Abstract
This paper summarizes the debate on human uniqueness launched by Charles Darwin’s publication of *The Origin of Species* in 1859. In the progress of this debate, Noam Chomsky’s introduction of the Language-Acquisition Device (LAD) in the mid-1960s marked a turn to the machine model of mind that seeks human uniqueness in uniquely human components of neural circuitry. A subsequent divergence from the machine model can be traced in the short history of ape language research (ALR). In the past fifty years, the focus of ALR has shifted from the search for behavioral evidence of syntax in the minds of individual apes to participant-observation of coregulated interactions between humans and nonhuman apes. Rejecting the computational machine model of mind, the laboratory methodologies of ALR scientists Tetsuro Matsuzawa and Sue Savage-Rumbaugh represent a worldview coherent with Darwin’s continuity hypothesis.

Keywords
ape language research, artificial intelligence, Chomsky, comparative psychology, Darwin, human uniqueness, social cognition

Introduction

Nothing at first can appear more difficult to believe than that the more complex organs and instincts should have been perfected, not by means superior to, though analogous with, human reason, but by the accumulation of innumerable slight variations, each good for the individual possessor. (Darwin, 1989b, p. 421)

With the publication of *The Origin of Species* (1859/1989a), Charles Darwin steered science directly into a conversation about human uniqueness previously dominated by religion and philosophy. In so doing, he went beyond overturning the religious mythology of humanity’s uniquely direct descent from a divine creator; he challenged the rational bias of Western philosophy. If even the most complex anatomical structures and mental capacities are
merely products of “innumerable slight variations” accumulated in the service of individual survival, human rationality no longer seems so surely attuned to transcendent truths. Human reason, in other words, must differ from universal reason by kind as well as degree.  

Darwin’s understanding of mind was heavily influenced by the faculty psychology of his day. His two-chapter “Comparison of the Mental Powers of Man and the Lower Animals” in The Descent of Man (1989b/1871) catalogues a pantheon of mental faculties with reason at its summit (p. 79). In this psychological universe, reason predominates over “lower” mental faculties—which Darwin refers to as “instincts” and “emotions”—finding expression in behaviors such as tool use and verbal speech, and in such mental states as self-consciousness, abstraction, and aesthetic, spiritual, and moral contemplation.

Darwin conceded in Descent that reason appears to mediate a dramatic transcendence over the unlanguaged and seemingly amoral minds of beasts, but he ultimately dismisses this appearance as a shortsighted illusion. His “Comparison of the Mental Powers of Man and the Lower Animals” opens by acknowledging vast differences between the minds of “even the lowest savages” and “the most highly organized ape.” Darwin adds that these differences would prevail even if the ape’s mind were domesticated to human culture (p. 69). For Darwin, who described Homo sapiens as “the most dominant animal that has ever appeared on this earth,” then, humans owe their status as the current winners in an ever-evolving, global dominance to the “immense superiority” of their intelligence (p. 52). In the evolutionary long run, however, interspecies dominance hierarchies are but fleeting expressions of natural order. Beneath the vertical disconnections of the many social hierarchies he observed in the 19th century, Darwin sought and found organic leveling in the geological past. Assuming relatedness to be the original pattern of life, he could assert in his comparative study of human and other kinds of mind, “there is no fundamental difference between man and the higher animals in their mental faculties” (p. 70).

In arguing for cognitive continuity between humans and other species, Darwin neither denied humanity’s unique evolutionary pathway to a position of planetary dominance nor suggested that this rise to power could be disconnected from human reason. He did argue, however, that human reason arose from animal mind. To demonstrate mental continuity across species, Darwin first addressed the so-called lower faculties—the instincts and emotions—and then worked through the higher faculties governed by reason, namely curiosity, imitation, attention and imagination, morality and sociability. At every step, Darwin drew parallels between behavioral expressions of these faculties by the lower animals and by human beings.
Among the rational functions of human mind, the development of verbal language marked for Darwin the turning point in human evolution. As he observed of man in the third chapter of *Descent*, “Through his powers of intellect, articulate language has evolved; and on this his wonderful advancement has mainly depended” (p. 52). Darwin believed that language arose from nonverbal behavioral systems for communicating mental awareness—what cognitive philosophers call “intentionality.” In *The Expression of Emotions in Man and Animals* (1872/1989c), he described nonverbal communication systems such as facial expressions, postures, and vocalizations as conveyors of *nonrational intent* in the form of “emotions.” Verbal expression, however, he preferred to connect with *rational intent*. Although he asserted in *Descent* that “animals are able to reason to a certain extent, manifestly without the aid of language” (p. 92), he regarded human language as necessary for the full development of human reason, observing that “a complex train of thought can no more be carried on without the aid of words, whether spoken or silent, than a long calculation without the use of figures or algebra” (p. 92).

In the century and a half since Darwin’s denial that the mind of man resembles the mind of god, humanity has never wholly accepted his alternative explanation—that the mind of man resembles the minds of other animals. By the turn of the 21st century, advances in neuroscience and artificial intelligence have enabled us to fashion a different alternative, a model of human mind created in the image of the computer brain. In the words of popular science writer Matt Ridley (1999), “Human beings are of course unique. They have perched between their ears the most complicated biological machine on the planet” (p. 25).

The linguist Noam Chomsky (1965) was an early proponent of the machine model of mind. He regarded syntax as the logical essence of human mind, hypothesizing an organic analogue to the “deep structure” of syntactic logic in the brain. Chomsky called this neurological attunement to syntax a “language acquisition device” (LAD) and predicted that when its neurochemical analogue finally became observable to science, it would only be found in human brains. Linguist Stephen Pinker (1994) describes Chomsky’s language acquisition device as a uniquely human “instinct” for symbolic logic. Unlike any other species, Pinker explains, humans express through language a natural inclination to syntactic design. Cognitive philosopher Daniel Dennett (1996/2001) perceives the language instinct as a mental technology, at once an invention of human mind and the instrument of its radical redesign. This technological breakthrough facilitated by language is, for Dennett, a cause for human self-congratulation. In *Kinds of Minds*, he writes that the invention of language marks a “momentous” and “uplifting” occasion in our
prehistoric past: “When *Homo sapiens* became the beneficiary of this invention, the species stepped into a slingshot that has launched it far beyond all other earthly species in the power to look ahead and reflect” (p. 195).

For Dennett, the great beyond to which humans are propelled by language is, contra Darwin, a matter of kind and not degree. Language does not simply endow humans with more brainpower; it has so profoundly reengineered the human brain as to make our mental lives qualitatively different from those of any other species. Dennett speculates, “Perhaps the kind of mind you get when you add language to it is so different from the kind of mind you can have without language that calling them both minds is a mistake” (p. 23). Hypothesizing an unbridgeable chasm between the mental lives of humans and all other kinds of animals, Dennett emphasizes separation where Darwin stressed relationship. Evolutionary biologist Christopher Wills (1993) similarly views language as a categorical divide. Like Dennett, he regards our linguistically reengineered brain as the reason “we have parted company from the other animals in such a startling fashion” (p. xix). Discontinuity with other minds, in Wills's view, results in human social alienation from other life forms, including those of other animals. While inarticulate animal minds remain tethered to the embodied here and now of the natural world, Wills suggests, human minds have engineered an escape that isolates us from other kinds of minds.

Arguing for a uniquely human kind of mind, evolutionary psychologists Derek Penn, Keith Holyoak, and Daniel Povinelli (2008a) authored a feature article in *Brain and Behavioral Sciences* titled “Darwin's Mistake: Explaining the Discontinuity Between Human and Nonhuman Minds.” The article generated over twenty peer responses from developmental and comparative psychologists, linguists, computer scientists, cognitive scientists, communication scholars, and philosophers, and these peer responses in turn prompted a final authors’ response. In the original article, Penn, Holyoak, and Povinelli challenge “the dominant tendency in comparative cognitive psychology... to emphasize the continuity between human and nonhuman minds and to downplay the differences” (p. 109). Penn and his coauthors argue that the special minds of our species derive from an intellectual design more deeply ingrained in human identity than language. Linguistic explanations of human uniqueness, they suggest, are too often distorted by a “trend” in linguistic scholarship to reduce an array of uniquely human faculties to a single “computational mechanism of recursion” (p. 111).

While objecting to the narrow focus of linguistic explanations of human cognition, however, Penn et al. retain the mechanistic terminology and the computational logic of these explanations, borrowing heavily from discourse
forged at the intersection of linguistics and artificial intelligence, or robotics. They describe their revised model of human mind as a brain with the capacity to internalize physical symbol systems; in place of Darwin’s *faculties* they hypothesize *modules*, and they replace Chomsky’s simple language acquisition device with a “symbolic-relational supermodule” that “combines inputs from… a motley collection of conceptual and perceptual modules in a computationally feasible fashion” (p. 129). The overarching intellectual project of their study, they explain, is to solve the age-old mind-body problem with a multidisciplinary blend of biology, behavioral science, and computational logic, producing a model of mind that is at once “biologically plausible, behaviorally accurate [and] computationally feasible” (129).

Darwin’s “mistake,” according to Penn et al., can be found in his claim in *Descent* that the functional rudiments of human language are discernible in other animals’ expressions and behaviors, in their “inarticulate cries to express… meaning” as well as in their “gestures and movements of the muscles in the face” (Darwin, 1871/1989b, p. 89). The species divide between humans and other animals, they argue instead, preceded the evolution of human language, and their attempt to explain this prelinguistic separation in computational terms situates reason squarely in the field of artificial intelligence. Skeptical of what they view as a dogmatic adherence to Darwin’s claim that the minds of people and animals differ by degree rather than kind, Penn et al. propose instead a “relational reinterpretation hypothesis” that posits “a unique representational system that has been grafted onto the cognitive architecture we inherited from our nonhuman ancestors” (p. 111). Penn and his coauthors agree with Dennett that human minds represent such radical transformations of animal minds that the single term “mind” cannot describe them both. They explain these mental differences by pointing to what they regard as a uniquely human capacity to conceptualize relationships among relationships. Penn et al. support their hypothesis with findings from laboratory experiments in comparative psychology, and though they refrain from proposing a particular computational formula to describe the unique mental capabilities of human beings, they insist that human mind is ultimately explainable in terms of neural architecture and computational capacities. They conclude with the assertion, “Nonhuman animals didn’t (and still don’t) get it” (p. 129).

**The Academic Politics of Human Uniqueness**

The peer responses to “Darwin’s Mistake” are spirited and varied. A number of respondents (Gentner & Christie, 2008; Lupyan, 2008; Siegel & Varley,
2008; Thompson & Flemming, 2008) draw the human uniqueness conversation back to language, objecting that Penn et al. underestimate the critical role it plays in structuring human minds differently from those of other animals. Language, they argue, mediates the kind of relational representations Penn and his colleagues regard as both prelingual and uniquely human. Other responses, however, show that the current conversation about human uniqueness is not just about human language as defined by words and syntactic structures; it is also about ideological politics and fashion. In “Darwin’s Last Word: How Words Changed Cognition,” respondent Derek Bickerton (2008), a linguist from the University of Hawaii, offers some fairly computational praise to Penn and his colleagues on their political boldness:

Kudos to Penn et al. for admitting what, if it were not politically incorrect (somewhere between Holocaust denial and rejection of global warming), would be obvious to all: the massive cognitive discontinuity between humans and all other animals. Since “kudos” has apparently become a count noun, how many kudos? I would say, two-and-a-half out of a possible four; that is averaging four for their analysis of the problem and one for their solution. (p. 132)

Bickerton maintains that a valid account of human uniqueness must acknowledge an obvious reality: “[W]e are not just one out of several ‘intelligent’ species on this planet” (p. 132). In qualitatively distinguishing humans from other animals, he allies himself with scholars who, like Penn and his coauthors, want to resist a purportedly popular academic “trend” of favoring human similarities to animals over our differences from them. Physicist James Trefil (1997) testifies that this trend was already well established by the late 1990s. In Are We Unique? he complains, “It has lately become fashionable among intellectuals to ignore ways in which humans are different from other living things and concentrate on the ways in which we are similar.” Trefil locates the origins of this trend in “a misplaced sense of egalitarianism among academics” (p. 2), whereas Penn and his coauthors attribute it to the cult of Darwin. By the 21st century, according to Penn and his coauthors (2008b), the tenet of human continuity with other species has ascended to doctrinal status in academic politics if not in science. Among the peer responses generated by their argument, they detect a tendency toward dogmatism: “Many contemporary comparative psychologists reflexively treat any suggestion of a cognitive discontinuity between human and nonhuman species as a heresy equivalent to defending creationism, or worse, anthropocentrism” (p. 164). In contrast to their own supremely rational construct, a depersonalized and purportedly disinterested, computational model of mind, Penn et al. regard current continuity theories as products not of reason but the “lower”
faculties of emotion and even subcortical “reflex”—the proverbial knee-jerk reaction. Misplaced egalitarianism born of irrational feelings and misguided instincts about human connectedness with other animals, according to discontinuity theorists, is little more than sentiment masquerading as science. Representing this viewpoint, psychologists Drew Rendall and John Vokey with anthropologist Hugh Notman (2008) congratulate Penn et al. on their “unsentimental critique on the current zeitgeist in comparative cognition” (p. 144). In a response to “Darwin’s Mistake” titled “Quotidian Cognition and the Human-Nonhuman ‘Divide’,” they assert their field’s need for rational stiffening against the pervasive belief that “some (perhaps many) nonhumans might be teetering on the brink of humanity” (p. 145). Rendall et al. trace the alleged sentimental spirit of the present age to Donald Griffin’s animal communication studies, beginning with the publication of The Question of Animal Awareness: Evolutionary Continuity of Mental Experience in 1976. Like Darwin and his successors in Japanese and European ethology, Griffin relied heavily upon field observations and anecdotal evidence, methodologies that Rendall et al. understand as operations of “lower” faculties than reason. They charge that current theorizing about mental continuity merely assents to “Griffin’s instinct [italics added] that communication behaviors offered privileged insight into animal minds and that continuity with human minds would be revealed in proportion to their language-like qualities” (p. 145).

A similar aversion to instinct- or emotion-driven theories of human-animal continuity pervades Penn et al.’s critique of Darwin himself (2008b). Though they eventually retract the charge against Darwin, renaming their proposed presyntactic symbolic-relational supermodule “Darwin’s Triumph” instead of “Darwin’s Mistake,” Penn et al. pointedly dissociate themselves from those of their peers in comparative psychology whose reason they believe is compromised by “the rush to defend Darwin’s honor” (p. 164). Claiming unity with Darwin on the basis of his speculation in Descent that human mental powers must have diverged from those of nonhuman apes “before even the most imperfect form of speech could have come into use” (p. 164), they nevertheless question the scientific rigor of Darwin’s methodology and the purity of his reason. They point out, for instance, his heavy reliance on “secondhand anecdotes and anthropomorphic attributions” and more particularly call into question “his infatuation with the mental powers and moral virtues of domesticated dogs” (164). Ultimately Penn et al. forgive these instinctive or emotional qualities in Darwin as the inevitable products of a more primitive scientific era, before technological advances in brain science and genomics had converged with theoretical advances in modern
linguistics and computation to bring about the current “revolution” in cognitive psychology (p. 165).

Science fiction enthusiasts will attest that affective attachments such as Darwin’s “infatuation” with dogs pose an unmet challenge to the artificial intelligence of robots, and so it comes as no surprise that lower-faculty connections between human selves and animal others rest uneasily in the sights of cognitive scientists like Penn and his colleagues, who espouse increasingly mechanistic models of mind. Nor is it surprising that among the respondents to “Darwin’s Mistake,” those employing more “social” methodologies—i.e., research involving close interactions with preverbal human children or long relationships with highly trained animal subjects—should regard Penn et al.’s argument as overly computational, mechanistic, and dismissive of an organism’s material, social, and affective interactions with the environment. Louise Barrett (2008), for example, charges that because Penn et al. are “in thrall to a representational theory of mind based on the computer metaphor” (p. 130), they isolate the brain from the body and the world, overlooking humans’ and other animals’ capacities to exploit social and environmental structures in adaptive ways. Barrett urges Penn et al. to consider that consciousness is in fact distributed throughout the nervous system and beyond, in an organism’s adaptive interactions with the environment through the body and its tools. Gordon Burghardt (2008) similarly complains that Penn et al. engage in robotic oversimplification of mind: “The mind is separated from biology, function is confused with underlying mechanisms, and there is a stereotypical human mind and a single type of nonhuman mind” (p. 134).

Among the fiercest defenders of human psychological continuity with other species are scientists actively investigating social cognition in nonhuman animals’ uses of interlanguages such as manual signing or lexigrams to communicate with humans and conspecifics. Psychologists Louis Herman, Robert Uyeyama, and Adam Pack (2008), who study bottlenose dolphins at the University of Hawaii, argue that bottom-up accounts of mental capacities to synthesize “sensorimotor experiences” into higher-order concepts are preferable to top-down explanations focused on computational algorithms that explain how human brain-machines function. Herman et al. (2008) refute Penn et al.’s claims for human cognitive uniqueness with accounts of the “relational competencies” of four language-trained dolphins they identify as Ake, Phoenix, Hiapo, and Elele. Their subjects’ capacity for the kind of “higher order” mental functions Penn et al. reserve for humans, they argue, reveals that culturally enriched environments can stimulate the emergence of otherwise unrealized intellectual competencies (p. 140). Irene Pepperberg (2008) similarly argues that Penn et al. have overlooked evidence of higher-
order avian competencies in her studies of a language-enabled Grey parrot named Alex, as well as in other studies involving starlings and corvids (p. 144). Finally, Allen Gardner (2008), who pioneered American ape language research studies (ALR) with a chimpanzee named Washoe, criticizes Penn et al.’s failure to consider a kind of communicative relationship between human experimenters and animal subjects that he describes as “mind reading” or “rapport” and points to enculturation studies like his own to illustrate that human culture provides a sociocognitive environment that encourages the development of humanlike mental capacities in nonhuman minds (pp. 134-35).3

From Chomsky to Chimpsky: Evolution of ALR from Syntax to Social Cognition

After researchers in the 1950s failed to teach human speech to an infant chimpanzee, psychologists Allen and Beatrix Gardner in the 1960s and 70s shifted attention from vocal to gestural communication as codified in American Sign Language. For several years the Gardners raised the chimpanzee Washoe in an ASL-saturated environment, much as a human child might be raised by deaf parents. With their doctoral student, Roger Fouts, the Gardners claimed success in teaching Washoe to use the rudiments of ASL for intentional communication, first with humans and eventually with other language-enabled apes. These conclusions were subsequently challenged by another sign-language study conducted from 1973-1977 by Herbert Terrace and his chimpanzee subject, Nim Chimpsky. Initially Terrace reported that Nim’s sign combinations in conversation with his teachers did indeed provide evidence that a chimpanzee could “get it”—that is, could employ syntactic elements of human language for intentional communication. But Terrace’s subsequent review of videotapes of Nim and his teachers prompted him to recant (Terrace et al., 1979). In fact, he reported, the most that could finally be said of Nim’s performance was that it was an elaborate act, a product of mimicry and conditioning. The illusion that Nim employed language as an intentional agent, Terrace conjectured, likely resulted from hopeful, anthropomorphic projections by trainers who had invested considerable time, effort, and emotional energy in the project of teaching human language to an ape.4

The name Nim Chimpsky reflects ALR’s early focus on syntactic logic as the key to language-using species status. Since then, ALR’s focus has gradually expanded to include the study of other cognitive and affective continuities between humans and other apes. Japan’s Tetsuro Matsuzawa for instance, began to study the mathematical logic skills as well as the linguistic abilities
of the chimpanzee Ai in 1978, while Sue Savage-Rumbaugh’s studies with the chimpanzees Sherman and Austin in the 1980s and more recently with bonobos Kanzi, Panbanisha, and Nyota have developed from investigations of syntactic logic to studies of cultural behaviors and emotional connections that humans and other apes mutually negotiate to form an interspecies hybrid community dubbed “Pan-homo culture.”5 Both Matsuzawa (2003, 2009) and Savage-Rumbaugh (1986, 1998) employ the anthropological methodology of participant observation in the research lab; both take a pragmatic view of cognition and communication that includes but is not limited to the words and grammar of human language; and both position the relational capacities of human and animal minds in the contexts of their own first-person relationships with their research subjects.

This broadening of the ALR field methodologically opens investigations of language in mind beyond the logical structure of syntax into the nonrational terrain of the so-called lower faculties—Darwin’s “instincts” and “emotions.” It also shifts the concept of “relational capabilities,” the subject of Penn et al.’s account of discontinuity between human and other minds, from an organism’s abilities to form and use logical or conceptual relationships to its abilities to form and use social and embodied relationships to know itself in the world. Participant-observation methodologies like those of Matsuzawa and Savage-Rumbaugh link the comparative laboratory studies of ALR with the comparative field studies of ethologists like Konrad Lorenz, Kinji Imanishi, and Marc Bekoff in a lineage that traces directly back to Darwin’s study of The Expression of the Emotions in Man and Animals (1872/1989c). In particular, Imanishi’s field studies of monkeys and apes anticipated the social or relational perspective that characterizes Matsuzawa’s laboratory research. As Frans de Waal (2003) has pointed out, Imanishi’s cultural heritage did not observe the strict separation of human and other animal minds that pervades Western culture, and he was therefore unburdened as a scientist by the need to purge his perspective of anthropomorphic contamination.

Like Darwin, ape language researchers who view their subjects relationally risk charges of “infatuation” with the animals they study. Both Savage-Rumbaugh and Matsuzawa qualify as “chimpers,” a term that D. Lawrence Wieder (1980) assigns to “those persons in academic and research circumstances who work well with chimpanzees outside cages” (p. 93). Such persons, according to Wieder, premise their work with apes on a relational state of mutual recognition whereby “chimper and chimp are for one another as witness and witnessed” (p. 94). Chimpers themselves suffer from a problematic double consciousness as they attempt to reconcile the incompatibilities of scientific and relational knowing—what Wieder describes as “an open tension
between behaviorizing and life-worldly tendencies” (p. 92). While acknowledging the disciplinary guidance of the empirical research paradigm of behavioral operationalism, chimpers also discuss phenomenological elements of their work in private, including “that which is not fundable, that which would show that one was ‘soft-headed’ if it were said in public” (p. 93). These private discussions are centered in the “unacknowledged knowledge” (p. 102) that comes from the intersubjective, relational negotiations that become visible when the lab is considered as a site within the life-world.

From the vantage point of science, the alleged “softness” of interspecies witness accounts of relational knowledge derives from the *pathos* that often characterizes such accounts, even in academic settings. Matsuzawa (2003), for instance, uses the journal *Animal Cognition* as a forum for presenting his first meeting with the infant Ai as an emotion-laden, interspecies act of mutual witnessing. When he gave her one of his arm warmers to play with, Ai looked steadily into his eyes, and Matsuzawa reports that the exchange was “something mysterious” that left him “amazed” (p. 202). In a retelling of this same story six years later, this time in a supplement to *Animal Cognition*, Matsuzawa (2009) comments on his own emotional participation in the research relationship that was to proceed as the Ai Project: “At that moment, she touched my heart, and I touched her future” (p. 53). Sue Savage-Rumbaugh (1986) acknowledges a similar emotional involvement with Sherman and Austin, the chimpanzee subjects of the research project described in *Ape Language: From Conditioned Response to Symbol*. Her introduction to the study reports, “Strong emotional bonds developed between Sherman and Austin and many of their teachers, including myself” (p. 45). In her later work with the bonobo Kanzi, Savage-Rumbaugh has been even more explicit about the subjective qualities of her interspecies relationships that cause species identities to blur despite empirically obvious differences:

I keep having to remind myself that Kanzi is not really a person; at least he doesn’t *look* like a person, and he doesn’t sound like a person. But it’s hard to think of him any other way when I am with him for long, because he acts so much like a person. He understands my moods, my thoughts, my feelings and my emotions. . . . It’s not an “animal intuition” that characterizes Kanzi; he does not “divine” my thoughts, but rather listens with sensitivity and concern when I explain them to him. There is an empathy that human beings share with others for whom they care. Kanzi shares this empathy, for he can read my facial expressions as well, if not better than any human being I have ever known. (Savage-Rumbaugh, Shanker, & Taylor, 1998, p. 7)

Privileging an intersubjective model of interspecies relationships in the lab over the objectifying gaze of science, both Matsuzawa and Savage-Rumbaugh
participate in what Stuart G. Shanker and Barbara J. King (2002) have called a “new paradigm in ape language research” that replaces an information transmission model of communication with a dynamic systems model. The transmission model fits comfortably with the mechanical concept of minded behavior, as it seeks evidence of the operations of mind in the individual parts of communication events. Discrete parts of social behaviors occurring in narrative time, Shanker and King observe, appear with increasingly fine granularity and intense focus as advances in video-recording technology continuously refine and extend the observational capacities of ALR scientists. Indeed, the now antiquated technology that facilitated intensive stop-action reanalysis of films of Nim Chimpsky’s performance in Project Nim in the late 1970s dramatically changed the course of fundable ALR studies. This analysis took place apart from the scientist-subject relationship, after the active teaching-learning-testing sequence had ended and Nim was being retired from research, and it provided Herbert Terrace with scientifically persuasive observational data to support his claim that no language had been found in the mind of Nim. Instead, Nim appeared to be mimicking the language of his teachers or randomly running through his language options, unaided by the organizational logic of syntax.

Seeking language in the machine between the ears, the information-processing and transmission paradigm holds that communication abilities are governed by genetically-determined neural programs and structures that enable communicants to encode information about their own mental states and then transmit this information to the mind of another for subsequent decoding. This linear, discrete-sequence model with its sights trained on individual minds, Shanker and King (2002) report, may be useful for describing the communication acts of simple organisms or cybernetic systems, but it fails to account for the complex and creative interactivity that characterizes communication between chimps and chimps. In its place, Shanker and King (2002) propose a dynamic systems framework as a better way to understand the most salient recent developments in ALR.

A dynamic systems framework invites the researcher to regard ALR communication from the standpoint of a socially active participant who engages with another participant from across the species divide in the act of mutual witnessing. Using Savage-Rumbaugh’s work with Kanzi to illustrate this new paradigm, Shanker and King (2002) recommend the metaphor of dance to describe communication as a relational phenomenon, a “continuous unfolding of individual action that is susceptible to being continuously modified by the continuously changing actions of the partner” (p. 605). This view of communication as coregulated interaction attends to the behavioral languages of
Nim and his human testers, registering their gazes, their gestures, their postures, their timing, their rhythms, their steps and missteps, as well as the structures of their signed utterances. The new dynamic-systems paradigm employs a pragmatic rather than syntactic orientation to language, focusing first and foremost on speech acts rather than the structures of speech. Defining communicative intentionality in the context of social relationships rather than individual minds, this model directs ALR scientists to care about much more than syntax; it asks them to understand communication as a joint performance, as the interplay of social engagement and disengagement, synchrony and discord, communication breakdowns and repairs. The substance of communication in this new paradigm is no longer information about mental states; it is the mental states themselves. The “meanings” of these joint performances, in other words, are the mental experiences they mediate among communicants; in the language of Shanker and King (2002), communicative meaning is created by “mutual convergence on some shared feeling, thought, action or intention” (p. 610). Finally, instead of locating creativity in the generative capacity of syntax, the dynamic systems perspective regards creativity as a foundational property of behavioral coordination within social relationships. Citing A. Fogel’s relational theory of communication (1993), Shanker and King explain that coregulated interactions develop like dialogue, in unpredictable ways, to produce new understandings: “[T]he most salient aspect of co-regulated interchange is the emergence of something novel, something that was not there before” (p. 608).

Openness to unpredictable communicative developments and understandings characterizes the turn ALR has taken in Savage-Rumbaugh’s work with bonobo Kanzi and other members of his family. Shanker and King (2002) point to her decision, upon discovering that Kanzi had learned to engage in lexigram-mediated speech acts from watching his mother’s language training, to give up all her initial plans for Kanzi’s formal language instruction and to offer him instead an environment rich with language and social opportunities. Because Savage-Rumbaugh (1998) conceives of mind as a social phenomenon that can bridge species divides, she objects to scientific dismissal of “joint attention, joint regard, and joint inference” between members of different species, particularly when these same sociocognitive orientations are requisites of social relationships and communicative development within the human species (p. 166). If you pay attention to the connections, the “joints” where human and nonhuman attention and intentionality converge, Savage-Rumbaugh and her colleagues maintain, you will discover the generative power of interspecies communication systems, with or without the presence of verbal syntax. Regarding Kanzi the bonobo’s interspecies laboratory
environment, Savage-Rumbaugh and her associates describe an intermediary culture that is a joint creation of minds that are both rational and nonrational, embodied in both human and nonhuman forms. Pan-Homo culture, she and her associates Par Segerdahl and William Fields explain in Kanzi’s Primal Language (2005), is not the result of deliberate design. Rather, it “developed spontaneously as we tried to live together during the past two decades, and it contains both bonobo and human traits” (p. 3). Matsuzawa’s participant observation methodology embraces a similar interspecies relational dynamic. As Matsuzawa (2009) explains, longstanding interspecies “friendships” between humans and chimpanzees are intrinsic to the research itself: “Thanks to the long-term relationship between researchers and the chimpanzee mothers, we were able to ask for the mothers’ help in examining many aspects of their infants’ cognitive development…. [T]he trio of chimpanzee infant, mother and researcher all worked together based on triadic friendship” (p. S5).

Ape language researchers who endorse relational dynamics such as “friendship” between scientists and subjects are, like Darwin, vulnerable to dismissal as infatuated fools. Friendship is not merely an expression of social inclusion; it introduces affective ties into the objectively detached social life of the science lab. Darwin’s refusal to reject such ties made it impossible for him to accept some of the laboratory practices of his day. Early in his “Comparison of the Mental Powers of Man and the Lower Animals” in Descent (1872/1989c), he relates a then familiar story of a dog who, in the agonies of vivisection, licked the hand of the scientist-surgeon. Darwin’s comment that “this man... unless he had a heart of stone, must have felt remorse to the last hour of his life” (p. 74), frames the incident as a story of moral failure, registered and recollected in feelings of bitter remorse. The sin in Darwin’s telling of this 19th-century laboratory legend is more than the cruelty of inflicting physical suffering; it is even more profoundly the refusal to acknowledge a relationship of mutual witnessing. For Darwin, this social failure registers as an emotion governed by the so-called “lower” faculties of the heart, not the head.

Penn et al. assert that in telling such stories, Darwin reveals his infatuation with domesticated dogs and thus compromises his credibility as a scientist. But present-day laboratory ethologists like Matsuzawa and Savage-Rumbaugh call this claim into question by challenging the limitations of scientific method. Purely objective, rationally detached observation of the research subject fails to capture the reality they experience as social beings in the lifeworld of the lab. Like the narrative voice of Darwin’s story, Matsuzawa and Savage-Rumbaugh refuse to regard their subjects as biological machinery,
viewing them instead as fellow denizens of the life-world of the ALR laboratory. Their examples prompt us to wonder if Darwin’s “infatuation” with dogs might be better understood as sensitivity to the intersubjective construction of meaning that is currently emerging from ape language research. This relational perspective locates the origins of language outside the neural circuitry that endows individual brains with syntactic logic, finding it instead in the social impulse we share with other animals.

Notes

1. Generous support for this project came from the College of Liberal Arts and Sciences and the Obermann Center for Advanced Studies at the University of Iowa.
2. For an explication and feminist critique of this secular mythology, see Lloyd, 1984.
3. For a comprehensive survey of animal-language research see Hillix and Rumbaugh, 2004.
4. For full accounts of Project Nim, see Terrace (1986) and Hess (2008).
5. For a full explication of Pan-Homo culture, see Segerdahl, Fields, and Savage-Rumbaugh (2005).

References


