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Chapter 15

Evolution and Culture

Ara Norenzayan, Mark Schaller, and Steven J. Heine
University of British Columbia

Human mental capacities, including the capacities for culture, are the product of biological evolution. Human mental capacities in turn develop in, draw from, and operate within richly structured cultural environments. These two uncontroversial truisms are often seen as competing, mutually exclusive statements about human psychology. But they aren't. Not only are these two perspectives compatible, they are in fact mutually necessary for a thorough scientific understanding of psychological processes on the one hand, and human cultures on the other.

This chapter has two goals. One goal is to discuss how an evolutionarily-informed social psychology contributes to a basic understanding of culture and how it emerges in human populations. To accomplish that goal, one must first explain how culture is afforded by individual-level psychological capacities that operate in the context of social interactions. Therefore, we describe how basic evolved psychological capacities, such as imitation, conformity, and communication, make culture possible. In addition, one must explain why some beliefs and behaviors become and remain cultural – widely distributed across a population – whereas others do not. (Why, for example, are beliefs in ghosts, spirits, and gods so popular across human populations, but beliefs in zombies are not?) We describe how basic mechanisms of social cognition, social motivation, and social interaction influence the extent to which specific beliefs and behavioral expectations are successfully transmitted within a population, thus creating and sustaining cultures with specific predictable normative contents.

The second goal of this chapter is to discuss the central role of cross-cultural research in addressing a question of fundamental importance to evolutionary social psychology: To what extent are psychological mechanisms universal across human populations? Any evolutionarily-informed theory of psychological processes implies some degree of universality. But any meaningful test of this universality assumption requires rigorous attention to the fact of cross-cultural differences, and to the causes of those cross-cultural differences. Cultural diversity offers substantial obstacles – and unique opportunities – for any evolutionary approach to social psychology. We elaborate on these obstacles and opportunities in the latter half of this chapter.

Evolved Psychological Foundations of Culture

In much of the empirical literature on culture and psychology, culture is treated as a given. We know that cultures exist, and we can describe the specific kinds of collectively shared beliefs, rituals and other norms that define different cultures. The questions of primary interest to cultural psychologists have been the impact of those cultural variables on individuals' thoughts

and actions (for reviews, see Fiske, Kitayama, Markus, & Nisbett, 1998; Markus & Kitayama, 1991; Nisbett, Peng, Choi, & Norenzayan, 2001; Nisbett & Norenzayan, 2002).

Of course, culture is itself something that must be explained. Why does culture exist at all? Why are cultures generally defined by specific distribution of some norms, rather than others? Why, amid all the options available within any single human group, do some kinds of belief and behavior become culturally popular while others never catch on? These and other important questions about culture demand that we treat culture – and the specific norms that define culture – as consequences as well as causes of human cognition and behavior (Kameda, Takezawa, & Hastie, 2003; Lehman, Chiu, & Schaller, 2004; Schaller & Crandall, 2004).

Humans are not just group living social animals. They are also cultural animals. Humans, more than any other species, have the special capacity to preserve behavioral modifications and inventions initiated by group members, by transmitting them horizontally across group members, and vertically across generations (Boyd & Richerson, 1985; Cavalli-Sforza & Feldman, 1981; Heyes & Galef, 1996; Sperber, 1990, 1996; Tomasello, Kruger, & Ratner, 1993). For example, once a new and useful food gathering technique is discovered by some individuals, humans have the capacity to preserve and improve upon the new skill through social, rather than biological transmission. Many theorists have suggested that the cognitive and behavioral capacities that make human culture possible – complex communication skills, social learning mechanisms, identification with a social group, biased processing of information that favors ingroup members and prestigious individuals – evolved because of the adaptive benefits that they offered to individuals (Boyd & Richerson, 1985; Henrich & Boyd, 1998; Henrich & Gil-White, 2001; Richerson & Boyd, 2005; Tomasello, 1999; Tomasello et al., 1993). Individual survival and reproduction was facilitated by participation within certain kinds of coordinated group activity where behavioral changes could be retained and perpetuated within the group. Thus it is likely that psychological mechanisms promoting these sorts of coordinated group actions evolved in humans (Richerson & Boyd, 2005). Several chapters in this book (Brewer & Caporael, this volume; Van Vugt & Van Lange, this volume) review many of these specific arguments, and so we will not belabor them here. The summary point is simply this: There are very likely specific evolved psychological mechanisms within social groups for the emergence of the sort of coordinated group activity that is minimally necessary for human culture to exist.

Human cultures are more than just well-coordinated social groups; they are well-coordinated social groups in which the individuals share massive amounts of common goals, desires, values, beliefs and other forms of knowledge. Cultures are defined not just by the fact that individuals within those cultures share many kinds of knowledge, but also by the specific kinds of knowledge that they find important to share. Cultures consist of specific prohibitions and taboos, specific moral "rights" and "wrongs," specific supernatural beliefs, specific themes in literature and art, and so on. Although cross-cultural research often draws attention to the differences between cultures (e.g., different supernatural agents appear in different religious traditions), this body of literature also reveals striking similarities in the basic contours of any culture (e.g., most if not all religions revolve around one or more supernatural agents that share striking cognitive similarities across cultures). Indeed, thorough reviews of the ethnographic record have revealed hundreds of universal patterns and norms across the full spectrum of human cultures (Brown, 1991). What accounts for the similarities underlying different belief systems? One set of answers is provided by evolutionary analyses of human cognition and social behavior.

Collective Consequences of Common Cognitive and Motivational Architecture

Many defining elements of human culture may be aggregate byproducts of evolved cognitive and motivational mechanisms (Tooby & Cosmides, 1992). The universal cultural prohibition against incest offers one example. The thought of incest typically elicits disgust, an affective reaction that would have served the adaptive function of discouraging genetically non-optimal sexual couplings (Lieberman, Tooby, & Cosmides, 2003). If indeed there evolved a tendency for the idea of incest to trigger disgust, a consensually-held moral aversion to incest can be viewed simply as a byproduct of the underlying evolutionary process. Moreover, within a species that also has a sophisticated capacity to communicate and persuade, it is possible that these individual-level disgust reactions will become reinforced at the cultural level as well, in the form of laws and other institutionalized codes of conduct. As a result, most if not all cultures will likely develop and propagate mechanisms such as taboos against incest.

Similar analyses can be applied to other elements of morality within human cultures. It has been argued that specific cognitive capacities evolved that allow individuals to be especially adept at identifying others who violate expectations of reciprocity and fair social exchange (e.g., Sugiyama, Tooby, & Cosmides, 2002; see also Van Vugt & Van Lange, this volume). As a consequence, most cultures have developed norms and rules that govern social exchange processes. The failure to follow these rules is treated often as a moral transgression, and there typically exist institutionalized means of punishing these transgressions. Children are socialized to internalize behaviors that reinforce the cognitive mechanisms for social exchange. These complex systems of cultural norms may reflect an inevitable collective consequence of a cognitive architecture that evolved in response to selection pressures associated with the benefits, and risks, of social exchange (Tooby & Cosmides, 1992). Thus, learned cultural processes serve as external reinforcements to already existing naturally selected tendencies in humans. More broadly, a number of theorists have argued that a wide range of moral norms – including norms governing obedience, reciprocity, care-giving, group solidarity, and social responsibility – may be inevitable aggregate byproducts of psychological mechanisms that evolved in response to specific kinds of adaptive problems (Krebs & Janicki, 2004).

In addition to moral norms, other kinds of cultural norms too may reflect evolved tendencies to engage in certain patterns of thought or action. Consider the role of beliefs about ingroups and outgroups in creating and maintaining cultural identity. An important part of any culture is the popularly-shared belief that "we" have certain desirable characteristics that are distinct from the characteristics of people in other cultures. A variety of evolutionary analyses – some of which focus on adaptive behavior within ingroups (e.g., Brewer, 1999; Brewer & Caporael, this volume) and some of which focus on adaptive reactions to outgroup members (e.g., Schaller, Faulkner, Park, Neuberg, & Kenrick, 2004; see Neuberg & Cottrell, this volume) – imply that these culturally-normative belief systems may be aggregate byproducts of evolved cognitive mechanisms.

Similar analyses can be applied even to cultural artifacts – art, music, literature, and mythology. Several theorists (e.g., Dissanayake, 1992; Miller, 1999, 2000) have argued that the production of art, and themes represented within art, are driven by fundamental evolutionary pressures. Aesthetic preferences in various domains appear to be linked to evolved constraints on perceptual systems. People enjoy visual art that reflects adaptive ways of interacting with physical landscapes (Orians & Heerwagen, 1992). More generally, the specific patterns and themes evident in the arts and crafts of any culture may stem, in part, from commonly-shared evolved preferences for certain kinds of sensory experiences. Popular forms of cultural

mythology may also be constrained by evolved aspects of human cognition. Several analyses have shown that mythic tales – including both religious myths and secular folktales – tend to be more memorable if they include a few, but not too many, "magical" elements (e.g., Norenzayan & Atran, 2004). These kinds of mythic tales are, therefore, more likely to persist in the collective memory across all individuals within any cultural population. In general, it appears that specific features of evolved cognitive mechanisms can exert an influence on the specific kinds of artifacts that are likely to become and remain defining features of a culture.

This approach to understanding the origins of culture – as a population-level consequence or byproduct of evolved psychological mechanisms – has been applied most strenuously to that part of human culture that is perhaps most prototypical: religion.

In every society known to anthropologists, there is evidence for the following: (1) beliefs in supernatural agents (gods, ghosts, jinns, ancestor spirits), (2) who demand costly sacrifice (hard-to-fake public expressions of commitment in time and resources), and (3) who manage existential anxieties, such as those triggered by death, hopelessness, and loss of meaning. The ritualized coordination of these three elements yields "religion" (Atran, 2002; Atran & Norenzayan, 2004; Norenzayan & Atran, 2004). Thus, widespread religious beliefs and rituals can be understood as population-level manifestations of the "evolutionary landscape" that shape the individual cognitive and motivational tendencies such as the tendency to anthropomorphize or impute agency onto the natural world, or the motivational tendency to engage in hard-to-fake expressions of commitment to one's group. In recent years, a growing body of research has been examining the cognitive, motivational, and communicative processes that give rise to cultural and religious beliefs (Atran, 2002; Barrett, 2000; Boyer, 1992; 1994, 2003; Norenzayan & Hansen, in press).

For example, there is abundant empirical research on the cognitive factors that constrain the cultural success of supernatural beliefs. One starting point in these analyses is the observation that spirits and other supernatural concepts found in culturally successful narratives (such as religious mythologies) have properties that are partially, but not entirely, counterintuitive. Spirits may be invisible or may pass through solid objects; but otherwise they possess the intuitive properties of ordinary intentional agents. Supernatural agents may have supernatural abilities of perception, but they also obey many of the mundane laws of folk physics and folk biology (e.g., they get hungry; they cannot occupy more than one physical location at a time). Indeed, it appears that people assume a substantial set of intuitive properties even for beings that are putatively supernatural. Controlled experiments indicate that people spontaneously anthropomorphize God in their reasoning – attributing human-like traits such as consciousness and intentionality – even if doing so contradicts their stated theological beliefs (Barrett & Keil, 1996). The attribution of anthropomorphic traits is such a hypersensitive cognitive tendency that it is extended even to inanimate objects, such as faces in clouds, voices in the wind, and talking mountains (Guthrie, 1996). Mythical and religious traditions all over the world make ample use of such images, and as a result, belief in fantastic intentional beings (ghosts, spirits, jinns) is culturally more contagious than belief in fantastic beings devoid of mental states, such as zombies (Boyer, 1994; Atran, 2002).

Other research indicates that culturally successful materials favor minimal rather than large violations of ontological expectations. In a content analysis of Ovid's *Metamorphoses*, Kelly and Keil (1985) found that the ontological transformations experienced by the characters followed a distinct pattern: the number of transformations of one ontological category to other ontological categories decreased as the distance between the two categories increased. Thus, it

was far more likely for a conscious being to be transformed into an animal, than a conscious being to be transformed into an inanimate object. Transformations that occur across wide swaths of ontological distance may be just too counterintuitive to be psychologically appealing. If indeed minimally counterintuitive concepts are cognitively optimal, they should enjoy a cognitive advantage in memory. They should also enjoy a transmission advantage in communication. Recent studies have supported both conclusions (see Barrett & Nyhoff, 2001; Boyer & Ramble, 2001).

Cognitive processes operate not only at the level of individual supernatural beliefs (e.g., belief in ghosts), but at the level of narratives as well (e.g., the Hindu Vedas depicting creation stories, or the folktale of the *Little Red Riding Hood*). Norenzayan, Atran, Faulkner and Schaller (2005) speculated that minimally counterintuitive narratives are the most likely to be culturally successful, because they enjoy a recall advantage relative to narrative templates that are massively counterintuitive or to those with no supernatural content. Counterintuitive narrative elements attract attention, and evoke a sense of magic or mystery, and therefore may encourage further cognitive processing that aids recall of these narrative structures. But only if these counterintuitive elements are connected to a meaningful set of everyday expectations can these narratives be readily represented, rehearsed, and transmitted to others. Consistent with this idea, Norenzayan et al. found that a few (but not too many) counterintuitive elements in a narrative facilitated both long-term recall, and cultural success. For instance, in an analysis of actual folktales (those collected by the Brothers Grimm), minimally counterintuitive folktales were found to be especially culturally successful.

This line of research offers just one example of a broader phenomenon. To the extent that ideas, beliefs, and other knowledge structures correspond to specific kinds of cognitive templates, they are more likely to be culturally successful over time (Berger & Heath, 2005).

Cognition, Communication, and Evolved Constraints on Socially-Constructed Culture

Culture is not merely an additive byproduct of mutually interacting but independent human brains clumped together in time or space. Culture is a social construction, sculpted by mutually influencing individuals occupying a particular time or space. People communicate, and in doing so, they influence each other. While the ability to communicate may not have evolved specifically to serve a cultural function, the consequences of communication on culture are profound. Research informed by dynamic social impact theory reveals that simple acts of interpersonal communication inevitably, over time, shape the basic contours of culture (Latané, 1996; Harton & Bourgeois, 2004). Other research reveals that mere acts of communication predictably influence beliefs about the groups with which we identify – thus shaping important socially-shared perceptions of what "our" culture is like (Kashima & Kostopoulos, in press). These and other lines of work (e.g., Boster, 1991; Sperber, 1990) highlight the fundamental role that acts of interpersonal communication play in the social construction of culture.

But people don't communicate about just anything, and they don't influence each other randomly. The social construction of culture is importantly constrained by individual thoughts, desires, and decisions. Thus, cultural level phenomena are predictably constrained and afforded by the evolutionary mechanisms that shape those thoughts, desires, and decisions.

Evolved constraints on socially-constructed cultural norms are illustrated by the results of research that investigate the selective communication of beliefs, stories, and other kinds of knowledge structures. What specific kinds of things do people actually talk about, and what are the eventual consequences for popular culture? Several lines of work answer that question with

results showing that (a) people are especially likely to talk about those things that reflect evolutionarily adaptive mechanisms, and therefore (b) these particular things – rather than others – are especially likely to become and remain culturally popular.

One line of work examines the social transmission and consequent popularity of trait-based group stereotypes. People are more highly motivated to talk about some kinds of personality traits than others, and those traits that are more "communicable" are more likely to persist in popular stereotypes of salient ethnic groups. For example, traits that are especially communicable were also especially persistent in popular stereotypes of African-Americans throughout the 20th Century (Schaller, Conway, & Tanchuk, 2002). But what makes a trait especially communicable? Here is where the role of evolved motivational systems can come into play. One evolved motivational system pertains to sociality itself – the need to belong, the desire to be an accepted member of a social group (Baumeister & Leary, 1995; Brewer & Caporael, this volume). In order to satisfy this need, we are typically motivated to present ourselves in a positive manner to others. This self-presentational concern manifests itself in strategic decisions about interpersonal communication (e.g., we strategically express certain opinions or avoid certain topics of conversation with others). Drawing on this logic, Schaller and Conway (1999) tested the hypothesis that this belongingness motive influences decisions to communicate about certain kinds of stereotypic traits rather than others, and that these strategic communication decisions consequently influence the contents of emerging socially-shared stereotypic beliefs. Empirical results supported the hypothesis. Other motivational concerns – such as self-protection – may be even more evolutionarily fundamental. Schaller et al. (2004) report preliminary evidence showing that personality traits that most clearly connote potential threat (e.g., "hostile") or lack of threat (e.g., "honest") tend to be more communicable, and that these threat-relevant traits have also been especially persistent in popular stereotypes of African-Americans.

Evolved motivational systems, such as those pertaining to self-protection, tend to be linked to distinct emotional responses, such as fear and disgust (see Keltner, Haidt, & Shiota, this volume). Knowledge structures that elicit these functional emotions may be especially communicable, and therefore especially likely to become culturally popular and persistent. This line of reasoning has been supported by studies on the transmission and popularity of "urban legends" (Heath, Bell, & Sternberg, 2001). Contemporary folklorists have collected hundreds of these apocryphal tales, and there is considerable variability in the extent to which urban legends are popularly-known. Most never catch on widely and so cannot be considered to be integral parts of any culture. But some do catch on (such the enduring myth – entirely debunked by actual research – about the risk of razor blades in Halloween apples). They capture individuals' attention, people feel compelled to share these stories with others, and so they become enduring parts of popular culture. Heath et al. (2001) found that urban legends are more communicable, and more likely to be popular, if they more strongly elicit the evolved self-protective emotion of disgust.

These examples focus on specific kinds of cultural knowledge structures (stereotypes, legends) that people explicitly talk about with one another. But evolutionary constraints on the social construction of culture are not limited to just these kinds of norms. Recent work by Kenrick, Li and Butner (2003) reveals how evolved cognitive architecture can guide the social construction of cultural norms governing mating behavior.

Every culture is marked by specific rituals, institutions, and other norms pertaining to mating behavior. In some cultures polygamy is prevalent; in others it is forbidden. In most

cultures, norms encourage long-term "restricted" mating; but in some cultures, short-term "unrestricted" mating is far more common. Drawing jointly on insights from evolutionary psychology and dynamical systems models, Kenrick et al (2003) show how these cultural norms can be understood as a product of a dynamic process of implicit interpersonal negotiation, the eventual outcomes of which are constrained by evolved decision rules.

Because of the evolutionary pressures imposed by differential parental investment, there is an average tendency for men to be more inclined toward unrestricted mating and women toward more restrictive mating. But actual mating behavior is flexible, and is responsive to aspects of the immediate context – such as individuals' perceptions about the extent to which others (especially potential mates) prefer a restricted versus unrestricted approach t o mating. The style of mating adopted by any pair of mates is therefore the product of a sort of implicit negotiation, informed not only by the preferences of the two individuals within the pair, but also by the preferences of other potential mates in the local geographical vicinity. This creates a dynamic process in which small amounts of variation in local sex ratios and mating preferences can exert a substantial impact on the mating norms that emerge across a population. The results of this process are such that there emerges a tendency for most (but not all) heterosexual populations to develop norms promoting restricted mating relationships. On the other hand, the same dynamic process predicts a greater tendency toward unrestricted mating norms within male homosexual populations. More generally, broad patterns of cross-cultural similarity, punctuated by certain specific kinds of cross-cultural difference, can be predicted from the operation of dynamical social influence processes that are constrained by evolved decision rules (Kenrick et al., 2003).

Thus, even though many aspects of culture are socially-constructed through interpersonal acts of social influence, this social construction process is fundamentally shaped by the evolved cognitive architecture of those individuals who – often unwittingly – do the constructing.

Psychological Universals Across Cultures

It is clear that an evolutionary perspective on social psychology can contribute to the scientific understanding of what culture is and how it emerges and stabilizes in human populations. It is less clear, perhaps, that evolutionary social psychology can benefit from a cross cultural perspective. One specific benefit is that rigorous cross-cultural analyses of social psychological processes are essential to conclusions about the evolved basis of those processes.

Evolutionary psychology rests on the idea that many mental processes have been naturally selected to solve the adaptive tasks faced by ancestral populations. It follows from this assumption that there exists some universally-shared repertoire of core psychological mechanisms. It is an important scientific goal to discover and document evidence of these alleged human universals across cultures (Buss, 2001; Schmitt & Pilcher, 2004). Unfortunately, the documentation of universals has been a neglected topic of inquiry within psychology in general, and within social psychology in particular. To address this problem, Norenzayan and Heine (in press) recently articulated a conceptual framework that can facilitate research into human universals. Here we summarize some of the observations and implications derived from this framework.

Most social psychologists would agree that, at some level, members of the human species share universal conceptual and motivational mechanisms that interact with cultural contexts in important ways – some set of psychological building blocks without which cultures and cultural learning would be impossible. Similarly, most social psychologists would agree that, at some

level, cultural contexts are implicated in psychological processes, and as a result give rise to cultural variation. Indeed, some appreciation of human universals and cultural diversity is necessary in order to make sense of the vast theoretical and empirical literature of social psychology. However, the challenge in considering universals within a context of cultural diversity is to target an appropriate level of analysis to make sense of them. At too abstract a level, universals are too diffuse to be of significant empirical import (Geertz, 1973). At too concrete a level, however, it is unlikely that many universals will be identified. The key is to articulate the optimal level of abstraction that renders potential universals useful in research, general enough to occur, yet tangible enough to have psychological authenticity.

Psychology's narrow empirical base, focused primarily on Western, middle class, secular, college-educated populations, is an obvious and daunting obstacle to the discovery of genuine psychological universals (for recent discussions of this problem, see Medin & Atran, 2004; Norenzayan & Heine, in press; Rozin, 2001; Sears, 1986). A phenomenon identified at, say, a midwestern U.S. university, does not inform whether that phenomenon exists elsewhere in a different human population. Perhaps the same phenomenon is present elsewhere, but simply remains undocumented. Or perhaps it exists elsewhere in a somewhat different form. Or perhaps it is largely absent. One important rationale for cross-cultural research, then, is that systematic empirical observation across cultures is an essential and necessary means of disentangling the culture-specific from the universal.

If we fail to engage in such cross-cultural research (or fail to attend closely to its results), then we all too easily fall prey to a pernicious sort of culture-blindness, in which we wrongly assume the universality of some culture-specific manifestation of a deeper underlying universal, and fail to discover that deeper universal itself. Alternatively, it is possible that some psychological processes are cultural inventions, and do not reflect any apparent evolved basis whatsoever. Either way, this is a serious liability for any scientist who wishes to draw accurate conclusions about the evolutionary (and thus at some level universal) bases of psychological phenomena.

Consider, for example, the debate over the universality of marriage from the anthropological literature (e.g., Goody, 1977; Levi-Strauss, 1969). If defined as a form of institutionalized arrangement for men and women to form a long-term mating relationship that facilitates the conception and caring of offspring, then marriage is universal across human cultures (Brown, 1991). However, at the level of particular cultural instantiations, we see a wide variety of marital arrangements around the world (e.g., arranged monogamy, voluntary serial monogamy, polygyny, fraternal polyandry, endogamy, and exogamy). If we are interested in articulating the evolutionary origins of marriage it is crucial that we are targeting the appropriate level of analysis. An evolutionary account of, say, serial monogamy in unlikely to be persuasive, given that exclusively monogamous relations are uncommon in many cultures. In contrast, an evolutionary account of marriage that is defined in the more abstract way (described above) would – given its universal presence in societies – rest on much firmer ground.

For a psychological example, consider the question of whether a need for positive self-regard is a psychological universal. The idea that people are motivated to seek and maintain a positive self-view is a foundational assumption of many theories in psychology (e.g., Allport, 1955; James, 1950/1890; Taylor & Brown, 1988). Thus, the question of whether a need for positive self-regard is universal is an important one. A perusal of the evidence for positive self-regard across cultures, however, underscores the importance of being explicit about the level of abstraction that one is considering. One way to consider the question of whether people are

motivated to have positive self-regard is to conceive of positive self-regard as *self-enhancement* – operationalized as the tendency to dwell on and elaborate positive information about the self, relative to the tendency to dwell on and elaborate information about one's weaknesses (e.g., Heine, in press; Taylor & Brown, 1988). At this more specific level of abstraction there is a great deal of cultural variability. For instance, comparisons of East Asians and Westerners reveal pronounced cross-cultural differences in dispositional measures of positive self-concept, self-serving biases, and reactions to success and failure feedback (Heine et al., 1999). One recent meta-analysis comparing self-enhancement tendencies among East Asians and Westerners revealed cross-cultural differences with an average effect size of $\underline{d}$ = .85 (Heine & Hamamura, 2005). Whereas there is abundant evidence for self-enhancement among Westerners (average $\underline{d}$ = .86), evidence for self-enhancement among East Asians living in East Asia is strikingly lacking (average $\underline{d}$ = -.02). This relative absence of self-enhancement among East Asians does not appear to be due to experimental artifacts (see Heine et al., 1999; Heine, 2003; Heine, in press; for a dissenting view see Brown & Kobayashi, 2002). In contrast to the pursuit of self-esteem that is so commonly documented among individuals in Western cultures, East Asians appear to be more concerned with securing "face"; and rather than engaging in strategic self-enhancement, East Asians are more concerned with self-improvement (Heine, 2005; Heine et al, 1999).

These and other similar findings certainly cast doubt on the universality of a motive for self-enhancement or positive self-regard (Heine et al., 1999). This is worth keeping in mind when evaluating the plausibility of theories that propose an evolved basis for self-esteem. Barkow (1989) proposed that self-esteem was selected to serve as a gauge of subtle changes of the individual's status within dominance hierarchies. Leary and colleagues (Leary, Tambor, Terdal, & Downs, 1995) argued that self-esteem is an adaptation that functions as an indicator to detect when our social relationships with others were vulnerable. Terror management theory (Pyszczynski et al., 2004) maintains that self-esteem emerged as an adaptation that serves to stave off the debilitating existential anxieties that come from fears of mortality. These different perspectives on the origins of self-esteem can be interpreted in different ways. If interpreted as theories specifying evolutionary origins of some general mechanism that makes self-evaluation possible, without specifying the psychological forms that this mechanism takes, then perhaps these theories are not directly tested by cross-cultural differences in self-enhancement. But if these theories are interpreted – as they often are – as specifying evolutionary origins for a need for positive self-esteem, then the cross-cultural evidence is both pertinent and problematic. At minimum, a plausible evolutionary account cannot be inconsistent with the cross-cultural data. Ideally, it should not simply be mute on the matter either. A truly compelling evolutionary explanation for self-enhancement should explain why this phenomenon appears more strongly in some cultures than in others, and needs to embed this explanation within a set of processes that are genuinely universal.

That last statement is the key; a compelling evolutionary account must identify evolved mechanisms at a level of conceptual abstraction for which there is evidence of universality. For instance, rather than focusing on a motive for positive self-regard, it might be more plausible to focus on a deeper motive to "be a good self" – that is, to strive to be the kind of person who is viewed as appropriate, good, and significant in one's culture (e.g., Crocker & Park, in press; D'Andrade, 1984; Heine et al., 1999; Kluckhohn, 1962). Within Western, individualistic cultures, self-enhancement and self-promotion may well be useful means toward being a good self; but not so among East Asians. Instead, in collectivistic East Asian cultures, self-improvement and saving face may be much more useful means of obtaining the same universal

goal (Heine, 2003; Heine, 2005; Heine et al., 1999). Thus it is the need to be a good self – and not the need for positive self-regard – that is the more plausible psychological universal. Evolutionary theories of self-concept might sensibly be targeted at this level of abstraction (see Heine, Proulx, & Vohs, 2005).

The same logic can be applied to a variety of other social psychological phenomena. Consider racism, for example. Although race-based prejudice has been a staple of the social psychological literature for decades and represents a paradigmatic case of intergroup prejudice, it would be a conceptual mistake to articulate evolutionary theories that focus on racism, per se. While race is a sociologically important construct in contemporary Western cultures, it is largely irrelevant to social life in many other human populations (and is highly unlikely to have been relevant in ancestral populations). The paradigmatic prejudices in other cultures are based on entirely different kinds of categorical distinctions (language, religion, family lineage, and so forth). Therefore, to understand the evolutionary roots of racism, one must focus on a level of conceptual abstraction that is deeper than race, and that encompasses these other kinds of categorical distinctions as well – and is more truly universal. Theories that focus on subjective impressions of foreignness, for instance, or on coalitional group membership are more likely to have merit as evolutionary explanations (e.g., Hirschfeld, 1996; Kurzban, Tooby, & Cosmides, 2001; Schaller, Park, & Faulkner, 2003).

As these examples illustrate, the existence of naturally-selected psychological processes does not preclude the possibility that these adaptations are expressed in different forms in different populations. The human brain evolved to learn from and be responsive to the physical environment (Kenrick, Ackerman, & Ledlow, 2003, Moore, 2004). Similarly, it evolved to function in social groups and to be responsive to the workings of other minds in the local social environment (e.g., Dunbar, 1992; Tomasello, et al, 1993). Consequently, psychological adaptations are best conceptualized as context-contingent decision rules that are sensitive to local variation in local ecologies and social geometries (Cohen, 2001; Kenrick, Li, & Butner, 2003). We rarely encounter evolved psychological processes at the universal level directly; they typically appear to us in context-specific, culturally-instantiated forms. In some cases, the instantiations are not so diverse and the universal phenomena are easily discerned (e.g., preferences for sweet and fatty foods, Rozin, 1976; sex differences in violence, Daly & Wilson, 1988). In other cases, however, the instantiations are so varied that the underlying universals do not lend themselves to easy observation (Heine et al., 1999; Markus & Kitayama, 1991; Nisbett et al., 2001; Shweder et al., 1997). Nevertheless, it is only by assessing cultural diversity – and taking those cultural differences seriously – that we can distinguish between specific instantiations and true universals.

In order to draw sensible conceptual conclusions about what is universal and what isn't, one must also make distinctions between different levels of universals that are meaningful for psychological analysis. Norenzayan and Heine (in press) recently developed a framework that offers a useful scheme for drawing conclusions about, and formulating theories of, cross-cultural differences and human universals.

Levels of Psychological Universals

Norenzayan and Heine (in press) proposed three levels of psychological universals and one case of non-universal that can be observed cross-culturally. This model rests on a powerful analogy of the mind as a *toolbox* (Cole, 1996; Piaget, 1952; Resnick, 1994; Stich, 1990; Vygotsky, 1978). Psychological processes, including cognitive structures, emotions, and

motivations, can be thought of as tools for behavior. Just as the handyman's specialized toolbox is utilized to construct, repair, add, and transform, the mental toolbox is accessed to solve the myriad problems of everyday life. In a world joined together by nails, a hammer is a more useful tool than a wrench. In a world held together by nuts and bolts, a wrench is a more useful tool than a hammer. To the extent that the worlds in which people inhabit are different (or are believed to be so), there emerge different affordances that elicit the use of different tools.

This perspective leads us to ask three questions about the comparability of psychological tools across cultures (see Figure 1). First, are the tools in the cognitive toolboxes—the cognitive availability of these mental processes--the same or different across cultures? Second, even if the repertoire of tools is the same, do people rely on the same or different tools to solve a given problem? Third, even if the tools are the same, and the same tools are used to solve a given problem, is the tool accessed with the same facility or frequency? The answers to these three questions suggest four degrees of universality: 1) *non-universals* (different tools altogether), 2) *existential universals* (same tool, but differential functions or uses), 3) *functional universals* (same tool and same function, but differential accessibilities) and 4) *accessibility universals* (same tool, use, and degree of accessibility).

Specific patterns of cross-cultural evidence imply the existence of specific kinds of universals. If there is no evidence of cross-cultural differences at all – that is, a particular phenomenon emerges with a similar effect size across cultures – this implies that the phenomenon falls in the category of an accessibility universal. An example is the cognitive ability to estimate quantity approximately. This analog "number sense" is insensitive to exactitude, and is shared by humans and higher primates alike (Dehaene, 1997). Recent evidence indicates that this ability operates in the same way among English speakers who employ an elaborate counting system, as well as among a preliterate culture (the Piraha of Amazonia) who employ a very simple counting system that does not differentiate between specific quantities greater than two (Gordon, 2004).

The phenomenon is demoted to a functional universal, however, if the shape of the relationship between the variables is the same across cultures, but the effect sizes differ systematically and predictably. A possible candidate for a functional universal is the tendency to make internal attributions for behavior. Empirical evidence indicates that this tendency does emerge cross-culturally, but is generally weaker in non-Western societies (Choi, Nisbett, & Norenzayan, 1999; Norenzayan & Nisbett, 2000).

In contrast, if qualitatively distinct patterns of findings emerge in different cultures (e.g., a relation between variables that is observed in one culture entirely disappears or reverses in other cultures), then the phenomenon fails the test of a functional universal. A case in point is self-enhancing and self-critical motivations for success and failure (see Heine, 2005, for a discussion). In a series of experiments, Heine and his colleagues found that success feedback (relative to failure feedback) led to more persistence later on that same purported creativity task among self-enhancing Americans. The reverse was true for self-critical Japanese, who persisted longer after failure. This indicates that the relationship between intrinsic motivation and experiences with success and failure are functionally different across cultures.

This kind of evidential pattern does not necessarily indicate that a particular psychological phenomenon is actually absent from the psychological repertoires in some cultures; it may instead reflect the relative dominance of alternative psychological strategies that exist in those cultures. If so, the phenomenon would be considered an existential universal. In such cases, the next step would be to consider more carefully whether the phenomenon does

indeed exist in the psychological repertoires across cultures, even if its functional use differs; if evidence indicates that it does not, then the phenomenon cannot be considered a universal at any level. Such a case can be made, for example, for the cognitive ability to count. Counting beyond two is a form of numerical thinking that appears to be contingent on a culturally available counting system (Gordon, 2004; see Norenzayan & Heine, in press for further discussion).

Levels of Universals in Theory Development

Evolutionary psychological theories can gain generality and empirical focus if they are calibrated to account for the observed level of universality in the cross-cultural evidence. As an illustration, consider Buss's (1989) cross-cultural survey of gender differences in mate preferences. Consistent with hypotheses derived from sexual selection theory, Buss predicted and found that in virtually all cultures men valued physical attractiveness and pre-marital chastity more than women, whereas women valued status and good financial prospects more than men. Buss concluded that these preferences are evolved psychological universals. However Buss also found considerable cross-cultural variation in the size of these gender differences. For example, the gender difference in valuing good financial prospects was twice as large in Nigeria as in Belgium. There was also robust cross-cultural variation in the desirability of chastity, ranging from virtually no gender difference at all in Sweden, to substantial gender differences in other countries. In fact, the overall results indicated that the respondents' culture was a stronger predictor of their mate preferences (for all traits considered) than gender. Eagly and Wood (1999) reanalyzed Buss' data and demonstrated that the size of the gender differences varied systematically as a function of measures of gender inequality in each culture, such that the gender effect increased with more gender inequality. Eagly and Wood concluded that the results are consistent with social structural theories of gender differences.

These explanations are not mutually exclusive, and indeed can be complementary. That gender effects were found consistently across cultures, despite variation in their size, supports the conclusion that the gender differences in mate preferences (predicted by Buss's evolutionary analysis) are functional universals. On the other hand, the fact that the size of these differences varies across cultures indicates that they fail the test of an accessibility universal, and supports the conclusion that these gender differences – even if rooted in evolved psychological universals – are responsive to local cultural conditions.

One does not need to unquestioningly accept the framework proposed by Norenzayan and Heine in order to appreciate the broader point: Evolutionarily-derived theories of social psychological phenomena can gain clarity and precision if they account for universality and variation at different conceptual levels. Theoretical debates can be sharpened, and perhaps even resolved, by specifying the particular level at which a psychological universal is alleged to occur.

Universality, Cultural Variability, and the Argument for Innateness

Universality is an important consideration for determining whether psychological phenomena are explainable in terms of innate structures. However, arguing for universality is distinct from arguing for innateness. There are at least three distinct reasons why some psychological phenomenon might be universal across cultures. (1) It may result from innate, naturally-selected psychological tendencies that emerge everywhere in the same ontogenetic sequence (such as language acquisition, Pinker & Bloom, 1992). (2) It may be a cultural byproduct of naturally-selected tendencies (such as religion; Atran & Norenzayan, 2004). (3) It may reflect independent cultural invention, or cultural diffusion of some learned response that

serves the same useful purpose everywhere – what Dennett (1995, p. 486) refers to as "good tricks" (such as counting systems, calendars, writing, trading, and cognitions and behaviors associated with these inventions). Thus, universality is encouraging but not conclusive evidence for the innateness of a psychological process. Any argument for the innateness of a process has to make a compelling case that the process is unlikely to have achieved universality due to repeated independent invention, or due to widespread cultural propagation.

On the other hand, cultural variability emerges for several possible reasons. (1) Differential distribution of psychological traits due to cultural learning mechanisms such as mimicry and instruction (e.g., Boyd & Richerson, 1985; Markus & Kitayama, 1991; Nisbett et al., 2001). (2) the same innate but flexible psychological tendency expressing itself differently in response to varied ecological conditions, such as when different forms of marriage emerge in response to variation in resource scarcity (e.g., Kenrick et al, 2003; Tooby & Cosmides, 1992). (3) Differential distribution of gene frequencies across different cultural populations. There is considerable theoretical and empirical support for the first two explanations for cultural variation. Here we examine briefly the plausibility of the third possibility.

Research in behavioral genetics reveals that many psychological traits and tendencies are substantially heritable (e.g., Plomin, Owen, & McGuffin, 1994; Roy, Neale, & Kendler, 1995; Turkheimer, 2000). Furthermore, findings from the Human Diversity Genome project identify a number of genes that systematically vary across human populations (e.g., Cavalli-Sforza & Cavalli-Sforza, 1995), including genes associated with distinct blood groups (Landsteiner, 1901), lactose intolerance (Flatz, 1987), and resistance to malaria (Allison, 1954). Might there also be systematic population variance in those genes that underlie social psychological phenomena?

If group-level psychological differences are associated with group-level genetic differences, selection pressures must have diverged in different populations. Cavalli-Sforza and Cavalli-Sforza (1995) argue that we should see the greatest differential selection pressures on traits that have had powerful consequences on fitness and that occurred consistently over long periods of time, such as those related to thermal regulation, pathogen resistance, and diet. This is unlikely to be the case with most psychological traits and tendencies. Most large scale societal changes that separate cultures today – with the possible exception of the agricultural revolution that occurred in some societies 10,000 years ago – have very short time frames that preclude the impact of culturally differential selective pressures on the gene pool.

Perhaps the best way to empirically address the question of whether variation in genes or in cultural practices underlies cross-cultural differences in psychological processes is to contrast groups such that race is held constant but cultural context is varied. Immigrants and their descendants provide practical samples that afford this investigation. Empirical results consistently show that immigrants and their descendants exhibit psychological processes intermediate to their ancestors who remained in their heritage culture, and their compatriots in their host culture – evidence consistent with a truly cultural, rather than genetic, explanation for cross-cultural differences. For example, Asian-Americans exhibit psychological tendencies intermediate to those of Asians in Asia and Americans of European descent (e.g., Kitayama, Markus, Matsumoto, & Norasakkunkit, 1997; Norenzayan, Smith, Kim, & Nisbett, 2002); if anything, Asian Americans more closely resemble European-Americans (Heine & Hamamura, 2005). Furthermore, the longer people of Asian descent have been in North America, the more similar their psychological tendencies resemble those of European-Americans, to the point that third-generation Asian-Canadians are indistinguishable from Canadians of other cultural backgrounds (Heine & Lehman, 2004; McCrae, Yik, Trapnell, Bond, & Paulhus, 1998). At

present we know of no compelling empirical evidence to suggest an innate basis of the cross-cultural differences that have been identified in social psychological studies, although a more thorough set of psychological traits would have to be investigated before any final conclusion can be reached.

Toward a Culturally Informed Evolutionary Psychology

The past quarter-century has witnessed not just the burgeoning importance of evolutionary inquiry as a means of generating important psychological discoveries, it has also witnessed the burgeoning importance of cross-cultural inquiries into psychological phenomena as well. Lurking within both perspectives is a fundamental concern with psychological universals. Cultural psychologists typically do not assume universality, at least usually not at the level of the phenomenon under investigation. Rather, they actively seek to test – and often reject – presumptions of universality. The result is a body of evidence that reveals remarkable variability even in psychological processes that had been tacitly assumed to be "basic," "fundamental," or otherwise universal (e.g., Heine et al, 1999; Nisbett et al., 2001). This evidence has provided both a challenge to existing psychological theories, and a stimulus for the development of newer, more sophisticated theories of human psychology (e.g., Choi et al., 1999; Kenrick, Li, & Butner, 2003; Medin & Atran, 2004). Just as importantly, perhaps, cultural psychology provides a set of methodologies and tools that can be used in the service of any investigation that requires sensitivity to questions about what is universal and what isn't.

As we have discussed, these questions are fundamental to evolutionary psychology. Evolutionarily approaches to human behavior have inspired some of the most wide-ranging cross-cultural studies in the social psychological literature (e.g., Buss, 1989; Daly & Wilson, 1988; Ekman, Sorenson, & Friesen, 1969; Kenrick & Keefe, 1992), and an increasing number of evolutionary psychologists are now availing themselves of cross-cultural methods in fruitful ways. Some of these studies provide important evidence showing that psychological phenomena previously documented in Western cultures also emerge in cultures that more closely reflect the subsistence nature of ancestral hunter-gather populations (e.g., German & Barrett, 2005; Sugiyama, Tooby, & Cosmides, 2002). Other studies employ samples from a wide variety of world cultures, and so provide unique opportunities to test and recalibrate tacit assumptions about universality (e.g., Schmitt et al, 2003).

Still other studies exploit existing knowledge about local ecologies to deduce and test evolutionary hypotheses that explicitly imply cross-cultural differences. For example, according to one evolutionary perspective on interpersonal attraction, subjective judgments about physical attractiveness are influenced by the perception of morphological features that covary with disease-resistance and long-term health outcomes; and because of this, attractiveness is a desirable feature in a mate. If so, it follows that individuals should be especially likely to value physical attractiveness as a mate-selection criterion under ecological conditions in which the threat of disease is especially high. Consistent with this hypothesis, Gangestad and Buss (1993) found that a greater priority is placed on a mate's physical attractiveness within cultures that historically have faced greater threats from parasitic diseases. This kind of study highlights yet one more way in which cross-cultural inquiry, focused on ecological variation, can be used to test theories within the realm of evolutionary social psychology.

Conclusion

Human social cognition and behavior has been substantially shaped by a long history of biological evolution, and continues to be substantially shaped by culture. Humans are endowed with a host of naturally-selected cognitive and motivational tendencies that had fitness consequences in the ancestral environment. Among these tendencies is a set of powerful cognitive capacities that allow for mimicry, conformity, and social learning, thus ensuring that behavioral changes will be culturally transmitted and stabilized at rates much faster than genetic transmission would allow. The complex interactions between biology and culture are still poorly understood, and difficult to figure out. But it is worth trying, as these interactions hold the key to the full story of human nature. Many of the sophisticated attempts to conceptualize these interactions (e.g., Boyd & Richerson, 1985; Lumsden & Wilson, 1981; Tomasello, 1999; Sperber, 1996; see Janicki & Krebs, 1998, for a review) are central to social psychological inquiry. A social psychology that is sensitive to both evolutionary universals and cross-cultural differences has much to offer to the community of scientists seeking to solve these puzzles. Social psychological inquiry can help us discover the cognitive and motivational capacities that make culture possible. It can help us reconstruct the subtle psychological mechanisms through which some beliefs, but not others, achieve cultural success – thus contributing to predictable patterns of cultural similarity and diversity. Cross-cultural studies are central to this project. Only through cross-cultural comparisons can we discover the true universal nature of our species. And only through these comparisons can we describe the many ways by which evolved psychological structures give rise to, and then interact with the astonishing range of human potentials that we observe in the world around us.

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Figure 1. Decision flowchart indicating different levels of psychological universals.