2 Evolutionary Approaches to Stereotyping and Prejudice

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Males are stereotyped as more competitive than females, females as more caring than men, and African Americans as more physically aggressive and violent than European and Asian Americans. Heterosexuals are prejudiced against homosexuals, locals are prejudiced against immigrants, and religious people are prejudiced against atheists. As generalizations, these statements are supported by considerable bodies of empirical work, many of which are reviewed in the other chapters of this handbook.

Werner Heisenberg, the theoretical physicist, noted that "what we observe is not nature itself, but nature exposed to our method of questioning" (1958/1999, p. 58). The findings just described characterize the nature of one small subset of stereotypes and prejudices and emerge from methods of questioning derived from a variety of theoretical perspectives – perspectives focusing, for example, on ingroup/outgroup distinctions, social identity and self-enhancement processes, and a need to justify discriminatory behaviors against others. As we will see throughout this chapter, however, the nature of stereotypes and prejudices is often more nuanced and complex than what the questioning favored by such approaches allows us to discern. These nuances have important implications not only for our understanding of stereotyping and prejudice but also for the theoretical frameworks aiming to explain them.

Some of these nuances exist in the form of more textured conceptions of stereotyping and prejudice, missed by traditional methodological lenses focused at levels insufficiently fine to detect them. For example, when researchers use traditional measures to assess prejudices against groups as varied as gay men and Mexican Americans, respondents report feeling similarly prejudiced and negative toward the two groups. When researchers ask respondents about their specific emotional reactions to these groups, however, respondents report feeling quite differently toward the groups – feeling disgust toward gay men but fear of Mexican Americans (Cottrell & Neuberg, 2005). Other complexities have been missed because they occur beyond the scope of the investigative lenses derived from traditional frameworks. Consider, for example, that stereotypes of young African American men being dangerous are especially likely to come to mind for

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perceivers who are physically in a dark environment (Schaller, Park, & Mueller, 2003), or that a woman's current ovulatory stage influences her prejudices against outgroup men (McDonald, Donnellan, Cesario, & Navarrete, 2015). As conceptual variables, environmental darkness and fertility status lie well outside the theoretical architectures of traditional theories. That they nonetheless shape stereotype activation and prejudice has meaningful implications for our understanding of stereotyping and prejudice.

Although previously undetected via traditional perspectives, these nuances and many others have been uncovered with the theoretical lenses provided by evolutionary approaches. The aims of this chapter are to provide an overview of existing research inspired by evolutionary principles and to present hypotheses and findings related to stereotyping processes, stereotype content, prejudices, and discrimination. To anticipate, one can conceive of stereotyping, stereotypes, prejudices, and discrimination as functionally interlinked mental, affective, and behavioral tools designed by natural selection to enhance people's ability to identify and manage the threats and opportunities that arise amid the complex interdependencies of social living. We begin with a brief discussion of what an evolutionary approach is (and is not), and how it generates the affordance-management framework that conceptually captures the bulk of the presented research (see also Schaller & Neuberg, 2012; Neuberg & Schaller, 2016).

What Is an Evolutionary Approach?

What is an evolutionary approach to the study of prejudices and related phenomena? First, it is important to note that there is no singular evolutionary approach to prejudice, any more than there is a singular social psychological (or developmental or cognitive) approach to prejudice. Like social psychology, developmental psychology, and cognitive science, evolutionary psychology is a metatheory – a set of assumptions and principles that enable one to derive and test more specific theories, models, and hypotheses. What makes the evolutionary metatheory distinct is that it explicitly recognizes that the human brain has been shaped by biological selection pressures. This recognition is a simple one, but it enables the building of rich conceptual frameworks for understanding the different aspects of human thought, feelings, and behavior (e.g., Buss, 1995; Tooby & Cosmides, 1992).

Like any organ or biological system, the contemporary human brain is a product of natural selection (Darwin, 1871). The features of its anatomy, physiology, and neurochemistry (and accompanying mental processes and capacities) are therefore those that enhanced the reproductive fitness of our long-gone ancestors, relative to alternative features that existed at the time. For instance, individuals inclined to avoid predatory beasts were more likely than those without this inclination to survive such encounters, thereby increasing the likelihood they would successfully reproduce. To the extent that this avoidance inclination had a genetic component,

and that the benefits of avoiding such animals existed for a long enough period of time, modern humans would come to be characterized by this avoidance adaptation and the cognitive and emotional inclinations causally linked to it.

An evolutionary approach thus (a) seriously considers the possibility that prejudices, stereotyping, stereotypes, and discrimination are in some aspects evolved adaptations, like the inclination to avoid dangerous animals, and (b) derives from this possibility various implications for understanding how these adaptations work, when they come into play, and for whom.

The usefulness of an evolutionary approach to prejudices and related phenomena is judged by the same criteria as any meta-approach: How well does it account for existing knowledge? How well does it predict novel findings? To what extent is it logically coherent? How well can it conceptually integrate phenomena? As judged by such criteria, the evolutionary approach has proven itself quite useful across psychology broadly (Buss, 2015), across the many realms of social psychology (e.g., Neuberg, Kenrick, & Schaller, 2010), across the subject matter of social cognition (Neuberg & Schaller, 2014), and, as we show here, within the more specific realms of prejudices, stereotypes, stereotyping, and discrimination (see also Kurzban & Leary, 2001; Neuberg & DeScioli, 2015; Neuberg & Schaller, 2016; Schaller & Neuberg, 2012).

Before proceeding, it is important to preempt several common misunderstandings about evolutionary approaches (for a more comprehensive discussion, see Kurzban, 2002; Neuberg et al., 2010). First, just because a behavior is an *adaptation* does not mean it is *adaptive* (i.e., beneficial for its possessor) in modern environments. The human preferences for fatty and sweet foods are adaptations for ancestral environments, in which calorically rich food was scarce, and thus inclinations to consume such food when it was available would have been biologically adaptive. Such scarcity no longer exists in much of the modern world, with the consequence that our evolved attraction to dietary fat and sugar often leads to overconsumption and serious medical problems. Adaptations need not be still adaptive.

The second misunderstanding is that because evolution is a natural process, because prejudices have evolutionary roots, and because "natural" is often conflated with "good," then prejudices and related phenomena must be good. Just because a process is natural, however, makes it neither good nor morally acceptable. The evolutionary perspective helps identify what *is* – and why it is – but makes no claim about whether it *ought* to be. Explaining is not justifying, and just because aspects of prejudices may be natural does not bestow on them moral value.

Third, and related to this point, it is often presumed that adaptations are conceived of as perfect solutions to problems. They are not. Rather, they are solutions that enhanced our ancestors' reproductive fitness *relative to* whatever alternative solutions were available to them at the time. An adaptation need not be "smart" in any absolute sense. That aspects of stereotyping and prejudice may be adaptations does not imply that they are perfect solutions to the problems they were designed by natural selection to solve.

Fourth, it is often presumed that evolved mechanisms are inflexible or inevitable. This is also incorrect. Just because we have an evolved preference for fats and sweets does not mean we are compelled to gorge ourselves on them. Just because we have an evolved inclination to fear young outgroup men does not mean we always seek to escape from, avoid, or attack them. Indeed, as we will see, functional *flexibility* is a fundamental implication of the evolutionary approach. Indeed, adaptations often depend critically on information from the environment, as when early developmental experiences, social learning, and culture play a strong role in determining which young men we identify as "outgroup."

Affordance Management

From an evolutionary perspective, the human mind has been shaped to address challenges to enhancing reproductive fitness – to perpetuate one's genes into future generations. Importantly, reproductive fitness is not just about successfully solving the challenge of mating, per se, but also about successfully solving a wide range of interconnected challenges (Kenrick, Griskevicius, Neuberg, & Schaller, 2010). One needs to survive in order to mate, which means acquiring nutrition and avoiding predation and disease. Moreover, individuals not only need to acquire a mate and successfully produce offspring but also to successfully parent to ensure that offspring themselves survive to reproduce. Furthermore, these challenges, such as protecting oneself from physical harm, acquiring resources, finding a mate, and caring for offspring, often entail addressing other challenges, such as gaining status, finding others to cooperate with on necessary tasks, and retaining one's mate.

Humans have long been highly interdependent social animals (Campbell, 1982; Richerson & Boyd, 1995), meaning that our ability to address fundamental challenges of reproductive fitness can be facilitated or hindered by the presence and actions of others. Although the social cooperation and coordination inherent to human sociality provides many opportunities and benefits to the individual, it also affords threats: for example, others may free-ride on one's efforts or take more than their fair share; they may commit violence or pass along infectious pathogens; they may espouse values and behave in ways that interfere with effective social coordination. An evolved psychology is therefore likely to be adapted to identify and address the particular types of social opportunities and threats afforded by others. We refer to the sets of evolved psychological mechanisms designed to address such threats and opportunities as *affordance-management systems* (Gibson, 1979; McArthur & Baron, 1983; Neuberg, Kenrick, & Schaller, 2010, 2011; Zebrowitz & Montepare, 2006). Stereotyping, prejudices, stereotypes, and discriminating behaviors are among the tools constituting these affordance-management systems.

Three themes run throughout much of the chapter. The first is that each of the different kinds of social opportunities and threats others pose often requires a qualitatively different response. Hence, multiple affordance-management systems are needed, each of which attends to and processes somewhat different information and generates somewhat different specific emotional and behavioral responses (Neuberg et al., 2011). That is, rather than reacting to a generalized threat with domain-general responses, people instead react to specific threats with domain-specific responses. One implication of this is that there are likely to exist qualitatively different prejudices and forms of discrimination to address the different threats others are perceived to pose. Rather than conceptualizing people's affective reactions to groups as prejudice (singular), it thus makes more sense to view them as prejudices (plural) – as different profiles of emotional responses (e.g., fear, disgust, anger) specific to the particular threats groups are believed to pose (Cottrell & Neuberg, 2005); we elaborate on this later.

The second theme relates to issues of accuracy and rationality in stereotyping and prejudice processes. Stereotyping processes, and the contents of stereotypes, have traditionally been viewed, and sometimes even defined, as inaccurate. In the same vein, prejudices and discriminatory behavior have also often been viewed as irrational. From an evolutionary affordance-management perspective, however, one would expect many stereotypes to possess meaningful kernels of truth. Even where they depart from accuracy, they might be expected to do so in highly predictable ways. Moreover, because cues to threat are imperfectly diagnostic, one would expect people to sometimes respond to objectively benign others with prejudices – but in ways that are "rational" in the sense that they are functionally tuned to shifts in perceived vulnerabilities. We elaborate on this later, too.

The third theme is that prejudices and discrimination are especially likely to be evoked when perceivers view themselves as interpersonally vulnerable. This felt vulnerability may be dispositional, as with some individuals who chronically view the world as a dangerous place. It may be situational, as when people find themselves in poorly lit, strange environments. It may be interpersonal, as when people encounter individuals from groups already stereotyped as threatening. It may be the result of all three, as when North Americans who are dispositionally fearful of attack and find themselves alone in a dark room are confronted with young African American men (Schaller et al., 2003). Prejudices and discriminating responses are functionally flexible, and their activation and engagement depend on interactions of vulnerability-relevant features of perceivers, their situations, and those being perceived.

Stereotyping: Why, and Which Categories?

Effective affordance management requires, first, that one identify the threats and opportunities potentially posed by others. The process of stereotyping can be viewed as serving that function.

To stereotype is to identify an individual as being a member of some group and then to infer that this individual possesses the characteristics typical of members of that group. The traditional understanding is that stereotyping serves to simplify the world for an information processor burdened by limited cognitive resources (Allport, 1954; Hamilton, 1981; Tajfel, 1969): By viewing a particular individual as being like typical members of some group, one need not engage in more effortful and lengthy attempts to understand him or her as a unique individual.

From an evolutionary perspective, however, conservation of mental resources and acts of simplifying, in and of themselves, cannot be the ultimate goal. Rather, we seek to understand others because they have affordance implications for us – they potentially pose threats and provide opportunities. Thus, the more fundamental goal of social perception needs to be a sufficiently accurate under-standing – accurate enough that we can predict to some reasonable degree others' affordance-relevant actions. We want to know about others not only quickly and easily, but we want to know specific things about them – about whether, for example, they are inclined to cooperate with us, hurt us, love us, or feed us. The reason we so ubiquitously stereotype others is that, for our ancestors, (a) there were certain regularities between readily perceived features of others and their affordance-relevant behaviors, and (b) those individuals who used these regularities to make inferences about others – that is, who stereotyped in specific ways – would have, on average, interacted with others more effec-tively, enhancing their reproductive fitness relative to those who did not stereotype.

To say that stereotyping is an adaptation is not to say that it will necessarily lead to perfect inferences about others – about whether they are, for example, coopera-tive, trustworthy, or dangerous. As noted earlier, adaptations are not perfect solutions, but merely solutions that were better for our ancestors' reproductive fitness than whatever alternative solutions were available at the time. In fact, as we discuss later, several parts of the stereotyping process – the overgeneralization of cues that imply threat, the particular contents of certain stereotypes – do tend to be biased. They are biased, however, in ways that tend, on average, to reduce the likelihood that perceivers make the most costly of possible errors.

In addition, to say that stereotyping is an adaptation is not to say that social perceivers never move beyond stereotyping to more carefully attend to potentially individuating information about another. Indeed, the focus of an evolutionary approach on the need to obtain affordance-relevant information suggests specific circumstances under which people will be especially motivated to individuate others. As with other conceptual approaches, an evolutionary approach suggests that individuation becomes more likely when time to delve more deeply into another's inclinations is available, when there is reason to believe that one's stereotypes insufficiently capture a particular target's inclinations, and when nuanced inferences are especially important, such as when the perceiver's out-comes especially depend on the actions of the perceived (e.g., Fiske & Neuberg, 1990; Neuberg & Fiske, 1987; Pendry & Macrae, 1994). Evolutionary approaches

also make more specific predictions about the use of stereotyping and individuating processes related to particular categories and stereotypes. For example, a perceiver currently concerned with physical safety may be especially likely to stereotype (and not spend the additional time and energy needed to individuate) young outgroup males, who – relative to outgroup females or older males – are believed to pose special risks of danger. In contrast, if there is less time pressure on making a social judgment, and judgments need to be made in especially complex domains of social life (e.g., managing social status) or in domains with significant long-term fitness implications (e.g., choosing a mate), one may be particularly likely to go beyond initial stereotyping in the hope of gaining a more nuanced understanding of the another. Just as stereotyping is likely an adaptation, so too is more thoughtful individuation (Neuberg, 1992). Social perceivers are functionally flexible, employing different strategies to gain understanding under different fitness-relevant circumstances.

From an evolutionary perspective, perceivers should categorize others in ways that, across human history, have enabled valid inferences about others' affordance-relevant capacities and inclinations. Of course, as revealed by work using the minimal group paradigm (e.g., Tajfel, Billig, Bundy, & Flament, 1971), people can generate a wide variety of seemingly arbitrary dimensions on which to categorize others. This does not mean, however, that the category dimensions used in "real-world" social perception tend to be arbitrary. Few of us categorize people by earlobe length or forearm thickness – and for good reason: Under most circumstances, such features provide little information about social opportunities and threats. Years of research reveal that people do categorize others, however, by age, sex, and race (for reviews, see Brewer, 1988; Fiske & Neuberg, 1990; Kinzler, Shutts, & Correll, 2010; Macrae & Quadflieg, 2010). Why are these features so important? And from an evolutionary perspective, what others might be similarly important? We briefly address each.

Age and Sex Stereotyping. Why are age and sex so often the basis of social categorization? Traditional work notes that physical cues to these dimensions are easily perceived, and that cultural norms and conventions teach that they are important. These are insufficient explanations, however. After all, other perceptually accessible features (e.g., shirt color) do not have the same impact on person perception. Moreover, cultural practices and norms regarding which features are important themselves need to be explained (i.e., *why* do cultures teach that age and sex are important features?). From an evolutionary perspective, age and sex are readily used as a basis for stereotyping because these features provide much information about the threats and opportunities others potentially pose.

Age and sex have long enabled diagnostic (albeit imperfect) inferences about others' potential abilities and capacities. Infants and young children are incompetent and require our care, young adults tend to be fertile and to possess physical capacities enabling strenuous physical work, and elderly people have acquired wisdom from experience. The differential biology of males and females provides

valid cues regarding with whom we can successfully mate and have children, at whose body we can nurse, and by whose hand we would be most physically injured if assaulted.

In addition to enabling diagnostic inferences about others' potential abilities and capacities, age and sex enable diagnostic inferences about others' goals, strategies, and behavioral inclinations. To better understand this, consider life history theory – a biological framework that examines how organisms allocate energy and time to different tasks (e.g., growth, mating, parenting) across the life span (Charnov, 1993; Stearns, 1992). Given finite resources (e.g., time, energy), all organisms, including humans, face the problem of how to allocate resources to facilitate survival and reproduction (Hill & Kaplan, 1999; Kaplan & Gangestad, 2005). The optimal allocation strategy varies across three dimensions, two of which are age and sex. Age is important because devoting resources to mating is possible only after sexual maturity, whereas devoting resources to offspring care can only occur after reproduction. Sex is important because most female mammals are obliged to invest a greater minimal amount of biological resources in offspring, including gestation before birth and nursing after birth (Trivers, 1972). A secondary implication of this sex difference is that female mammals, including humans, tend to be choosier about their mates – they can create fewer offspring across their lifespan and thus the quality and survival of each one is of greater importance – and this leads to pressure on males to compete with one another to be chosen by females.

Because age and sex shape how people prioritize their goals and their behavioral strategies for achieving them, and because such behaviors carry affordance implications for social perceivers (e.g., in terms of mating possibilities, competition threats), social perceivers are likely to be attuned to others' age and sex and use these features to make inferences about others.

An evolutionary approach goes a step further. The affordance implications of age and sex depend on each other. Females, for instance, are fertile only within a particular age range, and although males tend to invest more energy into competing for mates than do females, this sex difference diminishes at older ages. It should thus be less useful for people to categorize others by age and sex independently than by specific age-sex intersectional subcategories (Neuberg & Sng, 2013). We elaborate on this latter point when discussing stereotype content.

Race Stereotyping. Throughout time, human social groups have included males and females across a wide range of ages. Moreover, age and sex can predict important information about social opportunities and threats. Hence, the social mind should be highly attuned to cues of age and sex, and these features should be used to anticipate others' behaviors.

In many ways, race is different. Human social groups have only very recently (in evolutionary time scales) included a diversity of races. Our human ancestors were unlikely to have encountered others of different races, meaning that there would have been no selection pressures for a psychology sensitive to race per se. Yet, people stereotype others by race. Why?

One possibility brings us back to life history theory. Along with age and sex, ecological circumstances are an important driver of organisms' behavioral strategies. Ecology is important because in unpredictable environments in which resources are scarce and mortality rates high, it is more adaptive to invest one's energy into reproducing early than into building one's body and accumulating skills and knowledge for future use. Put simply, delaying reproduction in an unpredictable and high-mortality environment could lead to death without having reproduced. This present-focused orientation has been termed a "fast" life history strategy and is associated with a suite of traits including earlier first sex, greater promiscuity, having more children, impulsivity, and antisocial behaviors including violence and criminality (e.g., Brumbach, Figueredo, & Ellis, 2009; Ellis, 2004; Figueredo et al., 2005; Figueredo et al., 2006; Griskevicius, Tybur, Delton, & Robertson, 2011). A "slow" life history strategy is composed of the opposite, more future-focused, traits and is more likely to emerge in ecologies characterized by sufficient resources, greater predictability, and lower mortality.

Behaviors comprising fast versus slow strategies potentially have important affordance implications for others. It is important for us to know, for example, whether a person we encounter is more or less likely to act impulsively, or whether a potential mate is interested in a short-term versus long-term relationship. Our ancestors who were able to discern the association between changing ecological circumstances (e.g., resulting from seasonality, droughts, natural disasters) and others' behaviors were likely to have better anticipated the social threats and opportunities others posed, consequently enhancing their reproductive fitness. We might thus expect modern humans to be sensitive to cues to others' home ecology and to stereotype others in terms of these ecologies (Neuberg & Sng, 2013; Williams, Sng, & Neuberg, 2016).

What does this have to do with race? In many places around the world, members of different races (or ethnicities, tribes, castes) are differentially distributed across ecologies. In the United States, African Americans are overrepresented in economically harsh and unpredictable environments, whereas European Americans are overrepresented in more economically sufficient and stable environments (Massey, 2004; Sampson, Raudenbush, & Earls, 1997). This correlation between race and ecology raises the possibility that perceivers may use race as a cue to the more fundamental ecology, thereby explaining the common use of race as a dimension for categorizing others.

A second possibility, independent of the first, is that race cues another feature people use to categorize others – coalitional membership. Ancestrally, people who looked very different from one another – for example, because they employed distinct bodily markings – often also belonged to different cooperative groups. Perhaps, then, people categorize others by race as a proxy for categorizing them by coalition. If so, when social perceivers are presented with direct information about an individual's coalitional membership, the individual's race should become less relevant as a basis for categorizing him or her. Indeed, when social perceivers receive information about both a target's coalitional membership and race, they

become less likely to categorize that individual by race (Kurzban, Tooby, & Cosmides, 2001; Pietraszewski, Cosmides, & Tooby, 2014). Thus, because perceivers seem to be attuned to cues of coalitional group affiliations in general – a point we address later – race might be the basis for stereotyping because of its perceived association with distinct coalitional groups.

Disease-, coalitional-, and kin-based stereotyping. From an evolutionary perspective, other features are also likely to carry important affordance information. Given the threats that infectious diseases have long posed to individual survival and reproduction, people use cues associated with infectious disease (e.g., rashes, poxes, coughs) to categorize others as infectious. This is a significant challenge, however. The perceptible symptoms associated with infection vary greatly across pathogens and even across individuals infected with the same pathogen. Moreover, a huge number of different pathogens pose threats, and many evolve very rapidly. As a consequence, relying on any small set of specific cues to identify infectious others is likely to be ineffective over time. Instead, one might expect evolved psychologies to be sensitive to pathogens' more general tendency to leave atypical physical or behavioral marks on the infected individual and thus use a broad range of cues, including morphological and movement abnormalities, to implicitly categorize an individual as diseased (Schaller & Park, 2011). This is an important aspect of what is referred to as the *behavioral immune system* – an affordance-management system that influences behaviors with the goal of avoiding infection by pathogens. Indeed, social perceivers use many statistically abnormal features – including those linked to physical disability, obesity, and being elderly – to implicitly identify individuals as diseased (Duncan & Schaller, 2009; Park, Faulkner, & Schaller, 2003; Park, Schaller, & Crandall, 2007; Schaller & Neuberg, 2012).

Of course, having a movement disorder, being obese, and being heavily wrinkled are, at best, only weakly diagnostic of the presence of contagious pathogens. What this means is that many physically abnormal but pathogen-benign individuals will nonetheless be misidentified as posing a threat of infection. As with other threat-management systems, the behavioral immune system is biased toward avoiding the most costly of possible errors (Haselton & Nettle, 2006) – in this case, the cost of becoming infected with a dangerous pathogen (as opposed to the cost of avoiding a person even though they are not infected). As an illustration, consider the two types of errors a household smoke detector can make: It can falsely identify a dangerous fire when there is none (e.g., going off while bacon is smoking on the stovetop), with the cost of irritating the homeowner, or it can fail to detect an actual fire when there is one, with the potential cost of life to the homeowner. Because the latter error is much more costly than the former, smoke detectors are calibrated to avoid them, with the necessary consequence that the detector becomes more likely to make the opposite error – going off when there is no fire at all. Our psychological threat detectors are similarly calibrated to avoid the most costly errors – being infected, attacked, cheated – with the inevitable consequence that they, too, sometimes "go off" when the targets of our attention are actually benign

(Nesse, 2005; Neuberg et al., 2011). Consequently, morphologically abnormal but healthy individuals are nonetheless perceived to be potentially contagious (Schaller & Park, 2011), and non-threatening outgroup men are perceived to be dangerous (e.g., Becker, Neel, & Anderson, 2010; Maner et al., 2005; Schaller et al., 2003). Thus, although the process of stereotyping individuals as being members of threatening groups is error prone, these errors are not random. Rather, they follow a fairly straightforward "better safe than sorry" logic that, despite errors, on average enhances the fitness of the perceiver.

People also categorize others by their apparent coalitional affiliations, as mentioned earlier. Ancestral life was generally lived within small cooperative groups, although contact with other coalitions was not infrequent. Such inter-coalitional contact often posed a variety of threats, including violence. Indeed, aggressive intergroup conflict is believed to be a long-recurring feature of human social life, with evidence that it exists both within our primate relatives (Goodall, 1986; Wilson & Wrangham, 2003) and modern hunter-gatherers (Chagnon, 1988; Ferguson, 1984; Haas, 1990). Moreover, even within groups, competition for resources and mates leads to the formation of internal coalitions that have the potential to create intragroup violence. One would thus expect social perceivers to be sensitive to coalitional memberships and to stereotype others on that basis. One can view stereotyping by race, ethnicity, tribe, clan, religion, and other memberships – even arbitrary memberships as created via the minimal intergroup paradigm – as being examples of coalitional stereotyping.

From an evolutionary perspective, kinship should be another feature used to categorize and stereotype. Our ancestors who were able to discriminate between genetic relatives and non-relatives, and who used this ability to facilitate the survival and reproduction of related individuals, would have been more likely to pass their genes into future generations – with the consequence that kinship would be an important basis of contemporary stereotyping. An evolutionary approach certainly does not propose that individuals are born with knowledge of who their relatives are. Instead, an evolved relatedness-detection system would be attuned to cues that, in ancestral life, would have been reliably associated with kinship. Existing work has demonstrated that such cues include facial resemblance to the self, extended periods of co-residence, and attitudinal similarities (DeBruine, 2005; Lieberman, Tooby, & Cosmides, 2007; Park & Schaller, 2005).

In sum, we have seen that an evolutionary approach would anticipate that people stereotype others by age, sex, ecology, race, coalition, disease, and kinship. These features, among others, are used by social perceivers because they typically have – or at least had, for our ancestors – some diagnostic utility: They carry useful information about the threats and opportunities afforded by individuals with those features. Categorizing others as threatening, however, is potentially costly. Not only does it lead one to subsequently engage in energetically expensive behaviors to address the threat, but one may also be missing valuable opportunities while doing so. Stereotyping processes should thus be flexible – especially ready to engage certain categorizations and inferences when there is sufficient reason to

believe that one is vulnerable to threat, but also more open to alternative categorizations when one feels more secure. Indeed, they are. For example, White perceivers led to be concerned about resource scarcity become more likely to categorize racially ambiguous faces as Black rather than White, and to view African Americans more stereotypically (Krosch & Amodio, 2014; Rodeheffer, Hill, & Lord, 2012). In a similar vein, White perceivers are especially likely to categorize an angry, racially ambiguous face as belonging to an outgroup when they feel dispositionally vulnerable to physical threat and believe themselves to be in a dangerous environment (Miller, Maner, & Becker, 2010). And perceivers are especially likely to categorize others by their physical attractiveness when in a highly invested romantic relationship and the target others are potentially same-sex competitors (Maner, Miller, Moss, Leo, & Plant, 2012). In all these cases, both the boundaries and the usage of social categories vary predictably by individual and situational characteristics. These characteristics are linked to felt vulnerabilities, in ways that one would expect if a function of categorization and stereotyping processes is to manage affordances (for broader reviews, see Neuberg, Becker, & Kenrick, 2013; Neuberg & Schaller, 2014).

Stereotype Content: Beliefs about Threats and Opportunities

The study of stereotype content has a considerable history (e.g., Devine & Elliot, 1995; Fiske, Cuddy, Glick, & Xu, 2002; Katz & Braly, 1933; Madon et al., 2001; Niemann, Jennings, Rozelle, Baxter, & Sullivan, 1994), and an evolutionary, affordance-management approach offers several insights.

First, the approach suggests that the most significant stereotypes about any group – the ones that are most likely to drive our prejudices and actions – will be those linked to important affordances. For example, because humans are concerned about self-protection, we should have prominent stereotypes about others' danger potential; because we are concerned about status, we should possess prominent stereotypes linked to groups' competitiveness; because we are concerned about mating, we should possess stereotypes linked to others' mate quality and availability. Moreover, because such fundamental concerns shift in prominence as a function of one's own life stage, sex, and current circumstances (Kenrick et al., 2010), the psychological prominence of such stereotypes may shift as well. For instance, implicit associations between faces of Black men and words related to dangerousness are stronger for perceivers who dispositionally feel vulnerable to physical violence and who are literally in the dark (Schaller et al., 2003). In a similar vein, associations between obesity and disease concepts are greater for perceivers who dispositionally feel vulnerable to infection and for those in whom infection threat had just been primed (Park, Schaller, & Crandall, 2007). Such findings illustrate not only a link between perceiver concerns and the presence

of stereotypes relevant to those concerns but also that the psychological prominence of those affordance-relevant stereotypes changes with shifts in the prominence of those concerns.

Second, the affordance-management perspective suggests that the most prominent stereotypes will often exist at the intersections of important features – at the level of sub-categories. We can illustrate this by revisiting our discussion of sex and age categorization, as informed by life history theory. Recall that sex and age shape behavior in an interactive, rather than an independent, manner. If stereotypes exist to help perceivers anticipate the affordance-relevant behaviors of others, then one would also expect people's stereotypes to exist at the intersection of sex and age. That is, rather than having straightforward sex stereotypes – for example, that women are communal whereas men are agentic – people's stereotypes should be sensitive to sex-age intersections. They are. As one example, consider that males tend to invest more energy into mate competition than do females, but especially during prime mating ages. The sex difference in competitiveness is thus age dependent, and perceiver stereotypes ought to track this interactivity. Indeed, stereotypes of males as more competitive than females are especially pronounced for younger, as opposed to older, adult targets (Sng, Williams, & Neuberg, 2015).

Note that if one queries respondents only on their beliefs about males or females or only about young, middle-aged, or elderly people (as the traditional research has done), one never discovers age-sex sub-category nuances – or many others. Moreover, observing how humans (or other mammals) move through their natural worlds, it is not clear why independent stereotypes of "males" and "females" would ever spontaneously come to mind; after all, we never encounter males and females who are not also of a specific age. That people *can* report stereotypes at the level of "male" and "female" may only mean that they are able to transform their nuanced, complex stereotypes into a form that accommodates the constraints of our unnatural questions – constraints often imposed in tests of traditional theories.

A third insight adds another level of nuance. From an affordance-management approach, it is much less useful to know how an individual behaves in general than how that individual is likely to behave toward us *specifically* (or toward those we are invested in). One implication of this is that holding general stereotypes about others' traits – or cross-situational inclinations (e.g., "men are competitive") – will be less useful than holding stereotypes that reflect *toward whom* others are directing their behaviors (e.g., "men are competitive against other men"). For example, although males tend to invest more energy in mate competition than do females, females do invest in mate competition. Moreover, mate competition – for both women and men – tends to be directed toward reproductive-aged individuals of their *same sex*. One might therefore expect people's stereotypes of male and female competitiveness to track these patterns. Indeed, they do: Whereas people stereotype men to be more competitive than women *toward young men*, they actually stereotype women to be more competitive than men *toward young women* (Sng et al., 2015). Hence, stereotype content may in fact be "directed,"

carrying information about toward whom groups direct certain behaviors. This idea of directed stereotypes is novel and does not emerge from traditional theories.

Fourth, an evolutionary approach suggests there are social categories and stereotypes that have eluded the attention of traditional approaches to stereotyping and stereotype content. For example, the research discussed earlier reveals that people possess disease-linked stereotypes that they apply to people who are obese, disabled, and old (Schaller & Neuberg, 2012; Schaller & Park, 2011); such stereotypes do not derive readily from other theoretical frameworks. As a second example, following on our earlier discussion of the important role that ecology plays in shaping behavior, one would predict that people possess strong stereotypes based on the ecologies in which others live, and that these stereotypes would track the behavioral inclinations that these ecologies elicit. Ecologies in which resources are scarce and life is dangerously unpredictable elicit behaviors that are present focused, whereas ecologies in which resources are sufficient and life is predictable elicit behaviors that are future focused. Indeed, by tracking these actual ecology-behavior associations, people stereotype individuals from resource-poor and unpredictable neighborhoods as impulsive, aggressive, and less invested in education, compared to individuals from resource-sufficient and predictable neighborhoods. Such ecology stereotypes are readily applied to individuals within races, within levels of wealth, and in different cultures (Williams et al., 2016).

Fifth, implicit in this conceptualization is the idea that the most significant, affordance-relevant stereotypes will be, to some meaningful degree, accurate. This does not imply that such stereotypes describe well *all* individuals within any particular group, or even one member of a group perfectly well, but only that they will meaningfully describe, on average, the aggregate of individuals within any particular group. Some evidence suggests that this is indeed the case (e.g., Jussim, Cain, Crawford, Harber, & Cohen, 2009; Swim, 1994). Moreover, in line with the smoke detector principle (Nesse, 2005), inaccuracies in stereotype content are likely to be in the direction of exaggerating threat affordances. For example, given that the costs of being physically assaulted are typically greater than the costs of missing out on a possible friendly acquaintance, we might expect stereotypes held about young men from desperation ecologies to be biased in the direction of exaggerating their potential for physical aggressiveness.

In all, then, the evolutionary, affordance-management perspective has much to offer to enhance our understanding of the contents of people's stereotypes. Only recently, however, have researchers approached questions of stereotype content from such a perspective (Neuberg & Sng, 2013), and much work remains to be done.

Prejudices and Discrimination

Once one believes that an individual or group affords some potential opportunity or threat, effective affordance management requires one to act on

that information in an attempt to either take advantage of the opportunity or remediate the threat. Prejudices and discrimination can be viewed as serving this function, with prejudices translating the perception of specific threats and opportunities into focused behaviors (discrimination) aimed at remediating the threat or exploiting the opportunity.

The evolutionary view of prejudice and discrimination differs somewhat from traditional conceptualizations, which generally define prejudice as a valenced evaluation or feeling toward a group or its members and discrimination as valenced actions directed at a group or its members (Allport, 1954; Fiske, 1998). From an evolutionary perspective, however, these conceptualizations as attitudes/evaluations and behaviors on general negative-positive continua are problematic. Because prejudices and discrimination serve the function of managing threats and opportunities, and because different threats and opportunities require different solutions, general "negative" or "positive" responses will typically be insufficient. For example, although anger and fear are similarly "negative" emotions, they engage quite different behaviors and serve quite different functions. It would not be particularly useful, for example, to charge with anger toward a gang of young men approaching with weapons or to run away with fear from a salesclerk who just cheated you out of change at the cash register. If social perception has evolved to be sensitive to specific challenges, one might expect prejudices and discrimination to be similarly sensitive.

Unlike affect, broadly construed, emotions carry such functional nuances, reflecting the specific affordances perceived to be in the environment and triggering relevant responses (Carver & Scheier, 1990; Cosmides & Tooby, 2000; Ekman, 1999; Nesse, 1990). Indeed, qualitatively distinct emotions are engaged by different threats and opportunities and facilitate qualitatively distinct behaviors (Frijda, 1986; Izard, 1991; Plutchik, 1980; Roseman, Wiest, & Swartz, 1994; Tomkins, 1963). For example, anger results from the appraisal that something has been illegitimately taken, and it facilitates approach to get that thing back; fear results from the appraisal that one is in physical danger, and it facilitates escape; and disgust results from the appraisal that one is at risk of physical or moral contaminants, and it facilitates avoidance of exposure and contact.

From an evolutionary perspective, then, one thinks of prejudice not as simple valenced (negative-positive) feelings about groups and their members but rather of prejudices (plural) as emotion-based feelings toward groups and their members. Some prejudices are primarily anger based; others primarily fear based; and others are grounded primarily in disgust, envy, and the like (Cottrell & Neuberg, 2005).

One important implication of this is that, to the extent that different groups are believed to pose qualitatively different threats, these groups should elicit qualitatively different prejudices and discriminatory actions. Indeed, they do (Cottrell & Neuberg, 2005; Cottrell, Richards, & Nichols, 2010). Moreover, such differentiated responses are observed even when traditional measures suggest that respondents' prejudices are similarly negative. For instance, whereas prejudices directed toward Mexican American men are largely characterized by fear,

prejudices toward gay men are largely characterized by disgust. In cases such as these, traditional measures, focused as they are on general negativity, miss (and mask) important distinctions in how people feel about and act toward groups.

Recent research demonstrates that a threat-management approach to understanding prejudices can lend additional insights to the study of sexual prejudices. For example, simple ingroup-outgroup approaches would predict that heterosexuals would hold negative prejudices against non-heterosexuals, as a general outgroup, and this indeed appears to be the case when researchers employ traditional measures of prejudice. However, research that queries heterosexuals' reactions toward specific non-heterosexual subgroups – lesbians, gay men, bisexual women, bisexual men – suggests that conclusions drawn from traditional work are problematically simplified (Pirlott & Neuberg, 2014). Rather than revealing that heterosexuals hold straightforward, negative prejudices against non-heterosexuals, such studies show that sexual prejudices vary greatly depending on the sex of the heterosexual perceiver and the sex of the non-heterosexual target. Consider, for example, that college-aged heterosexual women are less prejudiced than heterosexual men against gay men – and, in fact, view gay men as favorably as they view straight men – or that straight men are less prejudiced against bisexual women than against bisexual men. Such findings are incompatible with the existence of a general negative sexual prejudice against non-heterosexuals, but consistent with the possibility that heterosexuals view (certain) non-heterosexuals of their own sex as posing threats of unwanted sexual interest.

Another new look at sexual prejudices builds on the finding that sexual prejudices have a prominent disgust component. Disgust evolved to help manage threats posed by infectious pathogens, so one might posit that sexually prejudiced individuals may be inclined to view homosexuality itself as a pathogen. Moreover, just as people strategically engage qualitatively distinct behavioral responses to the threat of pathogen infection depending on features that affect the likelihood of infection (e.g., network interconnectedness), early evidence suggests that sexually prejudiced individuals engage in qualitatively distinct antigay behaviors in response to these same types of factors (Filip-Crawford, 2015; Filip-Crawford & Neuberg, in press). Findings such as these are difficult to explain from existing, non-evolutionary approaches but readily emerge from an evolutionary affordance-management approach.

Just as identifying others as threatening imposes certain costs on a perceiver, so too does experiencing prejudices and engaging in behaviors to remediate those threats. Thus, just as stereotyping processes are functionally flexible – engaged particularly when vulnerability to the potential threat seems great – so too are prejudice and discriminatory processes. For example, as people become more concerned about contagious disease, they become more prejudiced against those exhibiting cues of physical abnormality or foreignness (e.g., Huang, Sedlovskaya, Ackerman, & Bargh, 2011; Park, Schaller, & Crandall, 2007; Young, Sacco, & Hugenberg, 2011). When growing economic competition is made salient, people become more prejudiced against groups stereotypically

viewed as strong economic competitors (Butz & Yogeeswaran, 2011). When people's roles as caregivers are made salient, they express greater prejudices against potentially threatening outgroups (Gilead & Liberman, 2014). When people are concerned about threats to their groups' norms and values, they report greater prejudices against atheists (Cook, Cottrell, & Webster, 2015; Gervais, 2013; Varley, Filip-Crawford, Neuberg, & Nagoshi, 2015). And pregnant women in their first trimester – when the fetus is most vulnerable to infectious pathogens – hold more negative feelings toward foreigners (Navarrete, Fessler, & Eng, 2007).

Much empirical work in the traditional stereotyping and prejudice literatures has focused its lens on a particular gender-age combination – young outgroup men – and has demonstrated powerful stereotyping, prejudice, and discrimination effects. From the perspective of traditional stereotyping and prejudice theories, though, it is not a priori obvious why young men should elicit such pronounced reactions. A recent evolutionary approach, labeled the male warrior hypothesis, provides both a theoretical foundation and corresponding insights (McDonald, Navarette, & Van Vugt, 2012). As discussed earlier, young men, in particular, engage in greater intrasexual competition for mates. Because the formation of alliances and coalitions among males could enhance success in such competitions, one might expect evolution to have shaped a male coalitional psychology with specific functions, including aggression toward outgroup males. Indeed, explorations of chimpanzee behavior and human hunter-gatherer tribes suggest that, ancestrally, adult males were more likely than females to engage in coalitional violence (Chagnon, 1988; Ferguson, 1984; Goodall, 1986; Haas, 1990; Wilson & Wrangham, 2003). One would thus expect that, in contemporary times, men (more than women) would be more sensitive to threat from outgroup men (than outgroup women) and more aggressively prejudiced against outgroup members, especially outgroup men.

Consistent with these hypotheses, non-Black perceivers are especially likely to erroneously perceive anger in the facial expressions of Black men but not Black women (Maner et al., 2005), and it is more difficult to unlearn conditioned fear responses to outgroup men than to outgroup women (Navarrete et al., 2009). Men are especially willing to inflict punishments on same-sex outgroups, even when doing so incurs costs to their own group (Navarrete, McDonald, Molina, & Sidanius, 2010), and those men who are especially focused on coalitional issues are also especially prejudiced against outgroup men (McDonald et al., 2012). Moreover, in the United States, Black men have been targeted for greater discrimination than Black women in a variety of domains, including consumer markets and criminal sentencing (Ayres & Siegelman, 1995; Ayres & Waldfogel, 1994).

Like stereotyping and stereotypes, then, we find that prejudices and discrimination processes are strikingly nuanced. These nuances are not obviously predicted by traditional theories but are readily derived from evolutionary and affordance-management approaches.

Conclusions and Final Comments

The human brain has been shaped by biological selection processes to identify and manage a range of challenges to reproductive fitness, including threats and opportunities afforded by the presence and actions of others. From this perspective, one can conceive of stereotyping, stereotypes, prejudices, and discrimination as tools of affordance-management systems, designed to enhance people's ability to succeed amid the complex interdependencies of social living.

Evolutionary theory provides a powerful, integrated, and generative framework for understanding these processes and for addressing fundamental questions at the heart of the study of stereotyping and prejudice. *Why do we stereotype?* We stereotype because we need to quickly and easily predict, with some degree of accuracy, the opportunities and threats afforded by others. *Why do we stereotype on the basis of some features more than others?* We especially stereotype others by age, sex, ecology, coalition, disease, and kinship because for our ancestors these features had diagnostic utility, and by race because it is a cue (in the United States and elsewhere) for ecology and coalition; these features were useful for predicting the affordances of others. *Why do our stereotypes of different groups differ in the ways they do?* Stereotypes differ – and are not merely "negative" or "positive" – because different groups are perceived to present qualitatively different threats and opportunities, and stereotypes need to reflect these differences if they are to help social perceivers achieve their goals. *Why do we have prejudices, and what forms do they take?* We hold prejudices because as emotion-specific feelings, they translate the perception of specific threats and opportunities into focused behaviors that can remediate the threat or exploit the opportunity. This means that because different groups are perceived to pose qualitatively different threats and opportunities, people will also have qualitatively different prejudices toward them. *Under what circumstances are specific social categories, stereotypes, and prejudices engaged?* The use of specific social categories and the engagement of specific stereotypes and prejudices depend on the interaction of a perceiver's own vulnerabilities, his or her current situation, and the target being perceived. Thus, a social perceiver is especially likely to view a young man as dangerous and consequently fear him if the perceiver dispositionally believes the world to be dangerous, is in a potentially dangerous environment, and the young man is from a group already stereotyped as physically threatening. *To what extent, if any, are our stereotypes accurate and "rational"?* Because stereotypes and prejudices exist to help people manage the threats and opportunities inherent to social life, many stereotypes ought to possess meaningful kernels of truth yet slip into error in predictable ways – specifically, in ways that decrease the likelihood that perceivers hold the more costly (to them) of possible beliefs. And although certain prejudices may appear irrational in the sense that they are responses to imperfect assessments of threat, they are functionally calibrated to perceived vulnerability and do facilitate behaviors that are often actually useful for remediating such threats.

Useful theoretical approaches generate novel hypotheses and findings that lie outside the theoretical architectures of other approaches. By this standard, the evolutionary, affordance-management approach has done quite well. Some findings generated by this approach are novel via the depth and nuance they provide. Consider a few examples, as reviewed: People's prejudices are not merely negative or positive but instead comprise a wide range of specific emotions that are elicited by perceptions that others pose specific, functionally relevant threats. People's stereotypes often exist not at general levels (e.g., "male" or "female") but rather at more affordance-relevant intersections (e.g., "young men" or "middle-aged women"). Stereotypes are not beliefs about the general inclinations groups are perceived to possess (e.g., "young men are competitive") but rather beliefs about toward whom such inclinations are directed (e.g., "young men are competitive against young men"). Other findings generated by the affordance-management approach are novel via the theoretical breadth they provide – that is, by demonstrating certain prejudices or conceptualizing roles for certain variables, toward which the field had previously been blind. Consider these examples, as already reviewed: Heuristic cues to abnormality activate disease-based stereotypes and disgust-based prejudices to a large number of groups; pregnant women in their first trimester are particularly favorable toward their ingroups and particularly unfavorable toward their outgroups; environmental darkness enhances the activation of violence beliefs linked to certain groups but not others; it takes longer to unlearn experimentally conditioned anxious reactions to outgroup men than to outgroup women. By generating hypotheses and findings beyond the scope of traditional approaches, evolutionary approaches both deepen and broaden our understanding of prejudices and related phenomena.

Our overview has focused on the social perceiver – on the holder of stereotypes and prejudices, on the one stereotyping and discriminating. The evolutionary, affordance-management approach also has interesting implications, however, for the targets of these perceivers. After all, perceiver stereotypes and prejudices – and their discriminatory implications – constitute threats that targets themselves must manage. It is thus intriguing that when completing a survey makes salient to young Black men that they are viewed as dangerous, they consequently report that they would smile more at others to create a favorable first impression (Neel, Neufeld, & Neuberg, 2013). In a similar vein, obese individuals for whom stereotypes linked to disease were made salient became more likely to report wearing clean clothes (but not smiling) as a favored means of creating a favorable first impression. Recognizing that they are targeted by a functionally focused set of specific threat-based stereotypes, these targets aimed to better manage their social encounters by responding with a similarly functionally focused self-presentational strategy. The affordance-management perspective has important implications for both perceivers and targets, and the target side may be especially ripe for future research.

Early in the chapter we referred to Heisenberg's insight that "what we observe is not nature itself, but nature exposed to our method of questioning."

Methods of questioning, as derived from theory-based assumptions, can sometimes constrain discovery. If stereotypes are defined primarily as tools for simplifying our understanding of others, then we may attend little to their potential complexity and accuracy. If prejudice is viewed primarily as negative affect toward groups, then we may fail to see their potential emotional specificity – and thus miss the important nuances characterizing people's emotional and behavioral reactions to others. If we believe the function of prejudice is to enhance self-esteem or social identity, we fail to identify variables such as vulnerability to disease, environmental darkness, or a woman's reproductive status as being relevant for understanding prejudices. A complete toolbox for the stereotyping and prejudice researcher should contain multiple theoretical approaches. We argue that the evolutionary approach is an indispensable tool, both for generating novel predictions and discoveries and for illuminating what has been previously missed or misunderstood.

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