

CHAPTER 40

Disgust



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For North Americans, elicitors of disgust come from nine domains: food, body products, animals, sexual behaviors, contact with death or corpses, violations of the exterior envelope of the body (including gore and deformity), poor hygiene, interpersonal contamination (contact with unsavory human beings), and certain moral offenses (Haidt, McCauley, & Rozin, 1994; Rozin, Haidt, McCauley, & Imada, 1997). What unites these disparate domains? Although all involve negative or unpleasant events, there are many kinds of negative events, such as pain, confrontations, and frightening interactions, that are not disgusting. The goal of this chapter is to make sense of this varied set of elicitors—that is, to describe the meaning of disgust within both developmental and cultural contexts. We argue for a path of development in individuals and cultures that extends from the presumed origin of disgust as a rejection response to bad tastes, in the service of protecting the body, to the full range of elicitors listed above, more appropriately described as in the service of protecting the soul.

DEFINING DISGUST

There are two classic papers describing disgust, published some 70 years apart. The first, a chapter in Darwin's *The Expression of the Emo-*

tions in Man and Animals (1872/1965), defined disgust as referring to “something revolting, primarily in relation to the sense of taste, as actually perceived or vividly imagined; and secondarily to anything which causes a similar feeling, through the sense of smell, touch and even of eyesight” (p. 253). Darwin related disgust not only to the experience of revulsion but to a characteristic facial expression. The second paper, by psychoanalyst Andras Angyal (1941), held that “disgust is a specific reaction towards the waste products of the human and animal body” (p. 395). Angyal related the strength of disgust to the degree of intimacy of contact, with the mouth as the most sensitive focus.

Tomkins's (1963) description of disgust expanded on Angyal's idea that disgust is a reaction to unwanted intimacy. According to Tomkins, disgust is “recruited to defend the self against psychic incorporation or any increase in intimacy with a repellent object” (p. 233). Our own definition of disgust, or what we call “core disgust” in this chapter, derives from those of Darwin, Angyal, and Tomkins: “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” (Rozin & Fallon, 1987, p. 23).

All of these definitions, and many others, focus on the mouth and real or imagined inges-

tion. Tomkins (1963, 1982) held that of all the emotions, disgust has the clearest linkage to a specific motivation (hunger), and functions to oppose this motive. Ekman and Friesen (1975) see disgust as an aversion that centers on oral rejection. Wierzbicka (1986) defines disgust as feeling bad about another person's action. This feeling is "similar to what one feels when one has something in one's mouth that tastes bad and when one wants to cause it to come to be out of one's mouth" (p. 590).

Some have proposed sources other than ingestion as the origin of disgust. Freud (1905/1953) predictably linked it to sex, and others (e.g., Renner, 1944; Plutchik, 1980) see its origin as a defense against infection, with the skin playing a central role.

Miller (1997), in his broad review of disgust in the context of Western culture and history, disputes the claim that disgust originated as a food-related emotion. He argues that touch and smell are the senses most closely related to disgust, and that taste became associated with disgust more recently. Although we agree with Miller's characterization of disgust in its current form as largely a social and moral emotion, we believe that the arguments for a food origin are very convincing (Rozin & Fallon, 1987). The facial expression of disgust can be seen as functional in rejecting unwanted foods and odors, and the most distinct physiological concomitant of disgust—nausea—is a food-related sensation that inhibits ingestion.

Another conception of the core of disgust, framed in terms of the concept of pollution, comes from Mary Douglas's (1966) classic anthropological work, *Purity and Danger*. She relates dirt and pollution to a sense of violation of accepted categories, sometimes described as "matter out of place." This captures the "uncanniness" of disgust, and no doubt is a significant part of the meaning of disgust. However, there is no substantial argument for this as the origin of disgust.

In keeping with our supposition that disgust originated as a food rejection is Darwin's (1872/1965) claim that it is the phylogenetic residue of a voluntary vomiting system. Darwin designates the gape as the primary facial indicant of disgust; gapes have been described for a number of species, and indeed function to promote egress of substances from the mouth. Darwin (1872/1965) claims that disgust has food origins, holding that "The term 'disgust,' in its simplest sense, means something offen-

sive to the taste" (p. 256). We presume that disgust, in its origin, is related to the general animal function of food rejection, but note that "Contrary to Darwin's expectations, no counterpart to human disgust has been distinguished in monkeys" (Chevalier-Skolnikoff, 1973, p. 82).

DISGUST AS A BASIC EMOTION

Disgust is on almost every list of basic emotions that has at least four emotions in it, from Darwin's onwards (see, e.g., Ortony, Clore, & Collins, 1988, p. 27). Disgust emerges as a basic emotion whether the primary criterion is facial (Darwin, 1872/1965; Ekman & Friesen, 1975), semantic (Johnson-Laird & Oatley, 1989), or eclectic (Izard, 1977; Scherer, 1986, 1997). Disgust stands out among the basic emotions in that it is specifically related to a particular motivational system (hunger) and to a particular part of the body (mouth). Disgust is also important for social and developmental psychology in that, along with fear, it is a primary means for socialization.

Paul Ekman (1992) has provided the clearest articulation of the characteristics of a basic emotion, and disgust meets all nine of his criteria. We consider here four of the most critical properties thought to be essential to any basic emotion.

Behavioral Component

Disgust is manifested as a distancing from some object, event, or situation, and can be characterized as a rejection.

Physiological Component

Two types of physiological changes have been associated with disgust. One distinguishes disgust from other emotions: Only disgust is associated with a *specific* physiological state. This physiological state, nausea, is typically measured by self-report. Although nausea is neither a necessary nor a sufficient condition for the experience of disgust, it is correlated with disgust. Another specific physiological aspect of disgust has been suggested by Angyal (1941), who pointed to increased salivation (itself associated with nausea and as a response to bad tastes) as a concomitant of disgust.

In spite of a large literature devoted to the

we presume that disgust is related to the general aversion to contamination, but note that in the literature, no consensus has been reached. See Levenson-Skolnikoff,

EMOTION

A list of basic emotions in it, from Ekman, Ortony, Clore, & Oatley, 1977; Scherer, 1986, 1994. Disgust is developmentally related to fear, it is a primary emotion.

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changes have been observed. Disgust distinguishes itself from other emotions in that it is typically associated with nausea. This is typically measured by the fact that nausea is neither a necessary condition for the experience of disgust nor correlated with the physiological aspect of it. As described by Angyal (1941), disgust is a reaction (itself associated with a response to bad taste) and is devoted to the

search for physiological signatures of different emotions, we know of no experimental studies of the relation of disgust to nausea or salivation. Rather, the study of the physiological side of disgust has been limited to the standard set of autonomic responses explored by psychophysicists. In this limited arena, it appears that disgust is associated with either minimal or a predominantly parasympathetic response, whereas fear and anger are associated with a predominantly sympathetic response (Levenson, Ekman, & Friesen, 1990; Levenson, 1992).

Expressive Component

The expressive component of disgust has been studied almost entirely with reference to the face. The characteristics of the "disgust face" have received particular attention from Darwin (1872/1965), Izard (1971), Ekman (1972; Ekman & Friesen, 1975), and Rozin, Lowery, and Ebert (1994). Scholars are not in complete agreement about a prototypical disgust face. Darwin emphasized the gape (in the Facial Action Coding System [FACS; Ekman & Friesen, 1978], the gape is Action Unit [AU] 25 or 26), but he also referred to retraction of the upper lip (AU 10) and, to some extent, the nose wrinkle (AU 9), dropping of the mouth corners (AU 15), and a few other movements. Izard (1971) also emphasizes the gape and the upper lip retraction, with some associated movements. Ekman and Friesen (1975) focus on lip retraction (AU 10) and nose wrinkle (AU 9), along with a raising of the lower lip (AU 17). Finally, Rozin et al. (1994) suggest that the precise facial configuration may relate to the nature of the elicitor. It is clear from all of these accounts that activity centers around the mouth and nose, and that the movements tend either to discourage entry into the body (e.g., nose wrinkle, lower lip raise) or to encourage discharge (gape with or without tongue extension).

The *Nāṭyaśāstra* (Masson & Patwardhan, 1970), an ancient Hindu treatise on drama (see Shweder & Haidt, Chapter 26, this volume), treats disgust as one of eight basic emotions. As described by Hejmadi (2000), the multiple portrayals of disgust designated in this document are dynamic (as opposed to the standard "frozen face" used in almost all Western research) and involve actions of the whole body, especially the hands. North American subjects, as well as Indians, are able to identify these dis-

gust expressions (in both free report and forced choice among 11 emotion words) remarkably well (Hejmadi, Davidson, & Rozin, in press).

There is also an auditory expressive component to disgust, associated with an increase in fundamental frequency in speech (Scherer, 1986).

Qualia

Qualia, the mental or feeling component of emotion, may be at once the most central component of disgust and the most difficult to study. The *qualia* of disgust is often described as revulsion. In comparison to other basic emotions, the experience of disgust appears to be rather short in duration (Scherer & Wallbott, 1994). Disgust is often invoked in humor, and laughter is a common response (as opposed to the disgust face) in some disgust-eliciting situations.

CORE DISGUST

We have argued above that disgust began its evolutionary life as a distaste response, focused on the mouth. However a major theme of this chapter is that the elicitors and meaning of disgust have expanded far beyond distaste, such that there is now a qualitative difference between the two, and hence that distaste and disgust now constitute distinct psychological categories. In this and subsequent sections we chronicle the expansion of disgust from core disgust, through animal-nature disgust, interpersonal disgust, and moral disgust.

Disgust as a Category of Food Rejection

Disgust has been described as one of four categories of food rejection, the others being distaste (rejection motivated by bad sensory properties), danger (rejection motivated by fear of harm to the body), and inappropriateness (rejection of a food culturally classified as not edible) (Fallon & Rozin, 1983; Rozin & Fallon, 1987). Disgust is differentiated from danger and distaste in that the basis for rejection is ideational (knowledge of the nature or origin of an elicitor). Disgust differs from the category of inappropriateness (e.g., paper, marigolds, and sand) in that disgusting potential foods are thought to be offensive and contaminating.

Properties of Core Disgust

By the definition we have offered for core disgust, three components are required for the occurrence of the emotion: (1) a sense of oral incorporation (and hence a linkage with food or eating); (2) a sense of offensiveness; and (3) contamination potency.

Oral Incorporation

Rozin and Fallon (1987) have noted that the mouth is the principal route of entry of material things into the body, and hence can be thought of as the gateway to the body. Since putting external things into the body can be thought of as a highly personal and risky act, the special emotion associated with ingestion is understandable. The aversion response to an offensive entity in the mouth is usually stronger than response to the same entity on the body surface near but not inside the mouth, or inside the stomach (Rozin, Nemeroff, Gordon, Horowitz, & Voet, 1995).

The threat of oral incorporation is framed by a widespread belief that one takes on the properties of the food one eats ("You are what you eat"). This belief has been thought to be characteristic primarily of members of traditional cultures. Frazer (1890/1922), in *The Golden Bough*, noted: "The savage commonly believes that by eating the flesh of an animal or man, he acquires not only the physical but even the moral and intellectual qualities which are characteristic of that animal or man" (p. 573). This idea is consistent with common sense, since it is a general experience that when two things combine (in this case, a food and a person), the product has resemblances to both. Nemeroff and Rozin (1989) have found, using indirect methods (the Asch impressions technique), that even U.S. college students attribute boar-like qualities to boar eaters, and turtle-like qualities to turtle eaters.

Offensive Entities: Animals and Their Products

Angyal (1941) held that the center of disgust is animal (including human) waste products, which he saw as debasing. It is hard to avoid the conclusion that waste products have a special role in disgust. Body products are usually a focus of disgust, and are central to the related anthropological concept of pollution (Douglas,

1966; Meigs, 1978, 1984). There is widespread historical and cultural evidence for aversion to virtually all body products, including feces, vomit, urine, and blood (especially menstrual blood). For example, blood pollution at birth was a central aspect of ancient Greek religion (Parker, 1983).

In accord with Angyal's (1941) suggestion of an animal focus for disgust, Rozin and Fallon (1987) have proposed that the elicitor category for core disgust is all animals and their products as potential foods. Soler (1973/1979) argues that animal food prohibitions, such as those of the ancient Hebrews, should be seen as the rule, and that ingestion of a few animals or of specific animal parts is the exception. Thus Adam and Eve began as vegetarians, and it was only after the flood that animals were allowed by God into the human diet.

Almost all cultures eat a very small subset of potential animal foods. In North American culture, we consume only a small number of the hundreds of thousands of potentially edible animal species, and we tend to avoid the viscera, head, and a number of other parts of the few mammals that we do consume. Furthermore, as Angyal (1941) pointed out, in many cultures some care is taken to disguise the animal origin of animal food by cutting, chopping, and other culinary preparations, as well as by having names for animal foods (e.g., "pork," "beef," in English) that are distinct from the corresponding animal names.

Animals and their products seem cross-culturally to be the most favored of foods, and at the same time the most tabooed. In short, animal foods are emotionally charged (Tambiah, 1969) and tend to give rise to ambivalent responses. Many animal taboos involve disgust. Some animals are disgusting because they bear some resemblance to body products such as mucus (e.g., slugs), or because they are commonly in contact with rotting animal flesh, feces, or other human wastes (e.g., flies, cockroaches, rats, vultures, and other scavengers). Carnivorous land animals eat raw, often decaying animal flesh, and produce putrid feces. They are therefore disgusting at both ends. Herbivores are much less likely to be prohibited cross-culturally. Even the hunter-gatherer !Kung bushmen, who eat a much wider variety of species than we do, reject rodents, carnivores, and most insects (Howell, 1986).

Two other categories of animal food prohibitions deserve mention. Animals that are in

some sense dangerous (e.g., other relationships with humans). And finally, the animals that seem dangerous (danger) and disgusting. These animals are harmful to humans (Davey, 1993; Jain, Burgess, 1993) offer evidence that animals is based on disgust than fear.

Contamination

The contamination of a potential food by a disgusting entity is a universal among college students and have been briefly discussed (Rozin, Millman, 1993). Actually all North Americans have been haunted or disliked persons (Sherrod, 1989). Culturally justified removal of this potential offending dead animal has a small effect. The disgust was common (Darwin (1872/1964) classic works.

Rozin and his colleagues have shown that contagion effects are particularly powerful in the case of pathogenic microorganisms (1871/1974; 1902/1972), which are in contact, although (1987; Rozin & Fallon, 1987).

The law of contagion is a potentially crippling or touch is powerful with this problem of contamination. Cultures, such as the threshold for contact with a dietary system (Caldwell, 1987) provide ritualistic and psychological relief (Nemeroff & Rozin, 1989).

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tionship with humans as pets, are rarely eaten.
And finally, there is a group of anomalous ani-
mals that seem to produce a mixture of fear
(danger) and disgust (e.g., spiders and snakes).
These animals are feared, though they are rarely
harmful to humans. Davey and his colleagues
(Davey, 1993; Matchett & Davey, 1991; Ware,
Jain, Burgess, & Davey, 1994; Webb & Davey,
1993) offer evidence that the aversion to these
animals is based more on a motivation of dis-
gust than fear.

Contamination

The contamination response (e.g., the rejection
of a potential food if it even briefly contacted a
disgusting entity) appears to be powerful and
universal among adults. North American col-
lege students reject liked beverages after they
have briefly contacted a sterilized cockroach
(Rozin, Millman, & Nemeroff, 1986), and vir-
tually all North Americans reject foods that
have been handled or bitten by either unsavory
or disliked persons (Rozin, Nemeroff, Wane, &
Sherrod, 1989). Although this aversion is typi-
cally justified as an avoidance of disease, re-
moval of this possibility (e.g., by sterilizing the
offending dead cockroach) typically has only a
small effect. The contamination property of dis-
gust was commented upon, in passing, by both
Darwin (1872/1965) and Angyal (1941) in their
classic works.

Rozin and his colleagues have suggested that
contagion effects may be instances of the sym-
pathetic magical law of contagion (Tylor,
1871/1974; Frazer, 1890/1922; Mauss,
1902/1972), which essentially holds that "once
in contact, always in contact" (Rozin & Fallon,
1987; Rozin & Nemeroff, 1990).

The law of contagion as applied to disgust is
potentially crippling; everything we might eat
or touch is potentially contaminated. We deal
with this problem in a number of ways. First,
contamination rules are developed in some cul-
tures, such as the explicit rules establishing a
threshold for contamination in the Hebrew di-
etary system (Grunfeld, 1982). These rules pro-
vide ritualistic relief but not necessarily psy-
chological relief of a sense of contamination
(Nemeroff & Rozin, 1992).

Most often, framing is the strategy that keeps
potential contamination out of consideration—
as when we do not think of the people in the

kitchen who prepare our food in a restaurant, or
the animal that was the source of our meat, or
the fact that our bodies contain a host of dis-
gusting substances. Indeed, as Allport (1955)
noted and as a recent study has confirmed
(Rozin, Haidt, McCauley, Dunlop, & Ashmore,
1999), we are disgusted by our own saliva as
soon as it leaves our bodies, as when we reject
drinking a glass of water that we have just spit
into. The framing solution fails when the source
of contamination/disgust is too salient. Thus,
although we normally handle money without
thinking of who touched it before us, this strat-
egy might not protect us in the unusual case of
a dollar handed over by a vagrant.

A second law of sympathetic magic, the law
of similarity, accounts for some other aspects of
disgust. The law of similarity, also dating from
Tylor, Frazer, and Mauss (see Rozin & Ne-
meroff, 1990, and Nemeroff & Rozin, in press,
for reviews), holds in one form that if things are
superficially similar, then they resemble each
other in a deep sense as well. In other words,
appearance is reality. It accounts for the fre-
quent observation that objects that look like
something disgusting, but are known not to be,
are often treated as disgusting. Thus we find
that many North American college students are
reluctant to consume imitation dog feces that
they know are made out of chocolate fudge
(Rozin, Millman, & Nemeroff, 1986). A combi-
nation of the laws of contagion and similarity
causes many North Americans to say that they
would be reluctant to consume a favorite bever-
age stirred by a brand-new comb or contami-
nated with a plastic replica of an insect (Rozin
et al., 1989).

ANIMAL-NATURE DISGUST

Our discussion of disgust up to this point has
focused on issues surrounding food and eating.
We have presented core disgust as an oral de-
fense in relation to potential foods, body prod-
ucts, and some animals. However when we
asked North American and Japanese respon-
dents to list the things they thought were dis-
gusting, fewer than 25% of listed examples
came from the three core disgust domains
(Haidt, Rozin, McCauley, & Imada, 1997).
Many of the other exemplars could be classi-
fied into four additional domains: inappropriate
sexual acts, poor hygiene, death, and violations
of the ideal body "envelope" or exterior form

(e.g., gore, deformity, obesity). In the four additional domains, the focus of threat spread from oral incorporation to contact with the body in general, and even offensive sights. This spread is captured in a psychoanalytic treatment of disgust: "In summary, any modality that represents a means of entry into the self or body—the mouth, the nose, the skin, the eyes—seems to play a part in the disgust experience" (Miller, 1986, p. 300).

Death and Disgust

Contact with death and corpses is a particularly potent elicitor of disgust. Two of the items in our 32-item Disgust Scale (discussed in more detail later) that correlate most highly with the total scale score fall into the death category: "Your friend's pet cat dies, and you have to pick up the dead body with your bare hands" and "It would bother me tremendously to touch a dead body." Furthermore, individuals who score high on disgust sensitivity also score high on a fear-of-death scale (Haidt et al., 1994).

The prototypical odor of disgust is the odor of decay, which is the odor of death. The centrality of death in disgust suggests a more general construal of disgust within a modified psychoanalytic framework. Rather than as a defense against coprophilia or sexuality, disgust can be understood as a defense against a universal fear of death. Becker (1973) has argued that the most important threat to the psyche is not sexuality and aggression, but the certainty of death. Only human animals know they are to die, and only humans need to repress this threat. In this framework, Becker's "denial of death" is served by disgust, which helps to suppress thoughts or experiences that suggest human mortality.

A Theory of Disgust: Avoidance of Reminders of Our Animal Nature

These speculations about death lead naturally to an overarching description of disgust elicitors: Anything that reminds us that we are animals elicits disgust (Rozin & Fallon, 1987). An examination of the seven domains of disgust elicitors we have identified thus far suggests that disgust serves to "humanize" our animal bodies. Humans must eat, excrete, and have sex, just like animals. Each culture prescribes the proper way to perform these actions—by, for example, placing most animals off limits as

potential foods, and all animals and most people off limits as potential sexual partners. People who ignore these prescriptions are reviled as disgusting and animal-like. Furthermore, we humans are like animals in having fragile body envelopes that, when breached, reveal blood and soft viscera that display our commonalities with animals. Human bodies, like animal bodies, die. Envelope violations and death are disgusting because they are uncomfortable reminders of our animal vulnerability. Finally, hygienic rules govern the proper use and maintenance of the human body, and the failure to meet these culturally defined standards places a person below the level of humans. Animals are (often inappropriately) seen as dirty and inattentive to hygiene. Insofar as humans behave like animals, the distinction between humans and animals is blurred, and we see ourselves as lowered, debased, and (perhaps most critically) mortal.

Elias (1939/1978), in *The History of Manners*, concludes that "people, in the course of the civilizing process, seek to suppress in themselves every characteristic that they feel to be 'animal'" (p. 120). Tambiah (1969) emphasizes the importance of this distinction for humans, and points to the paradox of human fascination for and aversion to animals. Ortnor (1973) notes that the one body product that does not reliably elicit disgust is tears, and these are seen as uniquely human. And Leach (1964) has pointed out that animal words are used as insults in many cultures. In general, the ethnographic literature is filled with references to the fact that humans consider themselves better than animals, and they work to maintain a clear animal-human boundary. Violations of that boundary—for example, treating an animal as a person in a pet relationship—are rather rare cross-culturally.

Miller's (1997) broad, historically based conception of disgust comes to a conclusion like ours: "... ultimately the basis for all disgust is us—that we live and die and that the process is a messy one emitting substances and odors that make us doubt ourselves and fear our neighbors" (p. xiv).

INTERPERSONAL DISGUST

The fact that direct or indirect contact with other people can elicit disgust was noted by Darwin (1872/1965). Furthermore, Angyal (1941)

noted that other waste products.

We have found that in the United States, silverware used by strangers (Rozin et al., 1999) is personally aversive, a component of moral repugnance (McCausley, 1999) that is healthier than a healthy stranger, more desirable than an animal. North American aversion to substances (aversion to substances) is a misfortune (e.g., tuberculosis) for which we seem to be both victims and thus they seem

Contact with other people, contact with their saliva, their urine and feces, and things used by other people (contamination effect) and this fact stands in terms of potential and hence avoidable. We currently cannot always find independent forms of disgust with other humans and can serve distinctiveness. In India, interpersonal contacts with society and the caste system (1968).

MORAL DISGUST

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We have found widespread evidence in the United States for aversion to contact with possessions, silverware, clothing, cars, and rooms used by strange or otherwise undesirable persons (Rozin et al., 1989; Rozin, Markwith, & McCauley, 1994). We have analyzed this interpersonal aversion into four separately identifiable components: strangeness, disease, misfortune, and moral taint (Rozin, Markwith, & McCauley, 1994). Thus a sweater worn once by a healthy stranger and then laundered is less desirable than an unworn sweater for most of the North American students we have surveyed (aversion to strangeness). This negativity is substantially enhanced if the stranger has had a misfortune (e.g., an amputated leg), a disease (e.g., tuberculosis), or a moral taint (e.g., a conviction for murder). These types of contacts seem to be both offensive and contaminating; thus they seem to be instances of disgust.

Contact with other people does open us to contact with their body products: their sweat, their saliva, their mucus, and traces of their urine and feces. But laundering or even sterilizing things used by others reduces the contamination effect only very slightly in our studies, and this fact makes it more difficult to understand interpersonal contamination simply in terms of potential contact with body products, and hence avoidance of our animal nature. Thus we currently consider interpersonal disgust, almost always mediated by contamination, as an independent category of disgust elicitors. This form of disgust clearly discourages contact with other human beings who are not intimates, and can serve the purpose of maintaining social distinctiveness and social hierarchies. In Hindu India, interpersonal contagion, mediated in part by contacts with food, is a major feature of society and a major basis for the maintenance of the caste system (Appadurai, 1981; Marriott, 1968).

MORAL DISGUST

In an extensive recent cross-cultural study of emotional responses in 37 different cultures, Scherer (1997) reports on the sequence of appraisals that his theory of emotion proposes. Surprisingly, disgust shows the highest score on immorality of all seven emotions surveyed (including anger and shame). In a related study,

disgust-producing events ranked a close second to anger-producing events in a cross-national study of "unfairness" in emotion-eliciting situations (Mikula, Scherer, & Athenstaedt, 1998).

When we elicited lists of disgusting things from North American and Japanese informants, we found that the *majority* of instances referred to moral offenses (Haidt et al., 1997). Some of these items involved some sexuality or gore (e.g., being sexually molested, reading reports of Serbian atrocities), and are thus easily assimilable to the animal-nature view of disgust. However, the word "disgusting" is often used as a synonym for "immoral" in situations that do not seem to be reminders of our animal nature. Thus our subjects have told us that racists, child abusers, hypocrites, Republicans, and liberals are all disgusting. It is our guess that moral offenses involving some reminder of our animal nature (e.g., sex and gore) are more likely to be labeled "disgusting" than are offenses that don't involve bodily issues (e.g., fraud). A lawyer who chases ambulances might be described by English speakers as "disgusting," but this could simply be a casual usage or metaphorical extension of the word.

Yet if the broad expansion of the word "disgusting" into the sociomoral domain is a quirk of the English language, it is also a quirk of almost every language we have looked at. French *dégoût*, German *Ekel*, Russian *otvraschenie*, Spanish *asco*, Hebrew *go-al*, Japanese *ken-o*, Chinese *aw-shin*, and Bengali *ghenna* all have a semantic domain covering concerns about the body, as well as concerns about other people's social behavior (Haidt et al., 1997). People of diverse cultures and languages apparently feel some similarity in their emotional reactions to sleazy politicians and to feces.

These moral offenses on the outer limits of disgust's expansion show not just the property of offensiveness, but also the property of contamination. Indirect contact with people who have committed moral offenses (such as murders) is highly aversive, to about the same extent as similar contact with someone with a serious contagious illness (Rozin, Markwith, & McCauley, 1994). In our research on contamination, one of the most potent stimuli we have discovered is Adolf Hitler's sweater. We speculate that what unites the domain of morally disgusting actions is that they reveal a lack of normal human social motivation. People who betray friends or family, or who kill in cold blood, are seen as inhuman and revolting; crim-

inal acts with "normal" human motivations, such as robbing banks, are seen as immoral but not disgusting. This kind of disgust may represent a more abstract set of concerns about the human-animal distinction, focusing not so much on the human body as on the human body-politic—that is, the human as a member of a cooperating social entity.

Shweder, Much, Mahapatra, and Park (1997) offer a theory of moral judgment that may help clarify the moral significance of disgust, contempt, and anger (the three other-condemning moral emotions; Izard's [1977] "hostility triad"). The theory proposes that three codes of ethics underlie the morality of most cultures. One code, called the "ethics of community," focuses on issues of duty, hierarchy, and the proper fulfillment of one's social roles. Violations of this code seem to elicit the emotion of contempt. A second code, the "ethics of autonomy," encompasses issues of rights and justice. This is the most fully elaborated code in Western societies, where violations of this code are usually associated with anger. A third code, called the "ethics of divinity," focuses on the self as a spiritual entity and seeks to protect that entity from degrading or polluting acts. We propose disgust as the emotion that guards the sanctity of the soul as well as the purity of the body. Hence we see a rough match between Shweder et al.'s three moral codes and the three other-directed moral emotions. We call this the "CAD triad hypothesis" (community-contempt, autonomy-anger, divinity-disgust) (Rozin, Lowery, Imada, & Haidt, 1999).

We have tested these predictions in a study of Japanese and U.S. college students, in which they were presented with situations in which one or the other of the moral codes were violated (Rozin, Lowery, et al., 1999). Subjects were asked to select either the relevant face (from a set of contempt, anger, and disgust faces) or the relevant word ("contempt," "anger," "disgust," or their Japanese translations). In both cultures, there was a substantial though far from perfect match between the Shweder et al. code and the emotion predicted.

The disgust-morality linkage may have developed in two directions. On the one hand, events that are widely considered to be disgusting (such as eating dog meat) may be treated as moral in some cultural contexts, such as those cultures in which the divinity code is operative. On the other hand, rather than assimilating moral violations to what is already disgusting,

there seems to be some extension of the sense of disgust to a wide range of moral violations that have no obvious relation to the traditional disgust elicitors.

Disgust plays a special role in the moral domain as a means of socialization. Insofar as entities viewed as immoral are also disgusting, there is no temptation to have traffic with these entities. For example, as cigarette smoking has moved from being a preference to a negative moral value in the United States, there is an accompanying increase in disgust responses to cigarettes, cigarette smoke, cigarette residues (e.g., ashes), and cigarette smokers (Rozin & Singh, 1999). This process of conversion of an entity from a preference into a value has been called "moralization" (Rozin, 1997). It is often associated with the recruitment of a disgust response to the entity or activity in question. In the case of vegetarians, a disgust response to meat is more common in moral vegetarians than in health vegetarians (Rozin, Markwith, & Stoess, 1997).

PREADAPTATION AND THE CULTURAL EVOLUTION OF DISGUST

We believe that the "output" side of disgust (physiology, behavior, expression) has remained relatively constant in cultural evolution, and still bears noticeable similarities to its animal precursors. However, the elicitors and meaning of disgust have been transformed and greatly expanded in cultural evolution.

We have suggested a course of biological and cultural evolution of disgust, summarized in Table 40.1 (Rozin, Haidt, & McCauley, 1993; Rozin, Haidt, et al. 1997). The proposed origin is the rejection response to bad-tasting foods, even though taste in the mouth ultimately has little to do with the emotion of disgust. However, oral rejection remains an organizing principle of disgust reactions, in what we have called "core disgust." Core disgust can be thought of as a guardian of the mouth, and therefore as a guardian of the physical body. Food and its potential contaminants (body products and some animals) are the elicitors for core disgust.

Disgust then expanded further to become a guardian of the temple of the body, responding to any evidence that our bodies are really no different from animal bodies (i.e., animal-nature disgust in the domains of sexuality, body

TABLE 40.1

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TABLE 40.1 Proposed Pathway of Expansion of Disgust and Disgust Elicitors

	Disgust stage				
	0. Distaste	1. Core	2. Animal-nature	3. Interpersonal	4. Moral
Function	Protect body from poison	Protect body from disease/infection	Protect body and soul, denial of mortality	Protect body, soul, and social order	Protect social order
Elicitors	Bad tastes	Food/eating, body products, animals	Sex, death, hygiene, envelope violations	Direct and indirect contact with strangers or undesirables	Certain moral offenses

envelope violations, death, and hygiene). Driving this desire to distinguish ourselves from animals may be our fear of animal mortality.

The next two steps in the expansion of disgust are problematic for the "avoidance of the reminders of animal nature" view. Interpersonal contamination and moral offenses may become disgusting for reasons independent of the prior focus of disgust, but may access the already present rejection system of disgust.

This model suggests what might be called an opportunistic accretion of new domains of elicitors, and new motivations, to a rejection system that is already in place. A parallel to this model in evolutionary biology is the concept of preadaptation (Mayr, 1960). Mayr suggests that the major source of evolutionary "novelties" is the coopting of an existing system for a new function. Preadaptation can operate either to replace an original function or to accrete new functions to an existing system. A particularly appropriate example is the human mouth, whose teeth and tongue clearly evolved for food handling. However, by a process of preadaptation, they have come to be shared by the language expression system. Teeth and tongue are critical in pronunciation, but they did not evolve for that purpose. We suggest that in both cultural evolution and individual development, a process like preadaptation occurs; in development it can be described as the accessing of previously inaccessible systems for a wider range of activities, functions, or elicitors (Rozin, 1976).

We have described the cultural evolution of disgust as a sequence of stages that takes disgust further and further away from its mouth-and-food origins, through a process of preadaptation. But it has not really expanded that far beyond food, because by a parallel process of preadaptation, food itself has come to serve many functions—aesthetic, social, and moral—

besides its original nutritive function. In parallel, the food vocabulary has taken on other, metaphorical functions, again by a process of preadaptation. Thus, the very words "taste" and "distaste" come to indicate general aesthetic judgments. In Hindu India, food and eating are quintessentially social and moral activities (Appadurai, 1981).

Kass (1994) eloquently traces the history of food from nutritive to more elaborated values. He notes that "As host feeds guest, *essen* replaces *fressen*; eating supplants feeding" (p. 107); that at the table, we face each other, not the food; that when we eat we exploit an animal necessity, as a "ballerina exploits gravity" (p. 158); and that "'Nobility' is not so much a transcendence of animality as it is the turning of animality into its peculiarly human and regulated form" (pp. 158–159). Ultimately, in the important moral role of food in many religions, most notably Judaism and Hinduism, we see food elevated into a moral entity.

DEVELOPMENT OF DISGUST

Of the four categories of food rejection, it appears that the only category that is visible in infancy is distaste (e.g., bitterness). In parallel with the results from rats and other animals, there appears to be an innate and present-at-birth rejection of bitter substances in humans, accompanied by a gape (Peiper, 1963; Steiner, 1979). The danger category emerges in the first few years of life, and disgust breaks off from distaste at some later point, perhaps between 4 and 8 years, for U.S. children (Rozin, Hammer, Oster, Horowitz, & Marmara, 1986; Rozin, Fallon, & Augustoni-Ziskind, 1986). Thus, although 3-year-olds typically reject feces as food, it is not clear that this rejection has contaminating or offensive features, and it may be no

different from a distaste, or a distaste combined with danger. So far as we know, there is no sense of offensiveness or rejection outside of the sensory realm in either infants or nonhumans, and hence no gape elicitors other than certain negative tastes. Disgust seems to require enculturation—a supposition confirmed by Malson's (1964/1972) review of some 50 feral humans, none of whom showed any sign of disgust.

Origins of Disgust: Feces and Decay

For adults, feces seems to be a universal disgust substance (Angyal, 1941; Rozin & Fallon, 1987), with the odor of decay as perhaps the most potent sensory attribute associated with disgust. It is also conceivable that vomit is a primary substance for disgust. Since feces, vomit, and decay are probably associated with disease vectors, it would be reasonable to suppose that there would be an innate rejection of such things. However, none seems to be reliably present in nonhuman animals, and children do not show rejection of feces early in life. Rather, it appears that the infant may be attracted to feces, and that disgust is a powerful cultural force that turns this attraction into aversion (Freud, 1910/1957; Jones, 1912/1948). The preponderance of evidence suggests that there are no innately negative nonirritant odors, and that a rejection of decay odors (without a referent object present) appears somewhere between 3 and 7 years of age (Engen & Corbit, 1970; Petó, 1936; Schmidt & Beauchamp, 1988; Stein, Ottenberg, & Roulet, 1958; but see Steiner, 1979).

Toilet Training

Given the centrality of toilet training in psychoanalytic theory, and the fact that toilet training is one of the earliest arenas for socialization, it is surprising how little is known about the process. Although children do not seem to have an aversion to feces before toilet training (Rozin, Hammer, et al., 1986), it is not clear whether the feces avoidance that appears subsequently should be characterized as disgust, as opposed to avoidance or distaste. In the period following toilet training, feces does not seem to have contaminating properties (Fallon, Rozin, & Pliner, 1984), but children do develop an aversion for substances resembling feces (e.g., mud, dirt, and mushy substances) and some-

times a marked concern for cleanliness (Senn & Solnit, 1968; Ferenczi, 1914/1952). There may be a latency period between completion of toilet training and the emergence of feces as a particularly negative disgust substance some years later. It seems likely that toilet training, with all of the attendant negative affect toward feces from significant others, plays an important role in the development of disgust.

Processes Accounting for the Spread of Response from Feces in Young Children

We believe that there is a spread of rejection responses following toilet training and the rejection of feces, but little is known about the mechanisms and events that account for this spread. Rozin and Fallon (1987) categorize these processes as "primary" (meaning that a new rejection is learned from the reactions of others or from some new information) and "secondary" (meaning that the acquisition is related to an existing disgust substance). Primary disgusts are probably frequently induced by the display of disgust in others (Tomkins, 1963), by a process that is not well understood.

Secondary disgusts may occur by two pathways (Rozin & Fallon, 1987). One is generalization, based on similarity, from existing disgust substances such as feces (Ferenczi, 1914/1952; Tomkins, 1963; Darwin, 1872/1965). Another pathway is evaluative conditioning (Martin & Levey, 1978; Baeyens, Crombez, Van den Bergh, & Eelen, 1988; Rozin & Zellner, 1985), a form of Pavlovian conditioning in which a valenced entity (an unconditioned stimulus—e.g., an already disgusting entity) is paired with a previously neutral entity, with the result that the neutral entity (the conditioned stimulus) changes in valence in the direction of the unconditioned stimulus.

Contamination Sensitivity

The idea of contamination is quite sophisticated in requiring a separation of appearance and reality. There is no sensory residue of past contamination in a contaminated entity; it is the history of contact that is critical (Rozin & Nemeroff, 1990; Nemeroff & Rozin, in press). Furthermore, contamination implies some conception of invisible entities (e.g., traces of cockroach) that are the vehicle of contamination. The notion of invisible entities and the no-

tion that appears, cognitive achievement, and both sexes (Piaget & 1986). This cognitive principal barrier of disgust. The disgust puts it in the human emotion: guilt, which also form until the age

Rozin and his clear contamination contacts with a favor a grasshopper as does not appear North American Rozin, Fallon, 1986). However, sitive procedure: responses in Au age.

Parent-Child Disgust Sensitivity

One study of disgustations predated comprehensive (low) and used a nation sensitivity (tation context) d Mandell (1984). items) was given students and the ent-child corre: 1984). This rel: study in Britain Mayhew, 1991). are much higher erences (ranging same U.S. samp: lation for disgu family resembla: ination sensitiv: lations obtained abortion) than (Rozin, 1991).

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tion, and both seem to be absent in young chil-
dren (Piaget & Inhelder, 1941/1974; Flavell,
1986). This cognitive limitation may be the
principal barrier to a full childhood acquisition
of disgust. The cognitive sophistication of dis-
gust puts it in the company of other uniquely
human emotions such as pride, shame, and
guilt, which also do not assume an adult-like
form until the age of 7 or 8 (Harris, 1989).

Rozin and his colleagues have found that a
clear contamination response to disgusting con-
tacts with a favored beverage (e.g., dog feces or
a grasshopper as contaminants in milk or juice)
does not appear until about 7 years of age in
North American children (Fallon et al., 1984;
Rozin, Fallon, & Augston-Ziskind, 1985,
1986). However, Siegal (1988), using more sen-
sitive procedures, has reported contamination
responses in Australian children by 4 years of
age.

Parent-Child Transmission of Disgust Sensitivity

One study of disgust transmission across gener-
ations predated the development of our more
comprehensive Disgust Scale (described be-
low) and used an unvalidated scale of contami-
nation sensitivity (focusing on disgust in a con-
tamination context) developed by Rozin, Fallon, and
Mandell (1984). The Contamination Scale (24
items) was given to University of Pennsylvania
students and their parents, and the mid-par-
ent-child correlations was $r = .52$ (Rozin et al.,
1984). This relationship was confirmed in a
study in Britain ($r = .33$; Davey, Forster, &
Mayhew, 1991). These substantial correlations
are much higher than correlations for food pref-
erences (ranging between 0 and .30) from the
same U.S. sample that generated the .52 corre-
lation for disgust/contamination. That is, the
family resemblance pattern for disgust/contami-
nation sensitivity was more in line with corre-
lations obtained for values (e.g., attitudes to
abortion) than with those for preferences
(Rozin, 1991).

It seems reasonable to attribute the
parent-child resemblance in disgust sensitivity
to social transmission in childhood. This pre-
sumption is supported by evidence for minimal
heritability in a twin study using a short (5-
item) version of the Contamination Scale used
by Rozin et al. (1984): Monozygotic twins

showed a correlation of .29 on this scale, while
dizygotic twins showed a correlation of .24
(Rozin & Millman, 1987).

We do not know how disgust is transmitted,
but children have ample opportunities to ob-
serve and be informed about their parents' atti-
tudes and responses in disgust situations, in-
cluding toilet training.

DISGUST ACROSS CULTURES

Almost the entire literature on disgust comes
from the approximately 6% of the world in
which English is the native language. Consis-
tent with our claim that the cultural evolution of
disgust has involved a conservative output sys-
tem and a flexible and expanding input/evalua-
tive (elicitor/meaning) system, we hold that the
principal cultural differences in disgust have to
do with the input/evaluative system. Cultures
may differ in the particular elicitors of disgust
within one of the domains we have described.
Thus, while most cultures value decayed/fer-
mented food of a special sort, that special sort
is different for different cultures (e.g., cheese
for Europeans, meat for Inuit, fish for South-
east Asians in their fermented fish sauce). Each
of these desirable exceptions in a particular cul-
ture is viewed by those in most other cultures as
disgusting. Furthermore, the act of kissing,
which involves an intimate exchange of body
fluid, varies from being considered disgusting
in all cases in some cultures to being consid-
ered highly desirable with certain intimates in
other cultures. Similarly, cultures differ about
whether dogs are best friends or dirty scav-
engers, or about whether or not corpses should
be touched during mourning. In spite of these
differences, it appears that core disgust and ani-
mal-nature disgust look relatively similar
across cultures, and there seems to be a "pre-
paredness" (Seligman, 1971) to attach disgust
to certain sorts of things (e.g., food), and not
others (e.g., flowers, machines).

It is primarily in the last two steps of the ex-
pansion of disgust that cultural differences
seem to become most important. Interpersonal
disgust appears to be most highly elaborated in
India. Moral disgust in the United States is trig-
gered most strongly by acts of brutality, or acts
in which someone strips others of their dignity
(e.g., racism). In Japan, participants applied the
word *ken-o* more to situations in which there
had been a failure to achieve a good fit in their

social relationships, such as when somebody else ignored them or unfairly criticized them. We believe that U.S. disgust may be guarding against threats to an individualist, rights-based social order, whereas Japanese *ken-o* may be guarding against threats to a more collectivist, interdependent social order (Haidt et al., 1997).

An additional cultural difference is found in the moral significance attached to the kinds of biological activities that disgust regulates. Some cultures have highly elaborated the ethics of divinity (Shweder et al., 1997), and therefore see issues of purity and pollution as central to morality. Middle-class North Americans, on the other hand, see little connection between morality (justice and rights) and matters of personal hygiene. Cultures should therefore differ in the degree to which disgust is related to moral judgment. Haidt, Koller, and Dias (1993) asked North Americans and Brazilians of higher and lower socioeconomic status about a number of actions that were disgusting yet harmless, including incestuous kissing, eating one's dead pets, and eating a chicken one has just had sex with. They found that North Americans of higher socioeconomic status separated their emotional reactions from their moral judgments, while other groups were more likely to condemn disgusting actions, even when they were harmless. Miller (1997) suggests that many Westerners may be uncomfortable using disgust as a moral emotion because it is often at odds with an egalitarian ethos: Disgust puts people down, and it is easily used to condemn people whose only "crime" is that they are obese, are deformed, or have sexual preferences at odds with those of the majority.

INDIVIDUAL DIFFERENCES IN DISGUST SENSITIVITY

Based on the first seven domains of disgust elicitors, together with the fundamental role of contagion in all of these categories, we constructed a paper-and-pencil scale to measure individual differences in disgust in the United States and in Japan (Haidt et al., 1994). The 32-item Disgust Scale includes two true-false and two disgust-rating items for each of the seven disgust domains, and four similar items tapping sympathetic magical thinking. In addition to revealing wide variation in disgust sensitivity, the Disgust Scale has demonstrated positive inter-correlations of disgust sensitivities across the

different domains of elicitors—that is, evidence that the domains converge on a common dimension of sensitivity to disgust. Recent additional validation emerged from a series of "hands-on" laboratory experiences in which the Disgust Scale predicted the degree to which subjects would actually engage in a wide range of disgust activities ($r = -.42$; Rozin, Haidt, et al., 1999).

Correlations with other scales have begun to locate disgust sensitivity in relation to other individual difference measures (Haidt et al., 1994). The Disgust Scale showed a moderate positive correlation (.39) with a scale measuring fear of death (Boyar, 1964), and a moderate negative correlation (–.46) with a scale measuring sensation seeking. In our initial Disgust Scale research (Haidt et al., 1994), women were substantially more sensitive to disgust than men; the mean difference amounted to more than half a standard deviation. There are hints, however, that sensitivity to disgust declines after the teen years, and declines more for women than for men. Druschel and Sherman (1994), and Quigley, Sherman, and Sherman (1996) found that Disgust Scale scores were lower for older than for younger undergraduates. Similarly, Doctoroff and McCauley (1996) found only a small and nonsignificant tendency for higher female scores when the Disgust Scale was completed by respondents (mean age 57) to a survey mailed to suburban residents from a commercial mailing list. Convergent evidence for the increased disgust sensitivity of females, as well as additional validation for the Disgust Scale, is provided by Oppliger and Zillmann (1997). They found that disgust sensitivity is negatively related to the enjoyment of disgust humor, and that male college students show more amusement than females in both ratings of and facial reactions to disgust humor.

Besides gender, the demographic variable most correlated with Disgust Scale scores is social class. Blue-collar workers in our initial studies were more disgust-sensitive than were students and middle-class managers (Haidt et al., 1994). This result was confirmed by Doctoroff and McCauley (1996), who found education to be negatively correlated with Disgust Scale scores ($r = -.32$). Recently, another scale of disgust sensitivity has been introduced, consisting of ratings of the disgustingness of 30 stimuli/events. This scale (Disgust Experience Scale) has more items related to blood, injec-

tion, and injury than the Disgust Scale, and is surprisingly correlated with the Disgust Scale (Kleinknecht, 1997).

There are about 10 correlations between disgust and other individual difference measures. For example, between disgust and attitudes toward abortion (e.g., "The movements both positive and negative) among an individual than among a sample. Even among the 100 highest on various measures (including neuroticism), suggesting a link between disgust and sensitivity.

Quigley et al. (1996) found that undergraduates, the 100 highest on the Disgust Scale, correlated with a measure of quality type and wit. There are conceptual links between obsessions or compulsions and contagion sensitivity. This indicates a deficit in detection among individuals with compulsive disorder (Ogata, Pundt et al., 1997, below). Summarizing a qualitative study of OCD, Power et al. (1996) found that when contagion is the primary motivator, disgust is the primary motivator. A linkage is very present.

Another clinical application of the work on animal phobias. These involving predatory animals invoke fear, where that do not threaten (rats, spiders, snakes) are avoided primarily by Matchett & Davey (1994). Matchett & Davey (1994) found that by a number of experimental findings. Nonpredatory animals related with disgust animal phobias (1991; Ware et al., 1994). Animal phobias are a

s—that is, evidence on a common disgust. Recent additions from a series of studies in which the degree to which age in a wide range (2; Rozin, Haidt, et

tion, and injury than the Disgust Scale, and surprisingly correlates only .31 with the Disgust Scale (Kleinknecht, Kleinknecht, & Thorndike, 1997). There are abundant possible linkages between disgust and psychopathology. In an early study of individual differences in disgust sensitivity, Templer, King, Brooner, and Corgiat (1984) constructed a 26-item scale to measure attitudes toward body products and body elimination (e.g., "The smell of other persons' bowel movements bothers me"). They found that scores were higher (attitudes were more negative) among an inpatient psychiatric population than among a sample of the general population. Even among the latter, high scorers also scored higher on various measures of psychopathology (including neuroticism and obsessiveness), suggesting a link between anxiety and disgust sensitivity.

Quigley et al. (1996) reported that among undergraduates, the Disgust Scale is positively correlated with obsessive-compulsive personality type and with dependent personality type. There are conceptual links between cleaning obsessions or compulsions and both disgust and contagion sensitivity, and recent research indicates a deficit in disgust facial expression detection among patients with obsessive-compulsive disorder (OCD; Sprengelmeyer, Young, Pundt et al., 1997; see "Disgust and the Brain" below). Summarizing a set of studies that suggest a qualitative difference between two forms of OCD, Power and Dalglish (1997) suggest that when contamination (cleaning) is salient, disgust is the principal motivator, whereas when checking is salient, anxiety is the principal motivator. Altogether, the disgust-OCD linkage is very promising.

Another clinical connection is suggested by the work on animal phobias by Davey and his colleagues. These authors argue that phobias involving predatory animals (sharks or lions) invoke fear, whereas phobias involving animals that do not threaten significant physical harm (rats, spiders, snakes, slugs, maggots) are motivated primarily by disgust (Davey, 1993; Matchett & Davey, 1991; Webb & Davey, 1993; Ware et al., 1994). This distinction is buttressed by a number of experimental and psychometric findings. Nonpredatory animal phobias are correlated with disgust sensitivity, but predatory animal phobias are not (Matchett & Davey, 1991; Ware et al., 1994). The two types of animal phobias are almost uncorrelated. Priming

experiences consisting of threatening visual exposure to violent materials increased fear responses only to predatory animals, whereas priming with disgust materials increased fear only to nonpredatory animals (Webb & Davey, 1993). A particularly clear link between disgust and phobias has recently been demonstrated with respect to blood-injection-injury phobias, using both disgust sensitivity measures and emotion-specific ratings of blood-injection-injury images by phobic patients (Tolin, Lohr, Sawchuk, & Lee, 1997).

A detailed discussion of the pathologies of disgust has been provided by Power and Dalglish (1997), who propose a major role for disgust (self-disgust) in problems of depression. A plausible linkage between disgust and eating disorders has also been proposed (Quigley et al., 1996). There is recent evidence supporting such a link: Enhanced disgust sensitivity to food and related stimuli has been found in females with eating disorders (Davey, Buckland, Tantow, & Dallos, 1998).

Very low activation of basic emotions can also have pathological consequences, though very low fear or anger does not align with any important categories of psychopathology. On the other hand, one might imagine that very low disgust might generate a highly antisocial person, since disgust is in many respects the emotion of civilization.

DISGUST AND THE BRAIN

There is universal agreement that disgust is fundamentally a negative emotion, and it should not be surprising that disgust experiences are associated with brain activation in the right frontal area (Davidson, 1992). Recently, Sprengelmeyer, Young, Calder, and their colleagues (Sprengelmeyer et al., 1996; Sprengelmeyer, Young, Sprengelmeyer, et al., 1997) reported that people with Huntington's disease, caused by late-onset degeneration of the basal ganglia, show a remarkably specific deficit in identifying disgust facial (and vocal) expressions. To this date, there is no information on deficits in production of emotional expressions. The same disgust recognition deficit is seen in people who are carriers of the Huntington's gene, but are still too young to show any of the classical symptoms. Magnetic resonance imaging evidence from normal subjects also suggests activation of basal ganglia structures,

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v. New Haven, CT: Yale

related aversions. *Jour-
ychology*, 36, 393-412.
olitics in Hindu South
, 494-511.

len Bergh, O., & Eelen,
ays in contact: Evalua-
to extinction. *Advances
rapy*, 10, 179-199.
"death. New York: Free

ion and partial valida-
urement of the fear of
dissertation Information

i. Facial expression of
es. In P. Ekman (Ed.),
: A century of research
rk: Academic Press.
ssion of the emotions in
University of Chicago
d 1872)

s influencing self-rated
ition and Emotion, 7,

antow, B., & Dallos, R.
sorders. *European Eat-
211.*

Mayhew, G. (1991). Fa-
sensitivity and animal
ch and Therapy, 31,

on and affective style:
chological Science, 3,

(1996, March). Demo-
ivity to disgust. Poster

- presented at the annual meeting of the Eastern Psy-
chological Association, Philadelphia.
- Douglas, M. (1966). *Purity and danger*. London: Rout-
ledge & Kegan Paul.
- Druschel, B. & Sherman, M.F. (1994, March). *Disgust
sensitivity as a function of personality characteristics
and gender*. Poster presented at the annual meeting of
the Eastern Psychological Association, Providence,
RI.
- Ekman, P. (1972). Universals and cultural differences in
facial expressions of emotion. In J. K. Cole (Ed.), *Ne-
braska Symposium on Motivation* (Vol. 19, pp.
207-283). Lincoln: University of Nebraska Press.
- Ekman, P. (1992). An argument for basic emotions.
Cognition and Emotion, 6, 169-200.
- Ekman, P., & Friesen, W. V. (1975). *Unmasking the face*.
Englewood Cliffs, NJ: Prentice-Hall.
- Ekman, P., & Friesen, W. V. (1978). *Facial Action Cod-
ing System: A technique for the measurement of facial
movement*. Palo Alto, CA: Consulting Psychologists
Press.
- Elias, N. (1978). *The history of manners: Vol. 1. The civ-
ilizing process* (E. Jephcott, Trans.). New York: Pan-
theon Books. (Original work published 1939)
- Engen, T., & Corbit, T. E. (1970). *Feasibility of olfacto-
ry coding of noxious substances to assure aversive re-
sponses in young children* (Final Report, Contract
No. PH 86-68-162, ICRL-RR-69-6). Washington,
DC: U.S. Department of Health, Education and Wel-
fare.
- Fallon, A. E., & Rozin, P. (1983). The psychological
bases of food rejections by humans. *Ecology of Food
and Nutrition*, 13, 15-26.
- Fallon, A. E., Rozin, P., & Pliner, P. (1984). The child's
conception of food: The development of food re-
jections with special reference to disgust and con-
tamination sensitivity. *Child Development*, 55,
566-575.
- Ferenczi, S. (1952). The ontogenesis of the interest in
money. In S. Ferenczi (Ed.), *First contributions to
psychoanalysis* (E. Jones, Trans.) (pp. 319-331).
London: Hogarth Press. (Original work published
1914)
- Flavell, J. (1986). The development of children's knowl-
edge of the appearance-reality distinction. *American
Psychologist*, 41, 418-425.
- Frazer, J. G. (1922). *The golden bough: A study in mag-
ic and religion* (abridged ed., T. H. Gaster, Ed.). New
York: Macmillan. (Original work published 1890)
- Freud, S. (1953). Three essays on the theory of sexual-
ity. In J. Strachey (Ed. and Trans.), *The standard edi-
tion of the complete psychological works of Sigmund
Freud* (Vol. 7, pp. 123-231). London: Hogarth Press.
(Original work published 1905)
- Freud, S. (1957). Five lectures on psycho-analysis. In J.
Strachey (Ed. and Trans.), *The standard edition of the
complete psychological works of Sigmund Freud* (Vol.
11, pp. 3-56). London: Hogarth Press. (Original work
published 1910)
- Grunfeld, D. I. (1982). *The Jewish dietary laws: Vol. 1.
Dietary laws regarding forbidden and permitted
foods, with particular reference to meat and meat
products* (3rd ed.). London: Soncino Press.
- Haidt, J., Koller, S., & Dias, M. (1993). Affect, culture,

- and morality, or is it wrong to eat your dog? *Journal
of Personality and Social Psychology*, 65, 613-628.
- Haidt, J., McCauley, C. R., & Rozin, P. (1994). A scale
to measure disgust sensitivity. *Personality and Indi-
vidual Differences*, 16, 701-713.
- Haidt, J., Rozin, P., McCauley, C. R., & Imada, S.
(1997). Body, psyche, and culture: The relationship
between disgust and morality. *Psychology and Devel-
oping Societies*, 9, 107-131.
- Harris, P. (1989). *Children and emotion*. Oxford: Basil
Blackwell.
- Hejmadi, A. (2000). *Rasa or aesthetic emotion: An an-
cient Hindu perspective*. Unpublished manuscript.
- Hejmadi, A., Davidson, R., & Rozin, P. (in press). Ex-
ploring Hindu Indian emotion expressions: Evidence
for accurate recognition by Americans and Indians.
Psychological Science.
- Howell, N. (1986). Feedbacks and buffers in relation to
scarcity and abundance: Studies of hunter-gatherer
populations. In R. Scofield (Ed.), *Beyond Malthus*
(pp. 156-187). Cambridge, England: Cambridge Uni-
versity Press.
- Izard, C. E. (1971). *The face of emotion*. New York: Ap-
pleton-century-Crofts.
- Izard, C. E. (1977). *Human emotions*. New York:
Plenum Press.
- Johnson-Laird, P. N., & Oatley, K. (1989). The language
of emotions: An analysis of a semantic field. *Cogni-
tion and Emotion*, 3, 81-123.
- Jones, E. (1948). Anal-erotic character traits. In E.
Jones, *Papers on psychoanalysis* (pp. 413-437).
Boston: Beacon Press. (Original work published
1912)
- Kass, L. (1994). *The hungry soul*. New York: Free Press.
- Kleinknecht, R. A., Kleinknecht, E. E., & Thorndike, R.
M. (1997). The role of disgust and fear in blood and
injection-related fainting symptoms: A structural
equation model. *Behavior Research and Therapy*, 35,
1075-1087.
- Leach, E. (1964). Anthropological aspects of language:
Animal categories and verbal abuse. In E. Lenneberg
(Ed.), *New directions in the study of language* (pp.
23-64). Cambridge, MA: MIT Press.
- Levenson, R. W. (1992). Autonomic nervous system dif-
ferences among emotions. *Psychological Science*, 3,
23-27.
- Levenson, R. W., Ekman, P., & Friesen, W. V. (1990).
Voluntary facial action generates emotion-specific
autonomic nervous system activity. *Psychophysiol-
ogy*, 27, 363-384.
- Malson, L. (1972). *Wolf children* (E. Fawcett, P. Ayrton,
& J. White, Trans.). New York: Monthly Review
Press. (Original work published 1964)
- Marriott, M. (1968). Caste ranking and food transac-
tions: A matrix analysis. In M. Singer & B. S. Cohn
(Eds.), *Structure and change in Indian society* (pp.
133-171). Chicago: Aldine.
- Martin, I., & Levey, A. B. (1978). Evaluative condition-
ing. *Advances in Behavior Research and Therapy*, 1,
57-102.
- Masson, J. L., & Patwardhan, M. V. (1970). *Aesthetic
rapture: The Rāsadhya of the Nāṭyaśāstra*. Poona,
India: Deccan College.
- Matchett, G., & Davey, G. C. L. (1991). A test of a dis-

- ease-avoidance model of animal phobias. *Behaviour Research and Therapy*, 29, 91-94.
- Mauss, M. (1972). *A general theory of magic* (R. Brain, Trans.). New York: Norton. (Original work published 1902)
- Mayr, E. (1960). The emergence of evolutionary novelties. In S. Tax (Ed.), *Evolution after Darwin: Vol. 1. The evolution of life* (pp. 349-380). Chicago: University of Chicago Press.
- Meigs, A. S. (1978). A Papuan perspective on pollution. *Man*, 13, 304-318.
- Meigs, A. S. (1984). *Food, sex, and pollution: A New Guinea religion*. New Brunswick, NJ: Rutgers University Press.
- Mikula, G., Scherer, K. R., & Athenstaedt, U. (1998). The role of injustice in the elicitation of differential emotional reactions. *Personality and Social Psychology Bulletin*, 24, 769-783.
- Miller, S. B. (1986). Disgust: Conceptualization, development, and dynamics. *International Review of Psychoanalysis*, 13, 295-307.
- Miller, W. I. (1997). *The anatomy of disgust*. Cambridge, MA: Harvard University Press.
- Nemeroff, C., & Rozin, P. (1989). "You are what you eat": Applying the demand-free "impressions" technique to an unacknowledged belief. *Ethos: The Journal of Psychological Anthropology*, 17, 50-69.
- Nemeroff, C., & Rozin, P. (1992). Sympathetic magical beliefs and kosher dietary practice: The interaction of rules and feelings. *Ethos: The Journal of Psychological Anthropology*, 20, 96-115.
- Nemeroff, C., & Rozin, P. (in press). The makings of the magical mind. In K. Rosengren, C. Johnson, & P. Harris (Eds.), *Imagining the impossible: Magical, scientific, and religious thinking in children*. New York: Cambridge University Press.
- Oppliger, P. A., & Zillmann, D. (1997). Disgust in humor: Its appeal to adolescents. *Humor: International Journal of Humor Research*, 10, 421-437.
- Ortner, S. B. (1973). Sherpa purity. *American Anthropologist*, 75, 49-63.
- Ortony, A., Clore, G. L., & Collins, A. (1988). *The cognitive structure of emotions*. Cambridge, England: Cambridge University Press.
- Parker, R. (1983). *Miasma: Pollution and purification in early Greek religion*. Oxford: Clarendon Press.
- Peiper, A. (1963). *Cerebral functions in infancy and childhood*. New York: Consultants Bureau.
- Pető, E. (1936). Contribution to the development of smell feeling. *British Journal of Medical Psychology*, 15, 314-320.
- Phillips, M. L., Young, A. W., Senior, C., Brammer, M., Andrew, C., Williams, S. C. R., Gray, J., & David, A. S. (1997). A specific neural substrate for perceiving facial expressions of disgust. *Nature*, 389, 495-498.
- Piaget, J., & Inhelder, B. (1974). From conservation to atomism. In J. Piaget & B. Inhelder, *The child's construction of quantities* (pp. 67-116). London: Routledge & Kegan Paul. (Original work published 1941)
- Plutchik, R. (1980). *Emotion: A psychoevolutionary synthesis*. New York: Harper & Row.
- Power, M., & Dalgleish, T. (1997). *Cognition and emotion: From order to disorder*. East Sussex, England: Psychology Press.
- Quigley, J.F., Sherman, M., & Sherman, N. (1996, March). *Personality disorder symptoms, gender, and age as predictors of adolescent disgust sensitivity*. Poster presented at the annual meeting of the Eastern Psychological Association, Philadelphia.
- Rapoport, J. L. (1989). The biology of obsessive compulsive disorder. *Journal of the American Medical Association*, 260, 2888-2890.
- Renner, H. D. (1944). *The origin of food habits*. London: Faber & Faber.
- Rozin, P. (1976). The evolution of intelligence and access to the cognitive unconscious. In J. A. Sprague & A. N. Epstein (Eds.), *Progress in psychobiology and physiological psychology* (Vol. 6, pp. 245-280). New York: Academic Press.
- Rozin, P. (1991). Family resemblance in food and other domains: The family paradox and the role of parental congruence. *Appetite*, 16, 93-102.
- Rozin, P. (1997). Moralization. In A. Brandt & P. Rozin (Eds.), *Morality and health* (pp. 379-401). New York: Routledge.
- Rozin, P., & Fallon, A. E. (1987). A perspective on disgust. *Psychological Review*, 94(1), 23-41.
- Rozin, P., Fallon, A. E., & Augustoni-Ziskind, M. (1985). The child's conception of food: The development of contamination sensitivity to "disgusting" substances. *Developmental Psychology*, 21, 1075-1079.
- Rozin, P., Fallon, A. E., & Augustoni-Ziskind, M. (1986). The child's conception of food: Development of categories of accepted and rejected substances. *Journal of Nutrition Education*, 18, 75-81.
- Rozin, P., Fallon, A. E., & Mandell, R. (1984). Family resemblance in attitudes to food. *Developmental Psychology*, 20, 309-314.
- Rozin, P., Haidt, J., & McCauley, C. R. (1993). Disgust. In M. Lewis & J. M. Haviland (Eds.), *Handbook of emotions* (pp. 575-594). New York: Guilford Press.
- Rozin, P., Haidt, J., McCauley, C. R., Dunlop, L., & Ashmore, M. (1999). Individual differences in disgust sensitivity: Comparisons and evaluations of paper-and-pencil versus behavioral measures. *Journal of Research in Personality*, 33, 330-351.
- Rozin, P., Haidt, J., McCauley, C. R., & Imada, S. (1997). The cultural evolution of disgust. In H. M. Macbeth (Ed.), *Food preferences and taste: Continuity and change* (pp. 65-82). Oxford: Berghahn.
- Rozin, P., Hammer, L., Oster, H., Horowitz, T., & Mar-mara, V. (1986). The child's conception of food: Differentiation of categories of rejected substances in the 1.4 to 5 year age range. *Appetite*, 7, 141-151.
- Rozin, P., Lowery, L., & Ebert, R. (1994). Varieties of disgust faces and the structure of disgust. *Journal of Personality and Social Psychology*, 66, 870-881.
- Rozin, P., Lowery, L., Imada, S., & Haidt, J. (1999). The CAD triad hypothesis: A mapping between three other-directed moral emotions (contempt, anger, disgust) and three moral ethics (community, autonomy, divinity). *Journal of Personality and Social Psychology*, 76, 574-586.
- Rozin, P., Markwith, M., & McCauley, C. R. (1994). The nature of aversion to indirect contact with other persons: AIDS aversion as a composite of aversion to strangers, infection, moral taint and misfortune. *Journal of Abnormal Psychology*, 103, 495-504.

- Sherman, N. (1996). Symptoms, gender, and disgust sensitivity. In meeting of the Eastern Psychological Association.
- of intelligence and acc...ous. In J. A. Sprague & ...s in psychobiology and ... 6, pp. 245-280. New
- ance in food and other ...and the role of parental ...102.
- In A. Brandt & P. Rozin ...p. 379-401) New York:
-). A perspective on dis- ...4(1), 23-41.
- toni-Ziskind, M. (1985). ...id: The development of "disgusting" substances. ...1, 1075-1079.
- Augustoni-Ziskind, M. ...of food: Development ...id rejected substances. ...n, 18, 75-81.
- dell, R. (1984). Family ...od. *Developmental Psy-*
- C. R. (1993). Disgust. ...id (Eds.), *Handbook of* ...York: Guilford Press.
- C. R., Dunlop, L., & ...ual differences in dis- ...and evaluations of pa- ...ral measures. *Journal* ...330-351.
- C. R., & Imada, S. ...n of disgust. In H. M. ...ces and taste: Continu- ...xford: Berghahn.
- , Horowitz, T., & Mar- ...ception of food: Dif- ...fected substances in the ...te, 7, 141-151.
- R. (1994). Varieties of ...of disgust. *Journal of* ...logy, 66, 870-881.
- & Haidt, J. (1999). The ...ing between three oth- ...tempt, anger, disgust) ...mity, autonomy, divini- ...*Social Psychology*, 76,
- Cauley, C. R. (1994). ...rect contact with other ...posite of aversion to ...t and misfortune. *Jour-* ...03, 495-504.
- Rozin, P., Markwith, M., & Stoess, C. (1997). Moraliza- tion: Becoming a vegetarian, the conversion of pref- erences into values and the recruitment of disgust. *Psychological Science*, 8, 67-73.
- Rozin, P., & Millman, L. (1987). Family environ- ment, not heredity, accounts for family resemblance in food preferences and attitudes. *Appetite*, 8, 125-134.
- Rozin, P., Millman, L., & Nemeroff, C. (1986). Opera- tion of the laws of sympathetic magic in disgust and other domains. *Journal of Personality and Social Psychology*, 50, 703-712.
- Rozin, P., & Nemeroff, C. J. (1990). The laws of sympa- thetic magic: A psychological analysis of similarity and contagion. In J. Stigler, G. Herdt, & R. A. Shwed- der (Eds.), *Cultural psychology: Essays on compara- tive human development* (pp. 205-232). Cambridge, England: Cambridge University Press.
- Rozin, P., Nemeroff, C., Horowitz, M., Gordon, B., & Voet, W. (1995). The borders of the self: Contamina- tion sensitivity and potency of the mouth, other aper- tures and body parts. *Journal of Research in Person- ality*, 29, 318-340.
- Rozin, P., Nemeroff, C., Wane, M., & Sherrod, A. (1989). Operation of the sympathetic magical law of contagion in interpersonal attitudes among Ameri- cans. *Bulletin of the Psychonomic Society*, 27, 367-370.
- Rozin, P., & Singh, L. (1999). The moralization of ciga- rette smoking in America. *Journal of Consumer Be- havior*, 8, 321-337.
- Rozin, P., & Zellner, D. A. (1985). The role of Pavlovian conditioning in the acquisition of food likes and dis- likes. *Annals of the New York Academy of Sciences*, 443, 189-202.
- Scherer, K. R. (1986). Vocal affect expression: A review and a model for future research. *Psychological Bul- letin*, 99, 143-165.
- Scherer, K. R. (1997). The role of culture in emotion- antecedent appraisal. *Journal of Personality and So- cial Psychology*, 73, 902-922.
- Scherer, K. R., & Wallbott, H. G. (1994). Evidence for universality and cultural variation of differential emo- tion response patterning. *Journal of Personality and Social Psychology*, 66, 310-328.
- Schmidt, H., & Beauchamp, G. (1988). Adult-like odor preferences and aversions in three-year-old children. *Child Development*, 59, 1136-1143.
- Seligman, M. E. P. (1971). Phobias and preparedness. *Behavior Therapy*, 2, 307-320.
- Senn, M. J. E., & Solnit, A. J. (1968). *Problems in child behavior and development*. Philadelphia: Lea & Febiger.
- Shweder, R. A., Much, N. C., Mahapatra, M., & Park, L. (1997). The "big three" of morality (autonomy, community, divinity), and the "big three" explana- tions of suffering. In A. Brandt & P. Rozin (Eds.), *Morality and health* (pp. 119-169). New York: Rout- ledge.
- Siegal, M. (1988). Children's knowledge of contagion and contamination as causes of illness. *Child Devel- opment*, 59, 1353-1359.
- Soler, J. (1979). The semiotics of food in the Bible. In R. Forster & O. Ranum (Eds.), *Food and drinking his- tory* (E. Forster & P. M. Ranum, Trans.). (pp. 126-138). Baltimore: Johns Hopkins University Press. (Original work published 1973)
- Sprengelmeyer, R., Sprengelmeyer, R., Young, A. W., Calder, A. W., Karnat, A., Lange, H., Hömberg, V., Perrett, D. I., & Rowland, D. (1996). Loss of disgust: Perception of faces and emotions in Huntington's dis- ease. *Brain*, 119, 1647-1665.
- Sprengelmeyer, R., Young, A. W., Pundt, I., Spreng- elmeyer, A., Calder, A. J., Berrios, G., Winkel, R., Vollmoeller, W., Kuhn, W., Sartory, G., & Przuntek, H. (1997). Disgust implicated in obsessive-compul- sive disorder. *Proceedings of the Royal Society: Bio- logical Sciences*, B264, 1767-1773.
- Sprengelmeyer, R., Young, A. W., Sprengelmeyer, A., Calder, A. J., Rowland, D., Perrett, D. I., Homberg, V., & Lange, H. (1997). Recognition of facial expres- sions: Selective impairment of specific emotions in Huntington's disease. *Cognitive Neuropsychology*, 14, 839-879.
- Stein, M., Ottenberg, P., & Roulet, N. (1958). A study of the development of olfactory preferences. *Archives of Neurology and Psychiatry*, 80, 264-266.
- Steiner, J. E. (1979). Human facial expressions in re- sponse to taste and smell stimulation. In H. W. Reese & L. P. Lipsitt (Eds.), *Advances in child development and behavior* (Vol. 13, pp. 257-295). New York: Aca- demic Press.
- Tambiah, S. J. (1969). Animals are good to think and good to prohibit. *Ethnology*, 8, 423-459.
- Templer, D. I., King, F. L., Brooner, R. K., & Corgiat, M. (1984). Assessment of body elimination attitude. *Journal of Clinical Psychology*, 40, 754-759.
- Tolin, D. F., Lohr, J. M., Sawchuk, C. N., & Lee, T. C. (1997). Disgust and disgust sensitivity in blood-injec- tion-injury and spider phobia. *Behaviour Research and Therapy*, 35, 949-953.
- Tomkins, S. S. (1963). *Affect, imagery, consciousness: Vol. 2. The negative affects*. New York: Springer.
- Tomkins, S. S. (1982). Affect theory. In P. Ekman (Ed.), *Emotion in the human face* (2nd ed., pp. 353-395). Cambridge, England: Cambridge University Press.
- Tylor, E. B. (1974). *Primitive culture: Researches into the development of mythology, philosophy, religion, art and custom*. New York: Gordon Press. (Original work published 1871)
- Ware, J., Jain, K., Burgess, L., & Davey, G. C. L. (1994). Disease-avoidance model: Factor analysis of common animal fears. *Behaviour Research and Ther- apy*, 32, 57-63.
- Webb, K., & Davey, G. C. L. (1993). Disgust sensitivity and fear of animals: Effect of exposure to violent or repulsive material. *Anxiety, Coping, and Stress*, 5, 329-335.
- Wierzbicka, A. (1986). Emotions: Universal or culture- specific? *American Anthropologist*, 88, 584-594.