CHAPTER X

Moral Disgust and Tribal Instincts: A Byproduct Hypothesis

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Psychological research has been discovering a number of puzzling features of morality and moral cognition recently.[1] Zhong & Liljenquist (2006) found that when people are asked to think about an unethical deed or recall one they themselves have committed in the past, issues of *physical cleanliness* become salient. Zhong & Liljenquist designate this phenomenon the "Macbeth Effect," and it takes some interesting forms. For instance, reading a story describing an immoral deed increased people's desire for products related to cleansing, like a shower soap, disinfectants, or antiseptic wipes. Moreover, Zhong & Liljenquist found that cleaning ones' hands after describing a past unethical deed actually reduced moral emotions such as guilt and shame. So much so that those who did "wash away their sins" were less likely that other participants to help out a desperate graduate student. Other researchers report similar findings. Schnall and his colleagues (unpublished manuscript) explored how issues of cleanliness influence judgments of moral *severity*. In one experiment, a first group of participants was given an alcohol-based cleansing gel to use on their hands, while a second group was given an ordinary moisturizing (but non-cleansing) hand cream. Those who had just washed themselves down with the cleansing gel were significantly less severe in their condemnation of the unethical deeds they were asked to evaluate.

Another series of experiments has demonstrated a link between contamination and *immorality*. Paul Rozin and his colleagues found that many people are slightly reluctant to put on a sweater that once belonged to and was worn by an undescribed stranger, even if it had subsequently been thoroughly cleaned. People tend to become increasingly reluctant to put on, and in some

[1] In what follows, I'll call attention only to those findings that are relevant to my argument. For a much more encompassing overview of recent work in empirical moral psychology, see Doris & Stich (2005, 2006), Nado et al. (forthcoming).

cases even touch, a similarly laundered sweater if they are told the previous owner had committed some extreme moral violation such as murder. The link between immorality and contamination was made especially evident by the piece of clothing that was the most aversive and contaminated of all: a sweater that once belonged to the ultimate moral monster, Adolf Hitler (Rozin et al. 1994, also see Haidt et al. 1997 for discussion).

Coming at the issue of morality from another angle are those exploring prejudicial attitudes that members of one group may harbor about members outside their own group. As is all too familiar, either from anecdotal report or even from common first hand experience, members of one cultural "ingroup" will often consider members of other cultural "outgroups" to be below them in one way or another. In exaggerated cases of this, one group is liable to completely demonize and dehumanize an other, considering them not fully human but merely animal, undeserving of any moral treatment or consideration whatsoever, and somehow tainted and tainting. Perhaps the most extreme and well-known example was the Nazi attitude towards Jews. Indeed, anti-Jewish Nazi propaganda flagrantly invoked the imagery and language of purity, contamination and dehumanization. Hitler described "the Jew" as a maggot in a festering abscess, hidden away inside the clean, healthy body of the nation. Experimenters have begun exploring the psychological bases of prejudices, and one of the most interesting findings has been that amongst members of a particular ingroup, different emotions are commonly associated with attitudes towards different outgroups (Cottrell & Neuberg 2005).

Finally, Wheatley & Haidt (2005) have used the emotion of disgust to induce some striking forms of irrationality in moral judgments as well. In one of their most devious experiments, they ask subjects to consider the following vignette:

> "Dan is a student council representative at his school. This semester he is in charge of scheduling discussions about academic issues. He often picks topics that appeal to both professors and students in order to stimulate discussion."

All of those given this vignette were asked to rate how morally wrong Dan's behavior is. However, some of the subjects were also hypnotically induced to undergo a brief flash of disgust when they saw the word "often", which occurs near the middle of the vignette. Amazingly, many of those hypnotized subjects judged Dan to be doing something morally wrong! They arrived at this judgment despite the completely innocuous description of Dan's actions. Moreover, they were remarkably persistent in standing by their initial impulses; they upheld their dim opinion of Dan even after admitting they had little or no justification for the judgment. Indeed, when asked to explain themselves, participants ended up saying things like Dan seems like a "popularity seeking

snob," and that he "just seems like he's up to something". Most revealing, perhaps, was one subject who bluntly stated "I don't know [why it's wrong], it just is."

The explicit mention of disgust in the last example points to a common thread running through all of these otherwise disparate findings. Indeed, these are just a few examples of recent work that has been exploring a link between disgust and morality that is fascinating, puzzling, and often troubling. In the rest of this paper, I will offer an account of moral disgust that illuminates this link, and makes sense of some of its more unsettling features. In the next section, I will briefly sketch the tribal instincts hypothesis, a component of gene-culture coevolutionary theory, which will serve to provide a theoretic background for the rest of the paper. In the second section, I will advance and defend my account of the basic disgust response, which I call the Entanglement thesis. Finally, in the third section, I develop the Co-opt thesis, which shows how the sorts of puzzling features of morality and moral cognition mentioned above can be explained as cognitive byproducts, produced when a specific psychological response was brought to bear on issues that it did not initially evolve to deal with.

1. The Tribal Instincts Hypothesis: Social Norms and Ethnic Boundary Markers

The tribal instincts hypothesis supposes that the human ability to cooperate on the scale of entire tribes and cultures is facilitated by a number of innately specified impulses. It is a specific hypothesis derived from a much broader theory concerned with human nature, namely gene-culture coevolutionary theory, or GCC for short. As its name suggests, both culture and cultural evolution, on the one hand, and genetic and biological evolution, on the other, fall within the scope of GCC. However, it does not treat either of these topics in isolation from the other. Rather, GCC sees cultural and genetic evolution as deeply intertwined in humans, and seeks to understand the ways in which culture can and has influenced genetic evolution, and alternatively how genetic factors have influenced the evolution of cultures (Boyd & Richerson 1985, 2005; also see Richerson & Boyd 2005 for a more accessible overview).

GCC conceives of culture very broadly, as information in the social environment that can be passed from one member to another by social (therefore non-genetic) means. Culture can be transmitted not just through populations but also across generations. Information accumulates as it is passed from one generation to the next, and as such, the entire body of information can be seen as an inheritance system, sharing some analogous properties with the genetic

inheritance system. One factor motivating the tribal instincts hypothesis is the insight that continuous and increasing reliance on the information in this cultural inheritance system imposes new requirements on those who rely on it. As the volume and import of the information in the cultural inheritance system both increase, new selective pressures would be created that favor certain psychological capacities, namely those capacities allowing individuals to easily access and use information stored in the cultural repository.

One important result of humans' extended immersion in culture – and according to GCC there are many – is that humans have become innately disposed to see their social world in tribal terms, and to react accordingly. The enfolding of cultural and natural selective pressures in humans evolution has produced a set of social or tribal "instincts" that are sensitive to particular types of cultural information, namely information that facilitates living within the context of large, cooperative groups or tribes. Into this category falls information about both *social norms* and *ethnic boundaries*.

It is nearly a platitude that human social interactions are regulated by complex systems of norms. GCC sees enormous importance in this platitude, however, and suggests that it is largely these systems of behavior-guiding social norms that make it possible for humans to cooperate in tribal sized groups.[2] Pairing this evaluation of the importance of social norms with the tribal instinct hypothesis yields the prediction that humans will have a distinctive capacity to cognize those social norms. Recent research suggests that this is, indeed, the case. While the details are far from settled, it appears that the capacity has a number of important features, including the ability to easily acquire and internalize norms from the social environment. Once a norm is internalized, it produces characteristic types of motivation to both comply with the norm and to punish those who violate it (Sripada & Stich 2006, see also Nichols 2004).

Whereas social norms help coordinate social interactions within a tribe, ethnic symbols serve to mark the boundaries between different tribes. Such symbols, or ethnic boundary markers, as they are often called in the GCC literature, allow members of the same tribe to identify and selectively interact with each other (McElreath et al. 2003, Barth 1969). Members of the same tribe, almost by definition, share a large set of beliefs and values. More importantly, they also share large clusters of social and moral norms. Such beliefs, values, and norms are not themselves immediately visible to the naked eye, however. More directly and easily detectable symbols of various sorts (displayed colors, styles of clothing, use of different dialects, varieties of cuisine, and so forth)

[2] Richerson and Boyd (1998,1999) argue that human "ultrasociality" is too complex to be fully explained by appeal to only kinship and reciprocity, the standard resources of evolutionary theorists attempting to explain cooperation.

often serve to signal information about which norms, values, and beliefs a person holds, and thus which tribe he or she belongs to.

Moreover, there is a sound rationale for displaying such symbols: intra-tribe interactions will go much more smoothly than inter-tribe interactions, and other things being equal, it is in no one's interest to engage in the later, more difficult sort of exchanges. Because they share the same norms, social interactions between members of the same tribe will be much more *coordinated* than interactions between members of different tribes. Social norms often govern social interactions in such a way that actors who share the same norms will have similar and complementary expectations about the "proper" form of the interactions, practices, and customs in which they might mutually engage. Since ethnic markers serve as visible cues for the behavioral dispositions and otherwise unobservable values and norms that guide the behavior of others, it is exactly the function of those symbolic markers to allow actors to selectively interact with those of their own tribe who have similar and complementary expectations, and to avoid difficult and inefficient exchanges with others.

Pairing this idea with the tribal instincts hypothesis also yields a prediction about human psychology: humans will have innate capacities that are sensitive to these ethnic boundary markers, and that make the expected inferences about who to socially engage and who to avoid. Moreover, such capacities will likely give rise to ethnocentric attitudes in favor of one's own tribe along with its members, customs, values and norms. The dark flipside of this is that those same capacities can also give rise to prejudicial attitudes against other tribes, and their members, customs, values and norms. In an eloquent expression of this line of thought, Boyd and Richerson speculate that such attitudes often involve the emotion of disgust:

> "[G]roups of people who share distinctive moral norms, particularly norms that govern social interactions, quite likely become ethnically marked. This suggests that ethnocentric judgments easily arise because "we the people" behave properly, while those "others" behave improperly, doing disgusting, immoral things, and showing no remorse for it, either."
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> (Boyd & Richerson 2005, page 101)

2. The Basic Disgust Response and the Entanglement Thesis: Poisons & Parasites

For the moment, set aside the tribal instincts hypothesis and consider the emotion of disgust. A wide range of empirical work has shown that the basic disgust response is comprised of a diverse but highly coordinated set of elements, including affective, behavioral, and cognitive components (see Ekman

1992, Rozin et al. 2000). Among the most recognizable of the behavioral components is the gape face, the characteristic facial expression associated with disgust. In especially intense episodes, production of the gape face can tip into the retching that it so clearly prefigures. Gapes are also accompanied by a feeling of nausea, an orally based sense of aversion, and a reflex-like withdrawal, the quick physical recoil from the disgusting entity. The basic disgust response includes cognitive components as well, namely a more sustained sense of offensiveness and contamination. When some entity is found disgusting, it is considered offensive in a particular way: the thing is repulsive; one does not want to come into physical contact with it; mere physical proximity to the entity often is off-putting, repugnant, barely tolerable. Moreover, while a disgusting entity often captures the attention, even thinking about it is unpleasant. More striking, an entity that is considered disgusting has the ability to transmit its disgustingness to other things it comes into contact with. Those things thus contaminated are thereby considered disgusting, and elicit the same suite of response elements. Together, the operation of these two cognitive components of disgust can quite naturally lead to a desire to cleanse or purify oneself.

Opposite the basic disgust response are the sorts of things that can trigger it. Here, the data are even more puzzling (see again Rozin et al. 2000). Disgust can be elicited by an extraordinarily diverse set of triggers, ranging from the concrete and physical to the abstract and social. On the one hand, some of the most universally disgusting things are closely associated with the body, like spit, feces, blood, and organic decay of all sorts. Disgust is also sensitive to bodily boundaries in a particular way; the emotion enforces a “no reentry” policy. If something was once within or a part of a body, even your own, but then exits or breaks off, it thereby becomes an object disgust; common examples include saliva, blood, hair, fingernails, and severed limbs. Also disgusting to many is a set of creatures that might be called “creepy crawlies”: slugs, roaches, rats, and the like (Davey et al. 1993, Webb and Davey 1993, Ware et al. 1994). Certain types of perfectly edible (i.e. non-poisonous) food disgust some people as well. Common offenders in this category include cuisine like Brussels sprouts, escargot, caviar, pork rinds, Whoppers and deep-fried Twinkies. Other common elicitors of disgust are non-standard sexual behaviors and practices, including most notably incest. Finally, certain types of social behavior can elicit disgust. Crooked politicians and ambulance chasing lawyers are emblematic of such behaviors in our own culture, but violating certain social norms, especially those that govern how antecedently disgusting entities are to be dealt with (norms regulating burial rituals, the correct way to prepare food or maintain bodily hygiene, etc.) can also often elicit disgust (Shweder et al. 1997, Rozin et al.1999, see also Haidt et al. 1997).

Another noteworthy feature of the elicitors is that some appear to be universally and perhaps innately disgusting. These include those elicitors closely linked to the body, as well as incest (Lieberman et al. 2003, Fessler & Navarette 2004). In the case of other elicitors, however, what is considered disgusting can exhibit patterned variation from culture to culture. For instance, whether it is escargot, caviar, and Brussels sprouts, or pork rinds, Whoppers and deep-fried Twinkies that are considered disgusting by the locals will depend on whether you are at a state fair in the US's rural Midwest or at a posh bistro on Paris's Left Bank. Likewise, while many cultures consider some types of deviant sexual activities not just wrong but also disgusting, exactly which of those activities are deviant in this way varies from culture to culture. In terms of social behaviors, as the relevant norms vary from one group to another, so will the transgressions that are considered disgusting. In extreme cases, the norms and even ideologies of entire opposing social groups can come to disgust as well, e.g. conservative ideology disgusts liberals; liberal ideology disgusts conservatives.

Taking a step back and surveying all of these data invites some difficult questions. First and foremost is the simplest one: given 1) this puzzling array of elicitors, that 2) evokes a response composed of an equally puzzling cluster of components, *how are all of these things connected*? My aim is to sketch an answer to this question. That answer comes in two parts: the Entanglement Thesis and the Co-opt thesis. The rest of this section will be occupied with the former, while the next section will take up in the later.

The Entanglement thesis holds that disgust is a uniquely human kludge.[3] Underlying the basic disgust response are two distinguishable cognitive mechanisms that were once distinct, but have become deeply entangled with each other in modern human beings. Through the evolutionary process of descent with modification, these two mechanisms became more and more functionally integrated with each other, eventually forming the single emotion now recognized as disgust. The character of that human emotion remains informed by the character of those two entangled mechanisms and adaptive

[3] The term "kludge" is taken from engineering and computer science, where it is usually used to refer to a clumsy, piecemeal, or inelegant solution to a problem, or the clumsy, piecemeal, inelegant device used to solve the problem. Kludges are often gerrymandered workarounds, constructed to fix problems that were themselves unanticipated. The clumsiness stems from the fact that kludges are often constructed out of whatever parts are available when the problem unexpectedly arises. Those initially unrelated parts are cobbled together to construct the kludge, and in the process often put to new uses. Given that natural selection is a blind process operating without the benefit of foresight, the term also comes in handy in evolutionary explanations, though obviously in such contexts the metaphorical use of terms like "unexpected" or "unanticipated" needs to be taken with a grain of salt.

problems each initially (and separately) evolved to solve. However, while homologies with similar features and functions to each distinguishable mechanism can be found in primates and other animals, the Entanglement thesis holds that *only* in humans have these two mechanisms become so tightly intertwined as to form disgust. Thus, the Entanglement thesis also provides an explanation for why this particular emotion is found in human beings, but not other animals (see Rozin et al 2000, Morris et al 2007).

One of those two entangled mechanisms is directly linked to digestion. This mechanism initially evolved to regulate food intake and to protect the gut and gastro-intestinal system against substances that are poisonous, toxic or otherwise harmful when swallowed. It mainly protects against such substances by preventing them from being fully ingested. The mechanism can also produce orally based aversion towards specific types of food, to prevent them being eaten at all. Indeed, foods that, once fully consumed, induce gut-based distress are often not only expelled, but also generate what have been called acquired taste aversions, so that they are not consumed again (Garcia et al. 1974, Bernstein 1999). For shorthand, this will be called the poison mechanism hereafter.[4]

Returning to the characterization of disgust offered above, certain features of the basic response are easily traced to the poison mechanism and its proprietary adaptive function. In general, the aversion in episodes of disgust is often produced via physiological systems primarily based in the mouth and gut, giving it a strong oral aspect (what Rozin calls a "sense of oral incorporation"). The gape face often precedes and uses many of the same muscle groups as retching, which is how the body expels substances from the gut and mouth. The accompanying feeling of nausea is also useful in preventing ingestion of food in the first place. Finally, culturally local patterns of disgust to certain types of cuisine also indicate the operation of a mechanism dedicated to monitoring food intake.

The other of the two entangled mechanisms that shaped human disgust is linked to disease and parasites. This mechanism originally evolved to protect the entire organism from all forms of pathogenic or parasitic infection. It does this by causing the organism to avoid any close physical proximity to infectious agents, or anything that is likely to be infected and contagious. Since many infectious agents are microbes that cannot themselves be detected by the naked eye, protecting against infection involves avoiding not only visible pathogens and parasites, but also avoiding places, substances and other organisms that

[4] Previous theorists have emphasized this feature of disgust. For example, Griffiths (1997) follows Darwin (1872) in casting the emotion as a food rejection system, and much of Rozin's work on disgust stresses its oral character (see Rozin et al. 2000 and citations therein).

might be harboring them. Unlike the one protecting against poisons, this mechanism is not specific to ingestion, and so obviously has a much larger domain to monitor. I'll often refer to this as the parasite mechanism in what follows.[5]

Once again returning to the characterization of disgust offered above, certain features of the basic response are easily traced to the parasite mechanism and its proprietary adaptive function. One of these is the reflex-like withdrawal: quickly recoiling from a disgusting entity instantly decreases its physical proximity. The more cognitive sense of offensiveness can effectively prevent getting close to disgusting entities in the first place, and motivate moving further away from them once they are detected. Finally, the sensitivity to the possibility of contamination, the motivation to cleanse oneself and the concern about physical purity are all clearly fitted to the adaptive problems linked to infection.

As in the case of the poison mechanism, evidence of the parasite mechanism can also be found in the common elicitors of the emotion. While disgust does appear to have a special link to the mouth (the intensity of an episode of disgust can usually be increased by imagining the offending entity coming into contact with one's mouth or tongue), its domain is by no means restricted to the oral; the emotion monitors all of the bodily orifices and boundaries (Rozin et al. 1995; Fessler & Haley 2006). Feces and organic decay are some of the most effective vectors of disease transmission, and are also some of the most potent elicitors of disgust, perhaps universally so (Haidt et al. 1994). Finally, phenotypic abnormalities and other reliable indicators of infection in conspecifics are also possible universal and innate elicitors of disgust (Curtis et al. 2004).[6]

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[5] Psychologists have previously noted this aspect of disgust as well. Steven Pinker (1997), for instance, calls disgust "intuitive microbiology", and Curtis et al. (2004) present an impressive body of evidence in support of the claim that disgust is an "evolved response to threats of infectious disease." Kurzban & Leary (2001) cite "parasite avoidance" behavior to explain a certain type of social stigmatization, though the link to disgust is less explicit in their discussion.

[6] Another form of evidence in support of the Entanglement thesis comes from developmental psychology. Patterns in ontogeny suggest that components of the disgust response are on different developmental schedules, and emerge at different ages. Indications of mere distaste (not liking the taste of certain foods, but not reacting to them with disgust) and the ability to make and react to gape faces are present within the first year of life (Bandura 1992). Other components of the mature disgust response such as contamination sensitivity, however, do not emerge until much later. Some researchers mark the usual appearance of full blown disgust as late as four to eight years (Rozin et al. 1985), while others put it earlier, around two and a half to three years (Siegal and Share 1990). Whichever turns out to be closer to the truth, both estimates place components of

It is worth nothing that despite the differences in evolutionary history, the Entanglement thesis holds that the poison and parasite mechanisms have merged in mature, modern humans. Once the emotion of disgust is fully developed in an individual, the many components of the response come as a package; they are thereafter produced together with law-like regularity, forming what philosophers of science sometimes call a "nomological cluster" (Boyd 1991). In the case of disgust, this means that any elicitor will reliably produce all or most of those clustered components, both those linked to the evolutionary problem of food regulation and those linked to pathogen and parasite avoidance. Elicitors of all sorts trigger this full nomological cluster, from creepy crawlies, to bodily fluids, to the relevant types of moral transgressions.

3. Moral Disgust and the Co-opt Thesis: Cognitive Byproducts

Recall the question posed earlier. Given, on the one hand, the puzzling cluster of affective, behavioral, and cognitive components that make up the disgust response, and on the other hand, the equally puzzling array of elicitors that trigger the response, how are all of these things connected? The first part of my answer was largely (though not exclusively) focused on the character of the response itself. The second part of my answer is the Co-opt thesis, which assumes the Entanglement thesis is correct, and embeds it within the context of GGC and the tribal instincts hypothesis. It takes the set of elicitors as its point of departure.

The Co-opt thesis holds that as humans became more reliant on social groups and the cultural information they provided, basic disgust was co-opted by the emerging tribal instincts to help perform a variety of novel functions that arose in conjunction with this increased sociality. In doing so, disgust's most characteristic features, features that initially evolved to solve adaptive problems linked to poisons and parasites, were brought to bear on those new functions in the social domain. Moreover, it is exactly this *imperfect fit* between the basic disgust response and those social functions it was later co-opted to perform that gives rise to the sorts of puzzling results turning up in the recent research on moral cognition. In short, those troubling features of moral judgments discussed in the first section can be understood as cognitive byproducts, generated by the mismatch between "unanticipated" problems and the imperfect and inelegant solution disgust helps provide.

As an example of co-optation, consider the gape face discussed above. Gaping utilizes most of the same facial muscular movements as retching, the

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the response linked to the parasite mechanism as emerging significantly later than those linked to the poison mechanism.

physical act that it often precedes and accompanies. When the poison and parasite mechanisms fused, however, that facial expression was given a new purpose: it was recruited to send signals to conspecifics. Generally speaking, the importance of communication increased in tandem with human sociality and the propensity to live in larger and larger groups. As the significance of communication rose, so too did the need for perspicuous signals that could cleanly transmit important information (Frank 1988, see also Pinker 1997). Faces and different facial expressions in general could already convey a rich assortment of information, and the gape face was co-opted to perform a similar signaling role. It can warn others, including small children, against eating something known to be toxic or poisonous. It can also signal a "Warning! Biohazard!" type of message, cautioning others to avoid nearby pathogens or contaminated areas. In being co-opted, the gape went from merely preceding the actual expulsion of substances from the mouth to acting as a warning sign. Moreover, once this broader signaling function was acquired, gapes were able to signal other socially relevant information as well, including information related to the other functions disgust acquired in the social and moral arenas.[7]

For insight into the character of those functions, recall GCC and the tribal instinct hypothesis. GCC maintains that one factor which greatly contributes to the human ability to cooperate and coordinate on such a large scale (compared, e.g. to other primates and most other animals) is that human social interactions are governed by a complex set of norms. Recent research shows that disgust is indeed operative in a number of different types of these social norms. In these cases, the emotion provides the types of intrinsic motivation mentioned above, including motivation to comply with the norm in question, to avoid the actions they prohibit, and to punish or direct punitive attitudes at transgressors of the norm. Indeed, disgust has been shown to play such roles in a number of different types of norms, including the rules of table etiquette (Nichols 2002a, 2002b, 2004), taboos restricting the consumption of meat (Fessler & Navarrete 2003), and taboos against incest (Lieberman et al. 2003, Fessler & Navarette 2004).

[7] Here it will be useful to make terminological caveat, in order to forestall a number of (interesting, open) philosophic questions about the definition of "morality", and thus the proper domain of the moral – which judgments, mechanisms, or roles are "really" about moral issues and which are not. (For discussion of these issues, see Nado et al. forthcoming, Kelly & Stich forthcoming, Nichols 2004). In the text, "moral disgust" is used in the same way it is used in the empirical psychological literature, namely to capture those roles that disgust systematically plays in the social arena. These include its role in guiding social coordination, motivating behavior in potentially cooperative situations, influencing interactions between individuals and between groups of people, and influencing judgments about similar matters.

More generally, the prominent anthropologist Richard Shweder has called attention to an entire class of norms that follow the logic of disgust, which he calls purity norms (Shweder et al. 1997, Haidt et al. 1997, Rozin et al. 1999). As their name suggests, purity norms are often understood as regulating issues of purity, not only guarding the sanctity of the physical body, but also protecting the soul from contamination and spiritual defilement. Indeed, purity norms can be distinguished from other classes of norms, such as harm norms or fairness norms, in that transgressions of purity norms usually do not result in direct physical harm or the inequitable treatment of any person. More traditional or religious cultures often see transgressors of a purity norm as defiling themselves by disrespecting the sacredness of God (or the gods), or by violating the divine order. Purity norms are not completely absent from largely secular cultures, however; their presence is just not as central to the social structure or prevailing moral code. They are often given a different justification in secular cultures, as well: transgressions of purity norms are usually conceived of as "crimes against nature" or violations of the natural order. According to Shweder, norms fitting this description regulate a range of issues, such as the proper foods to eat, when it is admissible to eat them, and often the proper way to prepare them; the details of sexual activities and even sleeping arrangements amongst family members; proper attire in a variety of settings, especially ritual and religious settings; the proper way to deal with organic materials, like corpses, blood, feces, and so forth; and how to interact with members of other social groups, particularly how to avoid being polluted by members of lower castes. In addition to the obvious themes of purification and contamination, preliminary research supports the idea that the character of purity norms is heavily influenced by the emotion of disgust (see especially Rozin et al 1999).

Similarly, recent neuroimaging experiments link the disgust response to prejudices and ethnic membership. This research shows disgust to be operative in sustaining a class of biases and prejudicial attitudes towards those in particular outgroups or tribes.[8] As was mentioned above, distinct emotions are

[8] In calling them "tribes" I do not mean to suggest that today's social networks are still structured along tribal lines. However, this is completely compatible with the possibility that important components of the human psychological system devoted to social cognition still *see* social interactions in largely tribal terms, and conceptualize and attempt to navigate those interactions accordingly. Indeed, this is one way to understand the tribal instinct hypothesis: many of the mechanisms underlying social cognition, even in contemporary human beings, originally evolved to allow living in tribal sized groups, and as such they are sensitive to the types of observable cues that are likely to convey information relevant to which tribe someone is a member of, and which cluster of norms they embrace. Moreover, those mechanisms are wont to process that information, make inferences, and form intentions in ways that are well suited to a tribal existence, even if

often associated with the different types of attitudes directed at different outgroups and their members (Cottrell & Neuberg 2005). Particularly interesting (if not completely surprising) is the demonstration that disgust is often the emotion linked to the most extreme prejudices, directed at members of the lowliest, most vilified and dehumanized ethnicities (Harris & Fiske 2006).

Finally, the pieces are ready to be put together. On the one hand, GCC provides details about a number of relatively novel adaptive problems that arise in the wake of increased human sociality and reliance on cultural information, and posits a set of tribal instincts that evolved to help deal with them. On the other hand is basic disgust, an emotion that appears to have been cobbled together from parts that originally and separately evolved to deal with poisons and parasites, but which also appears to be acting as an important component of certain tribal instincts. The Co-opt thesis offers an explanation: at some point after the poison and parasite mechanisms became entangled, basic disgust was co-opted to perform a variety of novel *auxiliary* functions unrelated to either poisons or parasites. Furthermore, the Co-opt thesis maintains that in performing those novel functions linked to social norms and monitoring ethnic boundaries, the full nomological cluster of components that make up the basic disgust response is brought to bear on those social functions, from the more cognitively complex sensitivity to contamination, to the gape face and physical recoil, to the more visceral feelings of nausea and repulsion. Moreover, the behaviors and attitudes driven by disgust in the social arena, while crudely effective, are sub-optimal and highly idiosyncratic.

Evolutionary theorists often call explanations of this form *byproduct hypotheses*. In general, a byproduct hypothesis is advanced to explain a puzzling but systematic deviation from optimal or rational performance. Those systematic deviations are explained as byproducts of the imperfect fit between the performance of the trait or system and a new function it has been co-opted to perform. The exact character of the departure from optimality is traced to the details of the mismatch, and to features the trait or system retained from before it was co-opted.[9] In the case of tribal instincts, the social norms that recruit disgust appear to require, most basically, some kind of avoidance and aversion motivation. In co-opting disgust in particular, the activities proscribed by those norms, as well as those actors who transgress them, are not *simply* avoided and found aversive. Rather, as a byproduct, they are also infused with a very specific

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the inferences and intentions they produce are not always optimal or even efficient in the context of our modern social institutions.

[9] Other psychological byproduct hypotheses have been offered, for instance, to explain features of the character and persistence of religious beliefs (Boyer 2001, Atran 2002), aspects of ethnic and racial cognition (Gil-White 2001), and patterns of homicide involving male sexual jealousy (Daly & Wilson 1988).

kind of offensiveness, are often considered tainted and contaminating, so much so that they can induce a desire to cleanse or purify oneself.

The same type of explanation applies to tribal instincts that monitor ethnic boundaries and their symbolic markers. According to GCC, what is needed is motivation to avoid members of other tribes who have internalized different social norms, in order to avoid uncoordinated exchanges. When disgust is the emotion co-opted to provide that motivation however, along with it come the cognitive byproducts of contamination sensitivity, offensiveness, visceral aversion – the full nomological cluster of the disgust response.

More troubling, perhaps, is the fact that feelings of disgust can induce judgments that are remarkably persistent. Remember Dan the "popularity seeking snob":

> "Dan is a student council representative at his school. This semester he is in charge of scheduling discussions about academic issues. He often picks topics that appeal to both professors and students in order to stimulate discussion."

Those hypnotized to feel disgust at the word "often" maintained their initial judgment that Dan was doing something morally wrong even when they were unable to provide any supporting reasons. As a byproduct, a similar persistence might accompany other attitudes or norms involved with disgust.

Luckily, we may conclude on a more optimistic note than this. The Co-opt thesis has an interesting corollary. It suggests a whole new line of argumentation in support of the conclusion that many of these puzzling aspects of moral judgments driven by disgust are not only troublesome, but indeed *irrational* and *unjustified*. Surprisingly, this is made evident from the rarified perspective of evolutionary theory, which is often thought to be morally neutral, or even corrosive to a moral outlook. For example, the evolutionary logic employed by GCC suggests that avoiding outgroup members may very well be rational, i.e. make adaptive sense, in certain contexts. However, there is absolutely no reason to think that treating them as tainted, contaminating or inhuman ever makes adaptive sense, or is ever justified. Indeed, in explaining a range of puzzling facts about morality as the byproducts of an imperfect fit between a uniquely human cognitive system that initially evolved to deal with poisons and parasites and the social and tribal dynamics it was later co-opted to help navigate, the Co-opt thesis demonstrates that such extreme prejudicial attitudes are irrational and unjustified even as it explains their source and prevalence.

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