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Chapter 1 : Primate Behavior and Space Use | Field Projects International

Human communication is far more focused on the use of oral sounds. Our speech is radically different from the hoots, howls, whistles, barks, slaps on the ground, and other sounds used by non-human primates to communicate.

That allowed scientists to look at the fine structure of sounds, and to compare and measure them. When people began doing that, the picture began to get more complicated. Steven Green was studying Japanese macaques and the first clue that things were complicated was his study. Japanese Macaque coos The coo is a common short-range vocalization between group members. He looked at spectrograms of the coos, divided them into different types, and realized that certain types happened during certain circumstances. This suggested that primate repertoires might be bigger than we had thought- and also that their calls were more context-specific than we had thought, which raised possibility that they might also be more representational than we had thought. Reflexive vs Voluntary The first big break came when we found a species which had a lot more control over its vocalizations than we had previously thought. Peter Marler and his associates looked at chicken vocalizations and they looked at rooster alarm calls. They set up experimental conditions with the rooster and one other chicken, scared the rooster, and noted whether the frequency of alarm calls changed depending on who the other chicken was. In primates, there was plenty of anecdotal evidence showing that vocalizations were voluntary. For instance, this story from Goodall. Early during her study she used to provision the chimps by putting out bananas. Figan was an adolescent at this time. She gave him some bananas, he got all excited and began to jump around and hoot excitedly, and the older chimps came and took the bananas away from him. This time, he got to keep the bananas. Vervet monkey alarm calls are the classic piece of evidence. They were seen to have different alarm calls for different predators- one for snakes, one for large terrestrial predators, and one for aerial predators. Seyfarth and Cheney recorded alarm calls, analyzed them, showed that they really were different, and did playback experiments which showed that monkeys actually behaved differently depending on the alarm call and would behave appropriately. If they heard a snake call, they would stand up on their hind legs and look around. If it was an eagle call, they would run down from the trees into the bushes. They also were worried that maybe the monkeys were just responding to the level of arousal in the call, so they modified the calls, making them louder and longer the usual parameters that are affected by increased excitement , but the monkeys still acted the same. Another bit of work was done on rhesus macaques by Carl Bazulis. He looked not at alarm calls but at the screams that they use to call for help. Remember that the rank of a female or juvenile depends on the rank of its relatives. This is because the relatives will help in a fight. This guy looked at the screams they give when fighting and asking for help, and he found that there are five distinct types of screams. So again, the calls seem to be pretty representational; they give information about things external to the caller. Then they did playback experiments of the same calls when there were no fights going on. So that showed that the monkeys not only knew who was calling, but knew who its mother was. Genetically Determined vs Learned Most of what we know about learning in animal vocalizations is from studies on songbirds. The first clear evidence that birds learned their vocalizations was the demonstration of dialects in birdsongs; when you look at birds over a geographical range, you find that they have slightly different calls. They learn from hearing what the birds around them sound like, so they develop distinct dialects in different places. There is also evidence now of dialects in chimps, discovered by John Mitani. He recorded chimp pant-hoots from Gombe and Mahale, and he found that when he did detailed structural measurements, he could statistically differentiate the differences. John Mitani also found that male chimps who hang around together tend to sound more like each other and the chimps who were the most variable in the structure of their panthoots were ones who hung around with the least number of same individuals. However, they do learn how to use vocalizations and how to respond to them properly. For this, we go back to alarm calls in vervets. They looked at actual alarm calls in the wild, recording who gave what alarm call and what stimulated it. They broke it down by age and they found that infants give all three types of alarm calls but all at the wrong times. As they grow older, they begin to make the calls more appropriately- only at birds, then only at large birds, then finally only at raptors. They seem to

learn how to respond by looking at what others are doing. So there is learning involved in how to interpret and use sounds, but not in how to make the sounds. It seems pretty clear that primate vocalizations are more voluntary than we thought, and more representational. There is also no evidence of a grammar for primates. Basically, we have a lot to learn about primate vocalizations.

Chapter 2 : Primate Behavior

Comparisons with the cognition and communication of other species have long informed discussions of the origins and evolution of human communication and language.

Received Nov 21; Accepted Jan Abstract Few mammalsâ€”cetaceans, domestic cats and select bats and rodentsâ€”can send and receive vocal signals contained within the ultrasonic domain, or pure ultrasound greater than 20 kHz. Here, we use the auditory brainstem response ABR method to demonstrate that a species of nocturnal primate, the Philippine tarsier Tarsius syrichta , has a high-frequency limit of auditory sensitivity of ca 91 kHz. We also recorded a vocalization with a dominant frequency of 70 kHz. Such values are among the highest recorded for any terrestrial mammal, and a relatively extreme example of ultrasonic communication. For Philippine tarsiers, ultrasonic vocalizations might represent a private channel of communication that subverts detection by predators, prey and competitors, enhances energetic efficiency, or improves detection against low-frequency background noise. Introduction Human hearing is relatively poor at higher frequencies; our putative high-frequency limit is 20 kHz, and frequencies above this boundary are classified as ultrasound. The hearing of most haplorhine primates is similarly constrained, although some species have high-frequency limits approaching 45 kHz [1]. For owl monkeys Aotus , the functional significance of such enhanced hearing is uncertain; all recorded vocalizations are contained below 10 kHz [2]. Other primatesâ€”Callithrix, Cebuella, Cheirogaleus, Galago, Microcebus, Nycticebus, Prolemurâ€”can emit and respond to calls with ultrasonic components [3 â€” 8]; however, the dominant frequencies are always well within the human audible range. Thus, the prospects for primate communication solely within the ultrasound, or pure ultrasound [9], appear limited. In fact, few mammals are reported to send and receive pure ultrasonic signals. Such mammals include cetaceans, domestic cats, and a few select bats and rodents [10 â€” 15]. Among primates, the potential for pure ultrasonic communication is perhaps greatest in the family Tarsiidae. Tarsiers are small â€” g nocturnal faunivores that form simple social groups, typically consisting of maleâ€”female pairs and their offspring. These factors are seldom associated with complex vocal signals [16], yet tarsiers have relatively large vocal repertoires. For example, Tarsius spectrum can emit at least 15 distinct call types, all contained below 16 kHz, that appear to serve several functions, such as conveying alarm, deterring rivals and facilitating social interactions [17]. Other species such as T. As a result, Niemitz [18] suggested that tarsiers might communicate in the ultrasound. Later recordings of T. Such results are promising, but technical and practical limitations have restricted the study of tarsier sensory faculties, especially hearing. Tarsiers are rare, endangered and challenging to maintain in captivity. Thus, traditional behavioural audiograms that require months of husbandry and training are impractical and difficult to justify. Here, we capitalize on recent technical advances to safely generate audiograms from wild animals under field conditions. Our findings not only verify that tarsiers are sensitive to the ultrasound, but also that T. Material and methods a Audiograms Six adult or subadult tarsiers T.

Chapter 3 : Primate Communication - Google Books

In habitual communication, such as affiliative displays, primate grooming, human politeness, a recurrent social situation prompts a reactive action. These communicational actions favour not so much rapidity as cognitive economy for low stake contexts.

Approaches[edit] One can sub-divide approaches to the origin of language according to some underlying assumptions: Some theories see language mostly as an innate facultyâ€”largely genetically encoded. Other theories regard language as a mainly cultural systemâ€—learned through social interaction. Noam Chomsky , a prominent proponent of discontinuity theory, argues that a single chance mutation occurred in one individual in the order of , years ago, installing the language faculty a component of the mid-brain in "perfect" or "near-perfect" form. Among those who see language as mostly innate, someâ€—notably Steven Pinker [7] â€—avoid speculating about specific precursors in nonhuman primates, stressing simply that the language faculty must have evolved in the usual gradual way. Those who see language as a socially learned tool of communication, such as Michael Tomasello , see it developing from the cognitively controlled aspects of primate communication, these being mostly gestural as opposed to vocal. A very specific social structureâ€—one capable of upholding unusually high levels of public accountability and trustâ€—must have evolved before or concurrently with language to make reliance on "cheap signals" words an evolutionarily stable strategy. Because the emergence of language lies so far back in human prehistory , the relevant developments have left no direct historical traces; neither can comparable processes be observed today. Despite this, the emergence of new sign languages in modern timesâ€— Nicaraguan Sign Language , for exampleâ€—may potentially offer insights into the developmental stages and creative processes necessarily involved. Few dispute that Australopithecus probably lacked vocal communication significantly more sophisticated than that of great apes in general, [30] but scholarly opinions vary as to the developments since the appearance of Homo some 2. Some scholars assume the development of primitive language-like systems proto-language as early as Homo habilis , while others place the development of symbolic communication only with Homo erectus 1. Using statistical methods to estimate the time required to achieve the current spread and diversity in modern languages, Johanna Nichols â€—a linguist at the University of California, Berkeley â€—argued in that vocal languages must have begun diversifying in our species at least , years ago. Atkinson [12] suggests that successive population bottlenecks occurred as our African ancestors migrated to other areas, leading to a decrease in genetic and phenotypic diversity. Atkinson argues that these bottlenecks also affected culture and language, suggesting that the further away a particular language is from Africa, the fewer phonemes it contains. The results suggest that language first evolved around 50,â€—, years ago, which is around the time when modern Homo sapiens evolved. The pooh-pooh theory saw the first words as emotional interjections and exclamations triggered by pain, pleasure, surprise, etc. The yo-he-ho theory claims language emerged from collective rhythmic labor, the attempt to synchronize muscular effort resulting in sounds such as heave alternating with sounds such as ho. Problems of reliability and deception[edit] Further information: Signalling theory From the perspective of signalling theory, the main obstacle to the evolution of language-like communication in nature is not a mechanistic one. Rather, it is the fact that symbolsâ€—arbitrary associations of sounds or other perceptible forms with corresponding meaningsâ€—are unreliable and may well be false. Animal vocal signals are, for the most part, intrinsically reliable. We trust the signal, not because the cat is inclined to be honest, but because it just cannot fake that sound. Primate vocal calls may be slightly more manipulable, but they remain reliable for the same reasonâ€—because they are hard to fake. Monkeys and apes often attempt to deceive each other, while at the same time remaining constantly on guard against falling victim to deception themselves. Language is ruled out because the best way to guard against being deceived is to ignore all signals except those that are instantly verifiable. Words automatically fail this test. Should they turn out to be lies, listeners will adapt by ignoring them in favor of hard-to-fake indices or cues. For language to work, then, listeners must be confident that those with whom they are on speaking terms are generally likely to be honest. This property prevents utterances from being corroborated in the immediate "here" and "now".

For this reason, language presupposes relatively high levels of mutual trust in order to become established over time as an evolutionarily stable strategy. This stability is born of a longstanding mutual trust and is what grants language its authority. A theory of the origins of language must therefore explain why humans could begin trusting cheap signals in ways that other animals apparently cannot see signalling theory. If language evolved initially for communication between mothers and their own biological offspring, extending later to include adult relatives as well, the interests of speakers and listeners would have tended to coincide. Fitch argues that shared genetic interests would have led to sufficient trust and cooperation for intrinsically unreliable signalsâ€"wordsâ€"to become accepted as trustworthy and so begin evolving for the first time. Critics of this theory point out that kin selection is not unique to humans. Furthermore, it is difficult to believe that early humans restricted linguistic communication to genetic kin: For language to prevail across an entire community, however, the necessary reciprocity would have needed to be enforced universally instead of being left to individual choice. On the contrary, they seem to want to advertise to the world their access to socially relevant information, broadcasting that information without expectation of reciprocity to anyone who will listen. This is because language is not a separate adaptation but an internal aspect of something much widerâ€"namely, human symbolic culture as a whole. Can we imagine a historian attempting to explain the emergence of credit cards independently of the wider system of which they are a part? Using a credit card makes sense only if you have a bank account institutionally recognized within a certain kind of advanced capitalist societyâ€"one where electronic communications technology and digital computers have already been invented and fraud can be detected and prevented. In much the same way, language would not work outside a specific array of social mechanisms and institutions. For example, it would not work for a nonhuman ape communicating with others in the wild. Not even the cleverest nonhuman ape could make language work under such conditions. Lie and alternative, inherent in language I have therefore argued that if there are to be words at all it is necessary to establish The Word, and that The Word is established by the invariance of liturgy. As digital hallucinations[clarification needed], they are intrinsically unreliable. Should an especially clever nonhuman ape, or even a group of articulate nonhuman apes, try to use words in the wild, they would carry no conviction. The primate vocalizations that do carry conviction—those they actually use—are unlike words, in that they are emotionally expressive, intrinsically meaningful and reliable because they are relatively costly and hard to fake. Language consists of digital contrasts whose cost is essentially zero. As pure social conventions, signals of this kind cannot evolve in a Darwinian social world â€" they are a theoretical impossibility. It involves addressing the evolutionary emergence of human symbolic culture as a whole, with language an important but subsidiary component. Tool culture resilience and grammar in early Homo[edit] While it is possible to imitate the making of tools like those made by early Homo under circumstances of demonstration, research on primate tool cultures show that non-verbal cultures are vulnerable to environmental change. Chimpanzees, macaques and capuchin monkeys are all known to lose tool techniques under such circumstances. Researchers on primate culture vulnerability therefore argue that since early Homo species as far back as Homo habilis retained their tool cultures despite many climate change cycles at the timescales of centuries to millennia each, these species had sufficiently developed language abilities to verbally describe complete procedures, and therefore grammar and not only two-word "proto-language". These researchers argue that these lowered system requirements for grammatical language make it plausible that the genus Homo had grammar at connection levels in the brain that were significantly lower than those of Homo sapiens and that more recent steps in the evolution of the human brain were not about language. Whatever may have been the moment and the circumstances of its appearance in the ascent of animal life, language can only have arisen all at once. Things cannot have begun to signify gradually. In the wake of a transformation which is not a subject of study for the social sciences, but for biology and psychology, a shift occurred from a stage when nothing had a meaning to another stage when everything had meaning. Thus, language, according to structuralism , must have appeared all at once and not gradually since a semi-language is impossible. Berwick, suggests it is completely compatible with modern biology. They note "none of the recent accounts of human language evolution seem to have completely grasped the shift from conventional Darwinism to its fully stochastic modern versionâ€"specifically, that there are stochastic effects not only due

to sampling like directionless drift, but also due to directed stochastic variation in fitness, migration, and heritabilityâ€”indeed, all the "forces" that affect individual or gene frequencies. What we do not see is any kind of "gradualism" in new tool technologies or innovations like fire, shelters, or figurative art. Two types of evidence support this theory. Gestural language and vocal language depend on similar neural systems. The regions on the cortex that are responsible for mouth and hand movements border each other. Nonhuman primates can use gestures or symbols for at least primitive communication, and some of their gestures resemble those of humans, such as the "begging posture", with the hands stretched out, which humans share with chimpanzees. Patients who used sign language, and who suffered from a left- hemisphere lesion , showed the same disorders with their sign language as vocal patients did with their oral language. For example, gorillas beat their breasts. This shows that gestures are an intrinsic and important part of primate communication, which supports the idea that language evolved from gesture. In humans, manually gesturing has an effect on concurrent vocalizations, thus creating certain natural vocal associations of manual efforts. Chimpanzees move their mouths when performing fine motor tasks. These mechanisms may have played an evolutionary role in enabling the development of intentional vocal communication as a supplement to gestural communication. Voice modulation could have been prompted by preexisting manual actions. This too serves as a parallel to the idea that gestures developed first and language subsequently built upon it. Two possible scenarios have been proposed for the development of language, [75] one of which supports the gestural theory: Language developed from the calls of our ancestors. Language was derived from gesture. The first perspective that language evolved from the calls of our ancestors seems logical because both humans and animals make sounds or cries. One evolutionary reason to refute this is that, anatomically, the center that controls calls in monkeys and other animals is located in a completely different part of the brain than in humans. In monkeys, this center is located in the depths of the brain related to emotions. In the human system, it is located in an area unrelated to emotion. Humans can communicate simply to communicateâ€”without emotions. So, anatomically, this scenario does not work. The important question for gestural theories is why there was a shift to vocalization. Various explanations have been proposed: Our ancestors started to use more and more tools, meaning that their hands were occupied and could no longer be used for gesturing. In many situations, they might need to communicate, even without visual contactâ€”for example after nightfall or when foliage obstructs visibility. The suggestion is that only once community-wide contractual understandings had come into force [77] could trust in communicative intentions be automatically assumed, at last allowing Homo sapiens to shift to a more efficient default format. Since vocal distinctive features sound contrasts are ideal for this purpose, it was only at this pointâ€”when intrinsically persuasive body-language was no longer required to convey each messageâ€”that the decisive shift from manual gesture to our current primary reliance on spoken language occurred. These sign languages are equal in complexity, sophistication, and expressive power, to any oral language[citation needed]. The cognitive functions are similar and the parts of the brain used are similar. The main difference is that the "phonemes" are produced on the outside of the body, articulated with hands, body, and facial expression, rather than inside the body articulated with tongue, teeth, lips, and breathing. Critics of gestural theory note that it is difficult to name serious reasons why the initial pitch-based vocal communication which is present in primates would be abandoned in favor of the much less effective non-vocal, gestural communication. Other challenges to the "gesture-first" theory have been presented by researchers in psycholinguistics , including David McNeill. The Tool-use sound hypothesis suggests that the production and perception of sound, also contributed substantially, particularly incidental sound of locomotion ISOL and tool-use sound TUS. That may have stimulated the evolution of musical abilities, auditory working memory, and abilities to produce complex vocalizations, and to mimic natural sounds. The prevalence of sound symbolism in many extant languages supports this idea. Self-produced TUS activates multimodal brain processing motor neurons , hearing, proprioception , touch, vision , and TUS stimulates primate audiovisual mirror neurons, which is likely to stimulate the development of association chains.

Chapter 4 : Primate Vocal Communication

Those who see language as a socially learned tool of communication, such as Michael Tomasello, see it developing from the cognitively controlled aspects of primate communication, these being mostly gestural as opposed to vocal.

Detailed Description This training program targets those with a strong interest in primate biology, animal behavior or wildlife biology. All groups have individually identifiable animals, with one female radio-collared per group. This summer, the primary foci of the behavioral ecology group is communication and space use. Primates utilize visual, chemical and vocal signals to convey information inter- and intraspecifically, and we are currently studying these sensory methods via multiple programs. In addition, the radio-telemetry project gives us the unique opportunity to map the home ranges of multiple primate groups simultaneously, which allows us to explore many fundamental questions regarding how primates share habitat both intra- and inter-specifically. Space use and habitat Tamarins, although closely related, demonstrate a large range of variation in terms of habitat usage. Studies have found home ranges as small as 30 ha and as large as ha, and seasonal fluctuations can contribute to a pretty large amount of variation within a single group across a year. At Los Amigos, FPI has been tracking tamarin groups of two species emperor and saddleback tamarins for nearly a decade primarily in the dry season June â€" August each year. During behavioral follows, we locate groups early in the day using radio telemetry, and record basic scan and focal sampling of individuals in the group. Scan samples record habitat features, height in the canopy, and individual behaviors. Focal samples rotate randomly across individuals in a group and have been modified to suit the needs of more specialised projects running at the site. Research teams work in pairs entirely off-trail and follow groups in all-day and half-day follows. We take detailed information on feeding ecology, which is useful for the further study of sensory ecology in these animals. Feeding, resting and sleeping trees are marked across years, and identified down to the species in an ongoing project connecting Amazonian botany with spacial analyses. Scent Communication Before we get into the details of this project it helps to highlight some interesting characteristics of tamarins: Groups are structured around a reproductively dominant female who mates with multiple helper males. None of the males knows for sure if they parent the twin offspring. Nevertheless, they all stick around and care of the twins until they are independent. This level of male care is rare in the primate world and only observed in a few species. We call this type of reproductive system cooperative breeding. This system of cooperative care would break down if each sexually mature female in a group had her own set of offspring since the care of twin infants is a demanding and tiring job. Hence, the evolution of female reproductive suppression. The principal goals of this research are to understand the mechanisms that underlie the behavioral and physiological phenomenon known as reproductive suppression. What forms of communication from the dominant female are responsible for suppressing maturation of subordinate females, causing miscarriages, or in some cases convincing them to abandon their young? Somehow, through a combination of hormones, scent, and sight, dominant females have been found to exert strong suppression on the ovulation of younger females in a group. In captivity, we know that the scent or sight of dominant females delay sexual development of daughters whereas no such relationship exists between dominant males and their sons. In the wild, however, the story can become complicated. Free-ranging tamarins live in sprawling territories relative to a tamarin, anyway and it rains frequently. Thus, scents do not stick around for very long, and this can lead to subordinate females that are incompletely suppressed. In spite of this, it is extremely rare to find tamarin groups with multiple sets of offspring, so reproductive suppression still occurs; if not by physiological suppression then by other means. In order to investigate this phenomenon in the wild, we spend time with the tamarins and observe them closely. Over the last six years, we have recorded over hours of information on these intriguing animals and their complex social systems. We combine observational data on scent-marking behavior with assessments of the physiology status of each primate. This includes an examination of their scent glands, collecting data on morphology and development, to determine the sexual maturity of both male and female tamarins. We also use fecal samples, collected non-invasively, to monitor changes in sex and stress hormones, especially with regard to female ovulatory cycles. Additional sensory

information is recorded on vocalisations as well see our most recent work on vocalisations below , with a focus on alarm calls. Skills and Training If you join this program, you will get experience in a wide variety of tasks that are applicable to many different fields, including but not limited to primatology. Research assistants who complete this program will be able to: Comfortably and safely work and move on and off trail systems Conduct half and full-day follows of wild primates Learn to identify individual primates based on identification markers Track primates by movement and vocalizations. Learn how to set up a laboratory in the jungle, where things are quite different than your average city laboratory Eligibility We are currently recruiting participants with the following requirements. If you are uncertain if you are eligible, contact us to confirm. Participants must exhibit a willingness to adjust their schedule to primate daily activity patterns. This can require waking up early, sometimes by 4 or 5 am, and going to bed early, 8 or 9 pm. Vocal Communication Vocal communication is the most plastic form of communication: With respect to tamarins, the function of vocal communication in reproduction, dispersal, and the location of mates â€" which are integral to the maintenance of stable populations â€" is not well understood. Our interests lie in interspecific variation and taxonomic affinities in dispersal and reproductive behavior. Previous research on vocalizations in sympatric L. In order to assess the effects of breeding status, age, and sex on vocal communication we will compile a complete vocal repertoire by recording vocalizations and their social contexts in both S. To systematically collect a representative sample of vocal and behavioral data, we will conduct randomized minute focal follows multiple times for each individual. During these follows, we will record the vocalizations of the target animal using a digital recorder and a shotgun microphone. Social behaviors of the target animals and any behaviors of additional tamarins who respond vocally to an initial call will also be recorded. Vocal repertoires for each individual will be compiled and analyzed according to several bioacoustic parameters to ascertain markers of individual, age, sex, and reproductive status. The second component of this research will be playback experiments. Using a speaker and recordings made during follows, we will play vocalizations made by different animals during different behavioral contexts, and record the responses of the group. In this way, we will be able to confirm the meanings of different vocalizations, whether individuals can identify age, sex, and breeding status from vocalizations, and assess whether they are biologically important.

Chapter 5 : Origin of language - Wikipedia

Thus, the prospects for primate communication solely within the ultrasound, or pure ultrasound, appear limited. In fact, few mammals are reported to send and receive pure ultrasonic signals. In fact, few mammals are reported to send and receive pure ultrasonic signals.

Abstract Against the prior view that primate communication is based only on signal decoding, comparative evidence suggests that primates are able, no less than humans, to intentionally perform or understand impulsive or habitual communicational actions with a structured evaluative nonconceptual content. Although humans have access to a strategic form of propositional communication adapted to teaching and persuasion, they share with nonhuman primates the capacity to communicate in impulsive or habitual ways. They are also similarly able to monitor fluency, informativeness and relevance of messages or signals through nonconceptual cues. In addressing this question, comparative psychologists and evolutionary theorists have relied on diverse, often incompatible views about the concept of communication. It makes no central use of fixed codes, but rather massively relies on inferential capacities. Ostensive communication, on this view, involves two steps: This first step allows the receivers 2 to interpret the message more or less as it was intended to be understood. In philosophy, three strategies have been proposed to plug the gap between nonhuman and human forms of communication. A first strategy minimizes the role of inference in communication: Pragmaticians and biologists, 10 however, have offered at least three reasons for rejecting this line of argument. First, the function of communication evolved from more or less inflexible, recurrent signalling, to flexible communication. Second, such flexibility is rooted in a properly human function: A flexible, deliberate message, however, cannot be phylogenetically engineered, nor stabilized through ritualization. Metapsychological abilities must instead be present to establish whether coordination is appropriate. Third, new evolutionary pressures derive from the demands of flexible communication. These three characteristics explain why metapsychological competences have developed, in humans, to address the challenges that the new communicational capacities have generated. A final reason for defending continuity in the evolution of communication is based on the recognition of a duality in human communication. Even though humans are able to communicate their propositional thoughts to others, they also have an alternative communication medium available, by expressing their emotions with respect to a given situation. This general line of thinking, however sketchy, seems a promising way of characterizing a possible common basis of nonhuman and human primate communication. Several questions, however, are left unaddressed. Three kinds of issues, then, will be addressed below. An analysis of the representational structure of animal signals will address question 3 Section 3. Finally the contribution that inferences and associations should make in interpreting a call will be discussed Section 4. Addressing these issues will provide a basis for assessing to which extent nonhuman and human communication share some of their basic processes. Intentional Communication In the first step of human ostensive communication, in its standard account, producers are supposed to let the addressees understand that a current gesture or verbal utterance is performed in order to communicate something to them. Does this step require that producers should form and express a prior intention to communicate? Do they need to consciously plan their message? The latter are subject to an economy principle, according to which any action must find the proper compromise, in a given context, between expected effort and predicted outcome. Applying this tripartition to communicational actions clarifies the analysis of intentionality in signal production: In impulsive communication, producers expressâ€”rapidly and at a low cognitive costâ€”an affective attitude towards a situation requiring prompt action from receivers, with stakes varying from high to moderate. In nonhuman primates, alarm calls, in humans, facial and arm gestures, interjections, intonation, emotional words and expressive speech acts are serving this function. In habitual communication, such as affiliative displays, primate grooming, human politeness, a recurrent social situation prompts a reactive action. These communicational actions favour not so much rapidity as cognitive economy for low stake contexts. Accordingly, they do not rely on intense emotional reactions, but rather on innate or implicitly learned behavioural patterns. The upshot of our tripartition is that ostensive

communication, being based on inferences, may suit the needs of strategic communication, without fitting those of impulsive and routine communication. A new research question, then, is that of how intentionality is conveyed in the latter two cases. Before raising it, however, we must ask whether impulsive and habitual communication are intentional. It might indeed be objected that impulsive signallings are automatic reflexes. A reflex does not qualify as an action because it is irrepressible and non modifiable. It thus fails to be a case of intentional communication. They are rather modulated primarily by involuntary processes involving subcortical brain structures such as the limbic system, midbrain and brainstem. It was noted, for example, that primate gestures are dyadic, and aim to attract the attention of others to the self, but rarely if ever to an outside entity. Such flexibility indicated that alarm calls can both be emotional and carry information that receivers are able to interpret. Second, there is flexibility in auditory signal production and reception: Male blue monkeys adjust their alarm calls to the distance of their females and offspring to a predator, regardless of their own. Communicational gestures involved in play, grooming, nursing, sexual and agonistic contexts, however, are comparatively more controlled and flexibly used than auditory signals. Granting that communication in nonhuman primates may be intentional, how do recipients recognize impulsive or habitual signals as signals? The first part of the response is simple: Given the fitness significance of calls and gestures for themselves, receivers learn to be sensitive and to respond adequately to them during their own development. In the case of impulsive signals, the recognition of their communicational content is tightly associated with their triggering congruent emotions in attuned receivers. One could object at this point that primate communication might also instantiate a strategic form of control. On this view, producers would not merely react to a presently felt emergency or recurrent opportunity. They would be able, when stakes are sufficiently high, to set the stage for anticipated events. Observations of feral apes and monkeys suggest that primates have the capacity to collectively plan to raid cornfields at night. They can also plan their future tool use. First, primates might use specific vocalizations to signal an upcoming coordinated activity. Furthermore, travelling together to new grounds, playing together, etc. Impulsive communication plays an important role in human exchanges: Habitual acts are exemplified, in humans, by conversational gestures, pointings, iconic or modelling gestures, and by verbal greetings. Human producers can perform several acts in parallel: Their general functionâ€”detecting and assessing opportunitiesâ€”is exercised independently from communication. While organisms perceptually inspect their environment, they routinely attempt to predict what kind of positive or negative utility a given perceived situation involves. Being ex hypothesi, common to all individuals in a species, affordances provide an adequate representational structure for a signal to be fluently produced and understood as an action trigger. Arousal and valence markers are associated with a presently sensed affordance: In contrast with PPRs, they have an indexical structure, to the extent that they describe an occurrent property in the presently perceived situation. What is indexed is an occurrent relational affordance, rather than an individual event or object. Given this contrast, signal indexicality does not instantiate reference as usually understood. An alarm call reflects the valence and intensity of the affordance. On the present view, evaluative cognition enables both impulsive and routine communication: The specialized bodily markers involved in sensing an affordance are often amplified for communication purposes. Gestural signals transmit an opportunity for interaction, the intensity of a request related to it and of its valence through incipient action icons. Distinctive embodied cues make a gesture into a pleasurable invitation or into a threat. Alarm calls, in contrast, elicit behavioural dispositions from call types, call loudness and vocalization sequence in the absence of visual contact. Inferences or Pattern Completion? We now are in a position to start addressing one of the questions raised at the end of Section 1. Are inferential capacities involved in interpreting alarm calls? Granting a sharp distinction between inferences and associations, they do not need to be. Propositional inferences are not needed, then, to mediate expression and content. Similarly, an angry call is not meant to produce anger in the recipient, but rather fright and submissive behaviour. It does not claim, in particular, that evaluators are unable to form beliefs and inferences. Our claim is, rather, that evaluative processes do not need to draw on beliefs. But the function of the call is not merely that of venting an emotion. If a call merely propagated an emotion, receivers would not be able to react adaptively as they do. Wild apes do not seem able to point declaratively, as human children do. Apes rather aim to have others do what they want. The same kind

of explanation has been used to characterize alarm calls elicited by a distinctive type of event and motivating a specific adaptive response. In contrast, a signal genuinely refers to O if the representational subsystem involved in the communicational act has the function of representing O on different occasions as one and the same individual entity, or as belonging to the same category of entities. Note, however, that genuine reference requires a propositional mode of representation, where objects are subsumed under concepts. Our semantic proposal offers an answer: This explains why captive apes do not generalize their understanding of human declarative pointing from a competitive to a cooperative context: As Leavens et al. In such contexts, they readily learn to point imperatively by mere reinforcement: This hypothesis can be generalized to human infant pointing. Why is it that, in some ontogenetic contexts, infants fail to point? In their environment, imperative pointings are not produced because there is no salient opportunity for being helped. Again, sensing an affordance does not entail that a child has formed a belief of a certain kind. Three motives have been found to elicit declarative pointings: The child first points to an event or a property in the environment because it is sensed as new and interesting environmental affordance , which triggers a disposition to communicate about it. If it is not reinforced, the behaviour will tend to disappear.

Chapter 6 : Primate Use of Language

Primate Communication brings together research on all forms of interchange and discusses what we know about primate communication via vocal, gestural, facial, olfactory and integrated multimodal signals in relation to a number of central topics.

Territory - Access through symbols, shared Sexual activity - extremely variable Same-sex adults - form groups including initiation rituals and task-oriented groups Offspring - variable residence patterns, partilocal, matrilocal, usually maintain contact with parents Social network - elaborate, kin and non-kin social networks. Most human groups do not practice monogamy. Most human sexual behavior includes more than one sexual partner for at least one sex. Many human cultures either sanction or tolerate sexual activity with more than one sexual partner. Even in cultures where monogamy or serial monogamy is the ideal, it may not be practiced by most people. If monogamy were "instinctual" rather than "learned," it would not require elaborate social sanctions to enforce. Since monogamy has never been an important part of human behavior and women are not "provisioned" by men in most cultures, then the earlier theory is invalid. Some alternative proposals about non-estrus include: Communication Non-human primates -no vocal cords for "human speech" but are able to use sign language. Speculation that it was our larger range for gathering that may have resulted in human speech. The ability to explain something that happened in the past or might happen in the future might have been selected for with larger home range. These have been some behaviors that we see among non-human primates that have important implications for human origins. Many of these behaviors play crucial roles in the theories of human origins. Of the many aspects of non-human primate behavior that seem to fascinate us is the idea of their communication. In recent past few decades debates have raged about the level of their abilities. Communication, particularly our ability to create and use symbols, is the core of our culture, and thus at the core of our humanity. With non-human primates it has for some been at the core of our fears regarding these animals and our evolutionary closeness to them. Communication has four aspects: Signals are is the actual form of the communication act. You can describe and analyze a signal. Among primates, signals can be made in any of four modes: The 4 modes can be ranked in terms of the strength or immediacy of the message. Olfactory signals are odors, aromas, or stinks - something that is intended to be smelled. They are used to convey gentle warning or invitation, but not used to convey strong emotions, like love or anger. Among strepsirhines, however, olfactory signals are used for stronger messages. Visual signals are something an individual does with its body or surroundings that is intended to convey a message. Things like staring, yawning, baring the canines, raising the tail, stamping the feet, shrugging the shoulders, or shaking the head are all visual signals. For most primates, visual signal lie between olfactory signals and auditory signals in strength. Color signals rank with olfactory signals as being relatively weak. Auditory signals involve some use of sound, such as screaming, smacking the lips, whining, grinding the teeth, or barking. Usually, auditory signals are stronger than olfactory or visual signals. Auditory signals have an advantage in that they can be perceived by a large number of receivers at the same time, even if those receivers were not initially paying attention to the individual giving the signal. The strongest of all signals are tactile signals. Tactile signals involve one individual touching another in some manner, such as grooming, caressing, hitting, licking, or biting. Of course, these 4 modes of communication can be combined in a variety of ways. A charging display visual can be combined with a yell auditory to provide a clearer, and to some extent stronger, message. Motivation is the reason the individual is giving the signal. A motivation can be an emotion or feeling, or it can be a more complex message. Anger, lust, hunger, and fear are all possible motivations. Motivation is one of the more abstract factors of communication. It is difficult to judge the emotional state of a particular individual without some level of ambiguity. The meaning of a signal is its interpretation by the receiving individual. We determine what the meaning of a given signal is by watching the reaction of the individuals that receive it. The function is what the individual gains from the signal in an evolutionary sense. Call systems vs language In one sense, human language is simply a complex communication system. The calls, gestures, and facial expressions of non-human primates and perhaps other animals are also complex. The question then

becomes, what is the difference between human language and the communication systems of non- human primates. How can we distinguish between the two? A simple key is the idea of the symbol vesus the idea of a sign. Signs carry their own meaning and convey reality directly to the perceiver. But symbols carry meaning for something else. They are intermediaries and they are abstractions from reality. Symbols are the basis of language. Multi-level structure of language Language is a multi-levelled system. Phonemes are basic elements of sound; morphemes are elements of meaning; syntax and grammar are rules for combining morphemes; and the sentence can be thought of as a complete message unit. In comparison, communication systems do not have as many levels. Certainly, they have phonemes and morphemes sound or the equivalent, and meaning. Language is designed to be an open system, in that it is designed to allow the production of combinations of meanings to produce something new. Communication systems are closed systems - they are designed to express a well-defined set of meanings. Language is highly arbitrary and culturally determined. The word for any given meaning varies enormously over the spectrum of human cultures. Non-human communication systems are less arbitrary and usually do not vary between groups. An example of the ways in which a communication system is not arbitrary is that across all known animals that make noise, a quick, high, sharp sound means danger. Conversely, a low, sustained sound is reassuring. Humans do have a communication system that for the most part stands beside language. This is a system of gestures and vocalizations referred to as paralanguage and kinesics. Paralanguage consists of noises and changes to the character of the voice that are used while speaking. These carry information, but not in as precise a way as actual language. One aspect of paralanguage is voice quality. We use a slow pace with very little change in pitch when we are bored and a faster pace with more change in pitch when we are excited. With control of rhythm, pitch, jerkiness, resonance, speed, and other qualities of the voice we can convey a lot of information about our emotions and attitudes. Another aspect of paralanguage is vocalizations. Several vocalizations, like laughter, yawning, coughing, screaming, or growling exist, which convey information about emotional and physiological states. Kinesics is the scientific terms for what we might call "body language". We use facial expressions, postures, motions, and movements of our hands to convey information. Kinesics are often complementary to speech. Paralanguage and kinesics vary from culture to culture, but are much less variable than language. Research has demonstrated that monkeys are incapable of using syntax correctly or forming a sentence. This issue is still undecided for apes, and is hotly debated. The first experiment with ape language was trying to teach a chimp to actually use human spoken language. Viki was raised as if she were a human child. Eventually, viki learned a few hoarse sounds like "cup", "mama", and "papa", but that was it. So, the conclusion was that a chimp does not have the ability to use human spoken language. The next experiment was conducted by the two psychologists, the Gardeners, and eventually Roger Fouts, who figured that even though a chimp is limited by its vocal apparatus, it might be able to communicate using a different system. This experiment was much more successful. Washoe learned to use at least signs correctly. This experiment has been repeated a few times. One of the most interesting ape language experiments was conducted at the Yerkes Primate Center by Susan Savage-Rumbaugh. They started with a chimp named Lana who they taught to communicate using a large computer input device. After analyzing the results Rumbaugh concluded that apes were actually able to learn abstract communication skills. Among their questions is whether apes could spontaneously learn symbols, and work with Kanzai, a 2. They were never directly involved in the training sessions with their mother, but were simply present when she was trained. These researchers all assumed that the chimps were really learning to communicate, but there is a critic. Terrace video taped all his training sessions and studied them thoroughly. He concluded that Nim was actually not using AMSLAN as language, but was really just responding to cues provided, often unconsciously by the trainers. He explained it as a case of the "Clever Hans" problem. The evidence has been debated back and forth for years. One problem may be that apes have species and individual differences in the extent to which they can use language. Most people feel that Koko is in fact using something nearly on the level of human language.

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Primate Communication brings together research on all forms of interchange and discusses what we know about primate communication via vocal, gestural, facial, olfactory and integrated multimodal signals in relation to a number of central topics. It explores the morphological, neural and cognitive foundations of primate communication through.

Primate Use of Language Created by Lauren Kosseff Research concerning the ability of primates to acquire language has profound implications for the understanding of the evolution of the human species. In this sense, research of primate language and primate tool use offer similar insight into our early ancestors. Many people believe that language is a unique capacity of humans. Doubters of the ability of primates to use language include renowned M. Chomsky makes an analogy to flying in order to illustrate his position on primate language: The question is totally meaningless. They base their argument on the ease with which children acquire language in comparison to the difficulty exhibited by primates. To Chomsky and his followers, this disparity demonstrates the presence of an innate propensity for language in children which is not present in primates. Pinker posits the argument that primates can be trained to do incredible things, however, these trained behaviors do not signify language ability. He believes that the primates simply learn to press certain buttons in order to receive rewards. Sue Savage-Rumbaugh is a researcher who strongly believes in the ability of primates to use language. One of her most impressive observations involved a bonobo chimpanzee named Kanzi. From then on, Kanzi was not given structured training like his mother, but was taught while walking through the forest with his trainers. By the age of 6, Kanzi had acquired a vocabulary of words and was able to construct sentences by combining words with gestures or with other words. Observation of the vervet species of monkeys in the wild offers support for the ability of primates to use language. The vervet monkeys have demonstrated the most advanced primate system of communication in their natural environment. The sounds which the vervets produce as a means of communication are instinctive and not learned. Sign Language Sign language has been chosen as the superior medium in which to conduct language instruction for primates because they are unable to vocalize language. Some researchers hold the belief that primates are simply not intelligent enough to speak. This theory has lost credence as further research with apes has demonstrated their tremendous intellectual capacities in other arenas. A final theory suggests that the vocal cords of primates are not capable of supporting the production of language. Washoe Washoe is a chimpanzee who was taught to sign by her caretakers, Allen and Beatrice Gardner. She was raised in a friendly environment in which she learned sign language both through imitation and instrumental learning. Her language acquisition was notable in several respects. Washoe was able to transfer signs to a new referent without specific instruction. For example, she learned the word "more" in relation to tickling but was spontaneously able to apply the term to another referent. This spontaneous combination of signs seems similar to the ability of human children to connect words in sentences to which they have never specifically been exposed. Washoe has demonstrated reliable use of signs. A sign is deemed reliable when its use has been recorded by three separate observers on 15 consecutive days. Her trainers have observed that Washoe mostly uses her signs to discipline her children and explain her concern about them. Remarkably, Loulis nonetheless acquired more than 50 signs by watching the other chimps. Bob Ingersoll, who studied Washoe and Loulis, observed that there was little active teaching on the part of the adult chimps. He did not believe that the findings of language acquisition and use in Washoe, Loulis, and other primates were truly symbolic of language acquisition. Terrace also thought that primates only signed in order to please their trainers, not for the personal gratification of using the signs. Therefore, Terrace decided to conduct his own study of primate language use. He raised a chimpanzee, Nim, as a human child and taught him sign language in the manner in which Washoe had been taught. Nim did in fact demonstrate some important aspects of language use. He was observed using the signs for "angry" and "bite" to express his displeasure, an important observation in that it demonstrates the use of arbitrary symbols to represent physical actions. Despite his acquisition and use of numerous signs, Terrace decided that Nim was incapable of combining words to create novel ideas. The only occasions in which Nim produced combinations of signs were imitations of signs previously produced by his trainers. The chimps at CHCI use the signs alone

and in combination with other signs. One of the longest recorded sentences produced by a chimp contained 7 signs! Chimps generally utilize their signs in discussing aspects of family life. The trainers have observed that young males frequently sign to talk about games, such as tickle and chase. An important finding about primate language use at the CHCI is that the chimps use signs to refer to natural language categories. For example, the chimps use one sign signifying "dog" to refer to all dogs. This category generalization is similar to that of children as they first begin learning to speak. For example, one chimp at the CHCI was recorded describing a watermelon as "drink fruit. The CHCI is considering a couple of possible continuations of their research, provided that funding is available. One possible area of exploration is the ability of chimps to use signs to represent spatial relationships and their capacity for taking on the position of another person or chimp. Additionally, the CHCI is considering studying the ability of chimps to recognize break-downs in conversations and to repair them, their use grammatical markers, and their ability to understand and use temporal signs. The CHCI also hopes to expand their research to include the study of how to apply the teaching of language to chimps to assisting autistic children, who have difficulty learning language. They also hope that their research will be helpful in studying the teacher-student relationship in humans. Their training began with flash cards and has advanced to the use of computers with touch screens. Both nouns and verbs are being taught with the goal of eventually testing the Orang utans ability to develop syntactically accurate sentences. The Orang utan Language Project operates under the idea that the orang utans will learn the language if they wish to use it to communicate with their trainers and to control their environment. As such, no coercion is used in teaching the language.

Chapter 8 : Primate communication in the pure ultrasound

Nonetheless, primate communication differs from human communication, especially language, in important ways. This article focuses on natural communication processes in primates rather than artificial training to use sign language or computer symbols to mimic human language.

Chapter 9 : Primate - Wikipedia

A primate (/ Ëˆ p r aÉª m eÉª t / (listen) PRY-mayt) is a mammal of the order calendrierdelascience.com taxonomy, primates include two distinct lineages, strepsirrhines and calendrierdelascience.comes arose from ancestors that lived in the trees of tropical forests; many primate characteristics represent adaptations to life in this challenging environment.