

Steps toward an evolutionary psychology of a culture-dependent species

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1 Introduction

Humans are at once phylogenetically linked to, and yet fundamentally different from, other primates. Most profound among these differences is the extent of our reliance on culture, by which I mean socially transmitted information shared by at least some members of the learner's group. While recent work reveals the existence of socially transmitted foraging techniques and social behaviors in some nonhuman primates (Fragaszy and Perry, 2003; Whiten et al., 1999), compared to the human case, cultural information plays a minor role in these animals' efforts to negotiate their physical and social environments. Highly altricial and relatively gracile, lacking large teeth, strong jaws, or claws, we are a rather unimposing mammal—our ability to exist, indeed to prosper, in nearly every ecosystem on the planet is primarily due to our capacity to acquire, employ, and elaborate on socially transmitted information. This chapter is based on the premise that these capacities reflect the workings of special-purpose psychological mechanisms that evolved in order to exploit the enormous adaptive potential of socially transmitted information. After reviewing the principal existing approaches to this question, I outline some of the major topics that I believe need to be addressed in developing an evolutionary psychology of our uniquely culture-dependent species.

2 Principal existing perspectives

To date, scholars have largely adopted one of three perspectives when exploring the relationship between culture and human evolution; I refer to these, respectively, as the punctuated change model, the psychological anthropology model, and the orthodox evolutionary psychology model.

2.1 *The punctuated change model*

The punctuated change model holds that the transition from a more primate-like hominid having limited use of culture to a fully human creature deeply dependent on culture was the result of some discrete set of neurological changes that, at least initially, occurred largely independent of the benefits of socially transmitted information. In this view, a small number of genetic changes expanded some previously limited capacity (symbol manipulation and/or language use being popular candidates) in a fashion that allowed for the rapid development of a body of socially transmitted information; it was only after this event that culture became an important component of human behavior or, in more modest versions of the claim, that culture became the principal means whereby hominids coped with their physical and social environments (see, for example, Byers, 1994; Diamond, 1992; Klein, 1995; Mellars, 1989; Mithen, 1994, 1996; White, 1959).

There are both empirical and theoretical grounds for questioning the punctuated change model. First, as the breadth and resolution of the archeological record improves, evidence increasingly favors a portrait in which human behavior gradually increased in complexity, in fits and starts, over a period of several hundred thousand years—the so-called ‘human revolution’ wherein cultural complexity was thought to dramatically increase in the space of a few thousand years is an artifact of having viewed only a narrow slice of the archeological record (McBrearty and Brooks, 2000). Second, the punctuated change model argues either that a) the neurological changes that opened the door to culture use were not favored as a result of the advantages therein, culture use being an accidental consequence of selection for other traits, or b) dramatic alterations in the psychological architecture necessary for the extensive exploitation of culture took place very rapidly, as the result of a small number of changes. Although some investigators hold that our abilities to acquire, use, modify, and transmit cultural information are the result of relatively general-purpose cognitive attributes, such as being able to adopt another’s perspective (Tomasello, 1999), or being able to map information across cognitive domains (Mithen, 1994), I will argue that humans’ use of culture reflects the workings of a large number of highly specialized psychological mechanisms. If I am correct in this regard, then the evolution of a so-called ‘capacity for culture’ is not parsimoniously explained as a side-effect of other changes. Likewise, with regard to the proposal that a few sudden changes opened the door to a greatly enhanced reliance on culture, although such events are not impossible, nevertheless, in general, natural selection operates through the gradual modification of existing designs, with each minor alteration offering a fitness advantage over the previous configuration. It is therefore more plausible to suppose that, consistent with the archeological record, an incremental feedback process took place wherein small changes in specific aspects of the mind allowed for alterations

in culture-relevant behavior, opening the door to a modest expansion of the content and usefulness of socially transmitted information; in turn, such expansion favored additional alterations in the aforementioned aspects of mind, inviting additional cultural expansion, and so on (see both Griffiths and Papineau, this volume, for discussions of possible evolutionary processes). In short, it is unlikely that our ancestors ever suddenly “got culture”.

2.2 *The psychological anthropology model*

Students of psychological anthropology will recognize that neither the above position nor the general goal of this chapter is novel. Half a century ago, in his Presidential Address to the American Anthropological Association, A. Irving Hallowell (1950) took his colleagues to task for allowing one of the most important scientific questions to fall through the cracks in their division of labor. As Hallowell described the social structure of the discipline of anthropology, the topic of human evolution was assigned to the physical anthropologist, who studies morphological change over time; behavioral evolution was assigned to the archeologist, who studies changes in the material record over time; and human nature was assigned to the cultural anthropologist, who buried it under evidence that experience and behavior vary greatly across cultures. Nowhere in this arrangement was there room for the study of the evolution of the psychological attributes that make humans distinctive, chief among which are those that allow us to so effectively exploit culture (see also Hallowell, 1956, 1961).

Hallowell both contributed to and drew on a large body of contemporaneous anthropological research aimed at exploring the evolution of the capacity for culture (see, for example, Cohen, 1968; Montagu, 1962, 1968; Spuhler, 1965). Why then did this enterprise largely collapse? With a few exceptions (e.g., D'Andrade, 2002), psychological anthropologists, Hallowell's intellectual descendents, have abandoned the question that he viewed as central to, and uniting of, the discipline of anthropology. I believe that two factors led to the collapse of Hallowell's agenda. First, in the vast majority of mid-century work on this subject, investigators saw as their goal the exploration of the phylogenetic precursors of attributes such as tool use and vocal communication, as this would allow them to address the question demanded by Darwinian gradualism, namely how we got here from there. In focusing on this topic, evolutionists were in part reacting to the disciplinary prejudices of mainstream anthropology. As Hallowell phrased it:

[W]hereas opponents of human evolution in the nineteenth century were those who naturally stressed evidence that implied discontinuity between man and his

primate precursors, anthropologists in the twentieth century, while giving lip service to morphological evolution, have, by the special emphasis laid upon culture as the prime human differential, implied what is, in effect, an unbridged behavioral gap between ourselves and our closest relatives. The possession of culture has tended to become an all-or-none proposition.

(Hallowell, 1956, p. 91)

I applaud the mid-century evolutionary anthropologists' attempts to map out the hominid precursors of the psychological attributes of interest here. However, although this emphasis usefully presaged investigations of primate behavior and psychology (cf. Fragaszy and Perry, 2003; Whiten et al., 1999), it also had detrimental effects. First, particularly in the case of tool use, it tended to focus evolutionists' attention on behavior rather than on the psychological attributes underlying that behavior. Second, it diverted attention away from the broader question of what "the capacity for culture" actually consists of--though they were obvious targets, the emphasis on reconstructing the phylogenies of tool use and language reduced attention paid to other fundamentally important aspects of the evolution of the human mind.

Largely alone among his peers, Hallowell attempted to grapple with the question of the nature of the psychological architecture that makes life as a cultural organism possible. Consistent with his goal of placing the study of human nature at the forefront of the anthropological agenda, Hallowell directed anthropologists' attention to the importance of symbolic representation in human thought, including both a) the manner in which symbolic representation facilitates discerning or learning norms for behavior, and b) the manner in which symbolic representation affords self-objectification, that is, the ability to view oneself and one's actions from an observer's perspective. These two features, Hallowell argued, are central to human behavior, for it is only through perceiving norms and comparing one's own behavior to them that cultural adherence or conformity, with all of the benefits thereof, can be achieved. Moreover, Hallowell went on to argue, while symbolic representation enhances the recognition of norms, and while self-objectification allows for awareness of the extent to which one lives up to such norms, the key component completing this triad is the motivational structure linking hedonic state to norm adherence (Hallowell, 1960). Hallowell thus correctly identified topics central to an understanding of the psychological architecture underlying the human reliance on culture (cf. Sripada and Stich, this volume). I believe that the reason that Hallowell's efforts nevertheless failed to inspire an extensive corpus of empirical research (and, perhaps relatedly,

failed to change the structural divisions within the discipline of anthropology) is that a) he often eschewed analysis of postulated selection pressures, thereby eliminating one of the most useful of the heuristics employed by evolutionists, and b) his ideas were framed in terms of the psychological constructs prevalent at the time, constructs that approach the phenomena at issue from the wrong direction.

While Hallowell and other evolutionarily-minded psychological anthropologists did identify some topics, such as *self-objectification*, that are useful in the present context, this was generally not true of the enterprise as a whole, a failing stemming from the fact that much of their theorizing was premised either on neo-Freudian psychodynamic models (e.g. Hallowell, 1950), or on a general humanistic psychology such as that of Maslow (e.g. Hallowell, 1960). Holding aside the (nontrivial) question of the empirical validity of either of these theories, it is important to recognize that such perspectives do not lend themselves to the adaptationist tactic productively employed in modern evolutionary analyses of behavior. It is often said that contemporary evolutionists “carve nature at its joints” by identifying the logically distinct adaptive challenges that selected for specialized psychological, physiological, or anatomical features. In contrast, concepts such as, on the one hand, *id*, *ego*, and *superego* (cf. Hallowell, 1950), or, on the other hand, *needs*, *desires*, *goals*, and *purposiveness* (cf. Hallowell, 1960), concern general postulates that do not directly address specific evolutionarily-relevant features of an organism’s interaction with its environment. To stretch the metaphor, rather than carving the turkey of human nature at its joints, these constructs address distinctions, like the one between white meat and dark meat, that, while they capture the observer’s attention, nevertheless shed little light on the question of why the turkey possesses the structure that it does; just as the notion of ‘giblets’ is useful for the chef but useless for the functional anatomist, so too can the notion of ‘superego’ be productive for the psychotherapist but counterproductive for the evolutionist. Handicapped by their choice of theoretical tools, more than fifty years after Hallowell declared that an understanding of mind is the key to exploring the evolution of the human capacity for culture, to the extent that they have attended to the issue at all, psychological anthropologists have made little progress.

2.3 *The orthodox evolutionary psychology model*

Largely independent of the efforts of the mid-century evolutionary anthropologists, over the last twenty years, enormous advances have taken place in the application of evolutionary theory to the study of human nature. While there is considerable variety in this enterprise, the past decade

has seen substantial consolidation, with what I term orthodox evolutionary psychology becoming the dominant perspective. In their seminal essay outlining an evolutionary psychological approach to human behavior, John Tooby and Leda Cosmides (Tooby and Cosmides, 1992), the principal proponents of this view, assert that traditional observations regarding culture mask three different sources of behavioral regularity and ideational similarity across individuals.

Tooby and Cosmides argue that panhuman circumstances and experiences, reliably present across generations, favored the evolution of psychological mechanisms attuned to, and able to exploit, those regularities. In turn, these mechanisms produce mental contents (beliefs, reactions, etc.) that, at a general level of abstraction, are similar across individuals and across social groups, leading to overarching similarities among all or most humans; Tooby and Cosmides term these regularities and similarities *metaculture*. For example, the altricial nature of human infants is such that all humans have the experience of growing up under the care and supervision of caretakers; biological kin selection is such that, in most circumstances, this care will be provided by close relatives. In turn, this reliable regularity in social circumstances allowed for the evolution of psychological mechanisms that, in the service of inbreeding avoidance, rely on propinquity during childhood as an index of relatedness; the combination of the commonality of experience across individuals and populations and the universal possession of these mechanisms leads to a near-universal negative emotional reaction to the idea of sex between close kin (Westermarck, 1891; Wolf, 1993).

Metaculture refers to features shared across radically disparate societies and groups. Cognizant of the inter-group variation that has for so long impressed (and perhaps obsessed) anthropologists, Tooby and Cosmides identify two sources of the similarity within, and difference between, groups. First, arguing that some behavioral and ideational similarities within groups do not stem from the social transmission of information, the authors propose that such patterns result from the uniformity of responses of panhuman psychological mechanisms when presented with a common local environment. For example, Cosmides and Tooby (1992) note that sharing, a method of managing production risk, is common in hunter-gatherer groups that face high variance in food production as a result of stochastic factors. This pattern, the authors argue, reflects the output of evolved psychological mechanisms that gauge resource availability—when luck matters, mechanisms present in each hunter’s head increase the attractiveness of sharing, resulting in locally-patterned behavior. The authors coin the term *evoked culture* to refer to similarities within groups that result exclusively from the responses of evolved mechanisms to the local social and physical environment.

Evoked culture is contrasted with *epidemiological culture*. In the latter, similarities within groups result from the transfer of information from one individual to another. The concept of epidemiological culture thus refers to the central phenomenon of interest in this chapter, namely socially transmitted information. Indeed, congruent with the goals of this chapter, Tooby and Cosmides (1992, p. 119) argue that a) a rich body of locally-useful knowledge acquired by one's predecessors constitutes a potentially valuable resource, b) the existence of such bodies of knowledge was a recurrent feature of ancestral social environments, and hence c) selection can be expected to have favored the evolution of specialized psychological mechanisms dedicated to the acquisition and use of such information. However, despite their recognition of the utility of cultural information, the choice of the term 'epidemiological' suggests that Tooby and Cosmides' emphasis is on the question of the relative ease of transmission of various ideas (or, in their phrasing, the relative ease with which ideas can be reconstructed in the minds of naïve actors). Moreover, the term epidemiological connotes the exploitation of the host organism—diseases spread as pathogens take advantage of features of their hosts, propagating at the host's expense. There is considerable utility in the notion that so-called selfish memes (Dawkins, 1976) spread as a function of the extent to which they resonate with the outputs of evolved psychological mechanisms possessed by their hosts. For example, this approach illuminates regularities in beliefs about the supernatural (Boyer, 2001); sheds light on the relationship between disgust and the popularity of urban legends (Heath et al., 2001); and explains the relationship between evolved inbreeding avoidance mechanisms and the ubiquity of incest taboos (Fessler and Navarrete, 2004; Lieberman et al., 2003), as well as the connection between the salience of proteinaceous foods in aversions produced by evolved toxin avoidance mechanisms and the centrality of meat in food taboos (Fessler and Navarrete, 2003). Importantly, however, while cases such as these involve phenomena long of interest to anthropologists, they do not address that aspect of culture with which we are here concerned, namely the body of advantageous information the existence of which favored the evolution of mechanisms aimed at its acquisition and exploitation. Examining the popularity of ghost beliefs or meat taboos does not shed light on how or why humans are able to employ socially transmitted information to an unprecedented degree. In short, while Tooby and Cosmides were on the right track, in combination with their emphasis on evoked culture (a notion that does not address accumulated cultural knowledge), their focus on the epidemiological aspect of information transfer deflected attention away from core questions; these issues have subsequently not been addressed by the majority of evolutionary psychologists.

The remainder of this chapter is devoted to sketching out some of the tasks involved in the acquisition and use of valuable socially transmitted information, and the evolved mechanisms that may address these tasks. I make no claims of either originality or completeness; rather, my goal is to further the agenda laid out, but not fulfilled, by scholars as diverse as Hallowell and Tooby and Cosmides.

3 Structure-rich information acquisition mechanisms

Tooby and Cosmides (1992) draw attention to the role of innate psychological structure in the process of social information transfer. In this regard, it is useful to define a spectrum of information transfer. At one end of the spectrum lies social information transfer that involves orienting or calibrating an elaborate preexisting set of schemas and behavioral responses to local circumstances; I term this *structure-rich information acquisition*. At the opposite end of the spectrum, the body of knowledge acquired from others is both sufficiently baroque and sufficiently parochial as to make it unlikely that this material maps in any tight fashion onto innate informational structures; I term this *structure-poor information acquisition*.

To illustrate the spectrum from structure-rich to structure-poor information acquisition, consider the difference between learning to identify locally-prevalent dangerous animals and learning how to make clay pots. Barrett (2005) has demonstrated that young children exhibit remarkable competence at identifying predators given their generally limited knowledge about the world, and seem quite attuned to information concerning the extent to which various animals pose a threat to humans. Barrett argues that a) humans inhabit a wide range of ecosystems, b) until recently, dangerous animals were prevalent in the vast majority of these, c) young children are particularly vulnerable to predation, but d) the identity of dangerous animals varies across ecosystems—boars do not resemble bears. Barrett suggests that children possess an innate ‘dangerous animal’ category which, while it may be linked with morphological cues (large sharp teeth, for example), is nevertheless dependent on socially transmitted information for content. Consistent with Hamburg’s (1963) speculations concerning the existence of predispositions to acquire evolutionarily relevant information, children avidly and preferentially pursue and retain socially transmitted information about predators (Barrett, 2005). The cognitive domain of predatory animals thus seems to be one in which social information acquisition and use occurs against a backdrop of fairly rich innate structure—children rapidly grasp distinctions in this domain, and are able to act on the acquired information (be afraid of, flee from, etc. predators) without extensive background learning. This contrasts with learning a complex technology-

related skill such as making clay pots. Pot making does not have the same universality as the problem of dangerous animals, as it a) is contingent on the presence of appropriate materials, and b) produces a tool that serves a function that can be performed by other tools (bladders, baskets, nets, etc.). Accordingly, while we might expect children to innately possess or easily acquire the concept of a container, we should not expect them to have richly elaborated structures dedicated to the task of acquiring and employing socially transmitted information about pot manufacture. As a consequence, children should be less attracted to information about pots than about dangerous animals, they should find it more difficult to learn about the former than the latter, and their command of the relevant information should occur later in development.

One facet of constructing an evolutionary psychology of humans as a culture-dependent species consists of identifying and exploring structure-rich domains. For example, food selection is another area in which natural selection likely created a strong predisposition to acquire relevant information from others. Humans, being dietary generalists, are able to subsist in a variety of ecosystems. However, this flexibility brings with it the dilemma that selection cannot specify templates for what to eat and what to avoid (Rozin, 1976). Given the costs of individual learning through experimentation (Boyd and Richerson, 1985), it is understandable that social factors play an important role in the development of dietary behavior. Social facilitation of the acquisition of food preferences and avoidances occurs in many animals (Galef and Giraldeau, 2001; Snowdon and Boe, 2003), hence there are phylogenetic precursors to our propensity to acquire dietary behavior from conspecifics. However, in addition, the social shaping of dietary behavior is symbolically mediated in humans (cf. Fallon et al., 1984; Rozin, 1990, this volume) opening the door to the use of dietary behavior for such non-dietary purposes as marking ethnic boundaries.

While mapping out structure-rich mechanisms can illuminate many aspects of mind, much of socially transmitted information, including information vital to survival, is more akin to pot making than to predator identification or food selection (see Boyd and Richerson, this volume). I turn, therefore, to some of the factors that may pertain to structure-poor information acquisition.

4 Structure-poor information acquisition mechanisms

4.1 Selecting a model for vertical information acquisition

In industrial and post-industrial nation-states, adult-initiated pedagogy plays an important role in social information transfer. However, such teaching is far less significant in the learning

processes that occur in many small-scale, traditional societies (Fiske, in preparation; Mead, 1943). Instead, learners spend much of their time either on the sidelines, watching the skilled performance of locally-adaptive behaviors, or attempting to engage in play-like learning behaviors that are often structured by older children (Maynard, 2002; Rogoff et al., 1993). In both contexts, the ability to imitate is often vital to the acquisition of new behaviors. Recognizing others' intentions and goals seems to play a vital role in the process of imitation (Bjorklund and Bering, 2002; Tomasello and Call, 1997), suggesting that the capacity to manipulate a theory of mind is a critical element in humans' reliance on culture. Conventional accounts (see Byrne and Whiten, 1988) hold that selection favored the ability to infer others' intentions because this enhances the capacity to both exploit conspecifics and counter such exploitation. However, this capacity may also have been favored due to the manner in which it enhances acquisition of information from fellow group members (see also Tomasello, 1999).

From an early age, humans excel at imitation. However, while this is a necessary condition for much exploitation of the knowledge possessed by conspecifics, it alone is not sufficient. A problem facing the social learner is the selection of an appropriate target for imitation (Boyd and Richerson, 1985). Even forager societies exhibit divisions of labor by sex and age (see Kelly, 1995), hence only a subset of all individuals present will have routinely engaged in actions constituting appropriate foci for imitation by a given learner. Moreover, imitators face the difficulty that complex skills are built atop, or subsume, simpler skills and knowledge, creating a necessary chronology in the acquisition of the relevant information: because simple skills and simple knowledge may be difficult to discern when embedded in complex behavior, the most effective acquisition strategy is that which begins by focusing on models who engage in behavior that is not vastly more complex than that of which one is currently capable (Rogoff et al., 1993; Wertsch, 1991). A single heuristic addresses both questions of appropriateness and questions of accessibility, namely imitate those who resemble oneself (Boyd and Richerson, 1985) but are somewhat more advanced in terms of skill, knowledge, social standing, and so on. Consider, for example, children's play: while themes in such play often concern adult economic and social activities, much of the actual content of play is acquired not from adults, but rather from older children (cf. Goodman, 1970). Overall, the presence of a slightly more advanced peer influences learning from an early age (Barr and Hayne, 2003; see also Zukow-Goldring, 2002).

The above suggests that we should expect humans to possess mental mechanisms that identify suitable targets for imitation as a function of some combination of the target's similarity

to the learner and the target's superiority to the learner. People should be sensitive to, and able to accurately gauge, the degree of similarity between themselves and others, and should find interesting and attractive those who are similar to, yet somewhat more advanced than, themselves. Children as young as 2 show a behavioral preference for same-sex individuals (Fagot, 1985; Maccoby and Jacklin, 1987) and, as both advertising agencies and parents are acutely aware, children long to be like their older peers. While children's play often mimics adult occupations, children pattern much of their daily lives, including many important everyday behaviors and skills, after the models provided by older children and adolescents.

There are at least two categories of cues that may elicit copying, namely superior performance and superior status. On the one hand, individuals may be selected as models for imitation because they evince superior abilities in a domain that is socially valued, self-evidently useful, or both. On the other hand, models may be selected because they occupy a higher position in the social order than the learner, notably when that position is the result of prestige (social advantage freely conferred by others) rather than dominance (social advantage achieved through force or the threat thereof) (Henrich and Gil-White, 2001). In practice, abilities and social position are often linked—sports stars, for example, achieve prestige through their athletic prowess, whereafter both their skills and their prominence serve to further focus public attention upon them. Nevertheless, because the tasks of evaluating relative skill and evaluating relative prestige differ in important ways, a system that efficiently selects models for imitation can be expected to employ input from separate mechanisms dedicated to each task. These mechanisms, in turn, ought to exhibit selectivity in the type of information to which they are sensitive. A mechanism that evaluates the skill levels of prospective models for imitation can be expected to attend to the outcome of others' behavior, the ease with which others accomplish a task, and the relative rapidity with which others accomplish a task. A mechanism that evaluates prestige can be expected to attend to others' orientations toward prospective models (Henrich and Gil-White, 2001) and the extent to which prospective models command markers of prestige.

4.2 Motivations for vertical information acquisition

To fully articulate the psychological architecture underlying the acquisition and use of culture, we must differentiate between information acquisition strategies and motivational systems. It is not enough to be able to learn through observation and imitation, nor does it suffice to be capable of identifying suitable targets for imitation, as neither capacity will be effectively utilized without a corresponding set of emotions that make such activities attractive. Foremost among

these emotions is probably admiration, which appears to motivate individuals to study the details of a target individual's behavior, to model their own actions after the target, and to be willing to incur costs so as to gain access to the target.

Henrich and Gil-White (2001) argue that prestige-based social interactions are explicable in light of the dynamics of a market for information transfer. Because learners stand to benefit from the opportunity to interact with and observe successful models, learners are willing to pay costs, in the form of deference and service, to successful models. The ability to learn from a model is in part a function of the degree of access, which in turn is a function of both the model's behavior and the presence of rival learners. Learners must therefore weigh the skill and/or prestige of a prospective model against his or her accessibility. If, at the proximate level, admiration is the factor motivating desire for proximity with, and willingness to pay costs for access to, the model, then the intensity of admiration felt toward an individual should not only reflect that individual's skill or prestige, but should also weigh these factors against indices of accessibility. Arrogant or domineering behavior is unattractive in a prospective model, while a self-deprecating, 'regular guy' persona is attractive, because these patterns reveal the model's willingness to provide access at a reasonable cost to learners (Henrich and Gil-White, 2001). Moreover, we can expect that admiration will rise as a function of having had the experience of successfully gaining proximity to, and interacting with, a model.

4.3 *Conformist information acquisition*

Thus far, I have emphasized the acquisition of cultural knowledge from individuals who are superior in skill or social standing. However, much information transmission involves not the pursuit of an advanced target, but rather conformity to a pattern prevailing among one's peers. As mathematical models demonstrate (Boyd and Richerson, 1985; Henrich and Boyd, 1998), conformist transmission, the "when in Rome, do as the Romans do" strategy, is often an effective alternative to patterning one's behavior after some outstanding individual. Importantly, the demands of the two strategies differ in notable ways. Whereas a principal task in vertical transmission consists of identifying a model who is both superior on relevant grounds and accessible, conformists do not want for models, nor is accessibility as much of a concern, since, if the behavior is sufficiently uniform across actors, the learner can compile individually incomplete observations by watching multiple models. Similarly, conformist strategies do not involve a willingness to pay costs in order to procure access to models, as access is not a limited

resource. At the motivational level, different emotional systems should underlie conformist and prestige-biased transmission.

Learning from successful individuals can provide two types of knowledge, namely a) information that is useful because it addresses a fitness-relevant task (e.g. knowing how to catch fish), and b) information that is valuable because it addresses culturally-constituted prestige competitions (e.g. knowing how to sing). Similarly, conforming to prevailing patterns of behavior can lead to the acquisition of both utilitarian practices and practices that are valuable primarily because of their social consequences. While scholars agree that humans are remarkably conformist, debate continues as to the evolutionary factors responsible for conformism.

It appears that much conformist behavior is not explicable in utilitarian terms. First, widely-shared behaviors often constitute but one of many possible solutions to a practical problem, with alternatives being relatively easy to learn or discover. Second, many widely-shared behaviors are stylistic in nature, without apparent utility (e.g. walking speed appears to be similar within, and differ across, cultures). Some of these behaviors are explicable in terms of the advantages of coordination—it does not matter which side of the road one drives on, so long as everyone drives on the same side. However, behaviors such as walking speed do not overtly concern coordination. One clue as to the significance of such behaviors, and hence the ultimate functions of the mechanisms underlying their acquisition and practice, lies in the observation that most, perhaps all, cultural information is “morally forceful” (Swartz and Jordan, 1980), meaning that there is a right way to think, speak, or act, and people have a higher opinion of those who conform to such standards, and a lower opinion of those who do not (see also Sripada and Stich, this volume). Congruent with this observation, violations of many cultural practices are met with punishment.

The models of Richerson, Boyd, and collaborators suggest that conformism has its roots in the stability of social systems in which a) norm violators are punished, and b) those who fail to punish norm violators are also punished. While this configuration can facilitate the cultural evolution of group-functional practices, it also constitutes a source of selection pressure favoring psychological mechanisms that enhance conformism, since conformists escape the costs of both punishment and higher-order punishment (punishment meted out to individuals who fail to conform to the norm of punishing norm violators). With both stable systems of punishment (Boyd and Richerson, 1992; Henrich and Boyd, 2001) and conformism-promoting psychological mechanisms in place, an efflorescence of norms will occur, leading to considerable within-group homogeneity with regard to nonutilitarian behaviors such as walking speed. In this view, for

many nonutilitarian practices, conformism is an accidental consequence of other social and psychological systems, with avoidance of punishment being the only benefit to be gained.

While Richerson and Boyd's position has much to recommend it, the phenomenology of reactions to norm violations suggests to me that the psychology of conformism has been shaped by more than simply the recurrent presence of higher-order punishment. A central pillar in Richerson and Boyd's argument is the indisputable observation that punishing others entails costs. Doing something often involves more costs than doing nothing, particularly when the action at issue concerns inflicting costs on another, behavior that will frequently elicit resistance or retribution. Even the seemingly low-cost tactic of punishing through ostracism generates costs -- others are often potentially valuable to the actor as cooperation partners, sources of information, and so on, hence engaging in ostracism entails forgoing a social resource. Given the costly nature of punishing others, Richerson and Boyd's perspective leads one to expect that actors should be conservative in this regard -- whether through conscious calculation or unconscious evaluation by mental mechanisms dedicated to this task, punishers should be motivated to punish only to the extent necessary to avoid suffering higher-order punishment themselves. By extension, the punisher's attention should focus primarily on the norm violation at issue, as this allows for a calibration of punishment such that it is commensurate with the action being punished.

Congruent with the above reasoning, Evangelical Christian preachers often exhort their congregations to "hate the sin, not the sinner," that is, to direct punitive sentiment toward discrete norm violations that are punctuated in time, rather than toward the norm violator, a social actor who may maintain a presence in the community long after the violation has been committed. The fact that such exhortations are necessary at all (and the observation that they are frequently unsuccessful) calls into question the conclusion that punishers are motivated to punish only to the extent necessary to avoid higher-order punishment.

Reactions to norm violations, including trivial norm violations, frequently seem to involve not merely disapproval of the violation (as might be expected in a punishment-driven system), but, moreover, condemnation of the norm violator as a person. Often, people who walk too slowly or too quickly are not merely bad walkers, they are suspected of being bad people ("he walks too slowly because he is lazy," "she walks too fast because she is arrogant," etc.). Such inferences are exercised not only in the domain of manners (into which walking speed falls), but also in regard to mundane, even practical practices. Try writing a check at the bank while holding a pen in your fist instead of using a pinch grip, punching the elevator button with

your elbow instead of your finger when you are not carrying anything, or walking about the supermarket pushing your shopping cart from the wrong end, and you will soon discover that you attract not merely attention, but disdain. Moreover, I suggest that this disapproval is not purely corrective in nature, as it is not simply your actions that are frowned upon, it is you, the whole actor, that is disliked.

One possible explanation for the tendency to hate the sinner rather than just the sin is that conformity to norms holds communicative value, indicating to the observer that the actor a) is familiar with local practices, the intricacy of which is often so great that only extensive exposure will lead to mastery across domains, b) values the local set of practices, viewing them as superior to possible alternatives, including those common in other groups, and c) values the opinions of members of the local group. Conformity to diverse norms thus signals that the actor is a competent and dedicated member of the cultural group, attributes that make the actor attractive as a potential member in coalitions and cooperative ventures in which predictability is an important attribute (see also Atran, this volume). Conversely, norm violations signal to observers that the actor either a) is not a member of the local group, b) does not value local practices, or c) does not value the opinions of members of the group, three attributes that make the actor unattractive as a cooperative partner -- the sinner is indeed truly of little worth. I therefore suggest that natural selection has favored the evolution of psychological mechanisms promoting conformism not simply because of the ever-present threat of higher-order punishment, but also because of the benefits to be gained by signaling that one is the sort of person that others ought to value (Fessler, 2004; Fessler and Haley, 2003).

4.4 Motivations underlying conformism and punishment

The above position is congruent with the observation that conformism is largely motivated by a desire to avoid shame and embarrassment, the aversive emotions attending negative social appraisal (see Fessler, 2004 for review). Although Westerners equate shame with guilt (Fessler, 2004), the two emotions are profoundly different: whereas guilt focuses on the wrongness of an action and the need to repair the damage it inflicts on other parties, consistent with the signaling argument developed above, shame focuses on the inadequacy of the person as a whole, and the corresponding need to escape additional costly social scrutiny (cf. Gilbert et al., 1994; Tangney, 1998). Second, embarrassment, the emotion often elicited by violations of norms governing comportment and presentation of self, is accompanied by display behaviors that inform onlookers that the violation was unintentional; by communicating that the actor knows and

values the local standards, this mitigates the damage the violation causes to the actor's social position (Keltner and Buswell, 1997; Keltner et al., 1997). While shame and embarrassment have their origins in homologous primate affects, they nevertheless exhibit a number of novel design features, including a) a focus on culturally constructed standards for behavior, and b) a reliance on a theory of mind (Fessler, 2004). Together with the "whole-self" attribute of shame, the latter feature suggests that humans possess evolved motivational mechanisms geared toward the avoidance of negative social appraisals stemming from nonconformity, where those appraisals concern not simply the action, but the individual as an actor in sustained, iterated social interactions—we do not simply care how others act in response to our failure to conform to social standards, we care what others think of us as a result of our nonconformity.

The threat of punishment by group members plays a central role in both Boyd and Richerson's account of the evolution of conformism and mine. The authors (1992) note that punishment, itself a costly action, is explicable in terms of the presence of higher-order punishment—once both punishment and higher-order punishment are in place in any given social system, the practice of punishment, and the attendant conformism, will be maintained. While cogent, this perspective does not explain the origins of punishment, since a critical mass of punishers is necessary before the system stabilizes. Kevin Haley and I (Fessler and Haley, 2003) have sketched a signaling account of punishment that, by addressing the factors motivating individual punishers, can explain the origins of punishment. We argue that costly punishing of norm violators offers an avenue for demonstrating to observers that the punishers know and support local standards for behavior, and hence are themselves reliable and predictable individuals who can be counted on as partners in coalitions and cooperative ventures (compare with Joyce, this volume). Natural selection has crafted emotions, importantly including moral outrage (anger at norm violations that do not affect the observer) that motivate punishment by assimilating norm violations to the category of transgressions against the self (see also discussion in Sripada and Stich, this volume). Recently, Haley (in preparation) demonstrated that third parties express more moral outrage at norm violations when in public settings than in private, and that those who resemble the norm violator along dimensions relevant to the violation express more moral outrage than those who do not. We interpret these findings as indicating that the mechanism generating the sentiments underlying punishment of norm violations a) is sensitive to opportunities for reputation formation, and b) operates to differentiate punishers from norm violators with whom they might otherwise be equated.

The social utility of signaling to others that one understands and values local standards in part explains why humans dedicate so much effort to acquiring and policing practices and beliefs that have neither intrinsic utility nor direct application to problems of social coordination. In turn, the existence of these mechanisms generates a proliferation of often-arbitrary cultural standards. As a consequence, humans are born into a complex ecology composed of both a dynamic social world of potential allies, rivals, and punishers and a baroque informational world of intricate and situation-specific norms. I suggest that the social benefits of both conforming to and enforcing cultural standards for behavior have constituted powerful selective pressures, crafting mental mechanisms dedicated to both the acquisition of information regarding prevailing local norms and the assignation of moral force to those norms. These mechanisms operate so pervasively that observers quickly moralize any prevailing pattern of behavior (a process I term normative moralization [Fessler and Navarrete, 2003]) even if the behavior's frequency does not derive from cultural sharing across actors. For example, the right hand is often associated with rectitude, purity, and so on, while the left (source of the word 'sinister') is often associated with evil and pollution. Presumably, these associations derive from the fact that, in all populations, most people are right-handed.

4.5 *Internalization*

The moral force associated with many standards for behavior appears to derive in part from foundational beliefs and values, by which I mean both propositional information (moral precepts, ethnopsychological schemas, etc.) and more inchoate intuitions driven by emotional reactions to events (see Haidt, 2001). A topic of longstanding interest in psychological anthropology is internalization, the process whereby cultural information comes to be integrated into the informational framework with which, and through which, the individual perceives and experiences reality. Spiro (1997), one of the leading theorists on the subject, draws a distinction between the internalization of cultural information and its mere acquisition, arguing that there is a fundamental difference between simply being familiar with a cultural concept and believing it to be self-evidently true (often to the point that the belief itself is transparent to the believer) and intrinsically motivationally salient. Information integrated into the fabric of one's perception of reality necessarily exercises a greater influence over one's actions than does information that is not so integrated. For example, during fieldwork in Indonesia, I observed that, among Bengkulu Malays working for a Western oil company, those individuals who appeared to have internalized the key tenets of the Islamic faith were violently ill upon learning that they had accidentally

violated the taboo against eating pork; in contrast, individuals who appeared to only pay lip service to religious ideas displayed little revulsion when informed that they had consumed pork. Given its impact on behavior, for the purposes of this chapter, there are at least two important questions regarding internalization, namely 1) what are the proximate mechanisms responsible for this process, and 2) what are its ultimate functions.

Although numerous scholars have postulated mechanisms responsible for internalization, consistent with the legacy of mid-century psychological anthropology discussed earlier, the vast majority of these rely upon one version or another of psychoanalytic theory (see Throop, 2003 for review). Explanatory frameworks in this tradition employ concepts such as transference, countertransference, and projection that today are rejected by many experimentalists as either false or simply untestable. One claim present in many accounts that is not intrinsically tied to such questionable constructs is the assertion that the degree to which cultural information is internalized is in part a function of the extent to which it resonates with redundant life experiences, particularly experiences that occur during maturation (see Throop, 2003). This idea is appealing for several reasons. First, it is congruent with the notion that conformist transmission of cultural information involves inferences made on the basis of observations of the behaviors and statements of numerous individuals. The degree to which an individual internalizes a given piece of cultural information can thus be viewed as a reflection of the ubiquity with which that idea is shared and the frequency with which it shapes the actions and utterances of models in the individual's environment. Second, of relevance for both conformist transmission and prestige-biased transmission, because the depth of internalization in part determines the extent to which a given idea influences behavior, by assessing or registering the frequency with which the actions of a given model appear to be congruent with or reflect a given idea, the learner can assess the importance of that idea for the given model—in other words, the process of compiling observations over a prolonged period of time allows the learner to acquire both the idea and its appropriate level of internalization (where 'appropriate' reflects either the level of internalization characteristic of one model, in the case of prestige-biased transmission, or the level of internalization prevailing across many models, in the case of conformist transmission).

Given the many connections to more rigorous models of cultural transmission, psychological anthropologists' claim that internalization is a function of redundancy in experience is deserving of study. However, caution may be in order with regard to the primacy assigned to early experience by psychological anthropologists. Granted, it is sensible to presume

that the more foundational or elementary a given cultural construct, the less likely it is that later experience will decrease its level of internalization. Nevertheless, I am impressed by the rapidity with which students appear to adopt new beliefs, at least some of which are passionately held, during the first year or two of college. In ancestral human populations, natural disasters, warfare, alliances, and exogamy would all have contributed to a pattern in which a significant number of individuals were, at one point or another during their adult lives, suddenly immersed in a new cultural environment, one in which there were enormous potential costs to nonconformity and hence, given the benefits of internalization (see below), enormous potential advantages to being able to deeply internalize new cultural beliefs. One question in need of study, therefore, is the extent to which age or maturational stage does or does not influence the impact of redundant experiences on internalization.

In contrast to the attention dedicated by psychological anthropologists to the process of internalization, to date, theorizing regarding the ultimate functions of internalization has been more circumscribed. Hallowell (1955) influentially argued that, because humans live in a culturally-constructed reality, deeply internalizing the cultural worldview of one's group is essential if one is to function effectively in society. I suggest that Hallowell was on the right track, but failed to carry this reasoning through. Specifically, I propose that internalization is often a) an efficient means of generating correct behavior in diverse circumstances, and b) a means of guarding against potentially costly temptations to violate norms (compare with Sripada and Stich, this volume). First, some of the cultural standards that have the greatest impact on an individual's potential inclusion in cooperative ventures and alliances both spring from more elementary principles and emotional orientations and may rarely be violated or otherwise addressed directly, leading to few learning opportunities. Individuals who are able to distill such principles and orientations from diverse experiences can act in a manner that will likely be acceptable to many members of the local group even when the specific task at hand is novel or rare. Second, whether due to discounting of the future or simply underestimating the probability of getting caught, individuals are often tempted to violate important cultural standards in order to obtain short-term gains. Because the long-term costs of such violations can be substantial (including ostracism or collective execution in many small-scale societies), it may be advantageous if important cultural principles can become self-evidently true, as this may reduce the likelihood that they will be violated.

In arguing that internalization is an effective means of generating socially-approved behavior, I do not mean to imply that there is a constant relationship between the degree to which

a cultural principle is internalized and the extent to which it shapes behavior (the same caveat also applies to the observation that individuals moralize prevailing patterns of behavior). Consistent with the notion that actors can enhance their inclusion in cooperative ventures by signaling their familiarity with local cultural understandings and their affiliation with the group that holds them, C. David Navarrete, I, and colleagues (Navarrete et al., 2004) have demonstrated that the prospect of circumstances in which aid would be advantageous leads people to enhance their endorsement of the views of their cultural in-group, a phenomenon dramatically illustrated in the U.S. following the September 11th terrorist attacks. Together with Haley's findings regarding moral outrage, these results indicate that much work remains to be done to uncover the mechanisms responsible for the selective deployment of culturally shared information.

5 Conclusion

As this volume illustrates, the time is right for a systematic investigation of the evolved psychological mechanisms that underlie humans' remarkable ability and propensity to acquire and use cultural information. While I have attempted to sketch out some of the joints at which, perhaps, this defining aspect of human nature can be carved, I suspect that the topics outlined above constitute but a small fraction of the beast. Sharpen your knives.

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References

- Barr, R. and Hayne, H. (2003). It's not what you know, it's who you know: Older siblings facilitate imitation during infancy. *International Journal of Early Years Education*, 11.
- Barrett, H. C. (2005). Adaptations to predators and prey. In D. M. Buss (ed.), *The Handbook of Evolutionary Psychology*. Wiley.
- Bjorklund, D. F. and Bering, J. M. (2002). The evolved child: Applying evolutionary developmental psychology to modern schooling. *Learning & Individual Differences*, 12.
- Boyd, R. and Richerson, P. J. (1985). *Culture and the Evolutionary Process*. University of Chicago Press.

- Boyd, R. and Richerson, P. J. (1992). Punishment allows the evolution of cooperation (or anything else) in sizable groups. *Ethology & Sociobiology*, 13.
- Boyer, P. (2001). *Religion Explained: The Evolutionary Origins of Religious Thought*. Basic Books.
- Byers, A. M. (1994). Symboling and the Middle-Upper Paleolithic transition: A theoretical and methodological critique. *Current Anthropology*, 35.
- Byrne, R. and Whiten, A. (Eds.). (1988). *Machiavellian Intelligence: Social Expertise and the Evolution of Intellect in Monkeys, Apes, and Humans*. Oxford University Press.
- Cohen, Y. A. (Ed.). (1968). *Man in Adaptation: The Biosocial Background* (Vol. 1). Aldine.
- Cosmides, L. and Tooby, J. (1992). Cognitive adaptations for social exchange. In J. Barkow, L. Cosmides and J. Tooby (eds.), *The Adapted Mind: Evolutionary Psychology and the Generation of Culture*. Oxford University Press.
- D'Andrade, R. G. (2002). Cultural Darwinism and language. *American Anthropologist*, 104.
- Dawkins, R. (1976). *The Selfish Gene*. Oxford University Press.
- Diamond, J. (1992). *The Third Chimpanzee: The Evolution and Future of the Human Animal*. HarperCollins.
- Fagot, B. I. (1985). Changes in thinking about early sex role development. *Developmental Review*, 5.
- Fallon, A. E., Rozin, P., and Pliner, P. (1984). The child's conception of food: The development of food rejections with special reference to disgust and contamination sensitivity. *Child Development*, 55.
- Fessler, D. M. T. (2004). Shame in two cultures: Implications for evolutionary approaches. *Journal of Cognition & Culture*, 4.
- Fessler, D. M. T. and Haley, K. J. (2003). The strategy of affect: Emotions in human cooperation. In P. Hammerstein (ed.), *The Genetic and Cultural Evolution of Cooperation*. MIT Press.
- Fessler, D. M. T. and Navarrete, C. D. (2003). Meat is good to taboo: Dietary proscriptions as a product of the interaction of psychological mechanisms and social processes. *Journal of Cognition & Culture*, 3.
- Fessler, D. M. T. and Navarrete, C. D. (2004). Third-party attitudes toward sibling incest: Evidence for Westermarck's hypotheses. *Evolution & Human Behavior*, 25.
- Fiske, A. P. (in preparation). *Learning a culture the way informants do: observing, imitating, and participating*. Unpublished manuscript in preparation.

- Fragaszy, D. M. and Perry, S. (eds.). (2003). *The Biology of Traditions: Models and Evidence*. Cambridge University Press.
- Galef, B. G. J. and Giraldeau, L.-A. (2001). Social influences on foraging in vertebrates: Causal mechanisms and adaptive functions. *Animal Behaviour*, 61.
- Gilbert, P., Pehl, J., and Allan, S. (1994). The phenomenology of shame and guilt: An empirical investigation. *British Journal of Medical Psychology*, 67.
- Goodman, M. E. (1970). *The Culture of Childhood*. Teachers College Press.
- Haidt, J. (2001). The emotional dog and its rational tail: A social intuitionist approach to moral judgment. *Psychological Review*, 108.
- Haley, K. J. (in preparation). Strangers in familiar lands: Reputational psychology and moralistic responses to norm violations. Unpublished manuscript, in preparation.
- Hallowell, A. I. (1950). Personality structure and the evolution of man. *American Anthropologist*, 52.
- Hallowell, A. I. (1955). The self and its behavioral environment. Chapter 4 of A. I. Hallowell, *Culture and Experience*. University of Pennsylvania Press.
- Hallowell, A. I. (1956). The structural and functional dimensions of a human existence. *The Quarterly Review of Biology*, 31.
- Hallowell, A. I. (1960). Self, society, and culture in phylogenetic perspective. In S. Tax (ed.), *The Evolution of Man*. University of Chicago Press.
- Hallowell, A. I. (1961). The protocultural foundations of human adaptation. In S. L. Washburn (ed.), *Social Life of Early Man*. Wenner-Gren Foundation for Anthropological Research.
- Hamburg, D. A. (1963). Emotions in the perspective of human evolution. In P. H. Knapp (ed.), *Expression of the Emotions in Man*. International Universities Press.
- Heath, C., Bell, C., and Sternberg, E. (2001). Emotional selection in memes: The case of urban legends. *Journal of Personality & Social Psychology*, 81.
- Henrich, J. and Boyd, R. (1998). The evolution of conformist transmission and the emergence of between-group differences. *Evolution and Human Behavior*, 19.
- Henrich, J. and Boyd, R. (2001). Why people punish defectors: Weak conformist transmission can stabilize costly enforcement of norms in cooperative dilemmas. *Journal of Theoretical Biology*, 208.
- Henrich, J. and Gil-White, F. J. (2001). The evolution of prestige: Freely conferred deference as a mechanism for enhancing the benefits of cultural transmission. *Evolution & Human Behavior*, 22.

- Kelly, R. L. (1995). *The Foraging Spectrum: Diversity in Hunter-Gatherer Lifeways*. Smithsonian Institution Press.
- Keltner, D. and Buswell, B. N. (1997). Embarrassment: Its distinct form and appeasement functions. *Psychological Bulletin*, 122.
- Keltner, D., Young, R. C., and Buswell, B. N. (1997). Appeasement in human emotion, social practice, and personality. *Aggressive Behavior. Special Issue: Appeasement and reconciliation*, 23.
- Klein, R. G. (1995). Anatomy, behavior, and modern human origins. *Journal of World Prehistory*, 9.
- Lieberman, D., Tooby, J., and Cosmides, L. (2003). Does morality have a biological basis? An empirical test of the factors governing moral sentiments relating to incest. *Proceedings of the Royal Society of London Series B Biological Sciences*, 270.
- Maccoby, E. E. and Jacklin, C. N. (1987). Gender segregation in childhood. In H. Reese (ed.), *Advances in Child Development*. Academic Press.
- Maynard, A. E. (2002). Cultural teaching: The development of teaching skills in Zinacantec Maya sibling interactions. *Child Development*, 73.
- McBrearty, S. and Brooks, A. S. (2000). The revolution that wasn't: A new interpretation of the origin of modern human behavior. *Journal of Human Evolution*, 39.
- Mead, M. (1943). Our educational emphases in primitive perspective. *American Journal of Sociology*, 48.
- Mellars, P. (1989). Major issues in the origin of modern humans. *Current Anthropology*, 30.
- Mithen, S. (1994). From domain-specific to generalized intelligence: A cognitive interpretation of the Middle/Upper Paleolithic transition. In C. Renfrew and E. Zubrow (eds.), *The Ancient Mind: Elements of a Cognitive Archaeology*. Cambridge University Press.
- Mithen, S. (1996). *The Prehistory of the Mind: A Search for the Origins of Art, Religion, and Science*. Thames & Hudson.
- Montagu, M. F. A., ed. (1962). *Culture and the Evolution of Man*. Oxford University Press.
- Montagu, M. F. A., ed. (1968). *Culture: Man's Adaptive Dimension*. Oxford University Press.
- Navarrete, C. D., Kurzban, R., Fessler, D. M. T., and Kirkpatrick, L. A. (2004). Anxiety and intergroup bias: Terror management or coalitional psychology? *Group Processes and Intergroup Relations*, 7.

- Rogoff, B., Mistry, J., Goncu, A., and Mosier, C. (1993). Guided participation in cultural activity by toddlers and caregivers. *Monographs of the Society for Research in Child Development*, 58.
- Rozin, P. (1976). The selection of food by rats, humans and other animals. In R. A. Hinde, C. Beer and E. Shaw (eds.), *Advances in the Study of Animal Behavior*. Academic Press.
- Rozin, P. (1990). The importance of social factors in understanding the acquisition of food habits. In E. D. Capaldi, T. L. Powley et al. (eds.), *Taste, Experience, and Feeding*. American Psychological Association.
- Snowdon, C. T. and Boe, C. Y. (2003). Social communication about unpalatable foods in tamarins (*Saguinus oedipus*). *Journal of Comparative Psychology*, 117.
- Spiro, M. E. (1997). *Gender Ideology and Psychological Reality: An Essay on Cultural Reproduction*. Yale University Press.
- Spuhler, J. N., ed. (1965). *The Evolution of Man's Capacity for Culture*. Wayne State University Press.
- Swartz, M. J. and Jordan, D. K. (1980). *Culture: The Anthropological Perspective*. Wiley.
- Tangney, J. P. (1998). How does guilt differ from shame? In J. Bybee (ed.), *Guilt and Children*. Academic Press, Inc.
- Throop, C. J. (2003). On crafting a cultural mind: A comparative assessment of some recent theories of 'internalization' in psychological anthropology. *Transcultural Psychiatry*, 40.
- Tomasello, M. (1999). *The Cultural Origins of Human Cognition*. Harvard University Press.
- Tomasello, M. and Call, J. (1997). *Primate Cognition*. Oxford University Press.
- Tooby, J. and Cosmides, L. (1992). The psychological foundations of culture. In J. H. Barkow, L. Cosmides and J. Tooby (eds.), *The Adapted Mind: Evolutionary Psychology and the Generation of Culture*. Oxford University Press.
- Wertsch, J. V. (1991). *Voices of the Mind: A Sociocultural Approach to Mediated Action*. Harvard University Press.
- Westermarck, E. (1891). *The History of Human Marriage* (2d ed.). Macmillan.
- White, L. A. (1959). *The Evolution of Culture*. McGraw-Hill.
- Whiten, A., Goodall, J., McGrew, W. C., Nishida, T., Reynolds, V., Sugiyama, Y., Tutin, C. E. G., Wrangham, R. W., and Boesch, C. (1999). Cultures in chimpanzees. *Nature*, 399.
- Wolf, A. P. (1993). Westermarck redivivus. *Annual Review of Anthropology*, 22.
- Zukow-Goldring, P. (2002). Sibling caregiving. In M. H. Bornstein (ed.), *Handbook of Parenting* (Vol. III), Erlbaum.