Evolutionary Bases of First Impressions

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Why do we form first impressions at all? What kinds of information are especially likely to influence our first impressions, and what specific impressions are inspired by that information? Under what conditions are we especially likely to form specific kinds of first impressions? What specific psychological mechanisms are responsible for producing these inferential phenomena?

These are fundamental questions in the study of first impressions. A lot of different theoretical perspectives can be applied to address those questions. This chapter focuses on the meta-theoretical perspective supplied by evolutionary psychology. I discuss various ways in which the logic of evolutionary inquiry can be applied fruitfully to the study of first impressions.

The Prospects and Perils of Social Life

Underlying most exercises in human evolutionary psychology is the assumption that the human genome (and the brain anatomy that it produces) evolved in response to chronic features of the local ecology. Conspecifics (i.e., our fellow human beings or, in more deeply historical times, fellow members of species ancestral to *Homo sapiens*) have made up a fundamental part of that local ecology. Specific kinds of behavioral responses to these conspecifics are likely to have had specific implications for reproductive fitness. This has consequences for cognition. Many features of human cognition may have evolved to facilitate specific forms of fitness-enhancing social behavior.

Consider a few examples. Most obviously, perhaps, social interaction provides a necessary means toward sexual reproduction. But not all mates exert equal impact on reproductive fitness. Thus, there may have evolved specific aspects of human cognition that help solve the problem of selecting a mate (or mates) bearing characteristics that are advantageous to the perceiver's reproductive fitness. Reproductive fitness is influenced not only by the successful production of offspring, but also by the extent to which one's offspring, and other close kin, successfully reproduce. Because of this, there may have evolved specific aspects of human cognition that help individuals distinguish among different degrees of kinship, and incline them to allocate resources differentially in favor of closer kin. These two examples illustrate specific fitness-relevant opportunities associated with the presence of others. Implicitly, they also illustrate a broader point about the opportunities afforded by social life: Because loners and outcasts are relatively unlikely to have access to desirable mates, or to receive the material benefits of kinship, simply being an accepted member of any social group has fitness-relevant advantages. Thus, there may have evolved specific aspects of human cognition that help promote sociality in general.

Of course, social interactions not only are a source of potential benefit; they can sometimes be the source of specific fitness-relevant threats as well. Some conspecifics, for a variety of reasons (e.g., competition for mates or material resources) may have the intention of

doing harm. If one falls prey to these malevolent intentions (if one is killed, for instance), the cost to reproductive fitness can be enormous. Consequently, specific aspects of human cognition may have evolved that facilitate detection of, and defensive responses to, potential harm doers. Even well-meaning conspecifics may pose a threat to health and reproductive fitness – if those individuals are infected with communicable, disease-causing pathogens. Thus, specific aspects of human cognition may have evolved that facilitate detection and physical avoidance of disease-bearing conspecifics. A third form of peril arises in the form of conspecifics who cheat, steal, or other otherwise fail to uphold social contracts. There may have evolved specific aspects of human cognition that facilitate the detection and punishment of such norm violators.

This is hardly an exhaustive list (for a longer list, see Schaller, Park, & Kenrick, 2007). It is merely illustrative of the kinds of enduring fitness-relevant "problems" – prospects to be achieved or perils to be avoided – associated with the presence of conspecifics. The key point is that, because these problems have endured across vast stretches of ancestral time, they may have exerted nontrivial selection pressures on the evolution of human social cognition. An extensive body of research is consistent with this general line of speculation (for a set of extensive reviews and discussions, see Schaller, Simpson, & Kenrick, 2006). More importantly, this body of research documents dozens of novel psychological discoveries that have emerged from the rigorous testing of specific hypotheses deduced within this evolutionary framework. Some of these discoveries bear directly on our understanding of first impressions.

Adaptive Spontaneity of First Impressions

Let's start with one of the most fundamental facts about first impressions: The fact that people form them spontaneously and with minimal cognitive effort (Carlston & Skowronski, 2005; Gilbert & Malone, 1995; Newman & Uleman, 1989). The relatively effortless formation of first impressions can be produced by repeated practice and overlearning (Bargh & Chartrand, 1999; Palmeri, 1999). However, there are good reasons to suppose that there's something more going on here as well – that people may be adaptively predisposed to form immediate impressions of others.

When detecting the fitness-relevant features of others, it is often essential to act fast. If someone is untrustworthy – if he or she intends to injure me – I'd better detect that trait immediately; or if he or she intends to cheat me, I'd better detect that intention immediately as well. Because, if I don't, I'll probably end up injured or cheated. Similarly, if another person nearby has an infectious disease, I'd better figure that out as soon as possible. If I don't, and I fail to take precautions, I'm likely to fall ill myself. Accordingly, there may have been substantial adaptive advantages associated with any mechanism that promotes instant inferences about the threat-relevant characteristics of other people.

Inferential speed is probably most essential to the avoidance of social dangers. But it's not irrelevant to the attainment of social opportunities as well. When mating opportunities arise, for instance, it may be necessary to make an immediate decision whether to pursue that opportunity – because if one dithers and deliberates, that window of opportunity may close. Thus, there may have been adaptive advantages associated with mechanisms that promote the immediate discrimination between fit and unfit mates.

The upshot is that there is an inferential need for speed. In many other domains of human decision-making, it has been compellingly asserted there were evolutionary advantages associated with psychological mechanisms that are fast and frugal – mechanisms that promote inferences immediately and with a minimum expenditure of cognitive resources (e.g.,

Gigerenzer, Todd, & the ABC Research Group, 1999). So too it is with person perception. It seems likely that trait inferences and other first impressions emerge spontaneously because, over a long stretch of human evolutionary history, this spontaneity was adaptive.

Spontaneous first impressions can be adaptive even if these impressions are fallible and imperfect. As long as immediate impressions are even minimally diagnostic, it may be more advantageous to form these first impressions than to dither and deliberate. "Minimally diagnostic" is a standard easily surpassed by many immediate inferences. Exposure to a person for just a few seconds produces first impressions that are often remarkably accurate (Ambady, Bernieri, & Richeson, 2000). Given this state of affairs, one could argue that it would defy the basic logic of evolutionary biology if people didn't form immediate impressions of others.

Of course, the fact remains that some inferential errors are inevitable. Importantly, different kinds of errors may have different implications for reproductive fitness. When it comes to avoiding social perils, the fitness implications follow what Nesse (2005) has called the "smoke detector principle": the failure to detect a real danger (a false-negative error) typically has implications that are far more costly than the detection of a danger that doesn't really exist (a false-positive error). Consequently, just as smoke detectors are calibrated to err on the side on false-positive errors (to trigger an alarm at the merest hint of smoke, even if it that smoke is associated with no real threat whatsoever), psychological mechanisms may have evolved to implicitly err on the side of making false-positive errors when inferring the potentially-dangerous traits or intentions of others.

For other kinds of fitness-relevant problems, the relative costs of false-positive and false-negative errors may be very different. For instance, in the realm of mating, there is a profound sex difference in the number of offspring than men and women can produce; consequently, a poor mating decision (i.e., the choice of a genetically-unfit mate) has greater fitness costs to a woman than it does to a man. It follows that, when inferring whether a potential mate might be desirable, women are more likely than men to err on the side of false-negative errors. In other words, among women, the immediate impression of any potential male suitor may be that he is potentially unsuitable as a mate. In contrast, among men, the immediate impression of any women may be that she might be just fine as a mate. In several recent overviews of "error management theory," Haselton and her colleagues review implications that an evolutionarily-informed signal-detection analysis has for this and other kinds of impression formation phenomena (Haselton & Funder, 2006; Haselton & Nettle, 2006).

It is with considerations like these in mind that Haselton and Funder (2006) suggested the existence of an evolved "personality judgment instinct." If such an instinct exists, they argue, the tendency to form spontaneous trait inferences should appear very early in childhood, and it appears that it does. Moreover, proficiency in drawing personality judgments should be ubiquitous, and it appears that this is the case as well. Indeed, Haselton and Funder (2006, pp. 30-31) observed that "consistent individual differences in judgmental ability have been surprisingly difficult to establish…Perhaps this is because personality judgment is such an essential life skill that nearly everyone can do it well enough to get by." Also consistent with the notion of a personality judgment instinct is some evidence showing that trait inferences – as opposed to other kinds of social inferences – are associated with activity in specific regions of the brain (Heberlein & Saxe, 2005). Bear in mind, of course, that it's extraordinarily tricky to draw conclusions about evolutionary adaptations – especially those that might actually qualify as instincts – solely on the basis of contemporary psychological observations (Conway & Schaller, 2002; Schmitt & Pilcher, 2004). Still, it's within the realm of possibility that our tendency to

form fast and frugal first impressions is not merely a product of practice; it may actually be instinctual.

Inferences About What: The Contents of First Impressions

OK, so we form first impressions; but just what do we form these impressions about? What specific kinds of inferences do we draw? We know, of course, that our minds are agile and responsive to whatever objective information is picked up by our sensory systems; and so we can, conceivably, form first impressions that focus on just about any kind of trait at all. But if our mind evolved to facilitate fitness-enhancing behavior, then we may be predisposed to be on the lookout especially for information bearing on the potential perils and prospects of social life. Accordingly, we may also be adaptively predisposed to form impressions more readily about certain kinds of traits than about others.

From an evolutionary perspective, the ultimate goal is the reproduction of one's genes. Behaviors that promote genetic reproduction (mating, provision of resources to offspring, etc.) are more difficult to produce if one is injured, destitute, dying, or dead. For that reason, some of the most evolutionarily fundamental psychological goals pertain to the avoidance of (or defense against) other people who might harm us, cheat us, or kill us. That requires that we know – or at least make a reasonable first guess – whether someone is nasty or nice. From an evolutionary perspective, no other kind of inference probably matters quite so much.

The implication for the contents of first impressions is obvious. This implication is one of the classic findings in the study of first impressions: The most basic evaluative dimension is that of interpersonal warmth and agreeableness (Kelley, 1950; Peeters & Czapinski, 1990; see also Cottrell, Neuberg, & Li, 2007).

This adaptive perspective not only predicts the evaluative dimension along which first impressions are most likely to be formed, it also suggests that these first impressions are likely to be pulled especially easily toward the negative end of this dimension. Recall the smoke-detector principle again (Nesse, 2005). There may be grave fitness costs to me if you're really nasty but I think you're nice; there are more modest costs if you're really nice but I think you're nasty. The inferential implication is that a strongly negative interpersonal impression ("What a jerk!") may be formed on the basis of very little information, whereas a strongly positive impression ("What a wonderful guy!") may require a greater amount of informational input. In addition, a positive first impression may be easily reversed by additional information to the contrary, but a negative first impression may persist even in the face of contradictory information. These implications are borne out by extensive empirical evidence (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Rothbart & Park, 1986; Rozin & Royzman, 2001; Skowronski & Carlston, 1992).

One's fitness is potentially influenced not only by others' intentions (whether they are nasty or nice), but also by their abilities to carry out those intentions. If two people want to kill me, the one who poses the greatest actual threat to me is the one who is smartest and most capable; not so much the malicious idiot. (Similarly, if two people want to do nice things for me, I will probably get more real benefit from the generous genius than from the equally-generous fool.) The implication is that there should also be a second evaluative dimension – one that focuses on capability – along which people will be especially likely to form first impressions. This implication too is borne out by an enormous body of research: When boiled down to their simplest essence, impressions of people are located within a two-dimensional space anchored by the evaluative dimensions of interpersonal warmth and agency (Judd, James-Hawkins, Yzerbyt, & Kashima, 2005; Rosenberg, Nelson, & Vivekananthan, 1968).

Another implication emerges from this line of reasoning as well. If indeed greater fitness consequences follow from other individuals' capability, rather than their incapability, then – in contrast to the negativity bias that occurs in impressions of agreeableness and warmth – a positivity bias may occur in impressions of capability. For instance, first impressions of incapability may be relatively easily reversed by information to the contrary, but first impressions of capability may be more resistant to change. There is now considerable empirical support for this hypothesis (Skowronski, 2002; Skowronski & Carlston, 1992).

These last few paragraphs reveal some of the useful insights that can emerge when applying an evolutionary perspective to the study of first impressions. We've known for a long time that warmth and agency are the fundamental dimensions of impression formation, and that different kinds of impressions are more easily formed (and more resistant to revision). The evolutionary perspective helps us understand why that is. Moreover, it suggests that these classic findings (the dimensional structure, negativity and positivity biases) are not the conceptually distinct phenomena that they might superficially appear to be; they may be inter-related consequences of the same adaptive mechanisms.

Beyond these general insights, evolutionary theorizing is proving to be productive in generating additional discoveries bearing on the specific contents of first impressions. Many of these discoveries have emerged from deductions about (1) specific kinds of features in others to which we might be adaptively hypersensitive, and (2) specific inferences that, for fitness-relevant reasons, may be spontaneously implied by the perception of those features.

For instance, in order to avoid falling prey to malicious or untrustworthy conspecifics, it would have been adaptive to be extraordinarily sensitive to any cue that might signal another person's potential maliciousness or untrustworthiness. This appears to be the case. Compared with other kinds of facial expressions, angry faces are especially likely to grab and/or hold attention (Fox et al., 2000; Schupp et al., 2004). Angry facial expressions are presumably predictive of aggressive inclinations, and so are diagnostic of potential danger. Other superficial cues may be more fallible; but because of their history of diagnosticity in ancestral environments, they may still inspire immediate inferences implying danger. Membership in a coalitional outgroup may serve as one such cue. Throughout much of human evolutionary history, ingroups have been sources of support and safety, whereas encounters with outgroup members presented a potential threat to personal welfare (Schaller & Neuberg, 2008). Consequently, outgroup members may be especially likely to inspire first impressions that are tilted toward distrust. Consistent with this reasoning is evidence that people find it easier to learn (and harder to un-learn) aversive responses to outgroup faces (e.g., Olsson, Ebert, Banaji, & Phelps, 2005).

Similarly, because of the powerful fitness costs associated with parasitic infection, it is likely that people are sensitive to cues signaling the possibility that another person is the carrier of an infectious disease. A wide variety of morphological anomalies (e.g., pustules, rashes, and other disfigurements) may have been symptomatic of parasitic infections over the long course of human evolutionary history. Consequently, our minds may be hyper-vigilant to any kind of perceptible disfigurement or morphological oddity; and, when perceived, those anomalies may inspire negative inferences. There is now a growing body of evidence consistent with this reasoning (Perrett et al., 1999; Schaller & Duncan, 2007). Moreover, consistent with the spontaneous and associative nature of many first impressions (e.g., Carlston & Skowronski, 2005; Skowronski, Carlston, Mae, & Crawford, 1998), some of this evidence indicates that these negative inferences are formed even when perceivers know that the perceived anomaly is

misleading. For instance, in a study by Duncan (2005), participants were provided with photographs and brief biographical sketches of two men. One man had a superficial birthmark on his face, but was described as strong and healthy. The other man looked just fine, but was described as being infected with a strain of drug-resistant tuberculosis. Participants then responded to a computer-based reaction time task that assessed which of the two men was more strongly associated with the semantic concept "disease." Results revealed a tendency to associate disease with the facially-disfigured man (who was known to be healthy) more strongly than the man who was actually known to be diseased (but who looked normal). In short, even when rational appraisal explicitly indicates otherwise, anomalous morphological features may implicitly inspire negative first impressions.

This line of reasoning also implies that physical unattractiveness of any kind may serve as a sort of crude heuristic cue for ill-health, and thus lead to aversive trait inferences (Schaller & Duncan, 2007; Zebrowitz et al., 2003). A conceptually different piece of adaptive logic leads to a similar prediction. This additional line of reasoning focuses not on *un*attractiveness as disease cue, but rather on attractiveness as cue for genetic fitness. The subjective assessment of facial attractiveness is based substantially on elements of facial physiognomy (prototypicality, symmetry) that may be diagnostic signals of genetic fitness (Fink & Penton-Voak, 2002; Thornhill & Gangestad, 1999a). There are clear adaptive advantages to mating (and perhaps affiliating more generally) with individuals who have a high degree of genetic fitness. Consequently, when people exhibit these desirable traits (i.e., when they appear subjectively to be physical attractive), they may inspire positive inferences of the sort that promote approach-oriented behavior. This clearly is the case: First impressions of physically attractive people are more positive, along many different trait dimensions, than first impressions of unattractive people (Eagly, Ashmore, Makhijani, & Longo, 1991).

Other specific kinds of features may inspire other specific kinds of initial impressions, for yet other adaptive reasons. Recall that reproductive fitness depends, in part, on the likelihood that one's own offspring survive long enough to successfully reproduce themselves. This fact, coupled with the fact that newborn primates are helpless and dependent on others for survival, highlights the adaptive importance of providing care to one's own infant offspring (and to the infant offspring of close kin as well). Thus, our minds may be hypersensitive to superficial facial features that are diagnostic of infancy (e.g., round faces, big eyes, small noses); and when perceived, those features may trigger functionally correspondent inferences. If indeed this is a spontaneous and associative process, these inferences may emerge even when the perceived person isn't an infant at all. There is abundant evidence attesting to exactly this phenomenon. Compared to other adults, babyfaced adults are more likely to inspire impressions suggesting ignorance and incapability (Zebrowitz & Montepare, 1992).

In the preceding paragraph I made a parenthetical allusion to kinship – a topic with substantial adaptive implications of its own. Fitness benefits follow from the differential allocation of resources in favor of closer kin, for instance, and fitness costs follow from sexual intercourse with close kin. Because of these and other fitness implications, many animal species employ superficial cues – such as phenotypic similarity – that help them distinguish close kin from more distant kin (Hepper, 1991; Rendall, 2004). These cue-based kin-recognition mechanisms are evolutionarily ancient. And so, despite the fact that humans have more recently evolved additional mechanisms (such as those involved in language use and symbolic thought) that allow us to accurately know who are close kin are, our inferences may be implicitly influenced by evolutionarily-ancient cue-based mechanisms as well. There is plenty of evidence

that people respond to phenotypically-similar individuals in a more kin-like way – even if those individuals objectively are strangers. Perceived facial similarity leads to impressions connoting greater trustworthiness but, importantly, it does not lead to increased sexual attractiveness (DeBruine 2002, 2005). Another study found that perceived self-other attitudinal similarity activates semantic cognitions connoting kinship (Park & Schaller 2005). This finding suggests that the evolved psychology of kin-detection may help explain the classic effect whereby attitude similarity leads to greater liking (Byrne et al., 1971). It also accounts for the observation that the similarity-liking effect emerges more strongly when similarity occurs along attitudes that are more highly heritable – and thus more highly diagnostic of actual kinship (Tesser, 1993).

Functional Flexibility and the Modulation of Adaptive Inferences

Evolved mechanisms of social inference may often operate spontaneously and with a minimum of cognitive effort, but that doesn't mean that they are inflexible in their operation. The opposite is true. These mechanisms – and their implications for first impressions – are highly flexible and predictably influenced by fitness-relevant regulatory cues in the immediate environment.

We must assume that evolved cognitive mechanisms are (or at least used to be, in ancestral environments) associated with specific fitness benefits. But their actual operation typically entails some costs as well. Any psychological response to perceptual stimuli consumes some metabolic resources. This is the case especially when psychological responses precipitate behavioral responses, as they often do. Plus, the engagement of one adaptive activity (e.g., avoidance of danger) often inhibits an organism's ability to engage in other kinds of adaptive activity (e.g., mating). For these reasons, many evolved mechanisms are functionally flexible. They are more likely to be engaged when additional information in the immediate environment indicates that the fitness-relevant benefits outweigh the costs; they are less likely to be engaged when additional information indicates either lower benefits or higher costs.

This broadly-applicable line of reasoning has many specific implications for how the outputs of social inference mechanisms may differ across cultures, individuals, and situations (Schaller et al., 2007). Some of these implications are directly relevant to the formation of first impressions. To illustrate, I'll revisit some of the phenomena discussed above, and discuss how these inferences may be moderated by input variables bearing on an evolutionary cost / benefit calculus.

Start with the phenomenon in which a distrustful first impression emerges simply from the perception that another person is a member of a coalitional outgroup. According to the principle of functional flexibility, this effect should be more likely to emerge under circumstances in which people feel more vulnerable to harm, and less likely under circumstances in which perceivers feel relatively invulnerable. What sorts of things might influence perceivers' sense of personal vulnerability or invulnerability? Lots of things – including chronic individual difference variables (some people are more tempermentally anxious and worried about interpersonal threats), as well as temporary features within the local ecology (e.g., being alone, or in the dark, or in a strange and unpredictable environment). Do these kinds of variables have the predicted influence on first impressions? It appears that they do. In one set of studies, Maner et al. (2005) assessed perceivers' beliefs about the emotional states of target individuals who, in fact, were not displaying any real emotional signals at all. Some of these target individuals were ethnic ingroup members and some were outgroup members. Results revealed that perceivers who chronically worried about interpersonal danger were especially likely to perceive anger (but

not other emotions) erroneously in the faces of outgroup members (but not ingroup members). Similarly, if perceivers had been made to feel temporarily fearful through entirely artificial methods (by watching a scary scene from a popular movie), they also were more likely to perceive anger (and anger only) in the faces of outgroup (but not ingroup) members.

A similar sort of modulation can be seen in the phenomenon whereby morphologically anomalous physical features (which may serve as heuristic cues to parasitic infection) inspire negative associations (Schaller & Duncan, 2007). In one study (Park, Faulkner, & Schaller, 2003), physically handicapped people were more likely to be associated with negative semantic concepts, and this effect was especially pronounced among individuals who either tended to feel especially vulnerable to infectious diseases, or who were especially liable to experience disgust (an emotional cue for potential infection). Building on this evidence, it is interesting to consider the possibility that actual variation in the functioning of the immune system might also have effects of this sort. For instance, a natural form of immunosuppression occurs in women during the first few weeks of pregnancy, and there is evidence that this has predictable effects on emotional experiences and social attitudes (e.g., greater sensitivity to disgust, greater ethnocentrism; Fessler, Eng, & Navarrete, 2005; Navarrete, Fessler, & Eng, 2007). It's possible that among newly-pregnant women and other immunosuppressed individuals (e.g., organ transplantees), the natural tendency to respond aversively to perceived morphological anomalies might also be exaggerated.

Inferential outcomes relevant to mating are also likely to be variable, depending on the extent to which perceivers are interested in pursuing mating goals. In one of their studies on emotion inference, Maner et al. (2005) found that men erroneously inferred exaggerated levels of sexual arousal from the objectively neutral facial expressions of physically attractive women. This effect was especially pronounced among men who reported a chronically active mating motive. The effect was also especially pronounced among men for whom a mating motive had been made temporarily salient by exposing them to a romantically evocative scene from a popular movie. An even better demonstration of functional flexibility in the realm of mating-related inferences is found in evidence that the female menstrual cycle moderates the strength of adaptive inferences to specific fitness-relevant stimulus features in men. A particularly fascinating phenomenon involves the inferences that women draw from the odors of men whose bodies are variable in their bilateral symmetry. There is evidence that morphological symmetry may be a signal of genetic fitness (Thornhill & Moller, 1997). There is also basis to believe that genetic fitness (and therefore symmetry) is also signaled by body odor cues. Women are sensitive to these olfactory cues, and this has consequences on impression formation. On the basis of body odor alone, women infer that symmetrical men are sexier; and women are most sensitive to the scent of symmetry under circumstances in which the differentiation between genetically fit and unfit mates has the greatest bearing on their reproductive fitness. That is, when women are in the fertile part of their menstrual cycle, they are especially likely to infer – on the basis of odor alone – that symmetrical men are sexier (Gangestad & Thornhill, 1998; Thornhill & Gangestad, 1999b).

Fitness-relevant circumstances may also moderate the extent to which kin-connoting impressions are implicitly inferred on the basis of superficial phenotypic similarities. An evolutionary cost / benefit analysis reveals that a tendency to make false-positive kin-recognition errors (judging non-kin to be kin) leads to higher fitness costs when the actual baserate of kin in the local population is lower, and leads to lower fitness costs when the actual baserate of kin is higher (Reeve, 1998). One possible implication is that individuals may be more likely to make

false-positive kin-recognition errors when contextual information implies a relatively high baserate of kin (e.g., rural environments, large families). If there is any merit to this speculation, then the similarity-liking effect may be especially pronounced among people in rural environments, or those who grew up in large families.

I don't want to drift into mere speculation just yet; so I'll end this section of the chapter by highlighting one more empirically documented example of functional flexibility in the realm of first impression formation. This line of research takes as its starting point the fundamental fitness benefits associated with being an accepted member of a social group (Baumeister & Leary, 1995; Brewer & Caporael, 2006). Given these benefits of belongingness, it would have been adaptive to respond toward others in such ways that social connections are maintained. Moreover, should this fundamental need for social connection be threatened (through some act of social exclusion, for instance), it would have been adaptive to respond in ways that maximize the likelihood of re-establishing social connections. Is re-connection facilitated by being fearful, disdainful, or otherwise negatively inclined toward others? No, it's facilitated by social optimism and positive regard for others. The implication is that, while social exclusion may lead individuals (quite logically) to form negative impressions of those who actually do the rejecting, it may also dispose those same individuals to form unusually positive first impressions of other people – if those other people are perceived to be potential sources of social connection. A recent set of set of studies supports this set of evolutionarily informed hypotheses (Maner, DeWall, Baumeister, & Schaller, 2007). When threatened with social exclusion, people express greater interest in making new friends, they increase their desire to work with others, and (here's the finding that is most pertinent to the theme of this chapter) they form more positive first impressions of novel interaction partners. Importantly, these effects occur only when those novel target persons really are perceived to be realistic sources of social connection – a result implicating the functional nature of this bias in person perception.

Digging Deeper

For the most part, evolutionary inquiries into person perception have followed an epistemic strategy analogous to that of behavioral ecology. Evolutionary logic is employed to deduce hypotheses about phenotypic outcomes (e.g., impressions, attitudes, and other cognitive knowledge structures); these hypotheses are then tested against observable data. It is understood, of course, that evolutionary processes don't produce cognitive outcomes in any direct way. Evolutionary processes operate on genes, after all, and the causal relationship between genes and cognitions involves lots of steps and is extraordinarily complicated. But if one takes an evolutionary approach seriously, one must eventually start to ask such questions as: If these impression-formation phenomena are the product of evolutionary processes, just what actually evolved? Exactly what was selected for that produces these specific kinds of social inference phenomena?

Great questions. As yet, we're not even close to having satisfying answers. However, it's not too early to discuss, in a very general sort of way, the kinds of answers that are (and are not) likely to emerge over the next few decades of research. At the very least, it may be useful to do this because it is easy to be misled about just what is (and is not) logically implied by an evolutionary perspective on social cognition.

First, let's talk about learning mechanisms. There remains a common misconception that evolutionary psychological processes are independent of developmental processes in general, and learning processes in particular. Nothing could be further from the truth. Genes are

instrumental in guiding developmental processes as they unfold, and genes produce the many different mechanisms through which individual organisms learn (Carroll, 2005; Marcus, 2004; Moore, 2004). Reciprocally, the phenotypic expressions of many genes are influenced by the developmental context, and so can be influenced by specific contextual information that is acquired through the operation of learning mechanisms (e.g., Godwin, Luckenbach, & Borski, 2003; for additional examples, see Ridley, 2003). Plus, many lines of psychological research on specific kinds of allegedly evolved response tendencies (e.g., the fear of snakes) suggest that one of the things that may have evolved is a predispostion – a sort of biological preparedness – to learn those specific tendencies in an unusually fast and efficient manner (Öhman & Mineka, 2001). This has clear implications for the way we might think about evolutionary influences on first impressions. Learning mechanisms may be integral to the allegedly evolved mechanisms through which a particular kind of fitness-relevant feature spontaneously produces a particular kind of first impression. Specifically, one of the things that may have evolved is a preparedness to learn – very quickly and efficiently – that particular association between social stimulus and adaptive response. As we dig more deeply into the question of what exactly evolved to produce specific kinds of social cognitive phenomena, we would probably be wise not to overlook the important role of evolved learning mechanisms.

Some learning mechanisms are specific to certain domains of information-acquisition. (e.g., when a taste aversion is acquired through one-trial learning, it is the result of a highly specific form of associative conditioning; Moore, 2004). Other learning mechanisms are much more general in their application. Many speculations about the evolutionary bases of cognition focus on the alleged domain-specificity of the underlying mechanisms (e.g., Kanazawa, 2004). These speculations are often accompanied by speculations about specific regions of brain anatomy that might be dedicated to these psychological adaptations. In proposing an evolved module of fear learning, for instance, Öhman and Mineka (2001) point to neuroscience evidence indicating the presence of neural circuitry dedicated specifically to fear learning. Similarly, in speculating about the existence of an evolved personality judgment instinct, Haselton and Funder (2006) suggest that such an instinct, if it exists, would be characterized by a dedicated neural structure.

Neuroanatomical evidence certainly can inform our understanding of evolutionary processes that lie at the root of psychological phenomena. However, this does not mean that every evolutionary speculation about cognition must be accompanied by the corollary assumption that some neural structure be dedicated uniquely to its operation. Evolutionary processes typically produce phenotypic "improvements" not by inventing whole new anatomical structures, but by tinkering with existing ones. Just as birds' beaks may evolve to be longer (in response to changes in the local ecological conditions), existing cognitive mechanisms may evolve to be responsive to a wider range of eliciting stimuli. Mechanisms that once served primarily to facilitate the detection and avoidance of dangerous non-social objects (e.g., snakes) might have evolved, over time, in such a way that they are now activated also in the social domain, to facilitate the detection and avoidance of potentially dangerous conspecifics (e.g., coalitional outgroup members). This kind of adaptation may involve modest changes in only a very few genes, and is unlikely to be associated with any sort of uniquely-dedicated neural structure (at least not of the sort that can be detected with the methods of contemporary cognitive neuroscience). Nonetheless, if such a response truly is an adaptation, evidence should be found at a more subtle – genetic – level of analysis.

So now we're talking about genes. Here again it is important to think sensibly about what a genetic influence on social inference might (or might not) mean. The effects of genes on phenotypic responses are often not the result of the presence (or absence) of some specific gene (or set of genes), but rather whether that gene (or set of genes) – even if present – is switched on or off; and that depends on a lot of other factors in the immediate environment (Carroll, 2005). How might this be relevant to the study of social inference? Consider the fact that there is plenty of evidence attesting to sex differences in social inference processes, and many scholars have speculated about the evolutionary bases of these sex differences (e.g., Haselton & Nettle, 2006). It's tempting to assume that this speculation implies that there must be a specific set of genes associated with each specific social inference phenomenon, and that these specific genes differ between men and women. Well, perhaps. But it is also entirely plausible that, if any specific set of genes is associated with these specific social inference phenomena, those genes are equally present in both men and women. What may have evolved is the tendency for those genes to be turned on (or off), in response to specific kinds of bodily signals (e.g., hormone levels) that are diagnostic of the perceiver's sex.

Again, this is just crude speculation. I claim no expertise whatsoever when discussing evolutionary processes at this genetic level of analysis. Nor can I claim any expertise on learning mechanisms or neuroanatomy. I broach these topics simply to illustrate three more general points. First, if one is to take seriously an evolutionary perspective on social inference, one must eventually begin to ask difficult questions about what exactly might have evolved to produce the phenomena we witness at a behavioral level of analysis. Second, in order to try to address those questions, we have to dig deeper and consider events operating on many additional levels of scientific analysis. And third, if we are to ever successfully provide answers to those questions, we cannot just gesture vaguely (which is all I've done here) toward those additional level of analysis; we will have to pay serious attention to advances in fields such as cognitive neuroscience, psychoneuroendocrinology, developmental biology, and functional genomics.

Yes, it's a serious challenge. And, yes, it will take considerable collective effort. But the scientific payoff should be substantial. There is already abundant evidence attesting to the intellectual benefits associated with an evolutionary approach to first impressions. An evolutionary perspective provides a rigorous means of generating insights into the ancient roots of contemporary social inference phenomena. This helps to build coherent conceptual bridges to other exciting scientific disciplines. An evolutionary perspective also provides a means of coherently linking together many superficially distinct kinds of social inference phenomena. In this chapter, for instance, I have discussed a wide variety of phenomena pertaining to first impressions (e.g., spontaneous trait inferences, the dimensional structure of person perception, the effect of attitude similarity on liking). These phenomena are typically treated by textbooks as conceptually independent factoids. But they are not. An evolutionary framework helps connect the conceptual dots between these different facts. Finally, and perhaps most importantly, an evolutionary perspective can be extraordinarily generative. When employed smartly, these logical tools promise to yield an enormous set of novel hypotheses and brand-new discoveries about first impressions.

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