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COMMENTARIES

Parasites, Behavioral Defenses, and the Social Psychological Mechanisms Through Which Cultures Are Evoked

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Let's talk first about parasites. Given the persistent influence that bacteria, viruses, and other parasites have had on human evolution (Van Blerkom, 2003), it's astonishing that so little scientific attention has been devoted to their impact on human psychology and human culture. There are extensive bodies of research documenting the role of parasites on evolved patterns of animal cognition and behavior. Many studies reveal that mammals are sensitive to signs of parasitic infection in potential mates and avoid mating with individuals who show those signs (e.g., Kavaliers, Colwell, Braun, & Choleris, 2003). These kinds of effects are not restricted to mating contexts either. Bullfrog tadpoles selectively prefer to swim near healthy tadpoles, while avoiding tadpoles that carry parasitic infections (Kiesecker, Skelly, Beard, & Preisser, 1999). Closer to home (phylogenetically speaking), chimpanzees react with unusual violence toward other chimpanzees that show the physical symptoms of debilitating diseases (Goodall, 1986). It is likely that the human mind too is characterized by mechanisms designed to recognize and respond negatively to individuals who show signs of parasite infections—and to do so especially under conditions in which the risk of parasitic infection is especially high (Kurzban & Leary, 2001; Schaller, Park, & Faulkner, 2003).

In recent years, empirical studies have documented the presence of just such mechanisms and their consequences on social cognition and behavior. Some of these consequences are straightforward: We stigmatize and avoid sick people, especially when we perceive their sickness to be contagious (Crandall & Moriarty, 1995). Additional consequences are more subtle. We not only stigmatize people who really are sick; we also stigmatize people who may be perfectly healthy but who—on the basis of some superficial feature—appear to pose a risk of parasite transmission. And we do so especially under conditions in which we feel especially vulnerable to parasitic infection. Xenophobic reactions to foreigners are stronger among folks who feel personally vulnerable to germs and disease (Faulkner, Schaller, Park, & Duncan, 2004). Individuals with deviant or nonprototypical morphological features—people who are disfigured or disabled, or who are grossly obese—are similarly stigmatized, and, again, this stigmatization seems to occur especially strongly among people who are personally concerned about their own vulnerability to disease (Park, 2005; Park, Faulkner, & Schaller, 2003). The preference for physically attractive mates might also be understood within this context. Physical *un*attractiveness is based substantially on perceived deviations from a population prototype (Langlois & Roggman, 1990). Consequently, the subjective assessment of unattractiveness may serve as a cue indicating the potential presence of a parasitic infection at the moment, as well as a cue indicating potential susceptibility to parasitic infections in the future. Within this conceptual context, it is no surprise that people care about the physical attractiveness of someone with whom they are destined to spend a lot of time with and that they care especially within populations that have historically been more vulnerable to debilitating parasitic infections (Gangestad & Buss, 1993). Now, in the results reported by Gangestad, Haselton, and Buss (this issue), we encounter even more impressive evidence that parasite-prevalence influences mate-selection preferences, and this influence occurs across an even broader set of preferences.

The Behavioral Immune System

It is because of results such as these that I am increasingly convinced that there evolved a sort of behavioral immune system that serves as an organism's first crude line of defense against potentially harmful parasites and pathogens. (It would probably be more apt to refer to this as the "psychological immune sys-

tem," because the system involves emotions and cognitions as well as behavior, but that term has appeared already in the psychological literature, referring metaphorically to a different set of processes that have nothing to do with parasite defense; see Gilbert, Pinel, Wilson, Blumberg, & Wheatley, 1998.) The behavioral immune system is triggered by the perception of specific kinds of stimuli (e.g., morphologically unusual appearance). When such stimuli are perceived, there ensues the automatic activation of the specific emotions and cognitions (e.g., disgust; automatic inferences about disease-connoting traits) that facilitate functional behavioral reactions (e.g., avoidance, social exclusion).

Of course, there are costs as well as benefits associated with the activation of this suite of reactions, and so the behavioral immune system is functionally flexible, responsive to information bearing on these costs and benefits. Relevant information may lie in temporary features of the immediate situation, and so these discriminatory reactions may be triggered in some situations more strongly than in others. Relevant information may also lie in chronic individual differences, and so these reactions may be triggered among some people more strongly than among others. Finally, relevant information may also lie in chronic aspects of the ecological context, and so these reactions may be triggered in some populations more strongly than in others.

That last remark—about the effect of ecological contexts and differences across populations—provides a point of transition into a bigger, broader point about universal evolutionary mechanisms and cross-cultural differences. I devote the rest of my remarks to this issue. The question I want to grapple with more fully is this: Just how are different cultural norms "evoked" under different ecological circumstances?

Questions Lurking Within the Concept of Evoked Culture

The notion of evoked culture is easily extrapolated from what we know already about evolved plasticity and environmental contingency. Those concepts are so well accepted within the biological sciences that, as concepts, they are almost boring. Not boring at all, of course, are the discoveries that result from the recognition that these concepts matter.

Consider the many wonderful examples that illustrate the operation of evolved plasticity and environmental contingency. Gangestad et al. (this issue) mention several (e.g., contingent mating strategies among collared flycatchers). I have a few other favorite examples. The tendency for cannibalistic spiders to selectively avoid eating their own kin is contingent on the extent to which alternative sources of food are available (Bilde & Lubin, 2001). Genetically-identical butterflies may take on entirely different appearances depending on local climatic conditions during the larval stage of development (Beldade & Brakefield, 2002). And, among several families of tropical fishes, changes in local sex ratio and social density may lead individuals to actually change from male to female or vice-versa (Godwin, Luckenbach, & Borski, 2003). Not only are these examples fascinating and fun in their own right, they offer a sort of standard against which we can judge the plausibility of evoked differences in human populations. If ecological variables can trigger such profound phenotypic variability in spiders and butterflies and fishes, it is hardly surprising that powerful ecological forces posed by parasites might evoke somewhat different mating preferences in a species as famously flexible as *Homo sapiens*.

The other thing that is definitely not boring about any environmental contingency in the biological sciences is the process through which it occurs. Interesting scientific stories lie not only in the observation that phenotypic differences are evoked under different ecological contexts; they lie also in the sophisticated programs of research that attempt to answer the question of exactly how this actually happens. These answers take us beyond the observations of zoology and behavioral ecology and deep into the realms of functional genomics and developmental biology (e.g., Hofman, 2003; Godwin et al., 2003; for a discussion of applications to human cognition, see Marcus, 2004). The documentation of an evolved environmental contingency is not a conclusion; it is an introduction. It opens the door to an enormous world of scientific exploration.

The same is true when the concept of evoked culture is introduced into conversations among psychologists and other social scientists. Evoked culture is not really an explanation for cultural variation. It is an observation that seeks explanation and offers logical clues to the sorts of theories that might be generated to provide those explanations. If indeed certain kinds of cultural norms are evoked by certain kinds of ecological circumstances, how does this actually happen? What are the actual psychological mechanisms involved? And what are the evolutionary roots of those mechanisms?

We are still a long way from having satisfactory answers to those questions. There is neither surprise nor shame in that. It is difficult enough to arrive at convincing answers to questions that address just the psychological level of analysis. It is even more difficult when connecting the psychological with either an evolutionary or a cultural level of analysis. And to connect all three levels of analysis together, coherently and convincingly—well, that is going to take some time and serious collective effort.

The Importance of Social Transmission Processes

As one step toward that goal, it will be valuable to sidestep the rhetorical baggage that sometimes accompanies the concept of evoked culture and explicitly integrate it with the concept of transmitted culture.

The baggage to which I refer is an ideology-tinged tendency to view evoked and transmitted culture as alternative theoretical approaches to the emergence of cultural differences. The presence of this baggage may help explain why some folks mistakenly believe that evidence of cultural transmission argues against the plausibility of evoked culture, and other folks mistakenly believe that evidence of evoked culture argues against the importance of social learning, interpersonal communication, and other modes of cultural transmission. This baggage might be traced, in part, to the manifesto-like tone of the chapter in which Tooby and Cosmides (1992) introduced the concept of evoked culture and contrasted their evolutionary perspective against the so-called standard social science perspectives that focused merely on domain-general learning and transmission processes. I have nothing against manifestos (in fact I rather like them), and that rhetorical approach probably made sense at the time. But it does'nt anymore. No longer is it necessary to argue that the principles of evolutionary psychology can be applied usefully to questions about culture. The intervening years have supplied plenty of evidence establishing that point. (Gangestad et al.'s, this issue, article offers one nice example. For other examples, see Atran & Norenzayan, 2004; Henrich & Boyd, 1998; Kameda, Takezawa, & Hastie, 2003; Kenrick, Li, & Butner, 2003; Krebs & Janicki, 2004; Norenzayan, Schaller, & Heine, in press). What is necessary now is to document more exactly the mechanisms through which evolved psychological processes actually do influence culture.

Here is where we need to take seriously an important point that Gangestad et al. (this issue) make toward the end of their article: that the mechanisms of evoked and transmitted culture are unlikely to be completely independent. I would hit that point even harder: The mechanisms of transmitted culture are integral to the process through which different cultures are evoked under different ecological circumstances. Just as biologists cannot fully understand environmentally contingent differences in the morphology of fishes without attending to the developmental mechanisms through which these differences emerge, we cannot fully understand the process of evoked culture without attending to the mechanisms of social transmission. Let me try to explain why.

A Few Thoughts on Social Learning

If I had a bit more space (and a lot more expertise), I might go into detail on ways in which social learning mechanisms are implicated in the process through which cultures are evoked. Instead, I just make a few quick points that suggest the need for closer attention and future elaboration. Basic mechanisms of social learning—mimicry, imitation, conformity—have deep evolutionary roots, operate automatically, and are ubiquitous aspects of the contemporary social landscape (Lakin & Chartrand, 2003; Moore, 2004; Henrich & Boyd, 1998). Many other evolved psychological systems employ basic learning mechanisms as a necessary means of facilitating adaptive behavior. One example is found in the set of mechanisms that comprise a sort of "fear module," endowing individuals with the adaptive tendency to respond fearfully toward potentially dangerous things. A fundamental part of that fear module is an evolved capacity to learn specific stimuli that signal danger, and it appears that there may be an innate preparedness to learn certain fears—such as a fear of snakes—especially quickly (Öhman & Mineka, 2001). These fears can be learned through entirely nonsocial associative mechanisms, but social learning is implicated as well. Rhesus monkeys, for instance, learn to fear snakes simply from observing other monkeys' fearful reactions to snakes (Cook & Mineka, 1990; see also Whiten, 2000). Just as social learning mechanisms are implicated in the process through which individuals acquire the capacity to react fearfully to potentially dangerous stimuli, it is also likely that social learning mechanisms are implicated in the process through which the behavioral immune system acquires the capacity to respond aversively to deviant morphological features and the process through which individuals acquire the capacity to distinguish desirable mates from less desirable ones.

Finally, just as other evolved psychological mechanisms (such as those that comprise the behavioral immune system) are triggered more strongly under specific kinds of circumstances, these learning mechanisms may be functionally flexible as well. Under conditions of high parasite prevalence, one might display an especially strong expression of disgust on encountering some stranger who is disfigured or otherwise unattractive. Under these same conditions, another person might be especially vigilant to those expressions of disgust and might be especially quick to form a learned association linking physical unattractiveness with social disapproval. Under conditions of low parasite prevalence, these associations may be learned more weakly.

The Causes and Consequences of Communication

Now let's talk about communication. The basic mechanisms that underlie interpersonal communication are activated and applied across every imaginable domain of social life. Over time, simple acts of communication exert a dynamic cascade of consequences that result, inevitably, in the emergence of different cultures defined by different norms (Harton & Bourgeois, 2004; Latané, 1996).

If we just left it at that, it might appear that communication processes create cultural differences independent of the sorts of evolutionary pressures described by Gangestad et al. (this issue). But we cannot leave it at that. People do not just talk; they talk about specific things, and the specific contents of communication have cultural consequences (Schaller, 2001). Plus, people make strategic decisions (not always consciously) to talk about some things and not others. Those decisions may reflect the role of functionally flexible psychological adaptations: In ancestral populations, strategic acts of interpersonal communication are likely to have had consequences on the communicator's reproductive fitness.

To appreciate this last point, it is helpful to bear in mind the important evolutionary concept of inclusive fitness, whereby any individual's fitness is affected not merely by his or her own individual outcomes, but also by the outcomes of others who share the same genes. Assume, for a moment, that you are I are living in some ancestral environment. To the extent that you and I are related, my inclusive fitness can be influenced by my decisions to tell you about some things, rather than others. If you are my sibling, for instance, my own inclusive fitness (or, if you prefer, the fitness of my genes) may be influenced by my decision to alert you to the danger posed by a poisonous berry or by the appearance of a stranger with peculiar-looking pustules on his face. If you are my child, my own inclusive fitness may be influenced by my decision to advise you to choose a symmetrical man for your mate, rather than some goofy-looking guy with a goopy eye.

Furthermore, within any highly social species, an individual's fitness may be influenced by the outcomes of other members of a coalitional ingroup, even if those members are not immediate kin. My own well-being, and thus my reproductive fitness, is likely to be adversely affected if you—a fellow group member with whom I expect regular social contact—become infected with a contagious parasite that I might then catch from you. Thus it would not only be in your best interests, but also in the best interest of my genes, for me to warn you against interactions with anyone who might already be infected. And, of course, it would be adaptive to err on the side of caution (Haselton & Nettle, in press; Nesse, 2005), encouraging you to seek interactions with folks who appear to be healthy (e.g., attractive people) rather than with those who might not be.

A couple of interesting implications emerge from this line of reasoning. First, it suggests that our behavioral immune system may be designed not merely to protect ourselves but to protect the broader population of individuals whose outcomes have implications for the reproductive fitness of our genes. Second, to accomplish that goal, the behavioral immune system is designed to produce specific kinds of communicative signals that alert those people.

This line of reasoning is not specific to the behavioral immune system. It can be applied to many other domains of social life and the psychological adaptations that apply to them. And so, generally speaking, the contents of communication are likely to follow the same principles that we commonly see in the operation of evolved cognitive processes. Just as we observe the selective activation of emotions and cognitions that are instrumental in guiding adaptive patterns of behavior (e.g., the tendency for morphologically unusual people to elicit disease-relevant cognitions), we are likely to observe that people selectively communicate fitness-relevant information to kin and other coalitional ingroup members. And just as the selective activation of emotions and cognitions occurs more strongly under some circumstances (e.g., morphologically unusual people elicit more disease-relevant cognitions under circumstances in which the perceived risk of contagion seems especially high), the selective communication of fitness-relevant information is likely to be exaggerated under the same circumstances.

These general points are perhaps illustrated by recent findings reported by Bangerter and Heath (2004) on the prevalence of media reports about the so-called Mozart effect—the alleged, but actually nonexistent, effect whereby children who listen to classical music become more intelligent. These results showed that the prevalence of these transmissions was especially high within populations in which there was greater collective anxiety about the quality of early childhood education. The prevalence of these transmissions may reflect an overgeneralization of the presumably adaptive tendency to provide kin with information that is instrumental in raising children with qualities, such as intelligence, that might enhance their fitness. If so, it follows that this tendency would be exaggerated under conditions in which there is greater reason to worry about their acquisition of such qualities. I am speculating, of course. But if there is any merit to this speculation, then these results document a sort of evoked cultural difference, and communication mechanisms play an essential role in the process through which these cultural differences are evoked.

We can apply the same logic to help understand how interpersonal communication may be an essential

mechanism through which parasite prevalence evokes different cultural norms. People are more likely to communicate about others' traits and characteristics that more clearly connote potential threat or lack of threat (Schaller, Faulkner, Park, Neuberg, & Kenrick, 2004). People are also especially likely to transmit urban legends—which often serve as cautionary tales—that most strongly elicit disgust, the emotion that serves as a cue for potential contagion (Heath, Bell, & Sternberg, 2001). Although it has not yet been documented, I bet that the latter effect would be especially strong under conditions in which parasite prevalence, and thus the potential risk of contagion, was especially high. Similarly, under conditions of high parasite prevalence, people may be especially likely to advise their family and friends to selectively interact with healthy or healthy-looking (i.e., attractive) individuals and to avoid interactions, especially in mating relationships, with sickly or unattractive folks.

Advice on interpersonal relationships is not merely communicated through private conversations among family and friends; it is also embedded in the folk tales, fairy stories, and other narratives that comprise the oral traditions of any culture. The handsome knights, beautiful maidens, and loathsome trolls that populate these tales are not merely stock characters. They also serve as prototypes, instructing children (and other individuals whose outcomes influence our own fitness) about what sorts of folks to avoid, what sorts of folks to spend time with, and what sorts of folks are suitable mates. Some narratives are more likely than others to be told and retold. This selectivity is influenced, in part, by memory mechanisms (Norenzayan, Atran, Faulkner, & Schaller, in press). In addition, I suspect that some of this selectivity is the function of the extent to which a narrative offers implicit lessons about the features that discriminate between the healthy and the ill, the fit and the unfit, the desirable mate and the mate that just won't do. And this selectivity is likely to be even more pronounced under conditions in which parasites are especially prevalent.

The point is clear, I hope: Different ecological circumstances are likely to evoke different decision rules that have direct consequences on the contents of interpersonal communication. It is through deeper inquiry into this mechanism of transmission that we can more fully understand what's going on when we talk about evoked culture.

Envoi

The biological sciences can be great sources of inspiration to people who study human psychology, culture, and other social sciences. (The spark of inspiration travels in the reciprocal direction as well; let's not forget that Darwin's evolutionary insights were influenced, in part, by his reading of Malthus; see Hull, 1988). Behind the concept of evoked culture lurk many wonderful findings from research on evolutionary theory and behavioral ecology. Those findings themselves pose deeper questions, which are addressed in other domains of biological inquiry (e.g., functional genomics) that focus on underlying mechanisms. It is probably premature to turn to genomics for answers to questions about evoked culture. But it is not premature to follow an analogous path and to dig more deeply into the actual mechanisms through which culture is evoked. When we do this digging, we discover that interpersonal transmission processes (social learning, interpersonal communication) are not alternative routes to culture; they are important links in the coherent causal chain through which evolutionary processes create culture. Then, by trying to figure out the specific details, we discover whole new realms within which to develop theories and conduct empirical research at the intersection of the biological and social sciences. I reckon that'll keep us busy for a while.

Notes

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References

Atran, S., & Norenzayan, A. (2004). Religion's evolutionary landscape: Counterintuition, commitment, compassion, communion. *Behavioral and Brain Sciences, 27,* 713–777.

Bangerter, A., & Heath, C. (2004). The Mozart effect: Tracking the evolution of a scientific legend. *British Journal of Social Psychology, 43,* 605–623.

Beldade, P., & Brakefield, P. M. (2002). The genetics and evo-devo of butterfly wing patterns. *Nature Reviews Genetics, 3,* 442–452.

Bilde, T., & Lubin, Y. (2001). Kin recognition and cannibalism in a subsocial spider. *Journal of Evolutionary Biology, 14,* 959–966.

Cook, M., & Mineka, S. (1990). Selective associations in the observational conditioning of fear in rhesus monkeys. *Journal of Experimental Psychology: Animal Behavior Processes, 16,* 372–389.

Crandall, C. S., & Moriarty, D. (1995). Physical illness stigma and social rejection. *British Journal of Social Psychology, 34,* 67–83.

Faulkner, J., Schaller, M., Park, J. H., & Duncan, L. A. (2004). Evolved disease-avoidance mechanisms and contemporary xenophobic attitudes. *Group Processes and Intergroup Behavior, 7,* 333–353.

Gangestad, S. W., & Buss, D. M. (1993). Pathogen prevalence and human mate preferences. *Ethology and Sociobiology, 14,* 89–96.

Gilbert, D. T., Pinel, E. C., Wilson, T. D., Blumberg, S. J., & Wheatley, T. (1998). Immune neglect: A source of durability bias in affective forecasting. *Journal of Personality & Social Psychology, 75,* 617–638.

Godwin, J., Luckenbach, J. A., & Borski, R. J. (2003). Ecology meets endocrinology: Environmental sex determination in fishes. *Evolution and Development, 5,* 40–49.

Goodall, J. (1986). Social rejection, exclusion, and shunning among the Gombe chimpanzees. *Ethology and Sociobiology, 7,* 227–239.

Harton, H. C., & Bourgeois, M. J. (2004). Cultural elements emerge from dynamic social impact. In M. Schaller & C. S. Crandall (Eds.), *The psychological foundations of culture* (pp. 41–75). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Haselton, M. G., & Nettle, D. (in press). The paranoid optimist: An integrative evolutionary model of cognitive biases. *Personality and Social Psychology Review.*

Heath, C., Bell, C., & Sternberg, E. (2001). Emotional selection in memes: The case of urban legends. *Journal of Personality & Social Psychology, 81,* 1028–1041.

Henrich, J., & Boyd, R. (1998). The evolution of conformist transmission and between-group differences. *Evolution and Human Behavior, 19,* 215–242.

Hofmann, H. A. (2003). Functional genomics of neural and behavioral plasticity. *Journal of Neurobiology, 54,* 272–282.

Hull, D. L. (1988). *Science as a process.* Chicago: University of Chicago Press.

Kameda, T., Takezawa, M., & Hastie, R. (2003). The logic of social sharing: An evolutionary game analysis of adaptive norm development. *Personality and Social Psychology Review, 7,* 2–19.

Kavaliers, M., Colwell, D. D., Braun, W. J., & Choleris, E. (2003). Brief exposure to the odour of a parasitized male alters the subsequent mate odour responses of female mice. *Animal Behaviour, 65,* 59–68.

Kenrick, D. T., Li, N. P., & Butner, J. (2003). Dynamical evolutionary psychology: Individual decision-rules and emergent social norms. *Psychological Review, 110,* 3–28.

Kiesecker, J. M., Skelly, D. K., Beard, K. H., & Preisser, E. (1999). Behavioral reduction of infection risk. *Proceedings of the National Academy of Sciences, 96,* 9165–9168.

Krebs, D., & Janicki, M. (2004). Biological foundations of moral norms. In M. Schaller & C. S. Crandall (Eds.), *The psychological foundations of culture* (pp. 125–148). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Kurzban, R., & Leary, M. R. (2001). Evolutionary origins of stigmatization: The functions of social exclusion. *Psychological Bulletin, 127,* 187–208.

Lakin, J. L., & Chartrand, T. L. (2003). Using nonconscious behavioral mimicry to create affiliation and rapport. *Psychological Science, 14,* 334–339.

Langlois, J. H., & Roggman, L. A. (1990). Attractive faces are only average. *Psychological Science, 1,* 115–121.

Latané, B. (1996). Dynamic social impact: The creation of culture by communication. *Journal of Communication, 6,* 13–25.

Marcus, G. (2004). *The birth of the mind.* New York: Basic Books.

Moore, B. R. (2004). The evolution of learning. *Biological Review, 79,* 301–335.

Nesse, R. M. (2005). Natural selection and the regulation of defenses: A signal detection analysis of the smoke detector principle. *Evolution and Human Behavior, 26,* 88–105.

Norenzayan, A., Atran, S., Faulkner, J., & Schaller, M. (in press). Memory and mystery: The cultural selection of minimally counterintuitive narratives. *Cognitive Science.*

Norenzayan, A., Schaller, M., & Heine, S. J. (in press). Evolution and culture. In M. Schaller, J. A. Simpson, & D. T. Kenrick (Eds.), *Evolution and social psychology.* New York: Psychology Press.

Öhman, A., & Mineka, S. (2001). Fear, phobia, and preparedness: Toward an evolved module of fear and fear learning. *Psychological Review, 108,* 483–522.

Park, J. H. (2005). *Cue-recognition mechanisms and person perception.* Unpublished doctoral dissertation, University of British Columbia.

Park, J. H., Faulkner, J., & Schaller, M. (2003). Evolved disease-avoidance processes and contemporary anti-social behavior: Prejudicial attitudes and avoidance of people with physical disabilities. *Journal of Nonverbal Behavior, 27,* 65–87.

Schaller, M. (2001). Unintended influence: Social-evolutionary processes in the construction and change of culturally-shared beliefs. In J. P. Forgas & K. D. Williams (Eds.), *Social influence: Direct and indirect processes* (pp. xx–xx). Philadelphia: Psychology Press.

Schaller, M., Faulkner, J., Park, J. H., Neuberg, S. L., & Kenrick, D. T. (2004). Impressions of danger influence impressions of people: An evolutionary perspective on individual and collective cognition. *Journal of Cultural and Evolutionary Psychology, 2,* 231–247.

Schaller, M., Park, J. H., & Faulkner, J. (2003). Prehistoric dangers and contemporary prejudices. *European Review of Social Psychology, 14,* 105–137.

Tooby, J., & Cosmides, L. (1992). The psychological foundations of culture. In J. H. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind* (pp. 19–136). New York: Oxford University Press.

Van Blerkom, L. M. (2003). Role of viruses in human evolution. *Yearbook of Physical Anthropology, 46,* 14–46.

Whiten, A. (2000). Primate culture and social learning. *Cognitive Science, 24,* 477–508.