckerman's (1979) Sensation Seeking Scale are significantly correlated (negatively) with individual differences in disgust sensitivity. This observation supports the conception of disgust and sensation seeking as opposing motivations.

Disgust guards against far more than just harmful foods. Rozin and Fallon (1987, p. 23) define disgust as "Revulsion at the prospect of (oral) incorporation of an offensive object. The offensive objects are contaminants; that is, if they even briefly contact an acceptable food, they tend to render that food unacceptable." This definition makes it clear that disgust is not primarily a matter of avoiding bad tastes, but rather it hinges on the more complex notion of "offensiveness", which is revealed by contamination sensitivity. Things that taste bad are not necessarily contaminating: if a vegetable we dislike touches a potato on our plate, we would still eat the potato. Conversely, things that are disgusting (and therefore contaminating) do not necessarily taste bad: it is not because of taste that Americans would refuse to eat a fried cockroach, or share a lollipop with a healthy stranger. Disgust is triggered off not primarily by the sensory properties of an object, but by ideational concerns about *what it is*, or *where it has been*. In fact, we conceptualise disgust as a distinct form of food rejection, different from rejections based on bad taste or on fear of harm to the body (Rozin & Fallon, 1980, 1987).

In its ability to spread from one object to another, disgust follows two laws of sympathetic magic first described by Tylor (1871/1974), James Frazer (1890/1959) and Marcel Mauss (1902/1972). The first law, *contagion*, states that "things which have once been in contact with each other continue ever afterwards to act on each other" (Frazer, 1890/1959, p. 35). When an offensive (or revered) person or animal touches a previously neutral object, some essence or residue is transmitted, even when no material particles are visible. The second law of sympathetic magic is *similarity*, which Frazer summarises as "like produces like" (p. 35). Things that are similar in some properties are believed to be fundamentally similar, or even identical. Thus, Americans are often reluctant to consume chocolate fudge in the shape of dog faeces, or to drink apple juice out of a new bedpan, even though they "know" there is no threat of contamination (Rozin, Millman, & Nemeroff, 1986; Rozin & Nemeroff, 1990). Related to these two laws of sympathetic magic is the widespread belief that "you are what you eat". Many cultures believe that by eating a particular animal, one takes on the traits of that animal. This belief has been found to be operative in American college students as well (Nemeroff & Rozin, 1989).

Angyal (1941), in his classic paper on disgust, suggested that disgust centres on animals or animal waste products. Rozin and Fallon (1980; Fallon & Rozin, 1983) have confirmed that, for Americans, most of the physical objects that meet their definition of disgust (cited earlier) are indeed animals (including humans), animal parts, animal waste products, or objects that resemble any of these, or are disgusting by virtue of their association with any of them. If disgust makes people cautious about physical contact (direct or indirect) with animals and people, then disgust could be a uniquely human adaptation to life in the presence of microbes and parasites, which are transmitted primarily by physical contact with animals and people, and their residues. Since microbes and parasites have been killing or weakening human beings for the most part of human history, it is at least plausible that disgust evolved through natural selection. Disgust may have conferred an advantage on those individuals who were concerned with the contact history of things they touched and ate, rather than simply with the sensory properties of those things.

On this view it makes sense that plants and plant products are rarely disgusting. Plants may contain toxins that are dangerous if consumed directly, but plants pose little threat to humans by the sort of indirect contact that can spread germs and parasites.

If disgust evolved to serve these important adaptive functions—food selection and disease avoidance—then it is particularly surprising that the disgust response is almost totally lacking in young children. Indeed, young children will put almost anything into their mouths, including faeces, and the full disgust response (including contamination sensitivity) is not seen until around the age of 5 to 7 (Rozin, Hammer, Oster, Horowitz, & Marmora, 1986; Rozin, Fallon, & Augustoni-Ziskind, 1985; Siegal, 1988). Contamination sensitivity is also not observed, so far as we know, in any non-human species. Caution is, therefore, warranted in proposing that disgust is important for biological survival. The social functions of disgust may be more important than its biological functions.

Disgust may have its roots in evolution, but it is also clearly a cultural product. Like language and sexuality, the adult form of disgust varies in accordance with culture, and children must be “trained-up” in the local rules and meanings. It is, therefore, interesting to note that in his review of approximately 50 cases of feral humans, Malson (1964/1972) found none who showed any sign of disgust.

In conclusion, disgust, or what we call “core disgust”, is a food related emotion that makes us cautious about what we touch or put into our mouths, both because of what an object *is* and because of where it *has been* or what it *has touched*. Core disgust focuses on issues of food, and on animals and body products, which are contaminators of food. The oral and food rejection focus of core disgust is reflected in its distinctive facial expression, including a wrinkled nose and retraction of the upper lip, and sometimes a gape as well (Darwin, 1872/1965; Ekman & Friesen, 1978; Izard, 1977; Rozin, Ebert, & Lowery, 1992). Core disgust is associated with feelings of revulsion and nausea, and in extreme cases it can lead to vomiting. Since core disgust is conceived of here as a guardian of the mouth, its connections to nausea and vomiting seem quite straightforward: nausea discourages eating,

and vomiting allows mistakes to be undone. (For a complete review of disgust see Rozin & Fallon, 1987; Rozin, Haidt, & McCauley, 1993.)

Elaborated Disgust in the United States

When people in the United States were questioned about things that disgust them, they made frequent references to issues of core disgust: foods, animals, and body products. Yet, our analysis of core disgust cannot explain two other kinds of events. First, there are frequent references to sexual matters, such as incest, homosexuality, bestiality, or almost any other deviation from the cultural ideal of "normal" heterosexuality. Second, there are frequent references to bloody car accidents, mutilated corpses, surgery, wounds, and physical deformity. This last set of examples all involve a forcible breach or alteration of the exterior envelope of the human body. If we think of disgust as an oral defence then we cannot explain why sexual "violations" and body envelope violations are disgusting. These violations neither involve food nor the mouth, so what is it that links them to the issues of core disgust?

One of the most widely shared features of disgusting events is that they remind us of our animal nature. Human beings in many cultures feel the need to distinguish themselves from animals (Leach, 1964; Ortner, 1973; Tambiah, 1969), and to hide their animal nature behind the cover of humanising rituals and practices. If we want to convince ourselves that we are not animals, our body would confound us in certain domains: we would still eat, excrete, and have sex, and we would bleed when our outer envelope was breached, or when we menstruated or gave birth. Every culture prescribes the proper *human* way to handle these biological functions, and people who violate these prescriptions are typically reviled or shunned. Thus, concerns about personal hygiene of the self and others emerge to be good predictors of disgust sensitivity (Haidt, McCauley, & Rozin, 1993). The link between concerns about hygiene and animality helps explain the otherwise

puzzling statement that "cleanliness is indeed next to godliness" (attributed by Bartlett to the theologian John Wesley, Sermon XCII). There is a long tradition in Western religious practice (Douglas, 1966), as in Indian religious practice (Fuller, 1992), in which bodily cleanliness and "purity" are essential before one can approach God. Human beings are suspended between God (or Gods) above and animals below, and we rise and fall as a function of our success in concealing or overcoming our animality.

Perhaps the clearest statement of the horrors of animality comes from the New England Puritan Cotton Mather, who observed a dog urinating while he himself was urinating, and was shocked at the vileness of his own act. Mather then made this resolution in his diary: "Yet I will be a more noble creature; and at the very time when my natural necessities debase me into the condition of the beast, my spirit shall (I say at that very time!) rise and soar..." (cited in Thomas, 1983, p. 38). The fear of animality, however, is not unique to Christians; Leach (1964) has observed that animal names are widely used as insults cross-culturally, metaphorically pushing a person over the symbolically charged human-animal boundary.

Consistent with this animal reminder account of disgust is the fact that there is only one body product that is not regarded as disgusting by Americans, or by many other peoples: tears. (Imagine that you lend your handkerchief to an acquaintance, who returns it wet with mucous, urine, sweat, saliva, breast milk, semen, or tears. In which case would you be least uncomfortable?) Ortnner (1973) has pointed out that tears are a uniquely human product, while all other secretions and excretions link us to animals. Unlike most body products, tears are more frequently referred to in poetry than in "dirty" jokes.

This animal reminder view of disgust also highlights a common quality of food, sex, and envelope violations. In all three domains there are many safe options available to human beings, yet many or most options are taboo. Almost all animal flesh is edible and nutritious, yet most human societies taboo many of the animal species available to them (Soler, 1973/1979; Douglas, 1966). All human beings (and some animals too) are potential sexual partners, yet most human societies

place taboo on many of the possible pairings of partners (and many of the possible sexual acts). There are dozens of safe modifications of the body envelope, yet most human societies taboo all but a few (such as ear piercing, "nose jobs", body building, and perhaps breast enlargement or reduction for Americans). Americans would consider it monstrous (that is, inhuman) for a person to engage in unrestricted sex, unrestricted eating of animal flesh, or unrestricted body modification.

Food and sex taboos may have a further similarity in that the middle distance is often the preferred range. Based on his study of a Thai village, Tambiah (1969) noted that animals cannot be eaten if they are too close to humans (pets, monkeys, humans), or too distant from humans (invertebrates and other "anomalous" animals; wild animals of the forest). Sexual partners cannot be too similar to the self (same sex, same nuclear family) or too distant (animals, people of other races). In many societies the prevalence of an incest taboo coupled with a preference for cross-cousin marriage exemplifies this preference for the middle distance.

The massive restrictions that Americans place on eating, sexuality and body modification, and the linkage of all three to disgust, point to a concern about the human body that cannot be based on rational fears about health. (If health concerns motivated disgust then skydiving, cyanide and butter would be disgusting, while genital piercing and the consumption of slugs or human flesh would not.) Rather, Americans seem at times to hold a view of the body observed in other parts of the world: that the body is a temple, housing the self or the soul within. This temple must be carefully guarded against all forms of pollution or desecration, and we propose that disgust is best understood as *the guardian of the temple of the body*. Core disgust guards against material contamination, and the extended animal reminder concerns about sex, envelope violation and hygiene guard against any undignified use or modification of the temple. Rozin (1990) contrasts fear, which guards primarily against physical threats to the body, with disgust, which guards against more subtle threats to the "soul". We would like to reiterate the contrast here: disgust involves a vertical dimension of degradation–elevation and a

link to notions of purity and sacredness, which are not found in fear.

We have argued that Americans want to distinguish themselves from animals, and that they (sometimes) see their bodies as more than biological machines. But why? Ernest Becker (1973) has offered one possible motive. Becker's thesis is that the fear of death and insignificance is the greatest fear haunting humans. Human culture and heroism are, in large measure, attempts to deny or repress the fear that, ultimately, human life is pointless and brief. Becker's thesis fits well with our analysis of disgust. We fear recognising our animality because we fear that, like animals, we are mortal. We thus attempt to hide the animality of our biological processes by defining specifically human ways to perform them. Becker's thesis helps explain another kind of disgust elicitor: corpses. In our efforts to construct a scale to measure disgust sensitivity (Haidt, McCauley, & Rozin, 1993), we have repeatedly found that reactions to contact with corpses and death are among the best predictors of a person's overall disgust sensitivity.

To summarise the argument so far, seven categories of disgust elicitors have been described for Americans. Food, animals, and body products are elicitors of core disgust, which may be an evolutionary adaptation to life in the presence of microbial threats. Core disgust can be thought of as an oral defence, and elicitors of core disgust are contaminating. Americans also find sexual "deviance", body envelope violations, poor hygiene, and contact with death disgusting. This expanded domain of disgust is referred to as "animal reminder" disgust, which can be thought of as a defence of the temple of the body, or (similarly) as a defence of the distinction between humans and animals.

We will now introduce two social concerns that, for Americans, are also associated with disgust. The first concern is about interpersonal contamination in general. Many Americans show some reluctance to wear clothing that was previously worn by a healthy stranger (Rozin, Millman, & Nemeroff, 1986; Rozin, Nemeroff, Wane, & Sherrod, 1989). This reluctance might at first seem to be based on a concern about body products, since used clothing may contain sweat or hair from the stranger. Yet the reluctance decreases only slightly when

the article of clothing is laundered. More importantly, this reluctance is highly contingent on the nature of the stranger. If the stranger committed a murder, or lost a leg in a car accident, the reluctance increases. If the stranger was Adolph Hitler, the reluctance increases even more. If the clothing was worn by a desirable or well-liked person, the reluctance may reverse (Nemeroff & Rozin, 1992; Rozin, Nemeroff, Wane, & Sherrod, 1989). These findings demonstrate the operation of contagion in the interpersonal domain (Rozin & Nemeroff, 1990). We suggest that contamination sensitivity, which helps us avoid pollution and maintain purity in the material world, should be thought of as a schema that we have extended into the social world, where we use it to avoid "evil" and increase contact with "goodness". The nature of this schema will be discussed in the following.

The second social concern is more problematic. When we ask Americans to list disgusting things, we find frequent references to racism, brutality, hypocrisy, political attitudes, and violations of important social relationships. Lawyers who chase ambulances are disgusting. People who abandon their elderly parents are disgusting. Liberals say that conservatives are disgusting. Conservatives say that welfare cheaters are disgusting. This widespread usage of the word "disgust" for such socio-moral violations is puzzling, since these violations seem to have nothing to do with concerns about the body, or about animality. They do not seem to be derived from the issues of core disgust or animal reminder disgust. How can socio-moral issues be disgusting?

The puzzle of socio-moral disgust could be solved simply by declaring it to be a quirk of the English language. In English, when we intensely dislike something, we say it is "disgusting", or that it makes us "sick". This could be just a figure of speech, a kind of metaphorical evocation of disgust and its somatic expression as nausea. After all, no matter how "sick" a politician makes us feel, we would not vomit after hearing a political speech. To determine whether socio-moral disgust is a metaphoric quirk of the English language we must examine other languages and cultures.

A central question will occupy us for the rest of this paper: are the issues of core disgust, animal-reminder disgust, inter-

personal contamination, and socio-moral disgust linked together in other cultures, and if so, what does this reveal about the relationships among the body, the psyche, and culture?

Elaborated Disgust in Cross-Cultural Perspective

To obtain a cross-cultural perspective on disgust and its elicitors we interviewed non-native speakers of English who are living or studying in the United States. We observed important cross-language differences in the semantic domains of words for disgust, yet it is abundantly clear that socio-moral disgust is not a quirk of English. Most of the languages we studied have a word with a compound semantic domain linking together bodily concerns (about food, faeces, cockroaches, sex) with social and moral concerns, for instance, French *degout*, German *ekel*, Russian *otvrashchenie*, Spanish *asco*, Hebrew *go-al*, Japanese *ken'o*, Chinese *aw-sbin*, and Bengali *ghenna*. An Israeli woman, interviewed by Amy Abramson at the University of Chicago, was asked to describe what sorts of situations might make her feel *go-al*. She said:

A horrible accident and you see body parts all over the place. That would be *go-al*. Or, you see an extremely fat person—in the nude. Blech! Especially if it's on the beach and it's like "How dare you" if you're not perfect, to show off. *Go-al* will be something if you really dislike a politician, you would use the word *go-al*. Israelis are very, very political people. You feel *go-al* if someone just picked his nose and ate it later. Ewwww! Clipping your fingernails in public.... [When asked what it feels like to feel *go-al*, she said:] It feels like you could throw up.... You feel like you'd like to be ten thousand miles away from this place. Like you want nothing to do with this place, incident, or event.... You make faces and noises, an international noise like "bloooch!"

Note that this woman began by talking about body parts (envelope violations), moved on to a naked fat person (combining

physical "deformity" with social violation), then talked about a politician (socio-moral), and in the next breath, returned to body products. The English language is not unique in linking core disgust, animal reminder disgust, and socio-moral disgust together under one word, and linking all these issues to nausea and revulsion.

The Japanese word *ken'o* reveals the familiar pattern of linking core disgust and socio-moral issues, but with an intriguing difference in the socio-moral domain. We asked 20 students at Hiroshima-Shudo University to list three events from their own experiences in which they felt *ken'o*. Another group of 24 students at the University of Chicago was asked to describe three events in which they felt disgust. When the items were sorted into groups of similar events, it was found that core disgust items accounted for about one-quarter of all responses in both samples. Furthermore, the specific items mentioned by each group were easily recognised by members of the other group. In Hiroshima, one subject said, "stepping in feces", and in Chicago, "seeing my brother's diapers". In Hiroshima, one said, "a flying cockroach", and in Chicago, "turning on my oven and watching 87 large hungry cockroaches crawl out of it". People in both cultures are talking about issues of core disgust. The animal reminder disgust items were less observable in both cities, but again, the kinds of items mentioned by each group were recognised by members of the other group. People in both cities mentioned surgery, bloody traffic accidents, and sexual issues.

Turning to the socio-moral disgust items, the percentage of such items was similar (61 per cent in Hiroshima, and 70 per cent in Chicago), but the focus of the two groups was very different. For Americans, socio-moral disgust is a kind of character judgment of others, especially of people who violate the basic dignity of other human beings. The largest single class of events, accounting for 21 per cent of the total pool of responses, described acts of senseless violence or cruelty, especially towards people who are weak or defenceless. Examples included Serbian atrocities, a recent Chicago mass murder, children who tease homeless people, and "a father who shook his child to death because he didn't like something that he saw during a football game". The second largest class,

accounting for 19 per cent of all responses, included ugly or offensive beliefs and attitudes, especially racist attitudes. The American respondents occasionally mentioned situations in which they themselves were mistreated, but for the most part they mentioned evil people whom they had met or heard about.

For the Japanese, in contrast, *ken'o* was experienced during their everyday social interactions, in situations where things were not going right. They mentioned everyday frustrations in which other people failed to meet their needs, or even worse, where other people abused or shamed them. For example, "when I was criticized for my driving with very harsh words", or "when punks tried to pick a quarrel with me". They also mentioned situations where they themselves failed to live up to certain standards, for example, "When I found myself not to be the person that I should be", or "When I did not find my name on the board where names are posted of people who passed the entrance exam".

Thus, Americans and Japanese did not differ in linking the issues of core disgust and animal reminder disgust to certain social issues, but they differed in the kinds of social issues that they mentioned. Americans connected their feelings about cockroaches and faeces to their feelings regarding racism and senseless murder, while the Japanese connected their feelings about cockroaches and faeces to their feelings about frustration, indignation, and failure. An attempt will be made to explain this divergence in socio-moral concern later.

The ancient Greeks also linked their concepts of physical contamination and social violation. Parker (1983) has analysed the concept of *miasma* in ancient Greek societies. *Miasma* and other words derived from the root *mia*, have the basic sense of pollution, defilement, or impairment of a thing's form or integrity. The condition of *miasma* has three properties: (a) it makes the person affected ritually impure, and thus unfit to enter a temple; (b) it is contagious; and (c) "it is dangerous, and this danger is not of familiar secular origin. Two typical sources of such a condition are contact with a corpse, or a murderer" (Parker, 1983, p. 4). The logic of *miasma* is similar to the logic of disgust. *Miasma* involves a distancing from divinity, contagion, and a kind of threat or danger that cannot

be explained as a rational fear of harm from the object itself. Parker has specifically stated that *miasma* resembles the English concept of disgust in uniting both the "physically repugnant" and "what is morally outrageous" (1983, p. 4).

Most important for the current analysis, the Greeks saw a clear connection between animality and socio-moral violation. The adjective *miaroi*, which Parker has translated as "disgustingness", means essentially a deficiency in shame. "Traitors and law-breakers are '*miaroi*', because it is shamelessness that causes them to disregard normal constraints. The '*miaros*' is an animal, lacking the self-control that is the first requisite of life in society" (1983, p. 5). For the Greeks, then, knowledge of moral rules and a proper sense of shame were crucial indicators of humanity, and the repression of animality emerges as a central issue in *miasma*. Social violations, especially if committed without shame, were indicators of barbarism or monstrosity.

A further clue to the nature of socio-moral disgust comes from the Hopi. Michael Wozniak, an undergraduate student at the University of Chicago, interviewed five Hopis in Arizona about their scripts for emotional experiences. They mentioned the word *tiyoyaeiwai* as the best Hopi equivalent of "disgust". Four of them listed the following situations as elicitors of *tiyoyaeiwai*: seeing a dead person; incest; disregard for the environment; and any form of aggression. The mix of physical and socio-moral events should be noted. When asked to describe what they felt in their body, all four said, "sick" or "nauseous".

The fifth Hopi was most informative. When asked about the situations that led to *tiyoyaeiwai*, he said:

Anything that would be deviant to Hopi teachings and belief could be seen as disgusting to some degree. The Hopi way of life was handed down to us by Massau'u, and it is important to keep to the right path. Often this is believed to be opposite of the White way, no offense. But it can be found that most Hopi believe there are two ways of life in the world, the traditionally good way of the Hopi and the way of the White man. Hopi believe that the world will end and that there will be a time of judgment, and

that we're now in the time of *koyaanisqatsi*, it means world out of balance. It is the time just before the end of the world. You can see it in things like mistreatment of the environment, wars, etc. We can't stop the world from ending but *koyaanisqatsi* is a time of suffering and fear and it's wrong to cause such trouble.

This image of the world as being out of balance, caused by (or reflected in) immoral human action, may be a key to understanding socio-moral disgust. We will attempt to integrate our analysis of core disgust with our cross-cultural data on socio-moral disgust.

The Embodiment of Cognition

We have argued that core disgust is an emotion that makes people cautious about foods and animal contaminants of foods. We have argued that disgust has extended among Americans to become not just a guardian of the mouth, but also a guardian of the "temple" of the body, and beyond that, a guardian of human dignity in the social order. And finally, we have argued that this expansion, from food to the social order, is not unique to Americans, but can be found in some form in many cultures. We have also observed, most clearly in the contrast of Japanese and Americans, that the kinds of social issues linked to disgust may be quite variable. We will try to explain why disgust tends to expand from the body to society, and also why the expansion to society shows the greatest cultural variation.

The answer may perhaps be found in a controversial but growing view of human cognition: that it is *embodied* (Lakoff, 1987; Varela, Thompson, & Rosch, 1991), and that it may involve metaphors and pattern matching more than propositions and reasoning. Margolis (1987) has argued that language and propositional reasoning are so recent in the evolution of the human brain that they are unlikely to be the basic processes of human cognition. According to him, cognition, for humans as well as animals, is primarily a matter of quick and intuitive

pattern matching, in which patterns get “tuned up” gradually by past experience. This view of cognition is consistent with current research on neural networks, which do not process information by manipulating symbols. Rather, we apply past patterns of action or recognition, quickly and intuitively, in new situations that resemble the original cuing conditions.

Lakoff (1987, p. xiv) has proposed a compatible view of cognition called “experiential realism”, in which “the structures used to put together our conceptual system grow out of bodily experience and make sense in terms of it; moreover, the core of our conceptual systems is directly grounded in perception, body movement, and experience of a physical and social character”. Building on his work with Lakoff (Lakoff & Johnson, 1980), Johnson (1987) has mentioned “image-schematic structures”, growing out of our physical embodiment, that allow us to understand one domain in terms of another. For example, it is only because we have bodies that we can know what it is to be pushed and pulled, to be blocked as we try to move, or to suddenly have a block removed, allowing us to pass. Johnson has analysed the discourse about logical inference and has demonstrated how logic itself may be understood through image-schematic structures of force. We say, “I am drawn to conclusion X”, or “I am forced to conclude Y, unless I can find some argument Z to block it”. According to Johnson, the extent to which we really do “feel” the force of an argument, we feel it because we imaginatively apply our bodily experience of force to the domain of ideas. We apply our force schemata to other domains as well, such as the understanding of physical attractiveness as a force that can stun, paralyse, or pull like a magnet. Lakoff and Johnson have argued that metaphor is a basic cognitive process, making certain kinds of understandings possible that would not be possible if we did not have bodies and bodily experiences that we happen to have.

The ideas of Margolis, Lakoff, and Johnson can help us understand disgust. We will use the term “embodied schemata” to refer to imaginative structures or patterns of experience that are based on bodily knowledge or sensation. We have argued that people generally have ambivalent feelings about food, in which core disgust and sensation seeking oppose

each other to create approach–avoidance conflicts. Our daily interactions with food give us a rich set of embodied schemata, for example, “some food attracts me”; “some food makes me nauseous”; “the pleasures of food makes it worth the risk”; “washing removes danger”. We have been compelled to express these schemata as propositions, but each one is meant to include feelings and sensations, including fear, interest, hunger and revulsion, plus bodily knowledge about chewing, swallowing, vomiting, and the feel of water.

These embodied schemata are easily cued (as Margolis would say) or applied metaphorically (as Lakoff and Johnson would say) to other domains. Ambivalence and disgust about sexuality has been noted not only in the West (Freud, 1905/1953), but among some non-Western groups as well (Gregor, 1985). Sexual ambivalence might employ some of the same embodied schemata as ambivalence about food: “some people attract me”; “the thought of sex with some people makes me nauseous”; “the pleasure of sex makes it worth the risk”; “washing removes danger”. By providing schemata that are easily cued, our experiences with food might shape the way we experience sex (or vice versa).

The ambivalence towards food and sex can be found in other domains of disgust as well. It may be assumed that envelope violations, corpses, and body products would be thoroughly negative stimuli, like electric shock, that people would consistently avoid. Yet there are situations in which people routinely go out of their way, or even pay money, to look at these things. Examples include horror films, freak shows, rubber-necking at car accidents, and habitual looking at one’s own bowel movements. Advertisements in pornographic magazines offer “stained panties”. We have also noticed, in the course of our own research, that when we ask people “do you want to see something disgusting?” the answer is usually a cautious “yes”. In sum, the domains of core disgust and animal reminder disgust show a similar tension between interest and fear, between sensation seeking and disgust.

A possible mechanism by which disgust expands from food and eating to a heterogeneous set of elicitors may be suggested here. It is useful to think of disgust elicitors as a prototypically defined category (Rosch & Mervis, 1975). In a prototypical

category, as in a family resemblance structure (Wittgenstein, 1953), all members are related, yet there may be no single feature shared by all members of the category. Core disgust experiences, such as finding half a cockroach in a sandwich we are eating, can be seen as prototypical or central disgust events, involving many of the embodied schemata of disgust. The disgust elicitors of animal reminder disgust can be viewed as non-central members of the category, and they are disgusting because they share one or more schemata with the central members, or with each other. For example, schemata about cautiously taking organic matter into body orifices may be active in food and sex, but not death. Schemata about the foul smell of decaying animal flesh may be active in death and food, but not envelope violations. Schemata about the ideally attractive body may be active in envelope violations and hygiene, but not food.

If the heterogeneous class of disgust elicitors is linked together by a set of shared schemata, then the elaboration of disgust, from core through socio-moral, may be explained by the mechanism of "preadaptation" (Mayr, 1960). According to Mayr, the major source of evolutionary "novelties" is the co-opting of an existing system for a new function. We suggest that core disgust be thought of as a very old (though uniquely human) rejection system. Core disgust was "designed" as a food rejection system, as indicated by its link to nausea, its concerns about contamination, and its nasal/oral facial expression. Human societies, however, need to reject many things, including sexual and social "deviants". Core disgust may have been preadapted as a rejection system, easily harnessed to other kinds of rejection. This harnessing, or accretion of new functions, may have happened either in biological evolution or in cultural evolution (Rozin, 1976; Rozin, Haidt, & McCauley, 1993). Human societies take advantage of the schemata of core disgust in constructing their moral and social lives, and in socialising their children about what to avoid.

The use of schemata from physical experience to understand, structure, and participate in social experience is not a new or radical notion in psychology. Piaget (1932/1965; Piaget & Inhelder, 1966/1969) proposed that children's early motor schemata are gradually developed, through accommodation

and assimilation, into concrete operations like reversibility, which is the basis of social reciprocity. (See Fiske, 1991, for a powerful theory in which four general cognitive models are the basic "structures of social life".)

Cultural Differences, Cultural Fears

The account we have sketched, involving embodied schemata and preadaptation, suggests "universalism without the uniformity" (Shweder et al., in press). The use of embodied schemata in social life may be a universal psychological and cultural process, yet the particular constellation of bodily and social meanings must be arranged or filled in by each culture. One major source of variation arises from cultural differences in conceptions of the body. In India (Appadurai, 1981; Marriott, 1976), and among the Hua of New Guinea (Meigs, 1984), people are thought to be linked together along blood lines in a web of shared bodily fluid, such that pollution incurred by one person spreads to close family members, just as a snakebite in the leg quickly spreads throughout the body. In the West, in contrast, the metaphor of the body as a temple competes with the metaphor of the body as a machine, but it is always either an individual temple or an individual machine. Pollution or contamination incurred by one individual does not threaten anyone else, except by direct touch. It is, therefore, not surprising that moral concerns about interpersonal contact play a greater role in Indian and Hua social life than they do in the United States. Many issues of hygiene and food choice, similarly, are regarded as personal issues in the United States, but as moral issues among many Indians (Shweder, Mahapatra, & Miller, 1987).

A second source of cultural variation arises from the multiplicity of potential threats to the self (or soul). We have described disgust as the guardian of the temple of the body, fending off things that threaten to pull the self down, or "degrade" it. We may now return to the puzzling difference we found between American and Japanese socio-moral disgust items. These items reveal what threatens the American self, and what threatens the Japanese self.

The European existentialists felt nausea and dread as they contemplated the senseless slaughter of the Second World War. They felt nausea because, in the West, meaninglessness is perhaps the greatest threat to the self. When people are so casually stripped of life, or of dignity, the implication is that life is cheap, and there is nothing of value to be respected. The Americans in our data similarly felt threatened and disgusted by the senseless murders that happen around them every day, and by people who strip others of their dignity, including racists, rapists, and child abusers. American morality, with its obsessive emphasis on rights, is an attempt to shore up the fragile dignity of the individual. A threat to the rights of a foetus is seen by some Americans as a threat to the dignity of all human life.

For the Japanese, in contrast, individual meaninglessness does not seem to be the primary threat to the self. The interdependence of the Japanese self (Markus & Kitayama, 1991) may protect Japanese people from the anomie and sense of meaninglessness that haunt Americans (Bellah et al., 1985). The Japanese appear to be more tightly bound into their society, which is a healthy state of affairs according to Durkheim (1897/1951). But if this tighter binding removes the threat of individual meaninglessness, it carries with it an alternative threat to the self: the threat of not achieving the proper fit. The Japanese subjects' descriptions of *ken'o* focused on the success of their own integration into the demanding and hypercomplex Japanese social world. The threat to the Japanese self (*jiko*) may occur when this integration is not attained. In extreme cases one may be cut off, or ignored. Thus, social *ken'o* experiences listed by the Japanese differed from the social disgust experiences listed by Americans, since *ken'o* and disgust guard against different threats to different selves.

That the degradation/elevation of the self depends crucially on the state of the social world was illustrated most clearly by the Hopi quoted earlier: you feel *tiyoyaetwai* when the world is "out of balance". But the image of "balance" here is not that of a scale, which can be set right or re-balanced. The image of balance invoked by the Hopi is that of a tall object that has been pushed away from the upright position, and is about to come crashing down. This too is an embodied

schema, for we all know from our physical experience the moment when a heavy object tilts past the point of no return. We watch helplessly during that brief moment of dread, between the time we lose control and the time the thing comes crashing to the floor. *Koyaanisqatsi* is that time, "just before the end of the world". During that time of imbalance the usual rules and forces no longer apply, and life is chaos. The Hopi see this chaos in "mistreatment of the environment [and] wars." Hindu Indians have a similar notion: they say we are now living in the time of "*Kali Yuga*", a time of sin and social chaos in which incest taboos are violated, widows remarry, and Brahmins drink alcohol and visit brothels, according to an apocalyptic pamphlet quoted by Shweder, Much, Mahapatra, and Park (in press). *Kali Yuga*, like *koyaanisqatsi*, is the sickening moment before the end of the world. The Old Testament story of Noah, as well as Christian visions of the apocalypse, reveal similar themes of social chaos and moral decay in the days before the flood or the fire.

Conclusion

Anger, fear and disgust may be responses to different kinds of threats. Anger is a proper and effective response to threats to one's rights, or one's property, which can be challenged. Fear is an effective response to threats that cannot be challenged, which one can run away from. Yet there are threats for which fear and anger are not appropriate. There are threats that one cannot simply run away from or fight off. Some of these threats, such as oral contamination, may be inescapable aspects of human bodily experience. Other threats, such as individual meaninglessness, may be cultural constructions unique to a particular time and place. Disgust, or some subset of its embodied schemata, is the emotional response to this heterogeneous class of threats. Disgust makes us step back, push away, or otherwise draw a protective line between the self and the threat. Protection may involve washing, looking away, avoiding certain people, or simply changing the topic of a conversation.

In conclusion, socio-moral disgust is not a quirk of the English language. People in all cultures have bodies which provide them with rich sets of embodied schemata. Each culture draws from these schemata to spin its own particular "webs of significance", upon which its social and moral life is based.

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