Chapter 13

Nonverbal Behavior

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In a much-cited essay, the experimental psychologist and vision scientist Nicholas Humphrey (1976) argued that our success as a species is due to our social intellect and that our brain and intellect have evolved for social processing. Our success and survival, according to Humphrey, are due not to our technology or ability to create and use tools but rather to our ability to function as social beings. He argued that the function of our superior intellect is to create and preserve social bonds and community: Indeed, there is increasing acknowledgment across disciplines that human cognition evolved, in part, to cope with increasing social demands (Cosmides & Tooby, 1992; Dunbar, 1998; Taylor et al., 2000).

In this chapter, we argue that the ability to communicate nonverbally is at the core of this social intellect. The social intellect involves the abilities to infer others' motives, intentions, character traits, and emotions and, in turn, to communicate one's own motives, intentions, character traits, and emotions. Underlying these specific abilities is the broad, generalized ability to understand nonverbal behavior and to use nonverbal behavior to communicate.

Nonverbal behavior and communication are hence foundational to social perception, cognition, interaction, and behavior. Beyond evolutionary adaptations to social life that occur on the scale of millions of years, humans exhibit the extraordinary ability to adapt to their social context over much shorter timescales; this adaptation is also undergirded by nonverbal behavior. Such short-term social adaptiveness lies at the heart of many influential social-psychological theories, including theories of affiliation (Baumeister & Leary, 1995), theories of social influence (Deutsch & Gerard, 1955; Heider, 1958), and theories of prejudice and ingroup bias (Dovidio & Gaertner; Yzerbyt & Demoulin, volume 2), to name a few. Although spoken language can be deployed to solve some problems of social complexity, nonverbal communication is the speediest, most effortless, and historically developed means for adapting to the social world. Whether occurring over millions of years through natural selection, over the course of a single lifetime via socialization, or over the course of minutes in moving from one social interaction to another, social adaptation is heavily grounded in nonverbal behavior.

Evidence for the role of nonverbal behavior in social adaptation comes from several sources. While humans do not develop linguistic capabilities until well into their first year of life, *at birth* humans respond to and produce nonverbal behavior. For instance, newborns are able to imitate certain facial expressions (Meltzoff & Moore, 1983; Sagi & Hoffman, 1976). Shortly after birth and well before language development, infants learn to produce and interpret a range of psychologically meaningful nonverbal behaviors (Walker-Andrews, 2008). After the development of language, nonverbal sensitivity only increases such that following infancy children continue to be socialized via the nonverbal behavior of caregivers and peers (Feinman, 1982; Walden & Ogan, 1988). Not only does nonverbal behavior serve as the starting point for social cognition in humans, but it also is the communicative means by which we are connected to our evolutionary ancestors. Across the animal kingdom but especially in the primates, the importance of nonverbal behavior to social life cannot be underestimated—many scholars regard nonverbal communication as the social glue that supports primate affiliation and alliances (Hauser, 1996; Preston & de Waal, 2002).

The ontogenetic and evolutionary primacy for the role of nonverbal behavior in social cognition suggests that the production and perception of nonverbal behavior should occur early in cognitive processing, even among adults. The machinery is certainly there to allow for such early processing. For example, as compared with semantic (verbal) stimuli, image-based stimuli are more efficiently and enduringly matched to conceptual categories (Paivio, 1971; Paivio & Csapo, 1973; Seifert, 1997). Recent models of cognition suggest that much thought occurs via perceptual rather than semantic representations (Barsalou, 1999). And the production of nonverbal behavior stands

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in contrast to the production of verbal behavior in terms of the consumption of cognitive resources: Whereas producing verbal behavior by speaking or writing is resource consuming, *stopping* nonverbal behavior is resource consuming (Richards & Gross, 2000; Richeson & Shelton, 2003). The ontogenetic, evolutionary, and cognitive-processing primacy of nonverbal behavior has important consequences for social psychology, many of which are reviewed in this chapter.

Nonverbal Behavior

The purpose of this chapter is to provide a thorough review of the existing literature on nonverbal behavior and nonverbal communication. In doing so, it is important to define and clarify several constructs.

Nonverbal behavior has been defined broadly as any behavior that is not linguistic (DePaulo & Friedman, 1998). However, this broad definition includes activities such as lifting weights, driving a car, and using a hammer, and these activities are normally not what social psychologists mean when they use the term "nonverbal behavior." The broad definition also runs the risk of including just about any behavior that can be conceived, which in turn creates a concept that may not be useful. Instead, nonverbal behavior is here defined as perceptible non-linguistic behavior that is not instrumental to manipulating the physical state of the world. By excluding the manipulation of nonsocial objects, our definition of nonverbal behavior includes the subtle facial expressions, body language, social touching, vocal acoustics, and interpersonal distance that are normally intended by the term within psychology. *Nonverbal communication* refers to the sending and receiving of thoughts and feelings via nonverbal behavior.

Traditionally, nonverbal behavior research has been divided into *encoding* (the production and communication of nonverbal behavior) and *decoding* (the recognition and interpretation of nonverbal behavior). Because the terms "encoding" and "decoding" suggest deliberate action on the part of the encoder and the decoder and because recent work points to the automaticity of these processes, we use the terms *nonverbal production* for encoding and *nonverbal perception* for decoding.

Another traditional distinction within the literature on nonverbal behavior is that between micro-level and macro-level nonverbal behaviors. *Micro-level nonverbal behaviors* are individual behaviors, sometimes referred to as "cues" such as smiles, eyebrow raises, forward leans, and finger tapping. *Macro-level nonverbal behaviors* generally refer to constellations of behavior that are imbued with broader psychological meaning, such as displays of warmth, dominance, or immediacy. Both levels of nonverbal behavior are reviewed in this chapter, but more emphasis is placed on macro-level behavior. This emphasis reflects the literature and the idea that macro-level behaviors are often more likely to exhibit validity and to generalize across people, cultures, and time (Ambady, Bernieri, & Richeson, 2000; Weisbuch, Slepian, Clarke, Ambady, & Veenstra-Vander Weele, in press; Zebrowitz & Collins, 1997).

In this chapter, we first discuss the production of nonverbal behavior, including theories regarding nonverbal behavior. We address several issues, including cross-species displays of nonverbal behavior, the automaticity and control of nonverbal expression, and the role of contextual and cultural cues in the production of nonverbal behavior. We also consider nonverbal behavior in infancy and the role of individual differences in nonverbal production. Finally, we suggest that nonverbal behavior undergirds basic cognitive processing and thinking. We then turn our attention to the perception of nonverbal behavior, focusing on automaticity and control in nonverbal perception. We examine how nonverbal perceptiveness might reflect basic social intelligence. We conclude by describing the critical role that nonverbal behavior plays in social influence.

NONVERBAL PRODUCTION

From impression management and leadership to socialization and culture, the production of nonverbal behavior is the foundation for many social processes. Although this idea may be counterintuitive for a species in which language is vital for survival and for scholars accustomed to communicating research findings in words, nonverbal communication is the only means of social organization in other species and is the primary way that preverbal infants exert social influence. Behavior that serves as *the* architecture of social life for our ancestral cousins and for our own early development might reasonably underlie many social-psychological processes.

Theories on the Production of Nonverbal Behavior

Theories of Nonverbal Leakage

Perhaps the most prominent theory of nonverbal production, initially offered by Charles Darwin, resembles what many people today probably think: Nonverbal behavior reveals emotion. Indeed, although the history of theories on nonverbal communication dates back at least to Confucius (Knapp, 2006), most modern theories are roughly built on

evolutionary principles, so it seems appropriate to start with Darwin. In his book *The Expression of the Emotions in Man and Animals,* Darwin (1872) describes the many similarities (and differences) between nonverbal expressions in humans and those in other animals. One important postulate in this book was that biological mechanisms associated with emotions directly influence nonverbal behavior. For example, Darwin writes, "terror causes the body to tremble. The skin becomes pale, sweat breaks out, and the hair bristles" (p. 90). Paul Ekman, Sylvan Tomkins, and Carroll Izard were heavily influenced by Darwin's approach and argued that subcortical brain structures associated with emotion directly caused particular patterns of facial expression (e.g., Ekman & Friesen, 1969a). By this view, specific facial expressions are directly caused by specific emotions, and this relationship is universal. Hence, the same facial expression should index the same emotions across cultures.

Unlike Darwin, who simply sent questionnaires to colleagues around the world ("do people in your area raise their eyebrows in fear?"), Ekman and his colleagues traveled to different cultures, asked individuals in these cultures to pose emotion expressions, and asked individuals in still other cultures to identify the emotions. For example, they traveled to Papua, New Guinea, to visit a group of people who had never been exposed to other cultures. Ekman (1971) provided some of these individuals with scenarios (e.g., a dead pig on the ground) and videotaped them as they expressed the emotion they would feel in that circumstance. The facial expressions in these videotapes were remarkably similar to American emotion expressions, and Americans were able to correctly identify the emotion in these expressions. Likewise, the tribesmen in New Guinea were able to identify the emotions of Americans. A recent meta-analysis examined cross-cultural facial expressions in 162 samples, with picture sets and raters from a great number of countries ranging from New Guinea to Malaysia to Germany to Ethiopia. Supportive of universality in facial emotion, in only 3% of these cross-cultural samples was even a *single emotion* recognized at rates below chance (Elfenbein & Ambady, 2002). These findings are consistent with the broader theory—that specific emotions directly cause corresponding and hard-wired facial expressions.

Theories of Nonverbal Influence

The second major perspective regarding the production of nonverbal behavior is not restricted to emotion but extends to all aspects of social influence and communication. Although this perspective and the nonverbal leakage perspective share the premise that evolutionary forces guide the production of nonverbal behavior, only *nonverbal influence* theories suggest that all forms of nonverbal communication, including emotional expression, primarily support the interests of the expresser. Nonverbal expressions, whether facial, vocal, or otherwise, are said to be signals that influence conspecifics' actions. This influence can occur either because the nonverbal display signals something about the upcoming behavior of the expresser or because the display itself has direct affective consequences for perceivers. Signals that do not influence others' behavior cannot contribute to survival and/or reproduction; hence, these signals are not selected. For example, threatening facial and vocal expressions would not have remained in existence if these did not provoke appeasement in conspecifics (Fridlund, 1994; Owren, Rendall, & Bachorowski, 2005). By the same token, only to the extent that threatening displays reliably predicted a powerful attack should perceivers have evolved appeasement to the display. Consequently, an evolutionary arms race emerges between expressers and perceivers. On the one hand, perceivers must learn to discriminate between reliable and unreliable nonverbal predictors of behavior. On the other hand, expressers benefit if the display gains what they want even (and perhaps especially) when it does not predict their behavior. Thus, as perceivers are increasingly able to discriminate between reliable and unreliable signals (over evolutionary time), expressers should alter these signals.

Models of nonverbal influence do not stipulate a one-to-one relationship between internal states and nonverbal behavior. In fact, Fridlund's (1994) influential model suggests that it would be detrimental to an expresser if others could always "see" the expresser's internal state (see also Hauser, 1996). More conservatively, Owren and colleagues (2005) argue that a relationship between internal state and expression will exist at times, if only because an internal goal prompts the influence attempt in the first place.

Thus, according to one model, nonverbal behavior functions to reveal, and according to another model, nonverbal behavior functions to influence. Both models are built on Darwinian principles, and both posit that nonverbal behavior is a powerful tool for understanding human social evolution. Hence, a good place to begin to understand the utility and ubiquity of nonverbal behavior is with a comparison of humans with our primate relatives.

Nonverbal Cues in Humans and Other Species

All primates (including humans) share certain needs, and all primates are social creatures, surviving in groups. Moreover, human brain structures bear considerable similarity to those of other primates, particularly in the subcortical areas. These primitive brain areas play an

important role in human and nonhuman behavior alike. In this section, the production of nonverbal behavior is examined with respect to similarities and differences between humans and other creatures. Specifically, human displays of dominance and affiliation are compared with those of other primate species.

Social Status and Dominance

Although there are far too many nuances in social behavior to provide a *complete* description with only two factors, status (or potency) and affiliation (or warmth) consistently emerge as the two underlying factors in studies of social perception (Fiske, Cuddy, & Glick, 2007; Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979). So it is no coincidence that nonverbal behavior plays an important role in vertical (status) and horizontal (affiliation) social relations across species.

The role of nonverbal dominance is so important among some primate species that it at times eclipses real physical dominance in demarking social structure. Consequently, leading primatologists make use of the terms *real dominance* to describe when one ape physically dominates another (as in a fight) and *formal dominance* to describe the nonverbal rituals associated with dominant and submissive animals (de Waal, 1982). Normal vertical interactions among chimpanzees always illustrate formal dominance but sometimes do not illustrate real dominance. Formal dominance may be observed when chimps greet one another, especially after a conflict. In these interactions, lower-status chimps repeatedly bow and emit a sound called a "pant-grunt" while timidly looking up at the more dominant ape. At the same time, the higher-status ape makes itself look bigger by stretching and standing its hair on end (Tomasello & Call, 1997).

Across primates, making oneself look bigger consistently emerges as a dominant greeting. Beyond stretching and putting hair slightly on end, alpha males often walk around in an exaggerated manner, as if they are bigger than they actually are. More generally, access to food, water, space, and sexual partners is highly but imperfectly correlated with nonverbal indicators of dominance such as interpersonal distance and movement, withdrawal and approach, and staring versus gaze avoidance (Bernstein, 1981). Finally, primate dominance signals include nonlinguistic vocal acoustics, such as high-frequency calls to signal subordinate status (de Waal, 1988; Hauser, 1993; Hayaki, 1990).

With this in mind, a recent meta-analysis provided a thorough investigation of human dominance displays (Hall, Coats, & Smith-LeBeau, 2005). This meta-analysis included studies that measured the different nonverbal cues exhibited by people varying in verticality. In this meta-analysis of 74 studies, the nonverbal behaviors exhibiting a meaningful relationship with verticality were increased facial expressiveness, postural expansion, decreased interpersonal distance from other people, and louder voice. Note that postural expansion (making oneself appear larger), decreased interpersonal distance, and louder voice are also dominance cues among apes. In other domains, cross-species similarity is modulated by the emergence of language. One illustrative example regards eye gaze. Submissive nonhuman primates hold gaze less than dominant creatures. Among humans the relationship is more complex: Submissive humans hold gaze less while speaking than while listening, whereas dominant people do not (Exline, Ellyson, & Long, 1975).

Despite the existence of some apparent overlap between humans and other primates with respect to nonverbal dominance displays, it is an oversimplification to claim that all primates express dominance similarly. For example, whereas macaques display submissiveness with a stereotypic facial expression that includes bared teeth (dominant macaques never display this face), this same facial expression is not always associated with submissiveness in chimps. Likewise, the relationship between facial expressiveness and dominance appears to be unique to humans. Nonetheless, striking similarities appear between human dominance displays and dominance displays of other primate species, as highlighted with respect to postural expansion, interpersonal distance, and vocal volume.

What functions might explain the ubiquity of dominance displays? Many scholars have argued that dominance displays reduce the need for actual physical aggression or more destructive displays of dominance. For example, Nelson (1984) observed more than 600 encounters in which an intruding pigeon attempted to take the territory of a male pigeon—in not one of these instances did Nelson observe an injury, and in the vast majority, territorial males won conflicts against intruders in the absence of fighting. A single type of display, the neck stretch, was highly effective in that intruders fled away in response to this display on 43% of the occurrences. Neck stretches are not common dominance displays in humans, but this example helps to illustrate that all species have some form of dominance display and these displays can function to help individuals avoid risk (in having to exert real power) and can help the group avoid harm.

Affiliation

Given the hierarchical nature of most primate social structure, vertical relations are clearly important. However, so are horizontal relations. Social exclusion typically meant death for our ancestors and still means as much for many of our primate cousins (Baumeister & Leary, 1995; Leary,

volume 2). Social bonding, friendships, and coalitions are the glue that holds people together in social groups. As with the vertical dimension of social relations, this horizontal dimension is supported by nonverbal behavior in both human and nonhuman primates.

Without a doubt, touch and grooming are the most important affiliative cues among nonhuman primates. In many ape groups, grooming is as valuable a commodity as food and it can be predicted on the basis of relationship status (de Waal, 1982; Furuichi, 1989; Gouzoules & Gouzoules, 1987; Nishida, 1987; Seyfarth, 1980). Grooming is also associated with forming bonds. Previously groomed entities are especially likely to help their former groomers in conflicts (Hemelrijk, 1994; Schino, 2007; Seyfarth & Cheney, 1984), to provide food to their former groomers (de Waal, 1982), and to share body warmth with former groomers in the cold (Cheney & Seyfarth, 2007). Moreover, getting groomed helps to reduce stress (Gust, Gordon, Brodie, & McClure, 1994).

Although grooming is clearly the most predominant affiliative behavior in nonhuman primates, there are other important affiliative nonverbal cues. For example, most primate species exhibit identifiable cues that are reliably used to recruit allies. Baboons emit certain vocalizations to indicate their support for individuals involved in a conflict—announcing they will intercede if necessary (Cheney & Seyfarth, 2007). And among chimpanzees, two facial expressions are reliably associated with affiliative behavior: the relaxed, open-mouth face ("playface"), which increases affiliative behavior and play, and the silent, bared-teeth face ("fear grin"), which also increases affiliation (Waller & Dunbar, 2005). In general, affiliative nonverbal displays among primates function to help create and maintain affiliations and horizontal group structure.

Although humans do not typically groom one another for hours on end, we do touch one another. Indeed, physical touch is an important mechanism for the provision of social support and the acknowledgment of interpersonal relationship. Touch increases with interpersonal intimacy (Guerrero & Anderson, 1991), and interactions involving touch appear to be more intimate (Burgoon, Buller, Hale, & de Turck, 1984). In the absence of touch, close interpersonal distance often signals affiliation (Burgoon, 1991; Mehrabian, 1969). Beyond touch and interpersonal distance, affiliation is thought to be illustrated by a constellation of nonverbal cues sometimes labeled "nonverbal involvement" (Edinger & Patterson, 1983) and sometimes labeled "nonverbal immediacy" (Anderson, 1985). The particular constellation said to account for immediacy typically includes touch, close interpersonal distance, gaze, and forward lean. Finally, the degree to which individuals' nonverbal behavior is synchronized during interaction is measureable and is related to apparent affiliative motives (e.g., Bernieri, Reznick, & Rosenthal, 1988).

Issues in Examining Nonverbal Cues Across Species

Scholars of both human and animal behavior note that nonverbal communication is complicated for several reasons. First, individual nonverbal cues only rarely have decontextualized meaning. Just as a human smile may indicate disparagement when it is flashed during an insult, ingratiation when it is shown while confessing to a misdeed, or joy when it is shown on learning of a promotion, a chimpanzee's outstretched arm may be used to ask for food, to garner support, or to suggest forgiveness (de Waal, 1982). Despite the existence of the context-general cues reviewed in the preceding sections, a great deal of growth in understanding nonverbal communication may be accomplished by examining homologues in the context-specific meaning of nonverbal cues. For example, do the meanings of nonverbal behavior in humans *and* in chimps both change when moving from an interaction with kin to an interaction with a higher-status individual? This type of analysis may reveal even greater similarity among species than previously thought.

A second issue regards the importance of facial expressions in nonverbal communication across primates. The continuity between nonverbal behavior in humans and that in the great apes (chimps, bonobos, gorillas, and orangutans) is highlighted by nearly identical sets of facial muscles (Burrows, Waller, Parr, & Bonar, 2006) such that the activation of similar facial muscles appears to produce roughly the same expressive facial appearance in both species (Waller, Vick, Parr, Bard, & Pasqualini, 2006). Facial expressions serve important social functions among primates—even among monkeys, who have much less muscular control over their faces than humans and the great apes (Hauser, 1996). A particularly interesting (and given the findings, cruel) investigation illustrates the importance of facial expression in monkeys. Izard (1971) removed rhesus monkeys from their social group, lesioned the eighth cranial nerve (rendering control over facial expression impossible, save eye movement), and returned them to the social group. These individuals subsequently experienced fewer and lower-quality social interactions, dropped in dominance rank, and were involved in more conflict. Unfortunately, similar interpersonal difficulties are experienced by individuals with certain physical and neurological diseases. For instance, patients with Parkinson's disease experience "facial masking" and gradually lose control over their facial expressions. Even physicians who should know

better underestimate Parkinson's patients' sociability and overestimate their neuroticism (Tickle-Degnen & Lyons, 2004), highlighting the corresponding importance of facial expression in humans.

In sum, nonverbal cues clearly play a role in structuring social life for nonhuman primates. Dominance displays in some primates are more central to social hierarchy than are actual exhibitions of power (aggression), and such displays appear to save lives and increase the survival likelihood of individual animals. Moreover, many similarities appear between human and nonhuman primate displays of nonverbal dominance. Similarly, affiliation displays play a key role in maintaining and revealing social cohesion among both human and nonhuman primates. Although the evidence for homologous affiliative cues is tenuous at best, there are loosely related homologues. Finally, despite differences in the meaning of particular facial expressions between chimpanzees and humans, the two species appear to have nearly identical facial musculature and expressive appearance. The implications of these similarities are yet to be realized, but it is likely that they will reveal more similarities than differences in the production of nonverbal behavior among primate species.

More broadly, the study of nonverbal behavior provides an important bridge for comparative studies involving humans and other primates. Although primatologists have been interested in social interaction for decades, they often rely on linguists for their social theories concerning humans. Likewise, most mainstream social-psychological articles do not include references to other primates; if they do, it is usually only in passing to note that humans are also animals. The bridge provided by nonverbal behavior is wide enough for researchers in many areas of social psychology to look toward primatology. For example, a great deal of research focuses on the if, when, why, and how in the use of deception in primates (Hauser, 1996). Clearly, such effects would be informative to social psychologists interested in self-presentation and impression management, and these psychologists may impart some wisdom to the primatologists. The use of grooming in most primates, of sexual touching in bonobos, and of the "playface" in chimpanzees to form alliances and social friendships and to gain compliance should be of interest to social psychologists involved in relationships research, research on social influence, and group dynamics. For those researchers who understand that humans are socially intelligent primates, the examination of our primate cousins' nonverbal behavior should be invaluable to understanding certain aspects of human social behavior.

Automaticity and Control in Nonverbal Behavior

That we share certain behavioral patterns with other primates does not imply that this behavior is automatic. Primates can exhibit strategic nonverbal behaviors—for example, de Waal (1982) described a chimpanzee named Yeroen who endured a shallow wound after a relatively tame tussle with another chimp named Nikkie. Initially, it was puzzling to the research group that Yeroen wobbled pitifully despite the lack of damage to his body. It soon became clear, however, that Yeroen would only limp when within the visual field of Nikkie—outside of Nikkie's visual field, Yeroen walked normally. Although it is sometimes difficult to interpret chimpanzee behavior, in this instance it appears that Yeroen altered his nonverbal behavior (gait) in a strategic move, suggesting that this behavior was regulated. Likewise, not all nonverbal behaviors are "automatic."

Still, nonverbal behavior is foundational to understanding the occurrence and consequences of automatic cognitive and behavioral processes as they occur in the natural world. Beyond the growing influence of the Internet, social interaction always includes nonverbal behavior and this behavior has important social consequences: People place considerable emphasis on nonverbal behavior in drawing inferences about others, perhaps more emphasis than on verbal behavior (Argyle, Alkema, & Gilmour, 1971; Argyle, Salter, Nicholson, Williams, & Burgess, 1970). People (and perhaps Yeroen) could thus enjoy substantial social gains by controlling nonverbal behavior in ways that create desired impressions. To understand self-presentation, then, is to understand automatic versus controlled processes, and to understand these processes in a social context is to understand automaticity in nonverbal communication.

Types of Automatic Nonverbal Behavior

The early part of the 20th century bore witness to a small group of researchers examining the spontaneity of nonverbal behavior. For example, Landis (1924) observed the nonverbal behavior of unknowing participants who were forced to sniff ammonia, look at pornographic materials, and cut off the heads of live rats. Some participants even had firecrackers dropped underneath their chairs. Fortunately for modern-day participants, such experiments are generally no longer possible, at least not in the United States. Despite a lack of access to these rather abusive means of eliciting spontaneous nonverbal behavior, contemporary researchers have made a great deal of progress in understanding the many nuances of automaticity (Dijksterhuis, this volume). One way to simplify the complexity of this topic is to break it into four types of "conditional automaticity" (Bargh, 1994). *A lack of controllability* refers to processes that cannot be consciously regulated even if one tries, *a lack of intentionality* refers to processes that begin without our conscious permission, *efficiency* refers

to processes that do not consume cognitive resources, and *awareness* refers to subjective knowledge of the process or its behavioral influence.

Unintentional and Uncontrollable Nonverbal Behaviors Perhaps the strongest form of automatic behavior is behavior that cannot be stopped or initiated consciously. Most studies of automatic social behavior include behaviors that *can* be consciously initiated or that *can* be consciously stopped. For example, although thinking about elderly people automatically activated slower walking in one study (Bargh, Chen, & Burrows, 1996), walking slowly is something that healthy adults can do or stop doing if they try. In contrast, less than 10% of the population can produce the raising and pulling together of the brows that occurs spontaneously with fear (DePaulo, 1992), blushing appears to be uncontrollable (Castelfranchi & Poggi, 1990; Leary, Britt, Cutlip, & Templeton, 1992; Timms, 1980), and some argue that the Duchenne smile (Ekman, Davidson, & Friesen, 1990), especially the contraction of the outer strands of the eye muscles, cannot normally be consciously controlled (Frank, Ekman, & Friesen, 1993). And although most people can consciously control the direction of their gaze when so inclined, this conscious control is short-circuited in the presence of another's gaze—one's own gaze uncontrollably orients in the direction of another's gaze (Driver et al., 1999). Of special importance for self-presentation and social influence, these difficult-to-control behaviors have substantial social consequences. For example, people like those who display Duchenne as opposed to non-Duchenne smiles (Frank et al., 1993) and blushing appears to ameliorate self-presentational damage created by untoward behavior (Leary et al., 1992).

Although only a few individual nonverbal behaviors are normally outside of conscious control, others may *often* be initiated unintentionally. Indeed, involuntary and voluntary facial actions appear to be innervated by different neurons (Ekman, 1984; Fridlund, 1994; Rinn, 1984). Moreover, certain stimuli evoke stereotypic facial expressions even when presented subliminally, short-circuiting the possibility of intentionality (Dimberg, Thunberg, & Elmehed, 2000). And people spontaneously respond to various positive and negative stimuli with the expected facial expressions (e.g., Ekman et al., 1990). Thus, facial expressions may often be uncontrollably elicited.

From the discussion so far, it should be clear that certain nonverbal behaviors are always uncontrollable and unintentional and others can often be elicited without our conscious volition. Yet many nonverbal behaviors are controllable under some circumstances. At any moment, we can easily change the way we walk, how close we stand to others, and our posture, and even untrained children can roughly pose emotional faces (Mazur, 2005). Moreover, symbolic gestures (e.g., the "peace" sign) are rarely unintentional. Nonetheless, for every nonverbal behavior we control there is another that cannot be *simultaneously* controlled, suggesting that at any point in (social) time people exhibit spontaneous nonverbal behavior.

Efficiency in Nonverbal Behavior Social interaction places various demands on cognitive resources (Ambady & Gray, 2002; Gilbert, Jones, & Pelham, 1987). In conversation, we have to (1) keep track of what the other person is saying, (2) keep what we want to say in mind until we speak, and (3) generate spoken responses, all of which consume cognitive resources. Within and beyond the conversation, people engage in active social perception processes, such as attending to *others'* nonverbal behavior to evaluate the impression one is creating, keeping an eye on the broader social environment, trying to avoid biases in forming judgments, and engaging in perspective taking to facilitate the flow of conversation. These many demands would seem to require us to be social superheroes, and yet without much conscious effort we are able accomplish meaningful and smooth-flowing social interaction.

One asset in our superhero arsenal may be that nonverbal behavior can proceed spontaneously, without the use of cognitive resources, whereas *stopping* it or changing it takes effort. For example, in one study, suppressing nonverbal expressions during an enjoyable film reduced memory for the film itself (Richards & Gross, 2000). Moreover, people who chronically suppress nonverbal behavior exhibited worse memory than did nonsupressors (Richards & Gross, 2000).

Efforts at control are probably most pronounced in situations in which it is important to create a particular impression. For example, White people with negative associations toward Black people may feel compelled to effortfully control their nonverbal behavior. Indeed, Richeson and Shelton (2003) demonstrated that White people who held negative implicit associations toward Black people suppressed nonverbal behavior (reducing limb, bodily, and eye movement) during an interaction with a Black person and subsequently exhibited heightened interference on a Stroop task that indexes reductions in attentional control. Similarly, Black people exhibited more control (trying to appear more engaged) *and* more of a deficit in executive function in interacting with members of another race than with members of their own race (Richeson, Trawalter, & Shelton, 2005; Shelton, Richeson, & Salvatore, 2005).

Together, these results suggest that nonverbal communication normally proceeds effortlessly and that consciously stopping or altering nonverbal behavior requires resources

from a limited pool of cognitive or self-regulatory resources. Perhaps contributing to these effects is the extra effort that people have to spend just to consciously identify their nonverbal behavior, as described in the next section.

Awareness of Nonverbal Behavior The poet Robert Burns (1853) wrote, "Oh wad some power the giftie gie us To see oursel's as others see us!" The ability to see ourselves as others do is particularly challenging in the domain of nonverbal behavior. We cannot see our own facial expressions, perceive our bodily movements and gestures, or hear our own voices as others do (Ekman & Friesen, 1969b). People may be aware that they are expressing joy in their face, that they are gesturing with their arms, or that their voice has escalated several octaves, but more fine-grained awareness is difficult. Accordingly, recent research suggests that most people exhibit comparatively little awareness of their nonverbal behavior. For example, people appear to be moderately accurate in estimating how much they smile but are not good at estimating behaviors such as nodding, gazing, gesturing, and self-touch (Hall, Horgan, & Carter, 2002; Hall, Murphy, & Schmid-Mast, 2007).

More broadly, Barr and Kleck (1995) examined the relationship between facial expressiveness reported by participants and that reliably judged by raters. Participants reported being more facially expressive than they appeared to observers, even when they had been previously told to attend to their own facial expressions; when later shown film of their own facial responses, the vast majority admitted that they appeared much less expressive than they remembered. In replication of these effects, people who were trying to maintain a neutral facial expression while tasting a disgusting drink overestimated the extent to which disgust was revealed (Gilovich, Savitsky, & Medvec, 1998). On balance, it seems that people are generally unaware of their nonverbal behavior.

Summary: Automaticity and Control in Nonverbal Behavior

In sum, as with most social activity, the production of nonverbal behavior is neither fully automatic nor fully controlled. Unlike most social activity, however, some nonverbal behaviors are nearly impossible to consciously start or stop and nonverbal behavior is often initiated and executed without intention. Moreover, people are surprisingly unaware of the form that their nonverbal behavior takes.

Although some nonverbal behaviors can be controlled, particularly in the service of impression management and meeting social norms (DePaulo, 1992), the control of nonverbal behavior appears to be taxing and reduces capacities for the performance of other tasks (Richeson & Shelton, 2003). For instance, individuals who were prevented from gesturing showed worse memory on a task compared with those allowed to gesture, suggesting that inhibiting nonverbal behavior functions as a cognitive load (Goldin-Meadow & Wagner, 2005).

For scholars interested in automatic and controlled processes, nonverbal behavior provides a unique playground. The production of nonverbal behavior has socially meaningful consequences that have existed for millions of years. Human evolution planned for social interaction, and the many automatic social processes that we share with less cortically advanced species should be observable in nonverbal behavior. The implication is that a sound way to understand socially situated automatic behavior is via examining nonverbal behavior. Yet not all socially adaptive behavior need be automatic, as described in the next section.

Context and Culture in the Production of Nonverbal Behavior

People who do not behave differently with their spouses than with their bosses are people who will soon be divorced or fired. The power of the situation is obvious when considering the contextualized nature of overt behaviors such as romantic advances versus promotion requests. Many situations are defined partly by the nonverbal behaviors appropriate therein such that the most socially successful impression managers are those who effortlessly adapt and display those appropriate nonverbal behaviors. More broadly, examining nonverbal behavior across cultures not only permits inferences about the universality of certain nonverbal behaviors but also provides substantial information about culture itself.

Contextual Control of Nonverbal Behavior

The efficiency with which nonverbal behavior adapts to the social context is rather striking. Indeed, the social environment automatically and with great speed initiates changes in facial expression and paraverbal behavior (Dimberg et al., 2000; Moody, McIntosh, Mann, & Weisser, 2007; Neumann & Strack, 2000). This fact can be observed in any movie theater—smiles and laughter immediately follow funny scenes, and startle responses occur immediately following terrifying scenes. Hence, nonverbal behavior reflects its social context.

Nearly every study to date shows that nonverbal behavior is different when others are present (vs. absent; cf. DePaulo, 1992). Perhaps most well known is a study in which participants viewing a pleasant videotape alone exhibited little smiling as compared with (a) participants who were told that a friend was watching the

same video or (b) participants for whom a friend was actually present (Fridlund, 1991). Notably, self-reported emotion did not differ among conditions, suggesting that the between-group differences in nonverbal behavior were expressive, not experiential. Similarly, Cole (1986) demonstrated that children smiled at an experimenter in response to a clearly disappointing gift but did not do so in the absence of an audience. The effect of social context is not always to increase expressiveness but rather to fit established norms. For example, Kleck and colleagues (1976) administered painful electric shock to participants and observed *attenuated* nonverbal expressivity with an audience.

Beyond the clear impact of *any* audience, the contextualized nature of nonverbal behavior is evident in the diverging nonverbal behaviors directed toward bosses versus peers, friends versus strangers, and experts versus nonexperts (e.g., Buck, Losow, Murphy, & Costanzo, 1992; Fugita, Hogrebe, & Wexley, 1980; Montepare & Vega, 1988; Steckler & Rosenthal, 1985). Situation-specific goals also contextualize nonverbal behavior. For example, people are especially likely to smile, nod, and gaze at others when trying to impress or gain favor (Godfrey, Jones, & Lord, 1986; Lefebvre, 1973; Rosenfeld, 1966).

The contextualization of some types of nonverbal behavior appears to be universal. For instance, across cultures, people use a type of speech characterized by high pitch, variable intonation, and other paraverbal devices ("baby talk") when talking to infants and children (as opposed to normal functioning adults (Ferguson, 1964). People also use this baby talk with foreigners, the elderly, developmentally delayed adults, and pets (Caporael, 1981; DePaulo & Coleman, 1986, 1987).

Although it may be tempting to conclude from this research that increased conscious control must account for the influence of the social situation on nonverbal behavior (DePaulo & Friedman, 1998), many of the reviewed findings might be interpreted as biologically prepared or functional responses to social life that either are hardwired (e.g., responses to higher-status individuals) or have through learning become automatic (DePaulo & Friedman, 1998). For example, although people exhibit predictably negative nonverbal behavior toward stigmatized individuals, this effect occurs primarily for highly prejudiced expressers, suggesting a learned but habitual response (Chaikin, Sigler, & Derlega, 1974; Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997; Harris, Moniz, Sowards, & Krane, 1994; King, Shapiro, Hebl, Singletary, & Turner, 2006).

In short, contextual influences on nonverbal behavior may sometimes reflect conscious control but often reflect the automatic influence of the environment. More generally, humans show a remarkable nonverbal ability to efficiently and enduringly adapt to social situations.

Culture and the Production of Nonverbal Behavior

As numerous anthropological accounts attest, culture exerts a profound impact on nonverbal behavior. This is clearly true with respect to gestures. Some of the earliest empirical work on nonverbal behavior demonstrated that Sicilian and Lithuanian immigrants exhibited distinct gestures that disappeared as individuals adapted to American culture (Efron, 1941). The cultural specificity of gestures is still apparent, of course. For example, walking hand in hand may be reserved for lovers or parent–child relations in the West, but in China and other countries, friends often hold hands. It is also well known that the "a-ok" gesture in America is an obscene sexual gesture elsewhere. Hence, gestures are often completely culturally specific.

A more controversial topic is the nonverbal expression of emotion. With respect to spontaneous emotion expressions, Ekman (1971) observed highly positive correlations between American and Japanese participants' patterns of facial response to neutral and pleasant videos. Similar findings have been observed in at least 10 other studies, supporting universality (Matsumoto, 2006). Yet Russell (1994) suggests that in many studies, spontaneous facial expressions only exhibit cross-cultural reliability with respect to general positivity and negativity—not discrete emotions. Two recent studies provided more conflicting evidence: Matsumoto and Willingham (2006) demonstrated cross-cultural stability in emotion expression among Olympic medal winners, whereas Naab and Russell (2007) demonstrated little such stability between a preliterature culture and the United States. It does seem clear that certain spontaneous facial movements are universally associated with certain feeling states, although those feeling states may be discrete emotions or diffuse affect.

The study of cultural similarity in spontaneous emotion expressions is supplemented by a much larger literature on deliberately posed emotion expressions. In most of these studies, photographers take pictures of people in different cultures posing each of several emotions. People from other cultures then rate the emotion that each facial configuration expressed. In general, there is clear evidence for cross-cultural similarity in deliberately posed emotion expressions (Elfenbein & Ambady, 2002). Yet these prototypical facial expressions are supplemented by culture-specific patterns. Facial expressions of fear (for example) bear considerable similarity across cultures, but subtle differences also exist—people within the culture are better able to recognize fear than are people outside of the culture (Elfenbein & Ambady, 2002). Indeed, as opposed to neutral facial expressions, emotional facial expressions appear

to reveal culture; in one study, nationality judgments of Japanese and Japanese Americans were more accurate when the posers exhibited emotional expressions (Marsh, Elfenbein, & Ambady, 2003). In short, cultural similarities in emotion expressions appear to be supplemented by *nonverbal accents* in such expression.

Summary: Nonverbal Behavior in Context (and Culture)

Nonverbal behavior is nothing if not contextually driven, even if a few universal action tendencies exist. Whether because of spontaneous or controlled processes, nonverbal behavior reflects conformity to situational constraints. The efficiency with which such nonverbal adaptation occurs, the specificity and duration of context-specific nonverbal behavior, and the existence of culturally specific patterns of nonverbal activity all attest to the special role of nonverbal behavior in assimilating to the group and to particular others.

One of the more fascinating things about nonverbal behavior is that, to the extent that the same contexts and cultures elicit the same nonverbal behavior, such behavior helps define the context. In fact, the way that cultural anthropologists and primatologists understand social situations is by observing nonverbal behaviors—those behaviors help define the situation, and in some cases, the culture (Molinsky, Krabbenhoft, Ambady, & Choi, 2005). Thus, nonverbal behavior is crucial not only for an understanding of contextual and cultural effects but also for defining the social-psychological situation. Broadly, then, situational control of nonverbal behavior is beneficial for individuals, as well as for the group. The flexibility of nonverbal behavior vis-à-vis the situation is clearly an efficient means of social assimilation that is so important that it emerges before perhaps any other social ability.

Nonverbal Behavior in Infancy

An understanding of the early stages of life provides a great deal of information about the natural processes central to social psychology. Much has been learned about infants' adaptation to and development within the social world, and this development typically involves nonverbal behavior. As explained here, nonverbal behavior represents the sole means by which young infants engage the social world.

Nonverbal Development: Findings

Anyone who has spent time with infants recognizes that newborns are not sponges who passively take in information. Babies have needs, and when those needs are not met, they let us know. One important obstacle for infants, then, is how to let us know what they need or want. The only way for them to accomplish this is through nonverbal behavior.

To spend time with infants is to know that they come equipped with impressive vocal capacities. Crying is typically evident at or within a few minutes of birth and when it is not there could be trouble. Crying has some clear social functions. For example, infants cry in response to other infants' cries, but this same pattern does *not* occur when the eliciting stimuli are synthetic cries, the cries of an older infant, or recordings of infants' own cries (Martin & Clark, 1982; Sagi & Hoffman, 1976; Simner, 1971). These findings illustrate that crying serves a social function beyond a simple response to a noxious stimulus. Likewise, if undifferentiated displeasure is all that fueled crying, newborns should not exhibit acoustically differentiated cries for pain versus anger, as they do (Lester & Boukydis, 1992; Zeskind & Collins, 1987). Crying is *socially* meaningful behavior.

Crying is not the only nonverbal communication skill displayed by newborns—meaningful facial gestures emerge quickly. Within 42 minutes of birth, many newborns imitate nonverbal behaviors such as mouth opening and tongue protrusion; this capacity is especially strong within 12 to 21 days after birth, and it can occur a full day after infants observe a novel facial expression (Meltzoff & Moore, 1977, 1983, 1994). Within a few months of birth, infants exhibit spontaneous smiling to human faces, spontaneous anger to the removal of a reward, and other nonverbal emotion expressions (Alessandri, Sullivan, & Lewis, 1990; Campos, Campos, & Barrett, 1989; Oster, 1978; Sullivan & Lewis, 2003). These responses may help infants meet a need, whether that need be affiliation or acquisition of a rewarding stimulus.

Other difficulties faced by parents may also be attributed to infant nonverbal communication. For example, putting an infant in a car seat is not always an easy task for parents, yet the movements of infants at these times are not completely random efforts to frustrate adults. Infants use various gestures to attract attention and to make requests, and still other specific body movements are associated with positive or negative affect (Acredolo & Goodwyn, 1988; Legerstee, Corter, & Kineapple, 1990). For example, positive affect is often communicated with open-handed arm extensions, whereas negative affect is often communicated with closed hands and arms extended at the sides. Around 1 year, more pleasant "offering" gestures emerge, and by 14 to 16 months toddlers have a broad range of request, attribute, and pointing gestures (Acredolo & Goodwyn, 1988; Masur, 1983). Note here the continued development of gestures following the advent of verbal speech. In fact, gestures predict changes in language and facilitate the learning of language (Iverson & Goldin-Meadow, 2005).

After the first year of life, children begin to learn display rules and to adjust their expressions accordingly. Although not definitively in response to a display rule,

infants begin to reduce negative gestural responses as early as 1 year of age (Blake, McConnell, Horton, & Benson, 1992). By 24 months, toddlers can deliberately use facial expressions to elicit support from caregivers (Buss & Kiel, 2004), although it can be difficult for them to do (joy is the most reliable controlled expression; Fridlund, Ekman, & Oster, 1987). The ability to situationally alter nonverbal expressions appears to improve with age. In Cole's (1986) study, 10-year-olds were better at concealing their negative facial emotion than were 4-year-olds.

Nonverbal Development: Theory and Implications

A variety of developmental theories attempt to account for early nonverbal expressions—differentiation theories, for example, emphasize that infants move from expressing relatively diffuse affect to more differentiated discrete emotions (Izard, 1991; Sroufe, 1996). One recent theory offers a fascinating and compelling explanation of how we develop from undifferentiated emotion expressers into discrete emotion expressers. This sociocultural internalization model (Holodynski & Friedlmeier, 2006) draws on the robust finding that caregivers mimic their children's nonverbal behavior, and vice versa (Malatesta & Izard, 1984). The idea is that caregivers *selectively* mimic their children's emotional behavior and in exaggerated form. Parents' selective and exaggerated mimicry then rubs back off on the children, who may reduce their unmimicked expressions and alter their mimicked expressions to better approximate the parent's expression. Over time, this process can shape expression—diffuse affect becomes organized into specific facial configurations of discrete emotions. This process may help explain how nonverbal accents (Marsh et al., 2003) are transmitted within a culture.

Strangely enough, the world of the infant is one that most of us have difficulty remembering, even though we all once lived there (e.g., Usher & Neisser, 1993). Perhaps this has to do, in part, with most of our experiences in that world being nonverbal. Our faces, nonlinguistic voices, and bodies were our only means of communicating our love, distaste, and interest for various aspects of the world. It thus seems reasonable that this early nonverbal experience shapes later social adaptation, temperament, cognition, and behavior—even if we can't remember that early experience it perhaps helps to form unique personalities. Indeed, individual differences in nonverbal behavior may have important predictive value, a topic we turn to next.

Individual Differences in the Production of Nonverbal Behavior

In the 2004 American presidential campaign, candidate Howard Dean exhibited a great deal of excitement in one speech. At the end of his excited speech, Dean drew a fist high up in the air and as he vocalized the sound "byah!" he quickly moved the fist down and forward. This moment was televised repeatedly in the United States, was ridiculed in the media, and many political pundits attributed the demise of Dean's campaign to that moment.

Impressions of others are often dominated by nonverbal behavior (Argyle et al., 1970, 1971), a fact that may have undermined Howard Dean's political ambitions. Moreover, many scholars believe that individual differences in nonverbal communication are predictive of more general social intelligence such that nonverbal behavior both indexes and contributes to likely social success.

Expressiveness

The two most-studied individual differences in nonverbal communication are nonverbal expressiveness and gender. *Nonverbal expressiveness* is the extent to which nonverbal behavior reveals feelings (e.g., Buck, 1984). The current review highlights the facets of nonverbal expressiveness most relevant to social adaptation (for a complete review, see Riggio, 1992, 2006). For example, individual differences in nonverbal expressivity emerge earlier than verbal behavior, coincide with our initial social adaptation in the world, and are stable throughout childhood (Kagan, Snidman, & Arcus, 1998). Expressivity also seems to be stable within families and across generations (Halberstadt, Fox, & Jones, 1993). Nonverbal expressiveness is critical to social success, at least within a culture: The mood of nonverbally expressive people is likely to spread throughout a social setting (Friedman & Riggio, 1981; Sullins, 1991), expressiveness appears to be more important than even physical attractiveness in first impressions (Friedman, Riggio, & Casella, 1988), and people tend to be especially satisfied with expressive physicians, teachers, and athletes (Abrami, Leventhal, & Perry, 1982; DiMatteo, 1979; Rejeski & Lowe, 1980). Moreover, nonverbal expressiveness in one arena can carry over to other arenas. Thus, people who are socially expressive in their nonverbal behavior also tend to be more expressive in their personal webpages (Weisbuch, Ivcevic, & Ambady, 2009). The causal impact of expressiveness on individual and group life may help to explain broader differences in behavior, such as those that occur with gender.

Gender

Most people believe that substantial nonverbal differences exist between men and women. Lay beliefs hold, for instance, that women speak more softly, gaze more, and smile more than do men (Briton & Hall, 1995). According to one provocative theory, women nonverbally behave in the way that weak and low-status people do and this

behavior helps to account for other gender differences (Henley, 1977). To what extent are these assumptions about gender differences supported?

The relationship between gender and nonverbal dominance is not simple. For example, women are more likely than men to exhibit some nonverbal behaviors empirically associated with low status, such as a softer voice, but also some nonverbal behaviors empirically associated with high status, such as facial expressiveness. Still, women and men clearly exhibit different nonverbal behaviors, and many of these confirm stereotypes about nonverbal behavior. In comparison with men, women smile more, gaze more, are more facially expressive, exhibit more expressive gestures, touch people more, and maintain smaller interpersonal distances (Hall, 1984). Of course, these effects have many nuances—for example, differences in smiling are only existent during social interaction (LaFrance, Hecht, & Levy-Paluck, 2003). Women and men also differ considerably in their movement—from point light displays alone, in which an actor walks in the dark with lightbulbs affixed to the joints, perceivers can detect whether that actor is male or female (Kozlowski & Cutting, 1977). This difference appears to occur because masculine men exhibit a "swagger," with lots of shoulder movement and little hip movement, whereas feminine women exhibit a "sway," with lots of hip movement but little shoulder movement (Johnson & Tassinary, 2005).

Summary: Nonverbal Behavior and Individual Differences

In general, nonverbal behavior is an important component of personality that is not limited to expressiveness and gender. Extraversion and self-monitoring, for example, have important nonverbal components. One of the more well-studied topics in all of psychology, infant temperament, is based on nonverbal reactions, suggesting the centrality of nonverbal behavior to the study of personality. Indeed, infant temperament predicts personality at 10 to 12 years of age (Kagan & Snidman, 2004). Moreover, the facial expressions of 18-month-olds were reliable predictors of the Big Five personality traits 2 years later, even after controlling for relational variables such as attachment at 18 months (Abe & Izard, 1999). In short, nonverbal behavior appears to play an important role in personality.

Thinking Nonverbally

The production of nonverbal behavior clearly plays an important role in social adaptation. But might basic social cognition also be based on nonverbal behavior? Research on cognitive and perceptual processing is increasingly informed by the view that people think nonverbally (Barsalou, 1999). Over the last decade, a new model of cognition has begun to compete with the existing view that cognitive representation is largely semantic. By the older view, the category "elderly" would be defined by a feature list that might include "gray hair," "slow," "calming," and so on. By the newer "grounded cognition" view (often described as "embodied cognition"), cognitive representations are composed of perceptual information, including the motor information involved in nonverbal behavior (Barsalou, 1999). "Elderly," for example, would be defined by visual neurons active with grayness, motor neurons active with slow movement, limbic system neurons active with calmness, and so on. Activation of the elderly person category is just the activation of these neurons; likewise, activation of these (e.g., "slow" motor) neurons makes it likely that the category ("elderly") will become active. According to this view, category activation *is just* the activation of modality-specific neurons, including motor neurons. Nonverbal behavior can thus be part of thinking.

Grounding Social Experience in Nonverbal Behavior

According to theories of grounded cognition, a pattern of neuronal activation corresponds to both category activation and category perception. These theories suggest a critical role for movement, or the activation of motor neurons, in category activation. Indeed, people categorize objects most quickly when making gesturing motions that simulate the movement they normally make when handling that object (Barsalou, Niedenthal, Barbey, & Ruppert, 2003; Tucker & Ellis, 1998). For example, they are fastest to identify a faucet when moving their hand in a faucet-turning motion. And when making responses with gentle finger grasping, people are faster to identify objects that require gentle motor grasping (a grape) than those that need gross motor grasping (a hammer; Tucker & Ellis, 2001). Similarly, when motor components of a category are suppressed, so is the perception of that category. Participants forced to hold a pencil sideways between their lips and their teeth (preventing smiles) were slower than other participants to detect a change in another's emotional facial expression (Niedenthal, Brauer, Halberstadt, & Innes-Ker, 2001). Moreover, people prevented from moving their faces are slow to identify emotion expressions in general (Stel & van Knippenberg, 2008). Finally, feelings of pride after success are inhibited among people forced to slump versus those forced to sit upright (Stepper & Strack, 1993).

If smiling produces happiness, then we should like objects more when we smile in their presence. Indeed, attitude change toward a counterattitudinal essay was strongest among participants whose expressions had been contorted into smiles (vs. frowns) as they wrote

counterattitudinal essays (Rhodewalt & Comer, 1979). As compared with smiling participants, frowning participants do not like cartoons as much (Strack, Martin, & Stepper, 1988), and participants with a disgust expression thought odors smelled particularly bad (Kraut, 1982). These findings provide initial evidence that motor representations involving the face are involved in attitudinal representations.

Other nonverbal movements are involved in representations of liking and disliking. For example, in one set of studies, participants were instructed to nod or shake their heads (to test a pair of headphones) while listening to an argument. They then stopped moving their heads and indicated the extent to which they agreed with the argument. Participants who nodded agreed with the argument to a greater extent than did participants who shook their heads (Wells & Petty, 1980). Likewise, eye gaze may *cause* rather than simply reflect preferences. For example, Shimojo, Simion, Shimojo, and Scheier (2003) found that *before* a preferential decision, the pattern of gaze between two faces eventually shifted toward the face that was later preferred. Moreover, manipulations of gaze direction caused predictable changes in preferences. Indeed, experimental studies have demonstrated that, for heterosexual individuals, increased gaze toward opposite sex partners causes increased romantic attraction (e.g., Kellerman, Lewis, & Laird, 1989).

More evidence that the production of nonverbal behavior facilitates cognitive processing comes from work on learning. Children who gesture more during instruction learn more than those who gesture less (Goldin-Meadow & Wagner, 2005).

The evidence thus far suggests an important role for nonverbal behavior in basic and social perception, although a great deal more work remains to be done to explore these relationships. Beyond social perception, emotion, and attitudes, other effects of nonverbal behavior on social cognition are likely. For example, given substantial evidence for mood-congruent memory, smiling should and does promote memory for emotion-congruent material (Laird, Wagener, Halal, & Szegda, 1982; Riskind, 1983). In general, nonverbal behavior plays a foundational role in the perception and expression of affective phenomena ranging from emotion to attitudes to memory. The grounded cognition perspective implies that nonverbal behavior plays a broader role in social cognition as well.

Grounded Cognition and Nonverbal Behavior: Redux

The traditional view of expressive behavior, articulated in the most prominent theories of nonverbal behavior (Ekman, 1999; Fridlund, 1994), is that internal states (emotions, intentions) cause nonverbal expressions. Yet it also appears to be the case that nonverbal expressions can cause internal states, influencing introspective judgments, memory, and attitudes. Although a grounded cognition account offers an engaging explanation of these effects, other theories can explain at least portions of them. For example, the ideomotor theory of perception (Dijksterhuis & Bargh, 2001) explains how the perception of behavior produces the same behavior in oneself, and vice versa. Likewise, the direct effects of nonverbal behavior on subjective evaluations of emotion and attitudes can be explained by the idea that people treat their nonverbal behaviors as metaperceptual cues to internal states (e.g., Brinol & Petty, 2003). In sum, the evidence clearly suggests an important role for nonverbal behavior in social cognition, but a grounded cognition account is not the only theory for describing this role. The next decade should provide evidence that disambiguates the relevant models.

Summary: Nonverbal Production

The production of nonverbal behavior is clearly part of social adaptation. In this way, humans are not unlike other primates who use nonverbal behavior to maintain social structure and to promote affiliation. In adapting to the social world and setting the foundation for later social cognition, infants rely heavily on nonverbal behavior for getting their needs met. As adults, nonverbal production skills developed over the millennia and early in individual lives aid in prompting adaptation to social groups. Such adaptation plays an important role and helps in socialization and acculturation. Finally, and surprisingly, the production of nonverbal behavior even plays an important role in basic cognitive and perceptual processes.

NONVERBAL FOUNDATIONS OF SOCIAL PERCEPTION

Clearly, the production of nonverbal behavior is central to various social-psychological processes. But the other side of the nonverbal equation—nonverbal perception—is perhaps even more important to social adaptation. As with the production of nonverbal behavior, the perception of nonverbal behavior is foundational. Much learning early in life occurs via others' nonverbal behavior, suggesting that the foundation of our social knowledge is nonverbal. Indeed, adult social perception and social judgment rely heavily on nonverbal behavior. Meaningful nonverbal behavior provides some of the earliest input to social perception and permits rapid and efficient social judgments (Ambady & Rosenthal, 1992).

Nonverbal Perception Processes

The social cognition juggernaut of the 1980s and early 1990s relied heavily on the use of written experimental

materials. The field of social cognition built on the established base of cognitive psychology and followed its methods, often using abstract, verbal, and written stimuli. While this era provided a rich and exciting knowledge base, it mostly overlooked the importance of social ecology in basic cognitive processes (McArthur & Baron, 1983). By the late 1990s, an increasing number of studies were demonstrating important differences between the processes that helped to disambiguate written descriptions of people and the processes that helped to disambiguate images of real people (Macrae & Bodenhausen, 2000). In the last decade, increasing emphasis has been placed on examining real behavior (Baumeister, Vohs, & Funder, 2007). To that end, it has become increasingly important to understand the processes that play a role in the perception of nonverbal behavior. In particular, the next two sections review the automatic processes involved in nonverbal perception and how various nonverbal cues contribute to person perception.

Automatic Processing of Nonverbal Behavior

Are our impressions and conclusions about others driven by spontaneous processes that escape our awareness? Or are they the result of conscious deliberation? These are fundamental questions that highlight the role of nonverbal behavior in social processing, judgment, and behavior (Bargh & Pietromonaco, 1982; Bargh, 1994; Devine, 1989; Winter & Uleman, 1984).

Automaticity in Nonverbal Perception: Nonconscious Processing Substantial evidence indicates that facial expressions are processed and elicit meaningful responses prior to perceivers' conscious recognition of those expressions (Murphy & Zajonc, 1993; Ravaja, Kallinen, Saari, & Keltikangas-Jarvinen, 2004; Rotteveel, de Groot, Geutskens, & Phaf, 2001; Stapel, Koomen, & Ruys, 2002; Strahan, Spencer, & Zanna, 2002; Winkielman, Berridge, & Wilbarger, 2005). Evidence from neuroscience details how some of this processing may occur. For example, the human amygdala responds to emotional facial expressions even when those facial expressions are presented subliminally (e.g., Hariri, Tessitore, Mattay, Fera, & Weinberger, 2002; Liddell et al., 2005; Ohman, 2002; Whalen et al., 1998, 2004). The path from the subcortical visual areas to the amygdala may represent the more "ancient" route to emotional understanding found in several species, including nonmammals (Adolphs, 2006). Moreover, the somatosensory system common to mammals is often activated in response to emotion expressions, a finding that some scholars regard as evidence for emotional contagion at the neural level (e.g., Schilbach, Eickhoff, Mojzisch, & Vogeley, 2008; Wild, Erb, & Bartels, 2001). Hence, neural pathways for processing unattended nonverbal expressions and producing unintentional nonverbal behavior appear to be largely subcortical and shared with other mammals and may account, in part, for meaningful pre-conscious responses to emotion expressions.

Automatic processing of nonverbal behavior is not limited to emotion. The extraction of information from nonverbal behavior proceeds in a relatively automatic fashion in many domains. For example, limitations imposed on cognitive processing resources do not interfere with (1) recognition of social relationship type (e.g., friends vs. strangers) given strictly nonverbal information, (2) recognition of attitudes based on nonverbal behavior, and (3) accuracy in nonverbal person perception (Ambady & Gray, 2002; Gilbert & Krull, 1988; Patterson & Stockbridge, 1998). Findings such as these suggest that the processing of nonverbal behavior is often free of cognitive resources (i.e., is often automatic).

Perhaps the strongest evidence that nonverbal behavior is processed automatically comes from research on gaze following. Even if people think that they can resist the urge to look where others' look, research has shown that attention is obliged to move in the direction of others' gaze. Indeed, specific neurons code for eye gaze direction (e.g., Calder et al., 2007) and are involved in the orienting of attention (Rafal, 1996). Within 3 months of birth, infants' saccadic eye movements appear to follow the dynamic gaze of caretakers (Farroni, Massaccesi, Pividori, & Johnson, 2004; Hood, Willen, & Driver, 1998), and this gaze following becomes especially strong by 18 months (Brooks & Meltzoff, 2002, 2005). In adulthood, others' eye gaze may be the only visual cue that, placed centrally, reflexively directs attention toward the periphery. The presentation of a gaze cue in the center of the screen rapidly shifts attention in the direction of the gaze (Friesen & Kingstone, 1998). Even when participants are explicitly told that a target will be in the *opposite* direction of the eye gaze image and even when the target typically *is* in the opposite direction, participants still exhibit a speedy attention-orienting effect in the gazed-at direction, suggesting that this effect cannot be suppressed (Driver et al., 1999). Thus, another's gaze immediately orients one's attention, and this orienting can only be consciously suppressed after a half second or so—immediate gaze following seems to be obligatory.

Automaticity in Nonverbal Mimicry: Goal-Dependent Automaticity A great deal of evidence shows that people unintentionally (and often without awareness) mimic the nonverbal behavior of others (Chartrand & Bargh, 1999; Neumann & Strack, 2000). In one paradigm, slides

of happy and angry faces elicited facial muscle responses that corresponded to the presented slides (Dimberg, 1982, 1990). Facial pain appears to elicit expressions of facial pain in viewers, foot tapping and nose rubbing during social interaction appear to prompt the same in interactional partners, and infants exhibit facial imitation shortly after birth (Chartrand & Bargh, 1999; Meltzoff & Moore, 1977; Vaughan & Lanzetta, 1980). In conversation, people appear to imitate accents, vocal tone, and vocal speed (Giles & Powesland, 1975; Neumann & Strack, 2000; Webb, 1969). And while it is well known that yawning is contagious among humans (Provine, 1986) even dogs appear to catch human yawns (Joly-Mascheroni, Senju, & Shepherd, 2008). The effects of nonverbal mimicry do not end at the behavior itself, but nonverbal mimicry is related to emotion in a process referred to as *emotion contagion* (Hatfield, Cacioppo, & Rapson, 1994).

Indeed, evidence now suggests considerable overlap in the neurons responsible for certain motor movements and perceiving the same movements in others; this is true for both monkeys and humans (Rizzolatti & Craighero, 2004). These neurons have been labeled "mirror neurons" and are thought by some to account for nonverbal mimicry (Gallese & Goldman, 1998).

Moderated Effects of Nonverbal Mimicry The existence of neurons dedicated to simulating others' actions suggests something special about nonverbal mimicry beyond simple perception. Given the importance of group life and hence social bonding to our species, it could be that these "special" neurons are dedicated to simulating the behavior of and thus to understanding our fellow group members (e.g., Preston & de Waal, 2002).

Recent work is consistent with this idea. For example, Weisbuch and Ambady (2008a) observed that nonverbal emotion contagion only occurred when the social perceiver shared group membership with the social target. Others have observed increased imitation for ingroup face rubbing and facial expressions of liked faces; when shown happy or angry images of then-President Ronald Reagan, people who did not like Reagan did not exhibit emotion contagion (Likowski, Muhlberger, Seibt, Pauli, & Weyers, 2008; McHugo, Lanzetta, Sullivan, Masters, & Englis, 1985; Yabar, Johnston, Miles, & Peace, 2006). Indeed, when people want to bond or have been socially excluded, they are especially likely to exhibit nonverbal mimicry toward ingroup members (Lakin & Chartrand, 2003; Lakin, Chartrand, & Arkin, 2008). Hence, the evidence appears to be strong that nonverbal mimicry is especially responsive to the ingroup. For this reason, it seems likely that affiliation goals underlie the simulation of others' nonverbal behavior.

If mirror neurons and nonverbal mimicry are driven by affiliation motives, they may be taken offline when mimicry would actually disrupt social interaction. In one study, for example, individuals were seated facing one another and participated in a cooperative task (Tiedens & Fragale, 2003). One of these individuals was a confederate who exhibited nonverbal dominance or submission via postural expansion or constriction. Participants' behavior revealed complementarity rather than mimicry. Thus, over the course of the interaction with a dominant, expansive confederate, participants exhibited increasing postural *constriction* and such responses contributed to positive evaluations of the interaction.

In general, meaningful nonverbal behavior is often processed nonconsciously and without cognitive resources. People clearly have automatic mechanisms in place for speedy adaptation to the social environment, as communicated via responses to nonverbal behavior. Of course, such flexibility occurs in responses to *real* social environments, the importance of which is reviewed in what follows.

Configural and Featural Processes in Nonverbal Perception and Judgment

Although political critics and pornographers might disagree, human bodies have heads and human heads have bodies. Regions above *and* below the neck are crucial to social life, yet just as initial studies on social perception often used a completely disembodied context, contemporary studies have used partially disembodied stimuli in an effort to create a solid scientific basis for future research. For example, the last decade has witnessed a tremendous amount of research on how the human face is processed perceptually and cognitively (Macrae, & Quadflieg, this volume; Zebrowitz, 2006). And just as moving from written materials to naturalistic faces has forced a rewriting and rethinking of some previously "known" phenomena (e.g., Quinn & Macrae, 2005), moving from bodiless faces to a full-human context may produce some revisions to what has been learned about social perception from studies of human faces. In this section, we describe existing theory and research that models whole-person perceptual processes.

Feature-Based Perception of the Whole Person Social psychologists have often used a lens model (Brunswik, 1956) to explore the nonverbal cues that contribute to social judgment. Studies that use this model to understand nonverbal behavior first measure characteristics of social targets (typically via self-report). Then, those social targets engage in a videotaped task and, based on the generated videotapes, judges code the targets for various behaviors (smiling, talking time, etc.). Finally, social perceivers provide macro-level ratings for the targets on relevant dimensions (e.g., personality). The resulting analyses

describe the nonverbal cues associated with particular target characteristics and the nonverbal cues used by social perceivers in judging those particular target characteristics. Such an analysis can be informative with respect to both the nonverbal cues that social perceivers use in general and the nonverbal cues that accurate social perceivers use.

In one example, groups of three previously unacquainted college students were asked to converse for about 15 minutes on topics of their choosing while seated in an informal waiting room. The conversations took place a week after participants had provided self-reported personality ratings. On the basis of silent videotapes, judges coded the nonverbal behavior of the targets and social perceivers provided personality ratings of the targets (Gifford, 1994). The eight measured personality traits were then analyzed with a lens model. For example, social perceivers' ratings of dominance were based on head orientation, trunk orientation, self-touching, gesturing, and many more cues. While perceivers correctly used leg extension and gesturing, the majority of cues they used were not valid indicators of dominance. Moreover, they missed several important cues, such as "left leg lean." Most traits showed similar patterns whereby social perceivers correctly used several nonverbal cues but also failed to use many correct cues and overused nondiagnostic cues. Various other lens model analyses have examined the role of particular nonverbal cues in social judgment, and in general the results suggest widespread use of nonverbal cues in judgment, even when those cues are not diagnostic (e.g., Gifford, Ng, & Wilkinson, 1985).

Yet such featural analyses have several important limitations. One unfortunate consequence of the study of discrete nonverbal cues is that while some of these cues may prove to be widespread across cultures and time in relation to psychological states and traits (e.g., emotion expressions), many may prove to be culturally specific, lending to eventual difficulties in replication and in the production of scientific laws (Gergen, 1973). Complicating matters further is that even within a culture the production of nonverbal cues in one setting, such as a group conversation (e.g., Gifford, 1994), may differ markedly from the production of nonverbal cues in another setting, such as reading a standard statement aloud (e.g., Borkenau & Liebler, 1992). Hence, the importance of specific nonverbal cues to social judgment may be both domain and situation specific (Ambady et al., 2000). Finally, lens models to date have disregarded the importance of configural processing by focusing on specific cues rather than on the interaction of those cues (Zebrowitz & Collins, 1997).

Configural Processes in Nonverbal Perception: Ecological Theory One influential perceptual theory (Gibson, 1979), holds that perceptual processes adapt to the environment in which they have evolved—both over the course of one's life, and over generations. According to this theory, perceiving is for doing in that perception is for extracting the actionable properties of things or the properties of things that are relevant to well-being. These self-relevant properties are described as *affordances.* For example, lowered eyebrows might afford danger if the eyebrow-lowering individual is moving toward the self, is yelling loudly, and exhibits other facial bodily motions indicative of aggressive intent. The key point for the current purposes is that affordances are said to be readily communicated over multiple modalities and most effectively via the higher-order patterning (or "configuration") of cues, rather than single cues in isolation (Zebrowitz & Collins, 1997). McArthur and Baron (1983), in a position consistent with Gibson's, suggested that social perception also proceeds in an ecologically adaptive manner. They argued that perceivers extract invariants, or stable social properties, from higher-order patterns in the social stimulus array. This social-ecological approach either implicitly or explicitly anticipated several findings with respect to the perception and judgment of nonverbal behavior.

Multichannel Facilitation and Interference in Nonverbal Perception The social-ecological approach suggests that modalities combine to inform social perception and judgment. If so, then judgment should be especially fast when several modalities impart the same information and are consistent. Moreover, judgment should be impaired or slowed when the to-be-judged modality imparts information that is inconsistent with a second modality.

Multimodal facilitation is clearly demonstrated with infant identification of emotion expression. Walker-Andrews and colleagues (for a review, see Walker-Andrews, 2008) have demonstrated, for example, that 3-month-old infants can recognize facial expressions of emotion but only when accompanied by a corresponding vocal expression. Only later do infants develop the ability to recognize facial expressions in the absence of other communicative channels. At least with regard to emotion recognition, then, developing humans require some degree of consistency to learn the emotional meaning of any particular nonverbal cue. Multimodal facilitation is also illustrated in observations of patients. In one case, occipitotemporal damage was responsible for a patient's visual agnosia, which prevented her from consciously recognizing emotion in the face (de Gelder, Pourtois, Vroomen, & Bachoud-Levi, 2000). Yet remarkably, exposure to facial expressions of emotion influenced her ability to recognize emotions in the voice, demonstrating an automatic multimodal influence in nonverbal judgment.

Among adults, multimodal *interference* is illustrated by the so-called McGurk effect: When people are asked to identify vocal utterances and to ignore images of targets moving their lips, they are unable to do so. These participants often misidentify the vocal utterance ("ba") in the direction of the lip movement ("ga"; McGurk & MacDonald, 1976). Hence, in perceiving a paraverbal cue, a facial cue can interfere. One particularly fascinating demonstration of multimodal interference used posed facial expression pictures. These facial expressions were seamlessly photo-edited onto bodies that expressed a different emotion. For example, a prototypically angry face was placed on a body that was holding a dirtied pair of underwear; a prototypically disgusted face was placed on a body that was holding a fist in the air (as if about to strike a blow). Although participants were instructed to ignore the body and focus on the face in making their emotion decision, they were unable to do so. Thus, disgust facial expressions were correctly identified 91% of the time when presented alone, but when presented on bodies holding fists in the air, these faces were incorrectly judged to be *angry* by 87% of participants (Aviezer et al., 2008).

Finally, meaningful physiological states may be best communicated via multiple channels. Although research drawing a connection between physiological patterns and nonverbal behavior has typically examined physiological responses to facial expressions, one recent study examined physiological *and* nonverbal responses to social interaction (Weisbuch, Seery, Ambady, & Blascovich, 2009). The cardiovascular patterns indicating threat and challenge could be predicted by social perceivers' judgments but only when judgments of facial and vocal confidence were considered *together.*

In general, and consistent with social-ecological principles, social perception processes appear to have adapted to the dynamic information inherent to whole beings rather than to isolated parts of those humans.

Configural and Dynamic Processing of Nonverbal Channels Although human heads do not normally express emotions when they are physically separated from their larger body, research suggests that facial emotion is perceived in accordance with the broader principles of ecological theories. Specifically, the configural pattern among expressive facial features is important to the identification of nonverbal expressions. Removing these configural relations by inverting the images greatly increases the time necessary to make an emotion judgment (the same is true for body expressions; Calder & Jansen, 2005; Stekelenburg & de Gelder, 2004). In addition, supportive of an ecological account is that dynamic facial expressions appear to reveal emotion better than static facial expressions. For example, one study used difficult-to-identify facial expressions and presented them alone, within a short "movie" in which the expresser began with a neutral expression ("dynamic" condition), or within an interrupted movie in which each frame was separated by visual noise (Ambadar, Schooler, & Cohn, 2005). The single-frame and interrupted-movie conditions yielded significantly lower accuracy than did the dynamic movie condition.

Thus, while features can be extracted from faces, higher-order patterns are clearly important to social perceivers encountering real nonverbal expressions. This idea can be illustrated with respect to the combination of eye gaze and emotion expression. Joy and anger appear to be considerably more intense and easier to identify when combined with direct than with averted gaze, whereas the opposite is true for sadness and fear (Adams & Kleck, 2003, 2005). Adams and colleagues argue that congruence in motivational meaning (approach vs. avoidance) speeds responses whereas incongruence slows responses. For example, both joy and direct gaze signal approach, whereas both fear and averted gaze signal avoidance; hence, both of these combinations should be and are processed especially quickly.

Configuring Multiple Dimensions of Social Perception Just as higher-order patterns of nonverbal cues and modalities inform social perception, ecological principles suggest that nonverbal patterns may combine with other social categories and cues to produce affordances in social perception.

Gender, for example, clearly moderates the meaning of nonverbal behaviors. Crying babies are perceived as considerably more angry when they are boys (Condry & Condry, 1976). During a marital dispute, silence on the part of husbands is considered loving whereas silence on the part of wives is considered a sign of hostility (Gaelick, Bodenhausen, & Wyer, 1985). And happy faces are most quickly and accurately categorized when those faces are female (Hugenberg & Sczesny, 2006). Another social category (race) also moderates the meaning of nonverbal behaviors. Although negative facial expressions automatically elicit negative affect in social perceivers (Dimberg et al., 2000; Murphy & Zajonc, 1993; Whalen et al., 1998), this effect is reversed when the expresser is an outgroup member (Weisbuch & Ambady, 2008a). In other research, White social perceivers more readily perceived anger in Black faces than in White faces (and joy in White than in Black faces), especially to the degree that White perceivers exhibited implicit prejudice or had a self-protection goal (Hugenberg, 2005; Hugenberg & Bodenhausen, 2003; Maner et al., 2005). At the neural level, Chiao and colleagues (2008) found that the amygdala response of Japanese and American participants to facial fear was greater when

the observed faces were members of their own culture relative to members of the other culture. In general, the pattern of findings in this section suggest that it is the meaning of the expression to the perceiver (the affordance)—not the expression on its own—that dictates the response.

Summary: Implications for Social Perception and Social Judgment

There is substantial evidence that social perceivers normally form judgments based on the unique *configuration* of the nonverbal elements. Although these effects do not rule out the possibility that single features provide important information about the meaning of nonverbal behavior, in real life nonverbal judgments proceed configurally and are enhanced by dynamic movement. In other words, there appears to be substantial support for social-ecological theories with respect to the perception of nonverbal behavior. Nonetheless, when important multimodal or dynamic cues are absent, single features may prove to be especially influential.

Judgments of Nonverbal Behavior: Surprising Social Insight

The ability to judge nonverbal behavior may be fundamental to human intelligence.

Since the early 1980s, some scholars have argued for the "social brain hypothesis," which posits that the development of the human brain is a direct consequence of the complexities of human social life. In fact, the size of the neocortex is correlated with social group size in cross-species comparisons (Dunbar, 1992, 1995; Gittleman, 1986; Marino, 1996) but not with other (nonsocial) candidate causes of larger brains, such as ranging area and difficulty of extracting food from the environment (Dunbar, 1998). Human intelligence may thus be a by-product of the need to interact in and keep track of an expansive social group. For this reason, an understanding of how people achieve accuracy in social judgment is crucial to understanding the human psyche. To that end, social judgment relies heavily on nonverbal behavior both for what it communicates directly and for how it alters spoken content.

Social Intelligence: Early Development

If people are to adapt to the social world early in life, it must be in the absence of linguistic understanding. We are born equipped with tools that enable such social adaptation and perhaps form the basis for nonverbal judgments later in life. Nonverbal sensitivity in humans begins prenatally, as people are born sensitive to the prosody of their mother's voice (DeCasper & Fifer, 1980). And as noted earlier, even 45-minute-old neonates imitate open-mouth and tongue protrusion displays (Meltzoff & Moore, 1983). There is also the phenomenon of crying contagion described earlier: On hearing another infant in the nursery cry, others cry as well (Martin & Clark, 1982; Sagi & Hoffman, 1976; Simner, 1971). And scholars agree that infants are able to discriminate and not just imitate nonverbal displays of emotion in the first few months of life (Flom & Bahrick, 2007; Walker-Andrews, 1997). For example, infants respond differently to approving and disapproving vocalizations even when those vocalizations are spoken in a foreign language (Fernald, 1993).

As their minimal language skills increase, children appear to be *more* and not less sensitive to nonverbal behavior. For example, as infants grow from 3 to 7 months of age, their skills at decoding nonverbal emotional displays become increasingly sophisticated (e.g., Flom & Bahrick, 2007). And infants begin to recognize body language and movement between 4 and 6 months of age (Fox & McDaniel, 1982). Indeed, nonverbal perception skills increase throughout childhood and adolescence (Rosenthal et al., 1979). In short, extremely young humans can clearly extract meaningful information from nonverbal behavior. To highlight the power of adult analogues to this skill, the next section details how nonverbal judgment is robust to many challenges.

Social Intelligence: How Low Can You Go?

The 4-minute mile, the first flight to the moon, and the peaceful revolution of Gandhi were astounding feats that highlighted humans' physical, mental, and spiritual capacities. Of course, it would not have been astounding to demonstrate that people can run on two legs, that people can create, or that people can adhere to a moral code—even though each of these latter capacities *is* rather astounding when compared with the abilities of other species. Similarly, it would hardly be astounding to demonstrate that people can make accurate social judgments if given enough information, even if this capacity is astounding. By restricting the amount of physical information provided to social perceivers, it is possible to examine and perhaps highlight the human *capacity* for social intelligence.

Temporally Limited Nonverbal Judgment The greatest amount of research on degraded social judgment has been accomplished in the domain of "thin slices" or brief observations of behavior. A meta-analysis of these studies revealed that social judgments made from less than 30 seconds of strictly nonverbal exposure accurately predicted criterion variables with a rather large effect size (Ambady & Rosenthal, 1992). Moreover, only negligible increases in accuracy were seen when exposure time was increased

from 30 seconds to larger increments. Notably, provision of the verbal channel did not reliably enhance judgment and in many cases detracted from judgment. Despite the time limit and the elimination of verbal information, social judgment operated efficiently and effectively.

It is possible that the robustness of social intelligence might be limited to more easily observable domains, such as extraversion. Indeed, with self-report and peer report as criteria measures, several research groups observed accuracy in extraversion judgments based on brief exposure to participants who varied only in nonverbal behavior (Borkenau & Liebler, 1992, 1993; Gangestad, Simpson, DiGeronimo, & Biek, 1992). Yet even in judging extraversion people exhibited surprising social intelligence. For example, Borkenau and Liebler (1992) simply asked their social targets to read a weather report aloud to a video camera in an otherwise empty room, yet social perceivers exhibited accuracy in their extraversion judgments.

More importantly, accuracy in judgments from nonverbal thin slices is hardly limited to extraversion. Among the more interesting variables that can be predicted via naïve observers' nonverbal thin-slice judgments are sexual orientation (Ambady, Hallahan, & Conner, 1999), sexual promiscuity (Gangestad et al., 1992), racial biases (Richeson & Shelton, 2005), trial judges' expectations for trial outcome (Blanck, Rosenthal, & Cordell, 1985), and status within a company (Hall & Friedman, 1999). Equally interesting is a study in which thin-slice judgments were based on targets behaving in a context different from the outcome measure. Specifically, judgments based on less than 1 minute of visual exposure to an informal conversation predicted the intelligence (IQ and peer reports of intelligence) of social targets (Murphy, Hall, & Colvin, 2003).

In general, research on temporal limitations demonstrates that major reductions in the amount of physical information available to social perceivers do little to stifle social judgment ability, as long as nonverbal behavior is available.

Spatially Limited Nonverbal Judgment In some work on social intelligence, special efforts are made to reduce the amount of spatial information available to social perceivers. The most famous of these manipulations uses miniature light-emitting objects placed on social targets' major joints (e.g., elbows and knees). In a darkened space, social targets perform some activity, often walking, such that their motion is visible but a great deal of important social information (e.g., the face) is not. In these studies on biological motion, the light fixtures do not appear to constitute a human until they begin to move. Given movement, social perceivers are able to reliably determine identity (friend vs. stranger), emotion, gender, sexuality, and behavior (Clarke, Bradshaw, Field, Hampson, & Rose, 2005; Cutting & Kozlowski, 1977; Johnson, Gill, Reichman, & Tassinary, 2007; Kozlowski & Cutting, 1977; Norman, Payton, Long, & Hawkes, 2004). Another technique, "content filtering," removes high-frequency sounds from speech such that it is not possible to derive words from the speech but vocal prosody and other vocal parameters remain. From content-filtered speech, social perceivers' judgments reliably predict job performance of managers and telephone operators (Ambady, Krabbenhoft, & Hogan, 2006; Hecht & LaFrance, 1995) and malpractice suits against vocalizing surgeons (Ambady et al., 2002). Although people are not good at detecting deception in general (as explained later), they are better than average when given only content-filtered speech (Zuckerman et al., 1981).

In sum, across both temporal and spatial restrictions of information, perceivers exhibit surprising social intelligence as long as they have access to some nonverbal information. Interestingly, people are often not aware of their ability to make accurate judgments, especially from subtle cues, and their confidence in and predictions of their ability and their actual performance in this domain are not calibrated (Patterson, Foster, & Bellmer, 2001; Rule, Ambady, Adams, & Macrae, 2008).

Social Intelligence: Specific Domains

Intelligence in nonverbal judgment is especially noteworthy with respect to deception detection, emotion recognition, and individual differences. Each area provides unique information about the importance and likely development of social intelligence, and it is perhaps for this reason that these topics have attracted scholarly interest.

Deception and Deception Detection Deception detection is a particularly interesting area of research with respect to social intelligence. Individuals can exhibit social intelligence by successfully deceiving others, whereas social perceivers can exhibit social intelligence by successfully detecting deception. Results of a large meta-analysis suggest that social perceivers exhibit just-above-chance accuracy in detecting deception (about 54%; Bond & DePaulo, 2006). When provided with only nonverbal (silent video) information, accuracy slips closer to chance (51%). These effects suggest that social perceivers are not particularly intelligent with respect to identifying lies. Although it is possible that certain people are especially adept at detecting deception, Bond and DePaulo (2008) demonstrated that the standard deviation of judges' true ability is less than 1%. And expertise, experience, and formal training do not seem to improve lie detection accuracy. In a meta-analysis of the literature, Aamodt and Custer (2006; see also Vrij, 1993; Vrij & Semin, 1996) found that

"professional lie catchers" (e.g., police officers, detectives, judges, secret service agents, and parole officers) were no more accurate at detecting deception than were students and other citizens. The professionals had an average accuracy rate (56%) only slightly higher than that of novices (54%). Hence, it is unlikely that certain types of people are a great deal better than others at detection accuracy. Given the hypothesis that humans must have evolved social intelligence, why are people not better at detecting deception from verbal or nonverbal cues?

One explanation is that deception is a special domain. While perceivers benefit by making accurate assessments, actors benefit by being able to deceive their counterparts. Indeed, nonverbal influence theories generally describe a one-upmanship throughout the ages of human evolution where, as social perceivers are increasingly able to discriminate signal from noise in nonverbal behavior, it is increasingly important for social actors to increase noise or reduce signal so as to accomplish their goals more often (Owren et al., 2005). Indeed, few nonverbal cues distinguish liars from truth-tellers, and those that do are generally associated with small effect sizes (with the exception of vocal immediacy and pupil dilation; DePaulo et al., 2003).

Yet it is important to note that the bulk of research on deception detection comes from carefully controlled laboratory studies, when the liar's motivation to be successful may be minimal. In a meta-analysis of the literature, DePaulo and colleagues (2003) examined whether the cues to deception become more transparent during "high-stakes" lies, when the liar has more motivation to be successful. Their analysis revealed that when liars are more motivated to succeed, they become tenser; specifically, they use less eye contact and a higher-pitched voice. Similar results were reported by Mann, Vrig, and Bull (2004) in a study of people's behavior during real-life high-stakes situations, including murder, rape, and arson suspects undergoing police interrogations. It is as yet unclear whether this greater transparency during higher-stakes situations reliably results in greater accuracy on the part of perceivers.

Emotion Recognition Whereas social perceivers do not exhibit particular intelligence in deception detection, emotion recognition is a different story. Even some *blind people* can detect, at rates above chance, the emotion expression on a face presented to the blind visual field (de Gelder, Vroomen, Pourtois, & Weiskrantz, 1999; Pegna, Khateb, Lazeyras, & Seghier, 2004). For example, one patient could not consciously detect movement, colors, or a strong light source yet was able to guess (at above-chance rates) the emotion expression on faces presented visually (Pegna et al.). Notably, these effects appeared to be specific to emotion: The patient was not better than chance at detecting visually presented squares versus circles, authentic versus jumbled faces, male versus female faces, or positive versus negative scenes. This patient exhibited more activation in the right amygdala while viewing emotional versus nonemotional faces, suggesting a neural pathway for emotion recognition.

Recognizing others' emotion may be important for various reasons. Emotion expressions may provide immediate and dense information about (1) the current social environment (Dimberg, 1997), (2) information about the expressive individual's likely behavior (Owren et al., 2005), and (3) information relevant for demonstrating empathy and securing social ties (Preston & de Waal, 2002). "Affective blindsight" and the hundreds of studies on the recognition of emotion from different channels of communication suggest an important role for the recognition of nonverbal emotion in social adaptation. The sections that follow illustrate the robustness of emotion recognition.

Emotion Recognition Across Cultures Emotion recognition across cultures, where one might expect some error due to substantial differences in accepted behavior, is surprisingly high. In one meta-analysis of 162 cross-cultural studies (noted earlier), 99.6% of the studies demonstrated that people detect emotion from posed pictures at above-chance levels, with only five studies indicating chance-level detection for even a single emotion (Elfenbein & Ambady, 2002). Although emotion recognition is generally lower from vocal than from facial samples, people also exhibit cross-cultural accuracy in detecting posed vocal emotion (Elfenbein & Ambady, 2002). In one study, for example, actors emotionally enunciated sets of syllables constructed by a trained linguist to be language neutral. Perceivers from nine countries ($n > 31$), speaking seven different languages then guessed which emotion was illustrated by each vocalization (Scherer, Banse, & Wallbott, 2001). Even the worst-performing country (Indonesia) correctly identified each emotion at higher than chance, and on average cross-cultural accuracy (corrected for chance) was a little higher than 60%.

The evidence with respect to the recognition of *spontaneous* emotions across cultures is a bit more ambiguous, with some researchers reporting cross-cultural recognition and others reporting no cross-cultural recognition (cf. Matsumoto & Willingham, 2006; Naab & Russell, 2007). Perhaps the most conservative way to summarize this literature is to say that spontaneous emotions are more difficult to identify than are posed emotions. This makes sense since posed emotions are prototypes of the spontaneous emotions. Posed emotions evoke considerable universal agreement, suggesting that social intelligence in

the domain of emotion is guided by biologically prepared emotion prototypes. Speculatively, these prototypes may help to support intelligence in emotion recognition, whereas spontaneous displays built on these prototypes may diverge on the basis of culture (cf. Elfenbein & Ambady, 2002).

Emotion Recognition with More Subtle Stimuli Incredibly, people can identify most of the basic emotion facial expressions (joy, sadness, anger, and disgust) in only 12 to 25 ms (McAndrew, 1986). People can also reliably identify emotions from only body postures, whole-body movement, and even just arm movements (Atkinson, Dittrich, Gemmel, & Young, 2004; Pollick, Paterson, Bruderlin, & Sanford, 2001). Touch also appears to convey emotion. In one study, anger, disgust, fear, gratitude, love, and sympathy could be differentially identified by perceivers who were touched on the arm or who viewed another individual being touched on the arm (Hertenstein, Keltner, App, Bulleit, & Jaskolka, 2006). And although odor production is only debatably nonverbal communication, it seems relevant to note that social perceivers could identify mood by smelling underarm pads worn by participants who had viewed mood-inducing movies (Chen & Haviland-Jones, 2000; see also Levine & McBurney, 1986).

If intelligence in nonverbal judgment reaches its nadir with identifying deception, it may reach its apex with identifying emotion. Several basic emotions can be universally identified (across cultures) by sight or sound. Even extremely subtle stimuli, such as those expressed for only 12 to 25 ms or those expressed via body posture, can be reliably identified. Even partially blind people exhibit visual emotion recognition.

Intelligence in Nonverbal Judgment: Individual Differences

Between the apex of emotion recognition and the nadir of deception detection lay considerable individual differences in nonverbal judgment ability.

Superior Social Intelligence Several groups are known for their impressive social intelligence. First, across cultures, nonverbal channels, and ages, women appear to make more accurate nonverbal judgments than men (Hall & Andrzejewski, 2008; Rosip & Hall, 2004). These gender differences hold throughout childhood and adulthood.

Second, nonverbal judgment appears to improve with age, up to a certain point. Rosenthal and colleagues used an uncommonly age-diverse sample to demonstrate developmental changes in nonverbal judgment. This large-scale study used a heavily validated measure for examining accuracy in interpersonal judgment from particular nonverbal expressions (i.e., facial expression, body movement, and vocal tone). Specifically, this study used the profile of nonverbal sensitivity (PONS; Rosenthal et al., 1979), which presents respondents with 2-second video clips of an actress and asks respondents to indicate the behavior illustrated by the actress (e.g., talking to a cashier vs. scolding a child). These are edited clips in which body parts or aspects of the audio track have been eliminated or altered. Third graders' PONS accuracy was approximately 58% for the body, whereas fourth graders' accuracy was approximately 68%. Accuracy in nonverbal judgment continues to improve in a linear fashion after sixth grade, with "jumps" occurring from sixth grade to junior high and from high school to college and with accuracy leveling off around age 25.

Impaired Social Intelligence In the last decade, scholars across disciplines have recognized the importance of intelligence in nonverbal judgment for normal social functioning. Specifically, autism spectrum disorders, including Asperger's syndrome, appear to be undergirded by a lack of intelligence in nonverbal judgment (e.g., Baron-Cohen, 2005). People with autism spectrum disorders are able to discriminate identity among faces but have much more difficulty discriminating among the negative facial expressions (Ashwin, Chapman, Colle, & Baron-Cohen, 2006) and in identifying mental states from eye gaze cues (Baron-Cohen, Joliffe, Mortimore, & Robertson, 1997). Indeed, deficits in these areas are now viewed fundamental to autism spectrum disorders rather than simple concomitants (Baron-Cohen, 2005). Abnormalities in the neural network known as the "social brain" (which consists of the medial, inferior frontal, and superior temporal cortices and the amygdala) may be responsible for these deficits (Brothers & Ring, 1992; Golan, Baron-Cohen, Hill, & Golan, 2006).

Similarly, research with schizophrenic patients reveals that intelligence in nonverbal judgment may be fundamental to this disease. Various studies have demonstrated that, as compared with other psychiatric patients, schizophrenic individuals have difficulty interpreting facial expressions in particular and nonverbal behavior in general (e.g., Cutting, 1981; Sergi & Green, 2003). Moreover, such difficulty is associated with lower functional status (Penn, Spaulding, Reed, & Sullivan, 1996; Sergi, Rassovsky, Nuechterlein, & Green, 2006), suggesting an important role for nonverbal judgment abilities in the development of schizophrenia. Finally, a recent meta-analysis demonstrated that people who engage in antisocial behaviors, as well as those who typically show a lack of empathy or remorse (e.g., psychopaths) show a specific deficit in the ability to recognize fearful expressions (Marsh & Blair, 2007). Such findings

are perhaps unsurprising because the accurate perception of fearful expressions likely contributes to the development of more prosocial behavior (Dadds et al., 2006).

In general, clinical deficits in psychosocial functioning are associated with reductions in social intelligence, as indicated by judgment in nonverbal behavior. Nonverbal judgment skills may underlie several disorders that until recently had been characterized as disorders in cognitive processing. This is an especially important area of research that would benefit from experimental and longitudinal designs to assess causality.

Intelligence in Social Judgment: Social Impact

If superior social intelligence helps individuals to survive and thrive, superior skill should be related to more positive outcomes. Intelligence in nonverbal judgment is related to several positive social outcomes. As compared to people with less intelligence in nonverbal judgment, those with more social intelligence are more popular, report less loneliness, receive better raises, and tend to attain higher status (Byron, Terranova, & Nowicki, 2007; Hall & Halberstadt, 1994; Nowicki & Duke, 1994; Pitterman & Nowicki, 2004; Rosenthal et al., 1979; for a meta-analysis, see Hall, Andrzejewski, & Yopchick, in press).

At first glance, these findings suggest that much can be gained from heightened intelligence in nonverbal judgment. Yet most studies on this topic suffer from interpretive issues—it could be the case, for example, that as a consequence of becoming popular or high status, individuals attend more to others' nonverbal behaviors and enhance their nonverbal judgments. The *causal* role of nonverbal judgment in social functioning thus remains unclear. Moreover, skill at nonverbal judgment does seem to depend on the channel of communication being judged. People who make accurate judgments from the face are not necessarily equally good at making judgments from the voice, and people who are good at judging emotion are not necessarily good at judging deception (e.g., Buck, 1976; Hall, 2001). Recent work suggests the intriguing possibility that specific nonverbal skills might be associated with superior performance on specific outcomes. For instance, Marsh and colleagues (2007) found that accuracy at judging fear expressions predicted prosocial tendencies better than did accuracy at judging other emotions.

Moreover, in some cases, the ability to pick up on emotions from nonverbal behavior is actually associated with negative outcomes. In particular, people may *really* want to keep some of their feelings secret. Although they may be successful regulating their facial expressions at these times, vocal and bodily expressions are thought to be more difficult to control—hence, they may "leak" true feelings (the face; Ekman & Friesen, 1969b; Rosenthal & DePaulo, 1979). If so, the social perceiver who picks up ("eavesdrops") on vocal emotion may not be well appreciated by individuals who are trying to conceal their true feelings. In one study, individuals who were especially good at picking up on negative emotion in the voice (but not the face) were especially *disliked* by their supervisors and teammates in an organization (Elfenbein & Ambady, 2002). Other studies have also demonstrated the negative interpersonal ramifications of eavesdropping. For example, eavesdropping among students was associated with poor interpersonal functioning, as rated by teachers (Rosenthal & DePaulo, 1979). Moreover, eavesdroppers appeared to create especially uncomfortable social interactions with strangers (Puccinelli & Tickle-Degnen, 2004).

Because of difficulties in causal interpretations, this is an area of research that could benefit from experimental methods. Training in nonverbal judgment skills—both general and channel specific—followed by interpersonal interaction would permit causal analyses of the extent to which intelligence in nonverbal judgment *causes* enhanced popularity and psychosocial functioning.

Summary: Judgments of Nonverbal Behavior

Much like running on two legs, social intelligence is often taken for granted. Yet social intelligence is a remarkable feat of evolution that is perhaps responsible for the abilities of humans to live in groups, to function interpersonally, and to promote the interests of their genes within a social environment. For these reasons, intelligence in nonverbal judgment may have played an important role in the survival of the human species. A number of empirical findings support this inference. First, there is a universal ability to decode affective facial and vocal expressions. Second, people need little time to come to relatively accurate conclusions about personality traits on the basis of nonverbal behavior. Third, people need only limited information from the body, face, or voice to come to accurate conclusions about many characteristics of others. Fourth, intelligence deficits in nonverbal judgment appear to play an important role in the definition of psychiatric abnormality, including autism and schizophrenia, suggesting that nonverbal judgment is crucial for social adaptation. And finally, intelligence in nonverbal judgment is associated with affiliation.

NONVERBAL SOCIAL INFLUENCE

Intelligence in conscious nonverbal judgment is clearly important to social adaptation. However, the many automatic processes involved in the perception of nonverbal behavior also allow for efficient social adaptation in the

absence of conscious judgment. This capacity implies an important role for nonverbal behavior in social influence.

Most social influence articles use verbal communication as the medium of influence (Weisbuch & Ambady, 2008c). Conformity is often manifested by individuals speaking aloud ("Line A is shorter") or by written statements about what most people believe ("78% of people like chocolate"). Persuasion research almost exclusively employs written or spoken arguments, partly due to conceptualizations of what counts as persuasion. In both domains, researchers occasionally examine the role of nonverbal cues, but beliefs are still transmitted via verbal behavior. And in these cases, the examination of nonverbal cues is folded into frameworks based on verbal communication and these cues are treated as moderator variables (Burgoon, Dunbar, & Segrin, 2002).

Yet nowhere in most definitions of social influence is there a requirement that beliefs be expressed verbally. At the broadest level, social influence can be conceptualized as the influence of one person's *expressed* beliefs on another's personal beliefs, and beliefs may be expressed nonverbally, through facial expressions, body language, paraverbal behavior, and subtle touch. If only because of the ubiquity of nonverbal communication, there is tremendous potential for nonverbal social influence. That is, people enact a constant stream of nonverbal behavior but even the most talkative people spend a great deal of time not speaking or writing. It is impossible to *not* behave nonverbally—even the absence of movement may be considered nonverbal behavior, as when a first date leads a nervous person to remain perfectly still. Speaking with a monotone voice is likely to compel inferences of dullness, a lack of facial expression often leads inferences of aloofness, and nonverbal stiffness often leads to inferences of anxiety (Banse & Scherer, 1996; LeDoux, 2000; Tickle-Degnen & Lyons, 2004). Any social activity that can be imagined includes a constant stream of nonverbal behavior, whereas only some of these activities include verbal behavior. Thus, we must be exposed to more nonverbal than verbal behavior. The anthropologist Ray Birdwhistell (1970) claimed that people only speak for about 10 to 11 minutes per day. Although it is difficult to be precise, scholars have estimated that within dyadic interaction, there is twice as much nonverbal as verbal behavior (Birdwhistell, 1970; Knapp, 1978). Nonverbal behavior is—almost by definition—more prevalent than verbal behavior. The widespread prevalence of nonverbal behavior suggests nonverbal social influence may be widespread. Although this potential has only recently been the subject of formal examination in social psychology, the following sections review two forms of nonverbal influence by integrating literatures across disciplines.

Indirect Nonverbal Influence

Indirect nonverbal influence occurs when the beliefs and attitudes of the self change after perceiving another's nonverbal responses to some stimuli. Among animals and from childhood to adulthood, there is impressive continuity in the power of indirect nonverbal influence.

Nonhuman Animals

Long before there was human language, organisms were responding to conspecifics' facial expressions, body language, gestures, and nonlinguistic vocalizations (Darwin, 1872). Judging by the diversity of organisms that exhibit meaningful responses to nonverbal behavior, indirect nonverbal influence may be universal in the animal kingdom. As but one of many examples, chukar partridge chicks only eat food items that their mother has pointed at with a partly opened bill (Avital & Jablonka, 2000). Among fish, minnows are sensitive to the "fright behavior" (e.g., dashing or freezing) of other minnows such that perceiver minnows who have observed another minnow's fright behavior in response to an object come to avoid that object as well (Mathis, Chivers, & Smith, 1996). And meerkats are sensitive to nonlinguistic vocalizations, such that one meerkat vocalization may produce one type of group behavior (harassment of an otherwise predatory cobra) whereas another slightly different vocalization might produce another group response (e.g., flight; Avital & Jablonka, 2000).

Among nonhuman primates, parents' nonverbal responses to various animals influence the formation of predator–nonpredator categorization schemes of young vervet monkeys (Cheney & Seyfarth, 1990). Moreover, baboons develop dislike for particular colors of banana after observing other baboons' negative facial and bodily responses to these bananas (Jouventin, Pasteur, & Cambefort, 1976). Likewise, rhesus monkeys develop a fear of snakes after observing conspecifics' fear responses to snakes (e.g., Mineka, Davidson, Cook, & Keir, 1984). And our nearest nonhuman ancestor—the chimpanzee—is sensitive to emotional facial expressions and body language (Nakayama, 2004; Parr, Waller, & Vick, 2007).

Social influence in the animal kingdom always occurs in the absence of language. That does *not* ensure that such influence is always "nonverbal," since much animal learning may occur via explicit behaviors and physical manipulations. Nonetheless, the main point is that indirect nonverbal influence is common to a diversity of animals with whom we share much evolutionary history.

Childhood

As with other animals, if young infants are to be socialized in their first year or so, it must be in the absence of language.

Shortly after birth and through the first year, infants have impressive nonverbal perception skills (reviewed earlier) coupled with a nearly complete absence of linguistic skills. It appears that the early emergence of nonverbal perception permits social influence via nonverbal behavior. Specifically, infants adopt evaluations toward objects by observing others' nonverbal behavior. In the presence of an adult, especially a caretaker, infants reference the caretaker's facial and vocal expressions to determine the value or danger inherent to a nearby object or potential behavior (Klinnert, 1984; Klinnert, Emde, Butterfield, & Campos, 1986; Mumme & Fernald, 2003; Repacholi & Meltzoff, 2007; Sorce, Emde, Campos, & Klinnert, 1985). This phenomenon is referred to as *social referencing* or, here, "nonverbal social referencing." One illustration of this effect is that a toy is especially likely to be approached if presentation of the toy is simply coupled with others' positive facial expressions. This *is* social influence in that the infant's beliefs about the toy (whether implicit or explicit) have been influenced by the beliefs expressed via the nonverbal behavior of another individual.

One set of studies in particular demonstrates sophistication in how nonverbal social influence contributes to infant belief and behavior. In these studies, infants watched two experimenters—one experimenter performed an action toward a toy, while the second experimenter ("emoter") directed a negative or neutral nonverbal expression at the first experimenter. Infants took longer to touch the toys, touched them for a shorter period, and were less likely to imitate the first experimenter when the emoter had (vs. had not) expressed anger toward the first experimenter's behavior (Repacholi & Meltzoff, 2007). Although it is difficult to measure beliefs in infants, these findings strongly suggest an indirect and nonverbal social influence.

Following infancy into toddlerhood and preschool, nonverbal social referencing is used extensively by the developing child (Feinman, 1982; Walden & Ogan, 1988). Perhaps of greater interest is that the social influence of nonverbal behavior may be stronger than the social influence of verbal behavior in 3- to 6-year-old children. In one study, for example, 3- to 6-year-old children observed a videotaped social interaction between a White adult and a Black adult (Castelli, de Dea, & Nesdale, 2008). The verbal and nonverbal behavior of the White adult was varied orthogonally. Children's attitudes toward the Black adult were more positive when the nonverbal behavior of the White adult (toward the Black adult) was positive (vs. negative). In a second study, these effects generalized to attitudes toward other Black adults. No similar effect emerged for verbal behavior. In a different study, similar results were observed among children who had observed the pairing of drink ingestion with a negative facial expression—children reported disliking the taste of the drink more following this manipulation (Baeyens, Vansteenwegen, de Houwer, & Crombez, 1996). These studies thus provide initial evidence for the special power of nonverbal behavior in social influence—in particular the role of indirect nonverbal influence.

In summary, nonverbal communication is necessary for the transmission of beliefs in the first few months of life and appears to play an important role in the formative years even after language has been acquired. Hence, nonverbal social influence may indeed be one of the primary mechanisms through which culture is transferred to children's minds.

Adults

Only recently have the nonverbal influence processes seen in children and apes also been observed in human adults. In one recent study (Weisbuch & Ambady, 2009), female participants were exposed to a series of brief and silent video clips featuring actresses of varying body size. As the actresses' body sizes (barely) increased, they received either increasingly positive nonverbal behavior from other characters (pro-heavy condition) or increasingly *negative* nonverbal behavior from the other characters (pro-slim condition). Females in the pro-slim condition reported desiring a slimmer body size and admiring slim women more than did females in the pro-heavy condition. Remarkably, separate groups of participants could not consciously identify the (pro-heavy or pro-slim) patterns in these clips even when they were provided with a substantial monetary award. Hence, indirect and nonverbal social influence continues to exert an (automatic) social influence among adults.

Other research supports a similar conclusion regarding nonverbal influence, although through a slightly different mechanism. For example, in one study, one member of a dyad was manipulated to be especially happy just before the dyad inspected a product together. Participants interacting with a happy (and silent) dyad partner liked the product more than those interacting with a neutral mood dyad partner. Crucially, these effects were mediated by nonverbal emotional contagion (the amount of smiling passed from the dyad partner to the participant during product inspection). Indeed, when nonverbal exposure was blocked (via a translucent screen), no attitude change occurred (Howard & Gengler, 2001; see also Ramanathan & McGill, 2007; Tanner, Ferraro, Chartrand, Bettman, & van Baaren, 2008).

Research more commonly labeled "evaluative conditioning" also supports the role of nonverbal social influence in belief acquisition. Findings in this domain are especially noteworthy in that they model a process that

is likely to happen often in the "real world": the devotion of limited conscious resources to nonverbal emotional behavior in the presence of other objects. For example, happy facial expressions presented subliminally and just before a novel symbol facilitate positive evaluations of that novel symbol, as compared with when the symbol is preceded by an angry subliminal expression (e.g., Murphy & Zajonc, 1993). These effects occur whether evaluations of the symbols are measured with self-report evaluations or facial electromyography (Rotteveel et al., 2001). In addition, subliminal happy expressions facilitate drinking among thirsty people (Winkielman et al., 2005), subliminal sad faces make music seem gloomy (Strahan et al., 2002), subliminal facial expressions influence ratings of other people (Stapel et al., 2002), and subliminal happy faces can increase positive evaluations of television programs (Ravaja et al., 2004). Moreover, happy faces paired with self-relevant behavior facilitate positive evaluations associated with the self (Baccus, Baldwin, & Packer, 2004). And when perceivers are exposed to faces looking *at* objects, the displayed facial emotion influences evaluations of the objects (Bayliss, Frischen, Fenske, & Tipper, 2007). Although many of these latter findings are often considered an aspect of "conditioning" rather than social influence, it is not clear—given the role of human stimuli—that these effects should not also be considered social influence.

Direct Nonverbal Influence in Adults

In the studies reviewed thus far, the impact of the nonverbal behavior was indirect—it was more about the relationship between a nonverbal behavior and a second stimulus than the relationship between the nonverbal behavior and the self. Direct nonverbal influence occurs when the nonverbal behavior of another individual *directed toward the self* influences the beliefs and attitudes of the self. Indirect nonverbal influence effects are perhaps analogous to persuasion and conformity, whereas direct nonverbal influence effects may be more analogous to compliance. For example, among chimps, the "silent, bared-teeth" display, perhaps similar to human smiles, elicits affiliative behavior in perceivers of the expression, and the "relaxed, open-mouth" face seems to reduce aggression and increase interest in "play" among conspecifics that perceive the facial expression (Waller & Dunbar, 2005). And wolf pack leaders are thought to be especially likely to lead the pack in a hunt after being nuzzled by other wolves in their pack (e.g., Mech, 1970). Among humans, two types of direct nonverbal influence have received the most attention from social psychologists: behavioral confirmation and dominance displays.

Compliance in Nonverbal Social Influence: Behavioral Confirmation

Behavioral confirmation occurs when the expectations of another are spontaneously confirmed by the target. For example, if a White interviewer expects poor performance from a Black interviewee, the White interviewer will exhibit negative nonverbal behavior and the Black interviewee will, as a consequence, perform more poorly (Word, Zanna, & Cooper, 1974). Meta-analyses conducted by Harris and Rosenthal (1985) revealed that to the extent that the sender maintained (with the receiver) eye contact ($r = 0.33$), little interpersonal distance ($r = 0.45$), a high frequency of smiles ($r = 0.29$), and a fast speech rate ($r = 0.48$), the receiver was likely to be influenced and confirm the sender's positive expectations. Nonverbal behavioral confirmation occurs in many domains ranging from job interviews (Word et al., 1974), to courtrooms (Blanck et al., 1985), to experimenter–participant interactions (Rosenthal, 1966). Expectations communicated nonverbally are so influential as to exert cross-species effects. For example, experimenters' expectations can nonverbally influence rats' maze-running and Skinner-box performance (Rosenthal & Lawson, 1964) and at least one horse's counting ability ("Clever Hans"; Pfungst, 1911).

Participants' attitudes and beliefs can also be influenced by nonverbally communicated expectations. For example, trial judges influence jury verdicts via nonverbal behavior directed at the jury (Halverson, Hallahan, Hart, & Rosenthal, 1997; Hart, 1995). In one study, Hart (1995) took videotaped footage of judges' final instructions to actual juries and showed this footage to mock jurors who had just observed evidence from a separate (but real) trial. Judges who expected "innocent" (vs. "guilty") verdicts in the original trials were especially likely to elicit "innocent" verdicts from the mock jurors. Because the judges gave identical (impartial) verbal instructions to jurors, the nonverbal behavior of judges directed at the (mock) jurors must have influenced the jurors' beliefs about a third party. The judges elicited compliance to their expectations via nonverbal behavior. On the whole, it appears that compliance can be gained via nonverbal influence.

Compliance in Nonverbal Social Influence: Dominance Displays

Individuals influence others and gain their compliance via dominance-related nonverbal behavior. This is perhaps an artifact of our genetic relationship with other primates. For example, young monkeys isolated since birth exhibit a fear response when shown a picture of an older male monkey making a threat display (Sackett, 1966). Although humans

sometimes direct such anger or dominance displays at others, nonverbal dominance expressions more commonly observed in humans include patterns of gestures (Hall et al., 2005), gaze (Ellyson & Dovidio, 1985), and postural expansion (Tiedens & Fragale, 2003). The expression of these dynamic cues gains behavioral compliance (submissiveness) among humans (e.g., Tiedens & Fragale, 2003) and other primates (Cheney & Seyfarth, 1990). For example, stared-at drivers are more likely to flee an intersection, leaving this territory to the staring pedestrian (Ellsworth, Carlsmith, & Henson, 1972). Likewise, a "dominance stare" directed at people on an elevator speeded exit time of elevator riders (Elman, Schulte, & Bukoff, 1977). In each case, compliance occurred as a consequence of nonverbal dominance directed toward the self.

The idea that responses to nonverbal dominance might include enduring changes to explicit beliefs about the self was presaged by Dovidio and Ellyson (1985), who suggested the following:

> Messages concerning dominance and relative status may be communicated and accepted without conscious awareness by the sender . . . . Interactants may come to explain their behavior with self-attributions that are consistent with their status relationship. (p. 146)

Hence, a social influence approach to nonverbal dominance displays need not be limited to examining how nonverbal dominance cues moderate the impact of a verbal message (Carli, LaFleur, & Loeber, 1995; Lee & Ofshe, 1981).

Given the tremendous capacity of the human mind to process information automatically, the nonconscious sensitivity of the human mind to nonverbal behavior, and the ubiquity of nonverbal behavior, a socially situated human mind should be vulnerable to an enormous amount of nonverbal social influence occurring outside awareness of that influence and even outside awareness of the nonverbal behavior itself (Weisbuch & Ambady, 2008b).

SUMMARY

If many of our social cognitive structures are formed early in life to enable nonverbal behavior, if the basis of social life in primates is rooted in nonverbal behavior, and if social perception, cognition, judgment, relations, and influence are heavily informed by nonverbal processes, it seems reasonable to conclude that nonverbal behavior is an important foundation for social adaptation in humans. We hope we have illustrated the critical role that nonverbal behavior plays in influencing basic social-psychological processes.

The area of nonverbal behavior has been criticized for a lack of theoretical development. Part of the problem is that, as documented in this chapter, nonverbal behavior is ubiquitous in so many domains of behavior. And within each domain, specific theoretical axioms hold true. Indeed, theories have been developed regarding specific domains of nonverbal behavior. For instance, elegant theories have been generated and tested regarding rapport (Tickle-Degnen & Rosenthal, 1990), nonverbal social influence (Weisbuch & Ambady, 2008b), and social-ecological perception (McArthur & Baron, 1983). Recently, more comprehensive theories have been generated that attempt to cross and bridge the different domains of nonverbal behavior (e.g., Patterson, 2006). We anticipate much progress in theoretical development in this area in the near future.

We began this chapter by citing Humphrey's (1976) assertion that our intellect developed to solve social, as opposed to cognitive, problems. In the same essay, he asserted that "Experimental psychologists in Britain have tended to regard social psychology as a poor country cousin of their subject—gauche, undisciplined, and slightly absurd" (p. 308). More than 20 years have passed since this claim, and in those years social psychology has made impressive strides. Indeed, experimental psychologists and neuroscientists (in Britain and beyond) now appreciate the fundamental contributions of social psychology as they explore topics that have long been central to social psychologists who study nonverbal behavior—topics such as how we perceive and understand the emotions, dispositions, goals, and intentions of other people and how we communicate our emotions, dispositions, goals, and intentions to them.

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