

# Evolutionary Processes

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## ABSTRACT

Two kinds of evolutionary processes inform psychological research on stereotypes and prejudices. One is a process through which genetic variants are selectively transmitted from individuals to their offspring through sexual reproduction; this process has shaped psychological mechanisms that characterize contemporary human populations. The other is a process through which knowledge structures are selectively transmitted between individuals through interpersonal communication; this process shapes the belief systems that characterize human cultures. Inquiry into the first kind of process (genetic evolution) produces novel discoveries about contemporary human prejudices and the cues that trigger them. Inquiry into the second kind of process (cultural evolution) produces novel discoveries about the contents of popular stereotypes. This chapter reviews these bodies of research, and their implications.

## EVOLUTIONARY PROCESSES

Two distinct types of evolutionary process are relevant to the psychology of stereotypes and prejudices. One is articulated within the vast scientific literature on human evolutionary biology. This is a process through which some genetic variants, rather than others, are selectively transmitted from individuals to their offspring through sexual reproduction, with resulting consequences for the phenotypic characteristics of human populations. The human brain is a product of this evolutionary process. Consequently, understanding how the brain evolved in response to selection pressures in ancestral environments leads to novel discoveries about psychological phenomena in contemporary environments.

The other kind of evolutionary process focuses not on genes, but on *memes* – a word coined by the biologist Richard Dawkins (1976) to refer to the vast array of cognitive structures (such as stereotypes) and behavioral tendencies that may, or may not, become widespread within a population. Some memes, rather than others, are especially likely to be transmitted from one individual to another (through ordinary interpersonal communication processes), and this selective interpersonal transmission has implications for the shared belief systems that define human cultures. This process – conceptually distinct from but analogous to genetic evolution (Mesoudi, Whiten, & Laland, 2006) – has been referred to variously as ‘social evolution,’ ‘socio-cultural

evolution,' and 'cultural evolution.' For the remainder of this chapter we use the latter term.

Both processes are 'evolutionary' in the sense that, over a period of time, some variants of information (either genes or memes) are more likely than others to be selectively transmitted and selectively retained within a population. But the mechanistic details of each process are very different, and they have very different kinds of implications when applied to the psychology of prejudices and stereotypes. Genetic evolutionary processes operate across vast time scales, and are not themselves the subject of direct empirical inquiry within the psychological sciences. Rather, rigorous theorizing about the consequences of human genetic evolution provides a logical framework within which it is possible to deduce novel hypotheses about the contemporary human prejudices and the variables that influence these prejudices (e.g., the hypothesis, and consequent empirical discovery, that women are especially xenophobic and ethnocentric during the few weeks of pregnancy; Navarrete, Fessler, & Eng, 2007). In contrast, cultural evolutionary processes often occur within relatively short periods of time, and so can be empirically observed with psychological research methods. Among these empirical observations are novel findings pertaining to variables that influence the emergence, persistence, and change of widespread stereotypes (e.g., the finding that interpersonal communication norms predict changes in the specific contents of African-American stereotypes over the course of the twentieth century; Schaller, Conway, & Tanchuck, 2002). Conceptually distinct bodies of psychological research reveal the implications of each kind of evolutionary process. This chapter reviews these bodies of research.

We begin with a brief historical overview. Then, in the second section we review many different ways in which conceptual speculations about human genetic evolution have led to novel discoveries about contemporary human prejudices. In the third section, we review research on cultural evolutionary

processes and their consequences on the contents of popular stereotypes. In the fourth and final section, we discuss integrative themes and directions for future research.

## HISTORICAL BACKGROUND

Evolutionary approaches to human behavior have scholarly roots that are both long and deep. Darwin's (1859) original treatise on evolution by natural selection focused on non-human species, but several of his subsequent books attended more explicitly to human evolution and implications for specific kinds of psychological phenomena, such as emotions (Darwin, 1871, 1872). Since then, enormous bodies of research have articulated the evolutionary origins of human cognition and behavior. Inquiries into evolutionary origins focus mainly on processes that operated on ancestral populations over long periods of time. In contrast, psychological inquiries typically focus on processes operating at an individual level of analysis, usually within very short periods of time. Given these different levels of analysis, insights about the evolutionary origins of human behavior do not translate easily into sophisticated hypotheses about contemporary psychological processes. Only in the last few decades have psychological scientists begun to employ evolutionary principles to develop and test such hypotheses (for reviews, see Buss, 2005; Crawford & Krebs, 2008; Dunbar & Barrett, 2007; Gangestad & Simpson, 2007; Schaller, Simpson, & Kenrick, 2006).

Donald Campbell was among the first psychological scientists to seriously consider the implications of human genetic evolution for the psychology of prejudice. In a chapter titled 'Ethnocentric and Other Altruistic Motives,' Campbell (1965a) discussed the psychological connections between two superficially distinct phenomena – altruism and ethnocentrism – suggesting that the evolutionary bases of altruism may have additional implications for intergroup prejudices as well. The influence of Campbell's work on this topic is apparent in many

contemporary programs of prejudice research (e.g., Brewer, 1999; Brewer & Caporael, 2006), and is discussed more extensively below.

Campbell was also instrumental in introducing the study of *cultural* evolutionary processes to the psychological sciences. Inquiry into cultural evolution has an even longer history than theories of genetic evolutionary processes (Hull, 1988). But, again, because the consequences of cultural evolution manifest at the level of whole populations, and not just individuals, these processes are easily viewed as lying largely outside the domain of psychological inquiry. Campbell (1965b, 1974, 1975) published a series of important articles in which he articulated the implications of cultural evolutionary processes for exactly the kinds of things – knowledge structures and social behaviors – that psychologists care about.

Stereotypes are, of course, also among the things that psychologists care about. There is a venerable tradition of psychological research devoted to assessing and documenting changes in widespread stereotypes (e.g., Katz & Braly, 1933; Madon et al., 2001), as well as on how stereotypes are communicated from one person to another (e.g., Clark & Kashima, 2007; Lyons & Kashima, 2003; Ruscher, 1998, 2001). The logic of cultural evolution provides a set of conceptual tools through which these two research traditions can be connected, such that stereotype communication affects the contents of widely shared stereotypes. Thus, just as cultural evolutionary processes influence the myths, legends, and other narratives that define popular culture (e.g., Heath, Bell, & Sternberg, 2001; Norenzayan, Atran, Faulkner, & Schaller, 2006), these processes also influence the extent to which some stereotypes, rather than others, have enduring social consequences.

We elaborate below on the implications of cultural evolution for the study of stereotypes. But first, we review the more substantial body of research that focuses on human genetic evolution and its implications for the study of human prejudices.

## GENETIC EVOLUTION AND THE PSYCHOLOGY OF PREJUDICE(S)

Evolutionary inquiry into human psychology assumes that if (a) some specific psychological tendency has some genetic basis, and (b) that psychological tendency, relative to alternative tendencies, promotes reproductive fitness (i.e., the perpetuation of genes into subsequent generations), then (c) that specific psychological tendency (along with its genetic basis) will become increasingly widespread within a population. Within that meta-theoretical framework, specific hypotheses can be deduced by identifying ecological circumstances that, over long stretches of human evolutionary history, were likely to have imposed enduring selection pressures on psychological tendencies that conferred higher levels of reproductive fitness. In the absence of any countervailing selection pressure, these adaptive psychological tendencies are presumed to have become widespread within the population, influencing human affect, cognition, and behavior in contemporary environments.

These psychological adaptations may take many forms, including attentional biases (Maner, Gailliot, Rouby, & Miller, 2007), cognitive shortcuts in information processing (Gigerenzer et al., 1999), competencies in logical reasoning (Cosmides & Tooby, 2005), and means of learning and knowledge acquisition (Öhman & Mineka, 2001). When applied to the psychology of prejudice, this adaptationist logic typically focuses on specific stimulus–response associations, such as the tendency for a specific superficial characteristic (a facial scar, for example) to trigger a particular set of affective, cognitive, and/or behavioral responses. Many lines of research have identified prejudices (i.e., specific stimulus–response associations) that are likely to have been adaptive over the course of human history. Importantly, this body of work does much more than merely speculate about the evolutionary origins of these prejudices; it also has produced many novel hypotheses specifying particular circumstances under

which these prejudices are either more, or less, likely to emerge.

### ***Obligatory interdependence and ingroup favoritism***

One line of research emerges from the fact that, compared to many other species, *homo sapiens* is an unimposing physical specimen. Humans are relatively weak, and lack the physical weaponry (sharp fangs, claws, or talons) and protective armor (thick hides, hard shells) that characterize many other species. Human offspring also mature slowly. These limitations are likely to have imposed severe fitness costs on individuals who lived solitary lifestyles. These limitations are ameliorated, however, for individuals who live within the protective milieu of a coalitional group. Humans also are characterized by extraordinary psychological proficiencies – including capacities for language, planning, and perspective-taking. These psychological assets would be valuable under any circumstance, but are especially powerful aids to reproductive fitness when employed within a group context where knowledge (e.g., where to find food, how to construct a weapon) can be passed on to others. Thus, compared to those who pursued solitary lifestyles, significant fitness benefits accrued to our ancestors who lived in highly interdependent, cooperative groups. Thus, it has been speculated that there evolved psychological mechanisms disposing humans toward a lifestyle characterized by *obligatory interdependence* with other people (Brewer, 1997; Brewer & Caporael, 2006).

Interdependence is not without its perils. In any population characterized by obligations to others, there is the risk of exploitation by individuals who reap benefits from others' largesse while neglecting to contribute to the common good. Many psychological adaptations have been identified that may help resolve this dilemma (e.g., Cosmides & Tooby, 2005). One set of adaptations is specifically relevant to intergroup prejudice: Psychological mechanisms that allow individuals to identify the boundaries of a coalitional ingroup so as to behave altruistically toward

individuals within the ingroup, but not to individuals outside this boundary (Brewer, 1999; Brewer & Caporael, 2006; Campbell, 1965a).

An important implication of this analysis is that the resulting prejudice (favoring members of coalitional ingroups, relative to others) represents ingroup favoritism (preference for the ingroup) rather than outgroup derogation (dislike of outgroups). Thus, ingroup favoritism need not be associated with any aversive response toward outgroups (Brewer, 2007). This implication is consistent with the results of experiments conducted within the 'minimal groups paradigm' (which assesses evaluations of, and rewards allocated to, ad-hoc groups created in laboratory environments) that show greater evidence of ingroup favoritism than outgroup derogation (Brewer, 1999). Indeed, ingroup favoritism can be shown even in the absence of an outgroup (Brewer, 1979; Gaertner, Iuzzini, Witt, & Orina, 2006).

### ***The evolution of coalitional psychology and its implications***

Theoretical inquiry into the evolutionary importance of coalitional groups has yielded additional implications. One is that many contemporary social categorizations (e.g., categorizations based on race or ethnicity) – and the prejudices associated with them – are context-specific manifestations of deeper, universal psychological mechanisms that evolved to distinguish between coalitional ingroups and outgroups. Although individuals may be hyper-vigilant to markers of race or ethnicity in some contemporary cultural contexts, this tendency exists not because there is anything evolutionarily fundamental about race or ethnicity, but because race and ethnicity happen to be superficial markers for the evolutionarily fundamental distinction between coalitional groups. As a consequence, the perceptual and mnemonic potency of racial cues (e.g., skin color) may disappear under circumstances in which other, even more powerful indicators of coalitional group membership exist. One set of studies found that any tendency to categorize individuals

according to race entirely disappeared when those individuals wore clothing (sports team uniforms) that served as more meaningful signal of coalitional group membership (Kurzban, Tooby, & Cosmides, 2001).

The emphasis on coalitional groups stems from the assumption that strong fitness benefits accrue to individuals who live within coalitional groups. These benefits are greatest when within-group interaction is efficient, cooperative, and coordinated by normative rules. Any breakdown in social coordination imposes fitness costs. Thus, prejudices against individuals who threatened social coordination may have evolved (Neuberg, Smith, & Asher, 2000; Schaller & Neuberg, 2008). Coalitional outgroup members may represent one such threat, because they likely adhere to rules and norms that deviate from those observed within an ingroup. This implies one evolutionary basis for xenophobia. But ingroup members may also undermine social coordination if they exhibit attitudes or behaviors that deviate from important group norms, implying an evolutionary basis for prejudices directed against ingroup members who violate group norms. Such deviant ingroup members are especially likely to be targets of prejudice under conditions in which their counter-normative attitudes appear especially likely to undermine effective group coordination, such as when those individuals are in positions of influence over others. Consistent with this implication, employment discrimination against homosexuals is especially strong when they are being considered for positions that connote considerable social influence (e.g., schoolteachers), compared to positions (e.g., jobs in the retail industry) that provide less opportunity for far-reaching social influence (Neuberg et al., 2000).

### ***Different fitness-relevant threats and different prejudice syndromes***

A deficit in social coordination is just one kind of fitness-relevant cost that may result from the actions (or mere presence) of other people. Fitness costs may also be implied by specific attitudes, actions, or characteristics. People

who fail to reciprocate acts of generosity can impose fitness costs. So can people who threaten one's physical safety (e.g., through acts of aggression) or health (e.g., because they have an infectious disease). Kurzban and Leary (2001) argued that specific psychological mechanisms evolved to stigmatize, discriminate against, and socially exclude individuals who represent these threats.

Importantly, this line of reasoning has implications that extend far beyond the mere observation that people do not much like folks who pose threats to their fitness. Neuberg and his colleagues (Cottrell & Neuberg, 2005; Neuberg & Cottrell, 2006; Schaller & Neuberg, 2008) have suggested that qualitatively different kinds of fitness threats are associated with psychologically distinct prejudices. Thus, just as different non-social threats (predators, poisons) inspire very different emotional responses (fear, disgust), different social threats inspire very different *prejudice syndromes* – defined by distinct affective experiences, cognitive associations, and behavioral consequences (Neuberg & Cottrell, 2006). Each prejudice syndrome represents a functionally adaptive response to a particular form of threat. Consistent with this evolutionary analysis, empirical evidence reveals that different social groups are associated with functionally distinct kinds of threat and, correspondingly, distinct emotional responses (Cottrell & Neuberg, 2005). This evolutionary analysis implies that the psychology of prejudice is more accurately characterized as the psychology of prejudices (plural).

An additional implication (with important practical applications) is that each distinct prejudice syndrome may vary across contexts, depending on the extent to which perceivers feel vulnerable to different types of threats. According to Neuberg and Cottrell (2006, p. 174), if prejudice syndromes are indeed responses to specific threats ... they ought to be triggered more easily, and experienced more intensely, in some (specific) situations (i.e., those that suggest a vulnerability to the target-relevant threat) and for some (specific) individuals (i.e., those who have a low

threshold for perceiving – accurately or not – the target-relevant threat).

Supporting evidence emerges mainly from two distinct research programs, one of which focuses on the threat of interpersonal aggression, and the other on the threat of disease. We briefly review each.

### ***Implied threat of interpersonal aggression and its implications***

Throughout much of human evolutionary history, intergroup contact was often associated with an increased likelihood of interpersonal aggression and physical injury (Schaller & Neuberg, 2008). As a consequence, psychological mechanisms (and their underlying genetic bases) may have evolved to dispose individuals to implicitly associate outgroup members with traits connoting aggression, violence, and danger. But, while there may be fitness benefits associated with such prejudicial beliefs (e.g., hypervigilant avoidance of potentially-dangerous intergroup encounters), there may be costs as well (e.g., caloric costs associated with the fearful avoidance behaviors). Therefore, these prejudice processes are expected to be sensitive to additional information indicating the extent to which their benefits outweigh their costs. The upshot is that prejudicial responses are especially likely to be triggered under conditions in which perceivers sense that they may be especially vulnerable to danger, but may be muted when perceivers feel relatively invulnerable.

This line of reasoning has resulted in novel discoveries about when specific prejudicial beliefs (but not others) emerge. For instance, people typically feel more vulnerable to danger when they are in the dark (Grillon, Pellowski, Merikangas, & Davis, 1997). Consequently, ambient darkness disposes people to perceive ethnic outgroups to be more aggressive and hostile – and this effect is especially pronounced among individuals who are chronically concerned with interpersonal threat (Schaller, Park, & Faulkner, 2003a, 2003b). Importantly, this effect is specific to prejudicial beliefs along danger-connoting

traits (e.g., hostility); no such effect is observed on equally negative but danger-irrelevant traits (e.g., ignorance).

In fact, while increased vulnerability promotes evaluatively negative stereotypic beliefs on traits connoting aggression and untrustworthiness, it can actually promote ostensibly positive stereotypic beliefs along other trait dimensions (such as competence or agency). For example, in an experiment conducted within the context of the ongoing ethnic conflict in Sri Lanka, a temporarily increased sense of vulnerability caused Sinhalese Sri Lankans to perceive an ethnic outgroup (Sri Lankan Tamils) as especially aggressive, but also as especially skillful and competent (Schaller & Abeyesinghe, 2006) – presumably because, in the context of malevolent intentions, a high level of competence connotes an especially high level of danger.

This perspective implies gender differences as well. Historically, violent intergroup contact was especially likely to occur between males. This implies that men (compared to women) are especially likely to perceive outgroup members as stereotypically dangerous, and are especially prone to have these prejudicial perceptions triggered by contextual cues (such as darkness) connoting vulnerability to harm. Several studies show such gender differences (see Schaller & Neuberg, 2008). In addition, given their greater physical strength and aggressiveness, men have typically posed a greater fitness-relevant threat to others. This implies that (compared to female outgroup members) male outgroup members are especially likely to trigger danger-connoting cognitive and affective associations and this has been shown to be so (Maner et al., 2005; Navarrete, Olsson, Ho, Mendes, Thomsen, & Sidanius, 2009).

Finally, this line of theorizing has important implications in the domain of person memory. There is a well documented cross-race face recognition bias, such that perceivers are very accurate at distinguishing between individual ingroup members, but not so accurate at distinguishing between outgroup members (Anthony, Copper, & Mullen, 1992).

The bias is commonly presumed to result from constraints on perceivers' perceptual processing capacities and from perceivers' tendency to pragmatically allocate perceptual resources (e.g., Sporer, 2001). The evolutionary framework yields new explanatory and predictive insights. Limited cognitive resources (necessary for the encoding and memory for individuating facial features) are likely to be selectively allocated to those individuals who are presumed to have the most immediate implications for reproductive fitness: members of coalitional ingroups. However, any potentially aggressive individual (as indicated by an obviously angry facial expression) is highly fitness-relevant, whether a member of an ingroup or outgroup. It follows that recognition memory for angry faces is likely to be highly accurate even for outgroup members and this has been shown to be the case (Ackerman et al., 2006). In fact, historically, angry outgroup members may have posed especially profound threats to reproductive fitness (compared to angry ingroup members, whose actual aggression may be muted by norms prescribing within-group cooperation). Thus, perceivers may actually be especially accurate in recognizing angry outgroup faces – a reversal of the face-recognition bias. Exactly such a reversal does emerge in studies assessing recognition memory for angry faces (Ackerman et al., 2006).

### ***Implied threat of disease transmission and its implications***

Even well-meaning individuals pose a threat to reproductive fitness if they carry infectious pathogens. Given the powerful fitness costs associated with pathogenic diseases, there likely evolved a suite of psychological mechanisms that sensitize perceivers to others who appear to pose an infection risk, and that facilitate aversive responses to those individuals. Moreover, consistent with the evolutionary cost-benefit logic discussed above, these prejudicial responses are especially likely to be triggered under conditions in which perceivers feel especially vulnerable to the

transmission of disease, but may be muted when perceivers feel relatively invulnerable to disease transmission (Schaller & Duncan, 2007).

Because pathogenic diseases are associated with a wide range of morphological and behavioral anomalies, anomalous appearance of just about any kind may trigger prejudicial responses – even if these anomalies are not actually symptomatic of disease (Kurzban & Leary, 2001; Schaller & Duncan, 2007). Indeed, under circumstances in which individuals feel especially vulnerable to infectious diseases, they show especially strong implicit prejudices against people characterized by many different kinds of non-normative physical characteristics, including people who are physically disabled, obese, or elderly (Duncan & Schaller, 2009; Park, 2003; Park, Schaller, & Crandall, 2007). In fact, physical unattractiveness of any kind might serve as a sort of crude heuristic cue for ill-health, and may thus lead to aversive trait inferences (Zebrowitz, Fellous, Mignault, & Andreoletti, 2003).

This particular prejudice syndrome may also contribute to xenophobia and ethnocentrism. Historically, intergroup contact led to increased exposure to pathogenic diseases. Also, given that many cultural norms (e.g., pertaining to hygiene practices and food preparation) serve as buffers against infection, contact with subjectively foreign peoples (those who ascribe to different cultural norms) may have posed an especially high risk of disease transmission. Consequently, people are likely to heuristically associate subjectively foreign outgroups with the threat of disease. This analysis suggests a disease-avoidance basis for xenophobia and ethnocentrism, with the additional implication that xenophobia and ethnocentrism may be exaggerated when perceivers feel especially vulnerable to infection. This appears to be the case (Faulkner, Schaller, Park, & Duncan, 2004): When Canadians perceive themselves to be especially vulnerable to disease, they show especially strong prejudices against subjectively foreign immigrant groups (e.g., immigrants from Peru and

Mongolia), but no such increase in prejudice against immigrants from subjectively familiar countries (such as Poland or Taiwan). Furthermore, ethnocentrism and xenophobia are also exaggerated among individuals who are temporarily immunosuppressed (women in the first trimester of pregnancy), and so actually are more vulnerable to infection (Navarrete et al., 2007).

### **Other cue-based interpersonal prejudices**

Two important evolutionary psychological principles are exemplified by the preceding line of research. First, people are perceptually sensitive to specific sets of physical characteristics that serve as heuristic cues connoting specific kinds of fitness-relevant categories (e.g., morphological anomalies are heuristic cues connoting potential infection risk). And second, given the signal-detection problem inherent in any such cue-based inference process, people often respond to an over-general set of cues (*any* morphological anomaly may serve as a cue connoting potential infection risk).

These principles also underlie a line of research documenting prejudicial perceptions of adults who happen to have childlike features. Because newborn infants are helpless and dependent on adults for survival, and because an adult's own reproductive fitness depends on the survival of one's infant offspring, the perception of babyish features in others may heuristically trigger functionally correspondent inferences (e.g., helplessness). This may happen even when rational analysis reveals that the target person is not at all infantile. The implication is a set of predictable stereotypes and prejudices: Compared to other adults, baby-faced adults are pre-judged to be relatively more ignorant, incapable, and guileless (e.g., Zebrowitz & Montepare, 1992, 2006; Zebrowitz & McDonald, 1991).

Other kinds of superficial physical features may trigger other kinds of prejudicial responses. For example, drawing on evolutionary biological research on kin selection and kin recognition, an extensive body of

psychological research shows that perceived self-other similarity inclines people to implicitly judge others – even total strangers – to be more kin-like (Park & Schaller, 2005; Park, Schaller, & Van Vugt, 2008). This sets the stage for many predictable prejudices in a variety of behavioral domains including sexual behavior, altruistic behavior, and even political outcomes (Bailenson, Iyengar, Yee, & Collins, *in press*; DeBruine, 2005; Krupp, DeBruine, & Barclay, 2008)

### **Social dominance and its implications**

Finally, there is an important line of research (associated with *social dominance theory*; Sidanius & Pratto, 1999) informed by the observation that fitness benefits are likely to have been associated with hierarchical group structures, and that most contemporary human societies are organized as group-based social hierarchies – with some groups of people exercising a disproportionate amount of power. Social dominance theory is not deduced strictly from evolutionary principles. Rather, it is a hybrid conceptual framework that integrates conceptual insights from different levels of analysis (e.g., evolutionary, psychological, sociological). The integrative framework produces hypotheses bearing on individuals' motivations to maintain existing group-based hierarchies and the social inequities implied by these hierarchies (Pratto, Sidanius, & Levin, 2006; Sidanius & Kurzban, 2003).

One implication is that many different prejudices may result, in part, from the tendency to justify and maintain the inequitable outcomes associated with dominant versus subordinate social categories. Consistent with this implication, individuals who score high on measures of social dominance orientation (i.e., people who are especially favorable toward the maintenance of dominance hierarchies) are especially prejudiced against a variety of different groups, and these prejudices are especially likely to emerge when intergroup context and other dominance-relevant considerations are temporarily paramount

(Pratto & Shih, 2000; Pratto et al., 2006, 1994).

Social dominance theory also has important implications for understanding ‘modern racism’ – the phenomenon in which overtly non-prejudiced attitudes mask more subtle expressions of racism. One set of studies found that overtly race-neutral objections to American affirmative action policies were predicted by dominance-related concerns, and that this relationship was especially strong among well-educated White people – who, presumably, stood to benefit the most from existing employment inequities (Frederico & Sidanius, 2002). Thus, ‘principled’ objections to affirmative action are not quite as principled as they appear, but may instead be based on latent desires to maintain the existing social hierarchy.

Social dominance theory, however, pertains not just to racial prejudice. The theory implies that the specific targets of dominance-based prejudices are likely to vary predictably, depending on the specific sociological context of inequality (Sidanius & Pratto, 1999). For instance, in societies described by salient race-based inequalities (e.g., North America, South Africa), social dominance orientation is especially like to predict racial prejudice. But, in societies in which social stratification is defined more saliently by social class or caste or religion (as in much of southern Asia), social dominance orientation is more likely to predict prejudices based on those particular categorical distinctions instead.

The theory also makes many unique predictions pertaining to sexism and gender stereotypes. In most human societies, men have historically exercised a disproportionate amount of societal power relative to women. It follows that men (compared to women) are especially disposed toward the maintenance of dominance hierarchies, and to show especially strong prejudices toward those who threaten their status in an existing dominance hierarchy (Pratto et al., 1994; Sidanius & Kurzban, 2003; Sidanius, Pratto, & Brief, 1995). In addition, social dominance orientation predicts gender-stereotypical attitudes. Among men,

higher levels of social dominance orientation are associated with lower levels of commitment to marriage and to offspring care; among women, higher levels of social dominance orientation are associated with a greater desire to marry a wealthy, high-status man (Pratto & Hegarty, 2000).

## CULTURAL EVOLUTION AND POPULAR STEREOTYPES

To this point, we have discussed how ancient evolutionary pressures, by operating on genes over many generations, may have shaped the psychology of prejudice. In addition, many scholars have observed that variation-and-selective-retention processes – which underlie genetic evolution – operate on other kinds of information too (e.g., Campbell, 1965b; Dawkins, 1976; Hull, 1988; Mesoudi et al., 2006). Specifically, selection mechanisms guide the evolution of cultural memes. Stereotypes are one such meme.

Many meaningful consequences of stereotypes exist only because those stereotypes are popular. Consider the phenomenon whereby African Americans perform poorly on academic tests under conditions that make salient others’ stereotypic beliefs about their ethnic group (Steele, 1997). This effect emerges only because the academic underachievement stereotype is widely shared across the American population, and has been for some time. The implication is hardly limited to this particular phenomenon. Stereotypes that are more popular are more likely to be activated in working memory, and these stereotypes in turn have more powerful consequences on individual behavior (Sechrist & Stangor, 2001; Stangor, Sechrist, & Jost, 2001). To the extent that stereotypes matter at all, they matter more whenever they are more popular (Schaller & Conway, 2001).

Why are some stereotypes popular, while others are not? Why do some stereotypes remain popular, while others disappear from the cultural landscape? Cultural evolutionary processes provide an answer to those questions.

Four key elements underlie a cultural evolutionary approach to stereotypes. First, there is a dualistic nature to the representation of stereotypes. At one level of analysis, stereotypes are individual-level cognitive representations; but at a second level of analysis, stereotypes are cultural representations shared by many members of a population (Stangor & Schaller, 1996). Second, the cultural representation of a stereotype – the extent to which it is popular – is driven largely by interpersonal communication processes. Third, interpersonal communication is a selective process: people are more likely to communicate about some things rather than others. The consequence is that certain kinds of stereotypes become, and remain, popular across the social landscape, but others do not. Fourth, the selective pressures imposed by communication are far from random. Individual-level psychological processes (motives, goals, etc.) predictably influence the extent to which people communicate about specific stereotypes. Consequently, these psychological processes influence the extent to which some stereotypes, rather than others, become enduring features of the popular landscape.

### ***Trait communicability predicts stereotype popularity***

A fundamental implication of this conceptual analysis is that, to the extent that an idiosyncratic bit of stereotypic knowledge is more likely to be talked about, it is not likely to remain idiosyncratic. If it is communicable, it is likely to become popular.

In one test of this hypothesis, Schaller, Conway, and Tanchuk (2002) obtained ratings for dozens of stereotypic traits indicating the extent to which information bearing on these traits is likely to be talked about. A separate sample of participants indicated the extent to which each trait was stereotypical of particular ethnic groups within the local geographical region. For prominent ethnic groups – those that people actually do talk about – more highly communicable traits were more likely to be central to the popular stereotype.

An additional study examined the effects of a trait's communicability on its persistence in the popular stereotype of American ethnic groups across 60 years. The communicability of a trait predicted the extent to which it remained central to the cultural stereotype of the most populous and prominent ethnic groups (e.g., Jews, African-Americans). Traits that people are especially likely to talk about (e.g., lazy) persisted in the popular stereotype, decade after decade, while less communicable traits (e.g., superstitious) did not.

It is notable that the predictive effect of trait communicability occurred only for conversationally prominent groups. This further implicates the importance of actual interpersonal communication. It is through acts of communication – individuals' choices about what to talk about and what not to talk about – that selection occurs, and this selection process predicts the evolving contents of popular stereotypes.

### ***Influences on communicability and their implications***

Why are some stereotypic traits more communicable than others? An answer lies in the analogy between genes and memes. The communicability of a gene (the extent to which it is transmitted to future generations) depends fundamentally on the ecological context. The communicability of a meme (such as a stereotypic trait) depends fundamentally on the *psychological* context – on the psychological state of the people who might, or might not, introduce that information into their conversations with others.

People generally communicate information they judge to be useful to their conversational partners. Information bearing on physical health and safety represents one of the most useful types to know about others. For example, people judge news stories to be more important, and to be more worthy of broadcast, if they arouse more fear (Young, 2003). Urban legends are more communicable to the extent that they arouse disgust (Heath et al., 2001). And in the context of impression formation, people prioritize

trait information bearing on interpersonal trust or distrust (Cottrell, Neuberg, & Li, 2007). Similarly, the communicability of a stereotypic trait positively correlates with the extent to which it connotes interpersonal danger or safety, and these same traits have been more persistent in the cultural stereotype of African-Americans (Schaller, Faulkner, Park, Neuberg, & Kenrick, 2004).

In addition to selectively crafting their communications to serve the needs of others, people also selectively craft their communications to serve self-interested goals, such as the desire to make a positive impression on others. Among other things, this accounts for individuals' reluctance to be the bearer of bad news (Rosen & Tesser, 1972). Impression management goals also influence the communicability of specific stereotypic traits. For example, if people believe that others will think more highly of them if they talk about positive traits, then they selectively talk about the positive characteristics of a group (e.g., intelligence); but if they believe that others will think more highly of them if they talk about negative traits, then they selectively talk about the negative characteristics of a group (e.g., aggressiveness). This direct impact of impression management goals on trait communicability has a consequent indirect effect – entirely unintended – on the emerging contents of socially shared stereotypes (Schaller & Conway, 1999).

Impression management goals may influence the communication of stereotypes in more subtle ways as well – favoring certain variations of the same trait over other, slightly different variations. In terms of functional implications, the blatantly sexist belief that 'women are not capable of taking care of themselves' is not very different from the more benevolent belief that 'women are sensitive and need protection.' But among people who worry about being perceived as prejudiced, these two beliefs may vary considerably in their communicability. The same is true of stereotypic information describing many ethnic minority groups. This may help to explain why, in the wake of the civil rights movements, blatant forms of racism are

replaced in the population by more discreet variations of the same essential prejudice (Gaertner & Dovidio, 1986; Swim, Aikin, Hall, & Hunter, 1995).

### **INTEGRATIVE THEMES, BROADER IMPLICATIONS, AND FUTURE DIRECTIONS**

We have reviewed many different lines of theory and research, each focusing on a specific set of phenomena relevant to the psychology of stereotypes and prejudices. While conceptually distinct, these lines of research are united by their emphasis on the variation-and-selective-retention mechanisms that define both genetic and cultural evolutionary processes.

Additional commonalities underlie the different lines of research that consider human evolutionary origins of contemporary prejudices. Whether the primary focus is on some specific kind of fitness-relevant danger (the threat of aggression, disease, etc.) or opportunity (the benefits of coalitional groups, hierarchical structures, etc.), these research programs all imply that contemporary prejudices emerge from psychological mechanisms that were adaptive in ancestral social ecologies, and that these mechanisms evolved because they help to solve fitness-relevant 'problems' (prospects to be attained, perils to be avoided) inherent to those ecologies.

Importantly, however, this does not mean that these prejudices are functionally adaptive in contemporary environments. Nor does it mean that these prejudices are inevitable or unchangeable. Quite the contrary. Evolutionary cost-benefit analyses imply the evolution of psychological mechanisms that are flexible and sensitive to contextual cues (Schaller, Park, & Kenrick, 2007). Evolutionary models that employ cost-benefit analyses often produce novel hypotheses about the specific contexts that are likely to either amplify or inhibit prejudicial responses. This not only yields novel scientific discoveries (e.g., the effects of immunosuppression on xenophobia

and ethnocentrism; Navarrete et al., 2007), it also provides a basis for the development of interventions that might help to moderate prejudices in contemporary environments (Neuberg & Cottrell, 2006; Schaller & Neuberg, 2008). Xenophobic responses to immigrant populations, for example, might be diminished by progressive public health policies and other interventions that reduce individuals' perceived vulnerability to infectious disease.

The psychological products of genetic evolution can influence cultural evolutionary processes too. Fitness-relevant information (e.g., traits connoting malevolence) may be especially communicable, especially within contexts (e.g., warfare, threat of terrorism) that enhance the salience of specific fitness-relevant prospects or perils. This has consequences on the evolving contents of popular stereotypes. Thus, just as evolutionarily informed interventions may inhibit the activation of pernicious prejudices (at an individual level of analysis), these interventions may also have additional consequences on the spread of stereotypes across a cultural landscape. Currently there is very little research that rigorously addresses this intersection of the two levels (individual and cultural) at which evolutionary processes operate. This remains an important topic for future research, which will not only contribute to the psychological understanding of stereotypes and prejudices, but also to a growing body of interdisciplinary attempts to integrate processes operating at evolutionary, cognitive, and cultural levels of analysis (Mesoudi et al., 2006).

Evolutionary insights can be useful not only in predicting stereotypes and prejudicial beliefs within a culture, but also in explaining the differences *between* cultures. There are substantial cross-cultural differences in the expression of specific kinds of prejudices (Inglehart, Basenez, & Moreno, 1998), but the origins of these cross-cultural differences remain largely unexplained. Recent research has employed evolutionary cost-benefit analyses to predict and explain relations between specific ecological variables

(e.g., pathogen prevalence) and specific cross-cultural differences (e.g., individualistic versus collectivistic value systems; Fincher, Thornhill, Murray, & Schaller, 2008). Similar analyses may help explain cross-cultural differences in specific kinds of prejudices as well.

Of course, to fully articulate the relations between evolution processes and contemporary prejudices, it will be necessary not merely to predict prejudices at a psychological level. Researchers will need to show how selection pressures influenced the frequencies of specific genetic variants within human (and pre-human) populations, and to identify relations between specific genes and prejudices. It will be useful to show how and why and under what circumstances those genes are (or are not) expressed during development. Additionally, research should attempt to trace the expression of those genes to the social and psychological processes through which individuals acquire prejudicial beliefs in the first place (e.g., associative learning mechanisms; e.g., Navarrete et al., 2009). And it will be useful to link the expression of those genes to the specific physiological mechanisms (neurotransmitter systems, neuroendocrine systems) that actually govern the experience, expression, and communication of prejudice at any particular moment in time.

## SUMMARY AND CONCLUSIONS

We have reviewed two distinct ways in which inquiry into evolutionary processes informs the psychological study of stereotypes and prejudices.

One approach draws upon foundational research in genetics and evolutionary biology, and applies these insights toward conceptual speculations about psychological adaptations that contribute to prejudices in contemporary social environments. Many of these deductions yield novel hypotheses, and novel empirical discoveries, about specific circumstances under which specific prejudices are likely to be either exaggerated or inhibited.

The second approach focuses not on genetic evolutionary processes, but instead on cultural evolutionary processes – the selective means through which some knowledge structures (rather than others) become, and remain, popular within any human society. Focused inquiry into cultural evolutionary processes yields novel hypotheses, and novel empirical discoveries, about specific circumstances under which specific stereotypes are likely to be social problems.

Both bodies of psychological research are informed by inquiries in other domains of biological and social science. The challenge associated with any evolutionary approach to human stereotypes and prejudices is that scientists must forge connections between phenomena operating at different levels of analysis. The benefit, ultimately, is a more complete understanding of human stereotypes and prejudices and what can be done to eliminate them.

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