CENTRE FOR PHILOSOPHY OF SCIENCE OF THE UNIVERSITY OF LISBON

Research Group Philosophy of Life Sciences

INTERNATIONAL COLLOQUIUM

10-12 SEPTEMBER 2012

FROM GROOMING TO SPEAKING

RECENT TRENDS IN SOCIAL PRIMATOLOGY AND HUMAN ETHOLOGY

CFCUL

Centre for Philosophy of Science of the University of Lisbon

http://cfcul.fc.ul.pt

Auditorium of the FFCUL

Faculty of Science

University of Lisbon

INDEX

FROM GROOMING TO SPEAKING

Recent trends in social primatology and human ethology

CFCUL, September 10-12, 2012, University of Lisbon

Scientific committee

Rod Bennison, CEO Minding Animals International
Rudie Botha, Univ. of Stellenbosch, South Africa and Univ. of Leiden, the Netherlands
Massimiliano L. Cappuccio, United Arab Emirates University, United Arab Emirates
Daniel Dor, Tel Aviv University, Israel
Luc Faucher, UQAM, Canada
Nathalie Gontier, Free University of Brussels, Belgium (chair)
David Leavens, University of Sussex, UK
Robert Lickliter, Florida International University, USA
Jorge M.L. Marques da Silva, University of Lisbon, Portugal
Mark Nelissen, University of Antwerp, Belgium
Eugenia Ramirez Goicoechea, UNED, Spain
Emanuele Serrelli, University of Milan, Italy
Chris Sinha, Lund University, Sweden
James Steele, University College London, UK
Ian Tattersall, American Museum of Natural History, NY, USA
Natalie Uomini, University of Liverpool, UK
Arie Verhagen, University of Leiden, the Netherlands
Luis Vicente, University of Lisbon, Portugal

Organizing committee

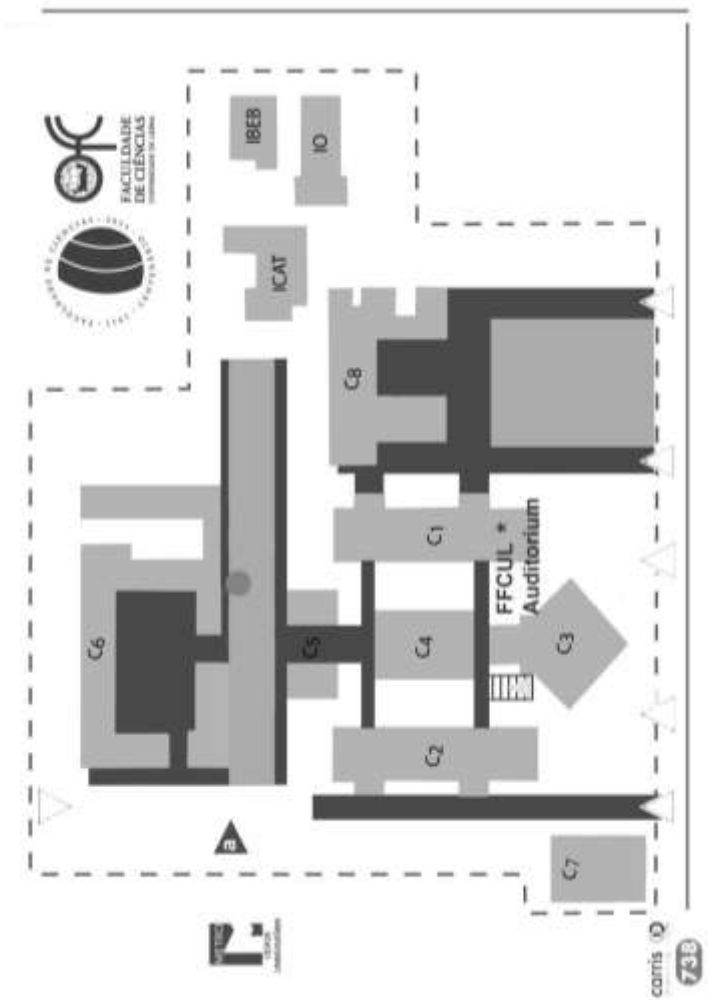
Nathalie Gontier (chair), Dutch Free University of Brussels, Belgium
Olga Pombo, Center for Philosophy of Science, University of Lisbon, Portugal
Marco Pina, Center for Philosophy of Science, University of Lisbon, Portugal

Secretariat

Alexandra Padinha
Márcia Belchior

Faculty of Sciences Map with the Auditorium location - at building C1 (*)

The “a” arrow indicates the entrance in the Faculty of Sciences campus if you arrive by Metro from the “Cidade Universitária” station.



MONDAY, SEPTEMBER 10TH

09.30 OPENING SESSION

10.00 COMMON DESCENT AND CONVERGENCE IN THE EVOLUTION OF THE MIND, Johan Bolhuis

11.00 LANGUAGE EVOLUTION REQUIRES AND REINFORCES INFERENTIAL MACHINERY, **August Fenk & Gertraud Fenk-Oczlon**

11.30 LANGUAGE EVOLUTION: FROM COMPUTING TO SPEAKING?, **Antonio Benítez-Burraco**

12.00 LUNCH

13.30 EXPERIMENTAL CONVERSATIONS: SIGN LANGUAGE STUDIES WITH CHIMPANZEES, Mary Lee Jensvold

14.30 THE BONOBO PROJECT IN PLANCKENDAEL (BELGIUM): 25 YEARS OF CAPTIVE BREEDING - 20 YEARS OF RESEARCH, Jeroen Stevens

15.30 BREAK

16.00 HOW PRIMATE MOTHERS AND INFANTS COMMUNICATE. CHARACTERIZING INTERACTION IN MOTHER-INFANT STUDIES, **Maria Botero**

16.30 RE-EVALUATING GREAT APE VOCAL SIGNALS FROM THE GROUND UP, **Adam See**

17.00 REFINING FOLK PSYCHOLOGY, **Shoji Nagataki**

17.30 DISCUSSION

20.00 CONFERENCE DINNER AT FÁBRICA BRAÇO DE PRATA

Address: Rua da Fábrica de Material de Guerra, nº1
(See directions to the "Fábrica" at the end of this booklet)
Bus (carris): 28, 718, 755, 210 (night bus)
GPS: 38.7433703 / -9.1006499

TUESDAY, SEPTEMBER 11TH

10.00 ARCHETYPES, PROTOTYPES AND VARIATION IN FACIAL EXPRESSION: LESSONS LEARNED FROM ACTUALLY MEASURING FACIAL BEHAVIOR, Augusta Gaspar

11.00 THE HOMOLOGY OF FACE RECOGNITION SYSTEMS IN HUMAN AND NON-HUMAN PRIMATES, **Claudia Lorena García**

11.30 THE ULTIMATE AND PROXIMATE CAUSES OF CONTAGIOUS YAWNING: THE EFFECT OF ONTOGENY AND EMOTIONAL CLOSENESS ON LOW-LEVEL IMITATION IN HUMANS, CHIMPANZEES, DOGS AND WOLVES, **Elainie Alenkær Madsen**

12.00 LUNCH

13.30 COMPARATIVE GESTURAL SIGNALING: A NEW APPROACH TO A VERY OLD QUESTION, Simone Pika

14.30 TOWARDS A CLEARER VIEW OF THE DEVELOPMENT AND EVOLUTION OF THE CAPACITY FOR JOINT ATTENTION, Tim Racine

15.30 BREAK

16.00 ARE APES' RESPONSES TO POINTING GESTURES INTENTIONAL?, **Olivia Sultanescu and Kristin Andrews**

16.30 GESTURES AND GESTURES IN CHILD LANGUAGE DEVELOPMENT, **Tove Gerholm**

17.00 COMMUNICATION AND COOPERATION RIDDLES, **Filomena de Sousa**

17.30 DISCUSSION

WEDNESDAY, SEPTEMBER 12TH

10.00 BODILY MIMESIS IN HOMINID EVOLUTION: BEFORE AND BEYOND?, Jordan Zlatev

11.00 THE EMERGENCE OF HUMAN LANGUAGE. SIMULATING MULTI-MODAL COMMUNICATION, **Roland Muehlenbernd, D. Enke, N. Gavrilov, J. David Nick, M. Villing**

11.30 THE COMPLEXITY OF ACTION AS COMPARED TO THAT OF LANGUAGE, **Hiroyuki Nishina**

12.00 LUNCH

13.30 EPISTEMOLOGICAL ISSUES IN SOCIAL PRIMATOLOGY AND HUMAN ETHOLOGY, Nathalie Gontier

14.30 ETHICAL CHALLENGES IN PRIMATOLOGY RESEARCH, Constança Carvalho & Luis Vicente

15.30 BREAK

16.00 HOW HUMANS BECAME BEHAVIORALLY MODERN, **Rita Nolan**

16.30 LORD MONBODDO'S OURANG OUTANG AND THE ORIGIN AND PROGRESS OF LANGUAGE**, Stefaan Blancke**

17.00 POLITICS, PRIMATES AND PRIMARY SOURCES IN SOUTH AFRICAN SOCIAL HISTORY, **Sandra Swart**

17.30 DISCUSSION AND ANNOUNCEMENT OF THE WINNER OF THE SPRINGER BOOK VOUCHER FOR THE BEST PRESENTATION AWARD

INTRODUCTION

The field of ethology arose in the 1930s, in Europe, as an outgrowth of both naturalized epistemology and comparative zoology. Inspired by early scholars such as Oskar Heinroth and Julian Huxley - Konrad Lorenz took on the study of imprinting and fixed action patterns; and Niko Tinbergen defined what became known as the 4 questions of ethology. Both would greatly enhance studies on the evolutionary origins of primate and animal behavior.

At around the same time, modern comparative psychology would, especially in America, turn behaviorism into a school. With their focus on learning and conditioning, scholars such as Edward Thorndike, John B. Watson and B.F. Skinner introduced the empirical and experimental study of behavioral development.

Both comparative psychology as well as ethology would lay the foundations for primatology and sociobiology. They would introduce cross-fostering experiments where they taught nonhuman primates to speak, sign or learn artificial languages such as Yerkes; and they took on the study of human and nonhuman primate behavior under experimental and artificial conditions. By the 1960s, pioneers such Diane Fossey and Jane Goodall would found modern primatology, that as a field, would take on the study of primate behavior in the wild.

Sociobiologists would criticize the early ethologists and comparative psychologists' exclusive focus on visible behavior. The deciphering of the genetic code in the 1950s provided them with the hope that soon, the genetic basis of primate and animal behavior would be discovered. In order to understand nurture, we need to understand nature, and early sociobiologists synthesized selection theory with the data provided by fieldwork and the outcomes of behaviorist experiments, and developed the first theories on the evolution of human and non-human primate behavior and cognition. Scholars from the classic humanity fields, such as Piaget and Chomsky, would also criticize the tenets of behaviorism and induce what is now called, the cognitive revolution. Advances made in the cognitive and neurological sciences allowed for research into the development of cognition and language. An important outcome of the cognitive revolution was the rise of the field of biolinguistics, as well as research on Theory of Mind.

By the beginning of the 1990s however, also the cognitive turn became partly criticized and partly expanded, by the "social turn" and "adaptationist turn". Evolutionary psychologists such as Cosmides and Tooby, and Pinker and Bloom, criticized all former approaches and argued that human behavior primarily needs to be understood from within evolutionary theory. The study of human behavior or language needs to be understood by making use of natural selection theory, and by studying our hominin past, much more than by studying behavior or cognition as it unfolds in modern human and non-human primates. Rather than focus on the proximate causes of behavior, evolutionary psychologists tackle the ultimate causes of behavior: how did behavior and cognition evolve? What are the adaptive benefits? Evolutionary linguistics and evolutionary anthropology are direct outgrowths of evolutionary psychology, and both fields examine how especially natural selection theory can provide theories on the rise of human sociocultural behavior.

The above described paradigm shifts have often been characterized as transitions from instructionism to cognitivism to selectionism. But the fact of the matter is that today, scholars remain active in all these fields, and all continue to provide valuable insights into the origin, development and evolution of human and nonhuman cognition and behavior. With this conference, we aim to bring together scholars who are active within all these fields. We will provide a platform where experts are able to reflect and discuss the pros and cons of their approach, and how their experiments, methodologies and theories enable insight into the origin and evolution of communication and human language. The conference will therefore focus on theoretical and methodological issues, much more than that it will focus on the dissemination of new results.

ABSTRACTS

(in order of appearance)

[September 10th, morning]

Common Descent and Convergence in the Evolution of the Mind

Johan Bolhuis, Utrecht University, the Netherlands.
j.j.bolhuis@uu.nl

In the century and a half since Charles Darwin's publication of the *Origin of Species*, evolutionary theory has become the bedrock of modern biology. Attempts to apply the theory of evolution to cognition, however, have not fared as well. Darwin himself thought that there was no fundamental cognitive difference between man and the 'higher mammals'. Many researchers still hold that common descent implies cognitive closeness. This view has excused anthropomorphism and often led to an over-interpretation of data from experiments with non-human primates. Recent studies on the cognitive capabilities of birds suggest that evolutionary convergence may be the rule rather than the exception in animal cognition. For instance, crows have been found to be much better in the use of tools than monkeys. Also, it has become clear that songbirds are far better models for the study of the brain mechanisms of human speech and language than apes. A prominent attempt to apply evolutionary and functional considerations to brain and cognition is that of neuro-ecology. According to neuro-ecology, differences between classes of individuals (e.g. between males and females or between food storing birds and non-storers) in the mechanisms of brain and cognition are the result of adaptive specialization. However, empirical results are more consistent with a 'general process' interpretation, without qualitative differences between different taxa. The new discipline of evolutionary psychology is based on the mistaken view that evolution can explain how the human mind works. A prominent claim by evolutionary psychologists is that mind of modern humans was formed as a result of selection pressures in the Stone Age. This suggestion is based on empirical research and on received wisdom in evolutionary biology and behavioral ecology. The empirical data are often over-interpreted, and evolutionary psychology is mostly based upon an outdated view of evolutionary biology.

More importantly, my colleagues and I have argued that questions of evolution and of mechanism are fundamentally different. Niko Tinbergen distinguished between evolution, function, development and causation as the four important questions in behavioral biology. In both neuro-ecology and evolutionary psychology, functional and evolutionary questions are confounded with questions of mechanism or development. Evolution is concerned with a historical reconstruction of brain and cognition, while the actual underlying mechanisms are the domain of cognitive neuroscience and psychology. As the examples above illustrate, it is often not clear a priori whether a particular cognitive or neural trait is homologous (i.e. the outcome of common descent)

or the result of convergent evolution. A good example is human speech and language, where an evolutionary scenario emerges where three factors are important. First, there is increasing evidence for neural and genetic homology, where similar genes and brain regions are involved in auditory learning and vocal production, not only in songbirds and humans, but also in apes and mice. Second, there is evolutionary convergence with regard to the mechanisms of auditory-vocal learning, which proceeds in essentially the same way in songbirds and human infants, but not in apes or mice. Third, our own analyses have shown that recent claims for strictly context-free syntactic abilities in songbirds are premature, and that there is no evidence to suggest that non-human animals possess the combinatorial complexity of human language. As a consequence, presently there is no credible animal model for the study of the neural substrate of human language syntax.

Thus, I argue that in the study of animal and human cognition, we should not assume that there is evolutionary continuity or adaptive specialization. Rather, questions of function and evolution and questions of mechanism should be seen as logically separate. Functional and evolutionary considerations may be used as clues to generate hypotheses regarding the underlying mechanisms. But these hypotheses may be false and should always be tested empirically, using methods from cognitive neuroscience, behavioral biology and experimental psychology.

Language evolution requires and reinforces inferential machinery

August Fenk & Gertraud Fenk-Oczlon, Alpen-Adria University of Klagenfurt, Austria. august.fenk@uni-klu.ac.at

An increasingly complex language requires and stimulates developments of neurocognitive mechanisms that in turn allow further progress in language. This framework [1; 2] suggests a general principle explaining the evolution of our capabilities to use and acquire complex languages. Here we shall put it more precisely with regard to the perceptual/cognitive mechanisms involved and the succession of their involvement in the course of language-evolution. This attempt is however an enterprise that requires a lot of “uncertain conjectures” [3] from partial and indirect information, thus suggesting a – here in some way “reflexive” [4:95] – use of the “probabilistic approach” and its “top-down or ’function-first’ strategy” [3:357]. Starting point is the inferential, pattern-extracting machinery in general (i); it requires especially in the auditory mode an efficient sensory memory because of the principally transitory character of acoustical input (ii). A system integrating the respective perceptual circuits

with articulatory circuits is able to keep (intended) utterances resonating for various purposes (iii).

(i) Our perceptual/cognitive system appears to make inferences that “go far beyond the data available” [5]. It is not purely data-driven but is incessantly generating top-down processes, i.e. “hypothesis-testing”. This picture connects with neurobiological descriptions of a “continual adjustment of the brain’s self-generated patterns” [6] by outside influences. The respective anticipations are vital [7] and allow for instance (faster) pattern recognition.

(ii) Powerful statistical learning and pattern recognition show in the acquisition of rudimentary phrase structure [8] and, already in 8-month-old infants, in the separation of words [9]. Saffran et al. characterize that “as resulting from innately biased statistical learning mechanisms”. (A functionalist interpretation of an innate *Language Acquisition Device?*).

The detection of patterns in the sound stream requires a selective “echoic memory”: The development of a predominantly verbal or “half-musical” [10] language – possibly from an alarm-system [11] using, for obvious reasons, the auditory channel – must have gone together with the development of a sensory memory retaining unprocessed clauses of increasing complexity and duration. But serial position effects in the recall of words from auditorily presented sentences [12] seem to reflect, moreover, rehearsal processes:

(iii) Rehearsal as well as a monitoring of intended propositions needs a coupling that allows “self-generated patterns” of articulatory circuits to interact with auditory circuits [13; 14:89] – the origin of a verbal working-memory and of a relatively autonomous symbol-manipulating system that is deeply involved in the human thought process [2].

Conclusions: The old idea of a “ratiomorphic”, intuitive-statistical apparatus [15; 16] has, though criticized as just metaphorical [17], proved to be very successful. This inferential machinery connected – in “relaxed selection” [18]? – to specialized memory and motor systems. But its basic principle, i.e. the comparison of top-down predictions with sensory input, is still reflected at several levels of language perception [19; 20]. A testable assumption: Other recent hominoids will show the same mechanisms but lower degrees of connectivity and of performance in each of the fields.

References:

[1] Fenk-Oczlon, G. & Fenk, A. (2002) The clausal structure of linguistic and pre-linguistic behavior. In T. Givón & B.F. Malle (eds.) The Evolution of Language out of Pre-Language, 215-229. Amsterdam: John Benjamins

[2] Fenk, A. & Fenk-Oczlon, G. (2007) Inference and reference in language evolution. In S. Vasniadou et al. (eds.) Proceedings of EuroCogSci07, 889. Hove: Lawrence Erlbaum Associates

[3] Griffiths T.L. et al. (2010) Probabilistic models of cognition: exploring representations and inductive biases. Trends in Cognitive Science 14, 357-364

[4] Giere, R.N. (1985) Constructive realism. In P.M. Churchland & C.A. Hooker (eds.) Images of Science, 75-98. Chicago: The University of Chicago Press

[5] Tenenbaum, J.B. et al. (2011) How to grow a mind: statistics, structure, and abstraction. Science 331, 1279-1285

[6] Buzsáki, G. (2006) Rhythms of the brain. Oxford: Oxford University Press

[7] Fenk, A. & Fenk, L.A. (2011) Wired for anticipation: an adaptive trait challenging philosophical justification? In C. Jaeger & W. Loeffler (eds.) Epistemology: Contexts, Values, Disagreement. Contributions of the 34th International Wittgenstein Symposium, 69-71. Kirchberg am Wechsel: The Austrian Ludwig Wittgenstein Society

[8] Saffran, J.R. (2001) The use of predictive dependencies in language learning. Journal of Memory and Language 44, 493-515

[9] Saffran, J.R. et al. (1996) Statistical learning by 8-month-old infants. Science 274, 1926-1928

[10] Fenk-Oczlon, G. & Fenk, A. (2009) Some parallels between language and music from a cognitive and evolutionary perspective. Musicae Scientiae, Special Issue 2009-2010 “Music and Evolution”, 201-226

[11] Noble, J. et al. (2010) From monkey alarm calls to human language: how simulations can fill the gap. Adaptive Behavior 18, 66-82

[12] Fenk, A. & Fenk-Oczlon, G. (2006) Within sentence distribution and retention of content words and function words. In P. Grzybek (ed.) Contributions to the Science of Text and Language, 157-170. Dordrecht: Springer

[13] Hickok G. et al. (2003) Auditory-motor interaction revealed by fMRI: Speech, music, and working memory in area Spt. Journal of Cognitive Neuroscience 15, 673-682

[14] Hickok G. & Poeppel D. (2004) Dorsal and ventral streams: a framework for understanding aspects of the functional anatomy of language. Cognition 92, 67-99

[15] Brunswik, E. (1957) Scope and aspects of the cognitive problem. In J. Bruner et al. (eds.) Contemporary approaches to cognition, 5-31. Cambridge: Harvard University Press

[16] Gregory, R.L. (1974) Concepts and mechanisms of perception. New York: Scribner

[17] Gigerenzer, G. & Murray, D.J. (1987) Cognition as intuitive statistics. Hillsdale, N.J.: Lawrence Erlbaum Associates

[18] Deacon, T.W. (2010) A role for relaxed selection in the evolution of the language capacity. PNAS 107, 9000-9006

[19] Poeppel, D. & Monahan, P.J. (2011) Feedforward and feedback in speech perception: Revisiting analysis by synthesis. Language and Cognitive Processes 26, 935-951

[20] Sohoglu E. et al. (2012) Predictive top-down integration of prior knowledge during speech perception. The Journal of Neuroscience 32, 8443-8453

Language evolution: from computing to speaking?

Antonio Benítez Burraco, University of Huelva (Spain), **Ana Mineiro and Alexandre Castro-Caldas,** Universidade Católica Portuguesa (Portugal).
antonio.benitez@dfesp.uhu.es

Our approach to language evolution is based on two different but related premises. On the one hand, we believe that the Faculty of Language is a system of computation (Chomsky, 1986) and that the problem of language evolution is to be satisfactorily tackled within the framework of the evolution of computational systems (Balari et al., 2011). We additionally believe that it is useful to classify computational systems according to the type of structures they are capable of generating (and ultimately, according to the amount of memory resources they demand) (Chomsky, 1956, 1959). Our second premise is, along the lines of Evo-Devo, that biological structures (and their activities), but not the diverse functions they contribute to (i.e., forms of behavior) are the only evolutionary *loci*. Since computation is the specific activity performed by certain neural structures, it is only computational systems, but not communication or symbolic behavior, that are natural classes subject to evolution. Together, these two assumptions lead us to argue that the evolution of language should be analyzed primarily in terms of the evolutionary modifications of the developmental systems responsible for the regulation of the growth and functioning of the neural substrate of the system(s) of computation involved in language processing. This change of focus can be particularly informative in relation to the long-lasting controversy around the evolutionary continuity or discontinuity of language, and ultimately, about its modular condition. Thus, a particular function (such as language) may be an evolutionary novelty (and eventually, a cognitive entity detachable from others in terms of performance), even though the biological structures that make it possible exhibit a significant degree of evolutionary continuity. The absence of a compelling link between structural and functional modules (that also holds at the brain/mind level [see Griffiths, 2007]) is a noteworthy outcome of Evo-Devo. Concerning language (evolution), it would imply that the computational system for language is to be functionally unspecific, as it can be (functionally) coupled to different input devices to produce diverse output. This possibility is been considered by recent neurolinguistic models (e.g. Poeppel and Embick 2005).

In our paper we will review Corballis' proposal (2002) on the role of gesture in language evolution in the light of this evolutionary scenario, but also of current knowledge about

the formal properties of sign languages and the nature and evolution of the neural substrate of language (oral or signed). We believe that Corballis' hypothesis is supported by the functional independence of the computational system of language, by the role in primates of some language areas (paradigmatically, Broca's area), and by the formal analysis of sign languages, which suggests that orality is not a prerequisite for language. However, our model also predicts that the (gestural) "languages" (or protolanguages) hypothetically employed by other extinct hominids would have been less structurally complex, since the complexity exhibited by natural languages is an acquisition of our species. Ultimately, the proposed change from a gestural "language" to an oral "language" would have certainly predated the emergence of modern (i.e computationally complex) language.

References:

Balari, S., Benítez-Burraco, A., Camps, M., Longa, V. M., Lorenzo, G. and Uriagereka, J. (2011) The archaeological record speaks: Bridging Anthropology and Linguistics". International Journal of Evolutionary Biology 2011: 382679

Chomsky, N. A. (1959) On certain formal properties of grammars. Information and Control 2: 137-167.

Chomsky, N. (1986) Knowledge of Language: Its Nature, Origin and Use. Nueva York: Prager.

Corballis, M. C. (2002) From Hand to Mouth. The Origins of Language. Princeton: Princeton University Press.

Griffiths, P. E. (2007) Evo-Devo meets the mind: towards a developmental evolutionary psychology, in Brandon, R. y Sansom, R. (eds.), Integrating Evolution and Development: From Theory to Practice, Cambridge: MIT Press, pp. 195-225.

Poeppel, D. and Embick, D. (2005) Defining the relation between linguistics and neuroscience, in Cutler, A.(ed.), Twenty-first Century Psycholinguistics: Four Cornerstones. Hillsdale: Lawrence Erlbaum, pp. 103–120.

September 10th, afternoon

Experimental Conversations: Sign Language Studies with Chimpanzees

Mary Lee Jensvold, Chimpanzee & Human Communication Institute, Central Washington University, USA.
jensvold@cwu.edu

Sign language studies of chimpanzees are a tool for studying the continuity between human behavior and the behavior of other animals and between verbal behavior and other intelligent behavior (Gardner, Gardner, & Van Cantfort, 1989). The chimpanzees Washoe, Moja, Tatu, Dar, and Loulis provide a unique opportunity for the continued study of conversational competence.

Gardner and Gardner (1969; 1989) cross-fostered the infant chimpanzees Washoe, Moja, Pili, Tatu, and Dar at the University of Nevada-Reno. Cross-fostering provided a detailed simulation of a human rearing environment for these infant chimpanzees. Caregivers integrated American Sign Language (ASL) into the procedure so that the chimpanzees were immersed in a sign language environment much like a human child is immersed in a speech environment. The cross-fosterlings' days were like a child's, filled with daily routines of meals, chores, activities, visits, and outings.

The cross-fosterlings paralleled children in their acquisition and use of signs and phrases. Both chimpanzees and children used immature forms of the signs, generalized the early meaning of the signs, and had similar content in their early vocabulary (Gardner & Gardner, 1978; Gardner, Gardner, & Nichols, 1989). The cross-fosterlings signed in different ways to different addressees. They also demonstrated the following: they combined signs; there was evidence of consistent word order within these utterances (Gardner & Gardner, 1971; 1978; 1994); they used the correct sentence constituent in replies to Wh- questions (Gardner & Gardner, 1975; Van Cantfort, Gardner, & Gardner, 1989); they used negation; they inflected signs in questions and the expression of person, place, and instrument (Gardner & Gardner, 1978; Rimpau, Gardner, & Gardner, 1989); and they were observed to sign to humans, to each other, and to themselves (Gardner & Gardner, 1974; 1978). The chimpanzees used phrase patterns that were similar to those of children, and the growth of phrase patterns paralleled that in children as well (Gardner & Gardner, 1994). These discoveries occurred under rigorous and systematic record keeping and experimental paradigms. Comparable conditions allowed valid comparisons between the chimpanzees and children.

When Washoe was about 14 years old at the Institute of Primate Studies she adopted a 10-month-old son, Loulis. To determine whether Washoe would teach signs to an infant without human intervention, all human signing was prohibited when Loulis was present. In the 5-year period of signing restriction Loulis learned 51 signs (Fouts, Hirsch, & Fouts, 1982; Fouts, Fouts, & Van Cantfort, 1989). Like the cross-fostered chimpanzees, the growth pattern of Loulis' phrases paralleled that of human children (Fouts, Jensvold, & Fouts, 2002). Tatu, Dar, and Loulis currently reside at the Chimpanzee and Human Communication Institute (CHCI) at Central Washington University in Ellensburg, preceded in death by Moja in 2002 and Washoe in 2007. At CHCI like in Reno, ASL is used in all interactions between caregivers and the chimpanzees. Into this continual stream of signed interactions systematic experiments explore conversational behavior in the chimpanzees.

Interlocutors can inadvertently lead subjects to correct or incorrect responses as the horse Clever Hans famously demonstrated (Gardner, Scheel, & Shaw, 2011, for review). Controls for cueing are essential in tests of language and intelligence. In systematic experiments the cross-fostered chimpanzees correctly named slides to blind experimenters (Gardner & Gardner, 1984). At CHCI a remote videotape procedure recorded behaviors of the chimpanzees with no humans present. On these videotapes there are numerous instances of the chimpanzees signing to each other (Fouts, 1994), to themselves (Bodamer, Fouts, Fouts, & Jensvold, 1994), and in imaginary play (Jensvold & Fouts, 1993). This procedure makes it impossible for humans to cue the chimpanzees' behavior. This control is often neglected in studies of children and chimpanzees (e.g. Hermann, Call, Hernandes-Lloreda, Hare, & Tomasello, 2007).

In human conversations, conversational competence is demonstrated in a variety of ways including initiation of conversation, topic introduction and maintenance, turn taking, responses to questions, conversational repair, and changes in conversational register. Several studies explored these skills in the adult signing chimpanzees.

In typical interactions caregivers of human children frequently ask questions; often questions with known answers such as "What's your name?" or pragmatic devices such as "What?" Systematic questions during natural conversations are a way to examine pragmatic skill both in chimpanzees and children. For example an interlocutor responded to the chimpanzees with one of four types of probes: General questions, On Topic questions, Off Topic questions, or Negative statements (Jensvold & Gardner, 2000). When the interlocutor asked General questions, the chimpanzees frequently expanded across turns showing a persistence in their original topic and giving the interlocutor more information. When the interlocutor asked relevant On Topic questions, the chimpanzees responded with many incorporations and expansions which are indicators of topic maintenance. When the interlocutor asked Off Topic questions, the

chimpanzees often failed to respond and when they did respond they used few incorporations and expansions. When the interlocutor replied with negative statements, Washoe and Dar often did not respond.

Interlocutor responses are another type of independent variable. Following the chimpanzee's request, a human interlocutor either: (1) complied with the request, (2) provided an unrequested item or activity, (3) refused to comply or (4) did not respond to the request. When requests were satisfied, the chimpanzees most often ceased signing. However, when their requests were misunderstood, refused or not acknowledged, the chimpanzees repeated and revised their original utterances (Leitten, Jensvold, Fouts, & Wallin, 2012).

In similar procedures the chimpanzees initiated conversation using sounds when the interlocutor was oriented away from them and signs when he turned towards them (Bodamer & Gardner, 2002). The chimpanzees signed less to strangers and non-signers than to familiars and signers showing sensitivity to the interlocutor (Hartel, Jensvold, Fouts, & Fouts, 2007)

The tradition in theoretical linguistics is to examine syntax and semantics using a top down approach. Yet successful face-to-face interactions involve the orchestration of pragmatics and context as well as syntax and semantics. More recent research in human adults and children explores pragmatic and contextual appropriateness in the stream of conversation (Abbeduto & Hesketh, 1997; Capps, Kehres, & Sigman, 1998; Ferguson, 1998; Galski, Tompkins, & Johnston, 1998; Ripich, Carpenter, & Ziol, 2000; Duncan, 2000; Godfrey, Hamish, & Shum, 2000). Other studies of ape language research (Premack, 1971; Savage-Rumbaugh, 1984) use artificial languages, which reduces the ability to explore language behaviors in their naturally occurring social context. Chimpanzees always have their hands, but they may not have their language board.

The hallmark of the sign language studies is that caregivers treat the chimpanzees as conversational partners rather than hairy test tubes bribed or forced into participation. The chimpanzees are always free to leave the testing situation and free to respond to their world with their full repertoire of behaviors; these are often the dependent variables. Interlocutors nearly always double as caregiving friends to the chimpanzees. The tests are then embedded into the rich daily interactions that occur between two friends. No rigor is lost and an understanding of the remarkable similarities between human and chimpanzee behaviors is gained.

The Bonobo Project in Planckendael (Belgium): 25 years of captive breeding - 20 years of research

Jeroen Stevens, The Royal Zoological Society of Antwerp, Belgium.
Jeroen.Stevens@kmda.org

The Royal Zoological Society of Antwerp (RZSA) has strong historical links with the bonobo. In 1987 European Zoos decided to form a breeding program for bonobos, under coordination of the RSZA. At the time 6 zoos in Europe kept 36 bonobos. As of 2012, 10 zoos in Europe are keeping 97 bonobos, 85 of which were born in zoos. The aim of the breeding program is to provide a genetically healthy and sustainable captive population that will maintain the current genetic diversity for the next 200 years. There are no immediate reintroduction plans for these bonobos, and the apes primarily serve as a ambassadors for their species, as a back-up population in case the wild population would ever get extinct, and last but not least they offer opportunity to study the behaviour of these elusive primates. Indeed, much of what we know today about bonobos stems from studies done in zoos.

In 1992 the RZSA opened a new exhibit for bonobos in Planckendael Wild Animal Park, including a 80m² indoor room, five separation enclosures and a 3000m² outdoor island. From the beginning, the possibility to do research was an important goal of this enclosure. Following the example of Arnhem Zoo, a special observation room was built, allowing researchers and students to do behavioural observations on the inside and outside enclosure of the bonobos. In the past 20 years, many anthropologists, psychologists, and mainly behavioural biologists have come from Belgian and foreign universities to study various aspects of bonobos. Research has always been non-invasive and has included studies into functional morphology and locomotion as well as various cognitive topics. But most studies have focussed on observations of the bonobos' social strategies, including male and female reproductive strategies, dominance relations and coalitions, reconciliation, maternal behaviour and communication. Whenever possible we used a multidisciplinary approach, combining behavioural data with non-invasive collection of urine, faeces and saliva samples. Rooted in the firm ethological tradition of Antwerp University, the bonobo project has always attempted to combine proximate and ultimate research approaches. Proximate research questions have led to the development of non-invasive measuring of female reproductive hormones which can be used in field conditions. We also looked into stress hormones and testosterone and how they relate to bonobo behaviour. More recently, research has focussed to intraspecific differences in receptor genes for neuropeptides as oxytocin and vasopressin as proximate causes for intraspecific differences in behaviour. On an ultimate level we have studied how different behavioural tactics can influence reproductive outcomes such as mating success

among the males, or how bonobo maternal styles can differ from those of chimpanzees. Students try to combine observations at Planckendael with those of other groups in European Zoos. The picture that emerged is one of behavioural flexibility and diversity, where bonobos do not always match their reputation of peaceful and egalitarian apes.

The results of these and other studies have increased our understanding of bonobos, but also have been applied in the breeding program, where input about behavioural strategies can help to make management decisions about transferring animals to different institutions. While bonobos should not be used as a referential model for human evolution, understanding the differences and similarities between chimpanzees, bonobos and humans can shed light on the evolution of human behaviour. Caution should be undertaken to interpret behaviour of small groups of bonobos as typical for the species, as behaviour can vary across context and time. After twenty years, the Bonobo Project in Planckendael is not finished. We are planning an expansion of the current bonobo facility, and will again integrate more experimental social cognitive paradigms into our research.

How Primate Mothers and Infants Communicate. Characterizing Interaction in Mother-Infant Studies

Maria Botero, Sam Houston State University, USA.
mboteroj@gmail.com

All methodologies used to characterize mother-infant interaction in non-human primates includes mother, infant, and other social factors. The chief difference is their understanding of how this interaction takes place; that is, each methodology selects certain elements of this interaction as relevant. Within each methodological design, researchers explicitly or implicitly answer several questions. First, what is interaction and which is the best way to describe the interaction among these units and second what, if any, are the mental contents of the individuals interacting. As a result, some researchers use a model that leads them to answer a specific set of questions meanwhile researchers using other models cannot answer these particular questions or are unable to offer a description textured enough to include all details of the interaction being observed. I will show how two of the main presuppositions of mother-infant studies is the nature of communication and mind and discuss how these affect the studies of mother-infant interaction. The first model I will examine is what I call the *Ecological-Linear* approach and offer as an example one of the most influential methodologies available to study mother and infant interaction, namely that designed by Jeanne Altmann (1974). Researchers who adopt this approach do not use mental

states (e.g. intentionality, beliefs, desires etc.) to explain the interaction between these units. They limit themselves to observable behaviors (e.g. contact, proximity) that take place between these basic units. They also place special emphasis on who initiates the behavior and who receives it; thus, they characterize the interaction between these units as a communicative one. As an alternative approach to communication I will analyze a model that has been used in the human mother-infant interaction based on Dynamic Systems Theory (DST) (Fogel 1993; Messinger et al. 1997; Thelen & Smith 1994). In this model the focus is on understanding the pattern that elements create when forming a system. In this understanding, a system cannot be reduced to its individual elements; because of the interaction of elements, new properties emerge which define and constrict future interactions. I will compare how these different models can be used to analyze studies of mother-infant interaction. In particular, I will focus on what are the advantages and limitations of applying each model in the design of a study that examines the effects that different kinds of mother-infant interaction may have on the anxiety levels and social interactions of two orphan and four mother-reared adolescent chimpanzees (*Pan troglodytesschweinfurthii*) in the Kasekela community at Gombe National Park, Tanzania (Botero et. al, under review).

References:

Altmann, J. (1974). Observational study of behaviour: Sampling methods. Behaviour, 49, 227-267.

Botero, M., MacDonald, S., & Miller, R. under review. Anxiety-related Behavior of Orphan Chimpanzees (*Pan troglodytes schweinfurthii*) at Gombe National Park, Tanzania.

Fogel, A. (1993). Developing through relationships; origins of communication, self, and culture. Chicago: The University of Chicago Press.

Messinger, D. S., Fogel, A., & Dickson, L. (1997). A dynamic systems approach to infant facial action. In The psychology of facial expressions. eds J. A. Russell, and J. M. Fernandez-Dols, 205-226. Cambridge: Cambridge University Press.

Thelen, E. & Smith, L. (1994). A dynamic systems approach to the development of cognition and action. Cambridge: The MIT Press.

Re-evaluating Great Ape Vocal Signals from the Ground Up

Adam See, Department of Philosophy, CUNY Graduate Center, Canada.
adam.see3@gmail.com

It has long been recognized that great apes possess remarkable gestural modality. While the vast majority of non-human communicative acts are inextricably bound up with specific emotions, contexts, and environmental cues, the past thirty years of work in primatology have provided suggestive evidence that certain “attention-getting”

gestures of both wild and captive apes are produced voluntarily and with great circumstantial flexibility. Further, certain ape gestures appear to be produced "dyadically," i.e., with sensitivity to the attentional state of the recipient. Liebal et al. (2004) found that, when gesturing to both humans and conspecifics, apes will reliably exercise the following process: attempt one gesture, monitor the receiver's response, and if necessary, walk around the receiver and repeat the gesture or try a different one. As Tomasello (2008: 30) notes, "This shows persistence to a goal with adjusted means as necessary—the prototype of intentional action." Ape gestures are therefore highly significant to discussions about animal minds and the evolution of human communication. According to Tomasello, "attention to the attention of the other during communication is unprecedented in nonprimate, and maybe even non-ape, communication" (33).

It is because of this fact that Tomasello (2008) draws a "sharp contrast" between the attention-getting gestures of great apes (which he calls "intentional signals") and the mere "communicative displays" that encompass all other acts of animal communication. Tomasello's view is that there is no functional difference between deer horns, peacock tails, bee dances, teeth-bearing, and, salient to this paper, all animal *vocalizations* including those of non-human primates, song birds, and cetacean species such as whales and dolphins. Tomasello's claim that ape gestures are an "evolutionary novelty" is therefore a very strong one. It is also, perhaps surprisingly, not very contentious in the modern literature. The view that animal vocalizations are, for the most part, unlearnable, inflexibly tied to emotions, involuntarily produced, genetically predetermined, and broadcast indiscriminately, is in fact widely accepted.

There are, however, studies as recent as this year that support a contrary position on the communicative potential of ape vocalizations, namely that they can be socially learned, produced voluntarily, and, most importantly, produced dyadically. In response to Tomasello's view, this paper attempts to construct a bottom-up account of intentional vocal signals in great apes, thereby suggesting that ape gestures are not in fact an evolutionary novelty. In short, gestures do not appear to have a monopoly on intentional communication in non-human primates. If this claim can be substantiated, Tomasello's argument that the origins of human communication emerged from primate gestures may demand revision.

Since Tomasello (2008) is not explicit about the criteria he uses to distinguish "communicative displays" from "intentional signals," I begin by deriving three general criteria from his argument. Each of which, I propose, builds upon the previous one in terms of cognitive demand and as a result appear to become rarer and rarer in the animal kingdom. These are: social learning, contextual flexibility, and attention-to-the-attention of the receiver. I then provide suggestive evidence that great apes may be

capable of vocalizations that meet all of these criteria and thus should, by Tomasello's own account, be classified as intentional signals that differ significantly from common vocal displays. It is imperative to note that my argument here is not that ape vocal signals are as flexible or as evolutionarily significant as ape gestures, but rather that Tomasello's arguments against their communicative potential are unjustified. To this end, I conclude by suggesting that the most critical issue faced by arguments in favor of intentionality in primate vocalizations applies equally to claims apropos primate gestures. In brief, Tomasello's view on gestural intentionality is largely contingent upon his position on the highly contentious debate over theory of mind in great apes. If one doubts that great apes have a theory of mind, one must also doubt that their attention-getting gestures are truly intentional in the sense Tomasello intends.

The fact that primatologists and philosophers refer to these gestures and vocalizations as "attention-getting" is in a sense functionally accurate, but the mere function of a behavior does not allow one to distinguish its underlying and/or accompanying cognitive processes. I am suggesting that if apes do possess a theory of mind—and there is strong evidence in favor of this—then, when combined with the fact they can use vocalizations in ways functionally equivalent to gestures, there is no salient reason to doubt that a theory of mind is operating in these circumstances as well. By Tomasello's own criterion, great apes have been observed to use vocalizations that may justifiably be referred to as "intentional signals."

Refining Folk Psychology

Shoji Nagataki, Chukyo University, Japan.
nagataki@lets.chukyo-u.ac.jp

We take it for granted that we understand, in some way or other, others' minds. On the face of it, we can make clear others' intention, thought, feelings, dispositions to the extent necessary to ensure our smooth communication. This practice seems to be just an everyday experience we have, and indubitable unless people with some pathological conditions are concerned. The ability of attributing certain mental categories, such as belief and desire, to others --- or even to ourselves --- is sometimes called "folk psychology."

The status of the concepts employed by folk psychology is, however, highly controversial; some argue that they play an essential role in understanding our mental states and behavior, while others say that they will be explained away by and replaced with scientific notions which cognitive science allegedly promises to offer. Also

contentious is the debate on how folk psychology works. Several theories have been put forth to elucidate it.

The aims of the present paper is, firstly, to highlight a phenomenological point of view on folk psychology. We will do this against the background of two contrasting conceptions, i.e. theory-theory and simulation theory. The second aim is show that we are equipped with keen senses to characteristic dispositions of others, as well as their present emotions, and that those senses can be trained empirically. In order to do this, we will try to find some clues in an experimental study in which experienced occupational therapists are asked to judge the mental states and personalities of others only by their bodily behavior. The experiment suggests that the skills of those experienced in that field typically include an impressive and distinctive ability to judge them. We will examine how this ability works in the practice of occupational therapy. And finally, we will discuss philosophical implications of bodily behavior in understanding others.

[September 11th, morning]

Archetypes, prototypes and variation in facial expression: lessons learned from actually measuring facial behavior

Augusta Gaspar, Centre for Psychological research and Intervention (CIS), Higher Institute of Business and Labor Sciences, Lisbon Interuniversity Institute (IUL), Portugal. augusta.gaspar@iscte.pt

Behavior evolves as do other traits (Lorenz, 1967/1986), and it can also have great impact on evolution (Bateson 2004). It tends to be conservative when survival and fast response is at stake, so we can find similar patterns across species, typical in their form and intensity, often also typical in context and consequence. Fixated stereotyped patterns are archetypes known as displays, and their phylogenies can virtually be traced. Darwin's (1872/1965) seminal work "The expression of Emotions in Man and Animals") launched the notion that expressive movements had undergone evolutionary processes and that one could identify some archetypes of expression across species. But behavior tends to change more rapidly and to exert greater influence on evolution when it is responding to demands of the social environment (Bateson, 2004).

Later, beginning in the 1960s – 70s, the subject of the evolution of facial expressions was picked up again with great interest in the evolutionary trends of primate facial expression (e.g. Andrew, 1963; Chevalier – Skolnikoff 1982; Preuschoft, 1992; Van Hooff, 1960; 1962; 1967) and particularly that of chimpanzees (Gaspar, 2001; Goodall 1986; Parr et al. 2005; Pollick and de Waal 2007; Van Hooff, 1972) which was thus conceived as comprised of archetypal facial displays. In line with that of other primates, the study of the phylogeny of at least some human facial expressions (displays) was seen as feasible, and the candidate expressions were emotion related configurations proposed as universal both in form and interpretation (Ekman et al. 1969). But instead of exploratory, descriptive studies of human facial expression, in the study of humans another paradigm blossomed — the cross – cultural study of the recognition of facial expressions. The outcome of that work, lead by psychologist Paul Ekman, was that over the years the association between that small number of facial action configurations and seven emotions gained great support, and the configurations (prototypes) became known as the human universal facial expressions of emotion (Ekman, 1984; 1999).

This universality became a quasi-dogma in Psychology. However, in recent years, the discrete nature of those facial expression prototypes-emotions dual associations has received considerable criticism (e.g. Russel & Fernandez-Dolls, 1997). The criticism is largely based on two grounds: the nature of emotion (e.g. Russel, 2006) and the

outcomes of studies that used different methods of those underpinning the emotion expression prototypes (e.g. Carrol & Russel, 1996; Widen & Russel, 2008). Indeed, many lines of research - behavioral, physiological, neurochemical - have accumulated evidence that emotional phenomena are not discrete and there is no clear-cut line between one emotion and the other, supporting alternative dimensional views of emotion, which detach arousal and valence as the most salient vectors (Grammer and Oberzaucher, 2006; Lang et al, 1998; Russel, 1980)

Emotion – induction experiments that measured human emotional behavior and ground up approaches, studying behavior that occurs naturally, including in highly emotional situations, both with human children and adults, failed to provide support to the most part of the discrete universal collection of facial expression prototypes (e.g. Camras, 1992; Gaspar & Esteves, 2012; Fernandez – Dols and Ruiz – Belda, 1997; Rosenstein & Oster, 1997; Oster, 2005).

Furthermore, formal variation in facial expression, including during emotion events, emerges in behavior studies more as the rule, rather than the exception (Gaspar, 2006). Chimpanzees and bonobos are highly expressive, and certainly not less than humans (Gaspar, 2001; Bard, Gaspar & Vick, 2011); stereotyped displays are but a few (Gaspar 2001; Parr et al., 2005). Human children show a variety of facial configurations in emotional situations and only when experiencing joy is their facial expression predictable (Gaspar & Esteves, 2012 in press). Freed from dogma, we can begin to ask questions and understand why variation in expressive behavior, and in particular facial expression, makes sense in an evolutionary perspective, in the shape of group differences and in the shape of and individual idiosyncrasy (Bard, Gaspar & Vick, 2011). Prototypical archetypal expression still occurs of course — there is laughter, more than one spontaneous type of smile, there is cry, there are anger faces, disgust faces and so on — but their meaning is also more complex than once though.

The Homology Of Face Recogntion Systems In Human And Non-Human Primates

Claudia Lorena García, Universidad Nacional Autónoma de México, Mexico.
clga1305@gmail.com

Most cognitive scientists accept the idea that *at least some* of the cognitive capacities of cognitively complex animals evolved in the same way in which many of their morphological traits did. If this is right, then the questions immediately arise concerning

how these capacities evolved—whether some of them arose *de novo*, others evolved independently in two or more different lineages, while others were inherited with modifications from a common ancestor. These are some of the questions related to the concept homology of cognitive systems. However, to be in a position to answer these questions, we need a concept of functional homology that is both adequate and empirically grounded, since cognitive systems are usually understood as *functional systems* of some sort. I will sketchily present my proposal of a concept of functional homology; I also present my proposed criteria for the empirical application of this concept— proposals that I already defended in some detail somewhere else (García 2010). Finally, I will schematically show how my proposal can be applied to the particular case of the face recognition systems in human and some non human primates.

The ultimate and proximate causes of contagious yawning. The effect of ontogeny and emotional closeness on low-level imitation in humans, chimpanzees, dogs and wolves

Elainie Alenkær Madsen, Department of Semiotics, Lund University, Sweden.
Elainie.Madsen@gmail.com

Contagious yawning is a well-documented phenomenon in humans and has recently attracted much attention from developmental and comparative sciences. Contagious yawning has been demonstrated in dogs and several non-human primate species, and been theoretically and empirically associated with empathy in adult humans and non-human primates (e.g. Platek et al. 2003; Campbell & de Waal 2011; Norscia & Palagi 2011). Moreover, humans show a developmental increase in susceptibility to yawn contagion, with typically developing children displaying a substantial increase at the age of four, when a host of cognitive abilities (e.g. accurate identification of others' emotions and false-belief understanding) begin to clearly manifest (Anderson & Meno, 2003; Helt et al., 2010; Millen & Anderson, 2011). Explicit tests of the contagion in non-human animals have, however, thus far only involved adult individuals.

The ultimate and proximate causes of contagious yawning remain largely unclear. Recent attempts to elucidate the underlying mechanisms of the phenomenon have clustered into three broad categories, linking contagious yawning to varying degrees of cognitive complexity, and presented it as representing e.g. (1) a fixed action pattern (Provine, 1986), (2) an emotional contagion, reflecting nonconscious mimicry (Yoon & Tennie, 2010) and the development of *affective* empathy (visceral *emotional* reactions to others' experiences), or (3) as sharing a phylogenetic and ontogenetic basis with

cognitive empathy, self-awareness, perspective-taking and theory-of-mind reasoning (Platek et al., 2003).

In this talk, I evaluate the phenomenon in the light of 'Tinbergens's Four Why's', with reference to recent studies conducted by my research group on the presence and ontogenetic emergence of yawn contagion in children, chimpanzees, dogs and wolves, and the potentially modulating effect of emotional closeness with the individual perceived to yawn. The results of these studies suggest that humans are not unique in being subject to a developmental increase in susceptibility to yawn contagion, and that the ontogenetic emergence of contagious yawning reflects developmental processes shared by humans and other animals. I discuss these issues in the light of the 'social domestication hypothesis' (Hare et al., 2002), and suggest that the presence of contagious yawning in young non-human animals may help adjudicate between *cognitive* (2) and *affective* (3) empathy as a potential mechanism underlying cross-species contagious yawning. There is considerable evidence that the *affective* and *cognitive* components of empathy have different developmental trajectories in humans (Decety, 2010), and that affective empathy precedes cognitive empathy, ontogenetically and phylogenetically (Preston & de Waal, 2002). It seems possible that nonconscious mimicry and the development of affective empathy (as well as an increase in attention to and identification of others' physical/emotional states) is sufficient to explain the distribution of yawn contagion, ontogenetically as well as phylogenetically.

References:

Anderson JR, Meno P (2003) Psychological influences on yawning in children. Curr Psychol Lett 11(2).

Campbell MW, de Waal FBM (2011) Ingroup-Outgroup bias in contagious yawning by chimpanzees supports link to empathy. PLoS ONE 6(4), e18283.

Decety J (2010) The neurodevelopment of empathy in humans. Dev Neurosci 32(4):257-267.

Hare B, Brown M, Williamson C, Tomasello M (2002) The domestication of social cognition in dogs. Science 298(5598):1634-1636.

Helt MS, Eigsti IM, Snyder PJ, Fein DA (2010) Contagious yawning in autistic and typical development. Child Dev 81(5):1620-1631.

Millen A, Anderson JR (2011) Neither infants nor toddlers catch yawns from their mothers. Biol Lett 7(3):440-442.

Norscia I, Palagi E (2011) Yawn Contagion and Empathy in Homo sapiens. PloS ONE 6(12):e28472.

Platek SM, Critton SR, Myers TE, Gallup GG (2003) Contagious yawning: the role of self-awareness and mental state attribution. Cogn Brain Res 17(2):223-237.

Preston SD, de Waal FBM (2002) Empathy: Its ultimate and proximate bases. BBS 25, 1-72.

Provine RR (1986) Yawning as a stereotyped action pattern and releasing stimulus. Ethology 72:109-122.

Senju A (2010) Developmental and comparative perspectives of contagious yawning. Front Neurol Neurosci 28:113-119.

Yoon J, Tennie C (2010) Contagious yawning: a reflection of empathy, mimicry, or contagion? Anim Behav 79:e1-e3.

September 11th, afternoon

Comparative Gestural Signaling: A new approach to a very old question

Simone Pika, Humboldt Research Group "Comparative Gestural Signalling", Max Planck Institute for Ornithology, Eberhard-Gwinner-Strasse, Seewiesen, Germany. spika@orn.mpg.de

Extensive research has shown that human language, especially manifest in speech and gesture, has evolved for living and exchanging information in cultural groups (Christiansen & Kirby, 2003). This sophisticated ability, without precedent elsewhere in the biological world, has often been used to define what it means to 'be human' (Hauser et al., 2002). Children begin to display nascent forms of communicative skills such as pre-linguistic gestures at around their first birthday (Bates et al., 1979). It has been suggested that this brief period in human ontogeny may reflect two critical moments in the phylogenetic emergence of human communication: (1) the onset of communicative intentions and conventional signals, and (2) the emergence of symbols and the discovery that things have names (Bates et al., 1979).

A long line of scholars have advanced the hypothesis that meanings may originally have been encoded gesturally rather than vocally (e.g., Hewes, 1973; Tomasello, 2008). However, although it has been shown that other basic communicative skills such as vocalizations, looking and smiling show only minimal cultural variation (Keller et al., 1988), systematic cross-cultural studies on pre-linguistic gestures are non-existent (e.g., Keller & Schölmerich, 1987). In addition, scholars interested in language evolution have often ignored comparative data altogether or focused narrowly on data of captive non-human primates only (e.g., Tomasello & Camaioni, 1997; Hauser et al., 2002). Recent archaeological evidence however suggests, that early hominins and extant apes are remarkably divergent in many anatomical features (e.g., dentition, feet, Lovejoy, 2009). To reconstruct the changes that paved the way for language to evolve, we thus have to

view the likely adaptations of early hominins generally rather than with specific reference to living chimpanzees only (Lovejoy, 2009).

By combining methods of Comparative Psychology and Ethology and by focusing on gestural complexity in three model systems: (i) different human cultures, (ii) closely related species, and (iii) species living in comparable social systems, I therefore aim to offer a new and highly innovative approach to language origins, advancing our understanding of the relationship between phylogenetic and ontogenetic factors.

Towards a Clearer View of the Development and Evolution of the Capacity for Joint Attention

Tim Racine, Department of Psychology, Simon Fraser University, Canada. tracine@sfu.ca

It has proven difficult to find unanimous or unambiguous answers to the question of whether nonhuman primates or even young human infants understand basic psychological states such as attention and intentions. It is common for psychologists to cast debates about these issues in terms of rich and lean interpretations of the meaning of joint attentional behaviours, such as pointing gestures. From a rich perspective, similarities and dissimilarities in the production of and response to pointing gestures between apes and human infants are taken to be best explained by particular psychological mechanisms that are argued to be present in prelinguistic humans but mostly absent in non-linguistic apes. Accordingly, rich views defend the attribution of concepts such as 'shared intentionality' to 12-month-old human infants, but deny their application to nonhuman primates. On the other hand, lean views tend to explain pointing with basic learning mechanisms, and often claim considerable continuity across species. In parallel form, rich views typically argue that the capacity for joint attention was selected in the Pleistocene, whereas lean views often claim that joint attentional capacities existed before the chimpanzee-human divergence some 5 million years ago.

Although various research findings have been used to argue for and against rich and lean interpretations of the meaning of joint attentional behaviours, a problem is that the entire reason for the rich-lean dichotomy is that highly similar or even identical forms of behaviour can be given a rich or a lean interpretation. Thus, presenting more data that can also be interpreted richly and leanly cannot in and of itself resolve this debate for the field.

Furthermore, the rich-lean contrast seems to draw its force from a cognitivist theory of mind that is becoming increasingly difficult to reconcile with the 4EA (embodied-embedded-enactive-extended affective) approach that has been gaining traction in some areas of cognitive science in the past decade. Rich-lean innatist claims and their adaptational underpinnings also seem quite out of step with the epigenetic, evo-devo and cultural revolutions and have also recently impacted on evolutionary theory.

Although these changes in the theoretical landscape may breathe new life into the rich and lean debate, and perhaps researchers will even stop defending rich and lean interpretations, the risk is that the conceptual confusions concealed in the rich-lean dichotomy will live on. It is therefore these confusions that I focus on in the presentation. My general claim is that the rich-lean debate in this research area and similar ones continues because rich and lean theorists pay insufficient attention to definitional issues. I will argue that as a consequence: (a) many of these researchers do not seem to fully grasp the conceptual intricacies of attributing an understanding of psychological capacities like attention or intention to nonlinguistic or prelinguistic agents, (b) there is fairly consistent conflation of empirical and conceptual issues, which obscures the grounds for the attribution of the concepts in question, and (c) rich and lean theorists tend to unjustifiably separate out and in some cases reify mind and behaviour thereby rendering their claims not actually amenable to empirical analysis in the first instance.

As a simple example of seeming empirical-conceptual conflation, Tomasello and colleagues (2007) defended a rich view of human infant pointing and have continued to argue for a similar interpretation in a variety of theoretical papers and empirical articles. In essence, the claim is that so-called protoimperative pointing to request objects or actions is caused in apes by reinforcement ("ontogenetic ritualization"), whereas non-instrumental or so-called protodeclarative pointing is caused in humans by an innate motivation to share intentional states with conspecifics. However, although protoimperative pointing in apes is claimed to not show an understanding of shared intentions, human protoimperative pointing does or at least might show such an understanding in the case of so-called indirect protoimperative. However, both of these forms of pointing qualify as joint attention in the sense historically used in the field to index an agent sharing attention with another (Bates et al., 1975; Leavens & Racine, 2009). That is, joint attention means to point (imperatively or declaratively) in the right sort of situation and when we say an agent understands the attention or intention of others, we use things like pointing to justify the claim. Therefore, although it may well be that protoimperatives and protodeclaratives have different causes, unless we are modifying the concept 'joint attention', these forms of pointing do not have different meanings and there is no justification for saying that humans understand joint attention and apes do not. This reframes the rich-lean debate as a debate concerning the causal mechanisms that are taken to be responsible for joint attentional behaviour.

Further fuelling the rich-lean debate is the belief that, as Gómez (2007) has aptly summarized, "In a rich view, this is evidence that infants are trying to make others orient mentally, rather than behaviourally, to targets they themselves have in mind." Although this remark was not offered up as a diagnosis of the conceptual problem in this debate, this way of framing the issue destroys the conceptual relation between intentions and intended actions. In a leaner moment, Gómez suggests, "However, infants may just be directing the adult's attention to the place where something interesting may happen or where something interesting lies hidden." However, if pointing means that agents understand attention, then agents who point understand attention. The misconception in both camps seems to be that understanding is taken to be some sort of mental action, but understanding is more like an ability that one shows through one's behaviour rather than some internal state that causes one's behaviour. Furthermore, mental actions are not involved in all acts of understanding, whereas the behavioural grounds (including avowals of understanding) are always involved thereby establishing the needed conceptual relation. Although one can be incorrect when attributing understanding to an agent on behavioural grounds, one can never be correct (or incorrect) if one always attributes to an agent who understands a given psychological concept an identical mental action.

Are apes' responses to pointing gestures intentional?

Olivia Sultanescu, Kristin Andrews, York University, Canada.
osultane@yorku.ca

It has become increasingly uncontroversial to claim that creatures capable of having intentional states (i.e. states that present the world as being in a certain way) are not essentially linguistic. But if language is not the criterion for intentionality, a new criterion is required. It has been suggested that what is essential to intentional states is *normativity*, insofar as any mental state with content has conditions of correctness. Following the work of Hannah Ginsborg, we defend the claim that a minimal notion of normativity, understood as a kind of primitive attitude that a creature has towards her own responses, serves as a criterion for separating intentional creatures from non-intentional ones.The focus on normativity leads us to challenge a number of proposals as to how to analyze great ape gestural communication. For example, we argue against Povinelli et al. (1999)'s view that the question of understanding seeing is a question of "low-level" behavioristic methods vs. "high-level" mindreading mechanisms.

After having defended the claim that a gesture can be viewed as intentional if it is normative according to the account of normativity that we develop, we aim to determine

whether what we currently know about gestural communication in apes is sufficient to conclude that they are capable of understanding the referential nature of pointing. We further examine the literature on the development of pointing behavior and comprehension in humans, and we argue that the responses of preschool children to pointing are normative. Pointing seems to be a powerful gesture that can interfere with children's abilities to understand that seeing leads to knowing as well as with their early mindreading capacities (Palmquist 2012). Both the production and the comprehension of pointing appear to count as evidence for our claim, insofar as children find it difficult to understand false points as well as to produce false points (Carlson, Moses, & Hix, 1998; Russell, Mauthner, Sharpe, & Tidswell, 1991; Sodian, 1991). The data on humans also suggests a dissociation between understanding pointing and mindreading. Furthermore, we examine the empirical literature on great apes in this context, and we argue that there are reasons to think that apes may also meet the conditions required to count their responses to pointing gestures as normative. In particular, we examine the evidence provided by Rudolf von Rohr et al. (2012), according to which chimpanzee societies demonstrate what they consider to be evolutionary precursors to social norms. As such, we develop an approach to the empirical findings on gestural communication in great apes that is fundamentally different from Tomasello's (2008).

Given that the normativity requirement draws upon qualitative differences in responses to stimuli, the way in which great apes react to pointing gestures is a phenomenon that deserves extensive attention. We conclude that qualitative analysis should play a greater role in the methodology of empirical research on gestures. In order to shed more light upon the intentional nature of the responses of certain non-linguistic creatures, we need the right kind of empirical evidence as well as the right kind of conceptual analysis.

References:

Carlson, Stephanie M., Louis J. Moses, and Hollie R. Hix. "The Role of Inhibitory Processes in Young Children's Difficulties with Deception and False Belief." Child Development 69, no. 3 (September 15, 2008): 672–691.

Ginsborg, H. "Primitive Normativity and Skepticism About Rules." Journal of Philosophy 108, no. 5 (2011): 227-254.

Ginsborg, Hannah. "Inside and Outside Language: Stroud's Nonreductionism About Meaning." In The Possibility of Philosophical Understanding: Reflections on the Thought of Barry Stroud, 147-181, 2011.

Palmquist, C. M., H. E. Burns, and V. K. Jaswal. "Pointing Disrupts Preschoolers' Ability to Discriminate Between Knowledgeable and Ignorant Informants." Cognitive Development (2011).

Povinelli, Daniel J., Donna T. Bierschwale, and Claude G. Cech. “Comprehension of Seeing as a Referential Act in Young Children, but Not Juvenile Chimpanzees.” British Journal of Developmental Psychology 17, no. 1 (March 1999): 37–60.

Rudolf von Rohr, C., J. M. Burkart, and C. P. van Schaik. “Evolutionary Precursors of Social Norms in Chimpanzees: a New Approach.” Biology and Philosophy 26, no. 1 (2011): 1–30.

Russell, J., N. Mauthner, S. Sharpe, and T. Tidswell. “The ‘windows Task’as a Measure of Strategic Deception in Preschoolers and Autistic Subjects.” British Journal of Developmental Psychology 9, no. 2 (1991): 331–349.

Sodian, B. “The Development of Deception in Young Children.” British Journal of Developmental Psychology 9, no. 1 (1991): 173–188.

Tomasello, Michael. Origins of Human Communication. The MIT Press, 2008

Gestures and gestures in child language development

Tove Gerholm, Stockholm University, Sweden.
tove@ling.su.se

The underlying question in most work on gestures is how the relation between gesture and speech should be understood. This is also the fundamental question in this presentation, where focus is on children’s gestures in relation to language development and socialization.

Gesture studies on adult interaction tend to divide gestural movements into various kinds depending on their assumed relation to spoken language. The group of gestures which have received most attention in the scientific world is the so called “co-speech gestures”, i.e. hand- and arm movements that occur simultaneously with speech and that are integrated temporally and semantically with the verbal utterance (Kendon, 1981, 2004; McNeill, 1992, 2005).

In child language studies, the term co-speech gestures is not used as frequently, although the gestures actually described tend to be within that domain, e.g. the deictic pointing gesture co-occurring with “there” (Tomasello et al.,2007; Rowe et al.,2008). Other child gestures receiving attention are the more pragmatically oriented “grab/reach gesture” or emblematic gestures like “nodding”, “waving goodbye”, etc. (e.g., Bates et al., 1975). Although humans remain children for quite some time the majority of child-gesture studies end when the children reach the vocabulary spurt (around the second birthday). A likely reason is that the questions posed relate to the transition from pre-language to language and the role played by gestural behavior in this developmental interval.

The presentation builds on a study taking the child gestures one step further by allowing the gesture definition to be wider (including in this term movements of the whole body), and the age span studied to go beyond the first two years. The material is longitudinal and consists of child-child and child-adult interaction between the ages 1 to 6. There are 11 children in the study, belonging to five families and they were recorded in their homes regularly during 2 ½ years. The data (in all 22 h) where transcribed and annotated using the ELAN software. The annotations of gestural behavior were categorized according to age of the child, interactional partner (child/adult), setting, activity/semantic theme, and concurrent speech/vocalizations.

In the presentation, main focus will be on two groups of gestural behavior in particular: co-speech gestures and co-activity speech. Whereas the former is an established term (se above), the latter is the term I have been using to describe speech-gesture combinations where the vocalizations seem to be redundant or at least second in priority, for example the utterances made while going through the motions of ritualized and mainly gestural play (e.g., “pat-a-cake”, “peek-a-boo”, “hide-and-seek”). The differences between these two classes of gestural behavior will be illustrated, described, and related to language development, cognitive growth, and socialization patterns. Ending the talk the fundamental question of speech-gesture relation will be addressed and a developmental path including the described gestural forms will be sketched out.

References:

Bates, E., Camaioni, L., & V. Volterra (1975). The acquisition of performatives prior to speech, in Merrill-Palmer Quarterly, 21, pp. 205-226.

Kendon, A. (1981). Geography of gesture, in Semiotica, 37, pp. 129-163.

Kendon, A. (2004). Gesture. Visible action as utterance. Cambridge: Cambridge University Press.

McNeill, D. (1992). Hand and mind. What gestures reveal about thought, Chicago: The University of Chicago Press.

McNeill, D. (2005). Gesture and Thought, Chicago: University of Chicago Press.

Tomasello, M., Carpenter, M., & U. Liszkowski (2007). A new look at infant pointing, in Child development, 78 (3), pp. 705-722.

Rowe, L.M., Özcaliskan, S., & S. Goldin-Meadow (2008). Learning words by hand: Gesture’s role in predicting vocabulary development, in First Language, Vol. 28 (2), pp. 182-199.

Communication and Cooperation Riddles

Filomena de Sousa, CFCUL- University of Lisbon.
mfisousa@fc.ul.pt

Why from an evolutionary perspective, both philogenetic and ontogenetic, communication is linked to the development of pro-social skills is not hard to understand, but the infrastructure underlying these competencies and the mechanisms whereby they have evolved affecting one another is not well understood. Among the many issues under debate two independent questions have aroused particular attention. The first is the problem of whether and to which extent human communication skills that have evolved within the constraints of pro-social mechanisms share parallels with those of our close living relatives, the many species of apes. Research continues to pour forth but recent empirical studies conducted by De Waal, Glimcher, or Tomasello are rich in insights, which are not easily reconcilable. The second issue concerns the nature of the cognitive infrastructure that acted as a platform upon which diverse forms of communication ranging from noise-signals to gestures and language could be built. A line of argument associated with the Chomskian tradition, explored from an evolutionary perspective by Pinker among others, has held for an innate structure underlying communication and cognition among humans, whereas alternative views propose instead that the building blocks of communication are biological adaptations for cooperative social interaction constructed and passed along within particular cultural groups.

In this paper I examine the overarching explanation for the two sets of questions set forth by Michael Tomasello who has drawn on empirical research into communication by great apes and human infants. I compare Tomasello's insights with opposing interpretations of similar data and argue that while his critique of nativism is rather compelling, his attempt to ground human uniqueness on the fundamentally cooperative nature of human communication deserves attention but fails to overthrow claims that rely on the same pro-social argument to substantiate the antipathetic hypothesis that favours continuity between humans and our closest related species.

[September 12th, morning]

Bodily mimesis in hominid evolution: Before and beyond?

Jordan Zlatev, Centre for Language and Literature, Lund University, Sweden. jordan.zlatev@ling.lu.se

Tomasello et al. (2005) and Tomasello (2008) have proposed that what distinguishes human from ape (social) cognition are: (1) a motivation to share (information) and (2) the cognitive capacity for shared intentionality, i.e. engaging in and understanding joint intentions, both simple and communicative. While not disagreeing in essence, Zlatev, Persson & Gärdenfors (2005b) and Zlatev (2008a) found this explanation somewhat vague, and offered the following as a complement more than alternative. First, it is fairly well established that apes are restricted in their capacity to imitate, in particular of bodily actions (Custance, Whiten and Bard 1995; Myowa-Yamakoshi & Matsuzawa 2000; Call 2001, Hribar, Sonesson and Call, in press). Second, imitation has been closely linked with empathy theoretically and empirically (Hurely and Chatter 2005), ever since the classical proposal of Lipps (1903). Third, imitation and empathy have been argued to serve as the "springboards" for intentional communication in both child development (Piaget 1962), and hominid evolution (Donald 1991). Thus, an adaptation for bodily mimesis implying improved volitional control of the body could possibly explain why human beings are particularly skillful (compared to non-human primates) in all three domains – imitation, empathy and (gestural) intentional communication. Since these are arguably prerequisites for language, no extra adaptations for the evolution of the latter (apart from vocal control) need be assumed (Zlatev 2008a, 2008b; Zlatev et al. 2005a).

However, there are important unresolved questions that would need to be addressed before any of these theoretical proposals can aspire for serving as a fully-fledged theory of human cognitive-semiotic evolution. In my presentation I will focus on two: (1) What ecological and social conditions brought about the evolution of bodily mimesis? (2) What lead to the transition from a predominantly mimetic form of communication to a predominantly symbolic one (using the vocal channel), i.e. language?

In answering the first question, I rely extensively on Hrdy's (2009) hypothesis that our ancestors underwent a transmission in major reproductive strategy, leading to cooperative breeding or "alloparenting". I will argue that this hypothesis offers the most plausible evolutionary account for human-specific skills of (primary) intersubjectivity, essential for bodily mimesis (or shared intentionality) to operate.

The answer to the second question will be twofold: First, it is important to realize that language is not a purely symbolic ("arbitrary") semiotic code, but a heterosemiotic,

multimodal system, where even the vocal component is to various degrees non-arbitrary. Nevertheless, there are some unique properties of "symbolic reference" that are absent in iconic-indexical systems such as bodily mimesis. They can be thought to emerge from mimesis in basically two different ways, either (a) gradually, through conventionalization, and with this a gradual "bleaching" of iconic/indexical forms of expression into relatively arbitrary ones or (b) by interpreting vocalizations that were produced spontaneously alongside the mimetic acts as "arbitrary symbols" (Brown, forthcoming). I will discuss the merits of both proposals.

The Emergence of Human Language. Simulating Multi-Modal Communication

Roland Muehlenbernd (University of Tuebingen, Germany)**, D. Enke, N. Gavrilov, J. David Nick, M.Villing**.
roland.muehlenbernd@uni-tuebingen.de

What is language? What turned language into what it is? How is it organized? And why is complex language peculiar to humans? Considering fundamental scientific insights into the origin of life, the picture of these questions is comparatively blurred.
However, these global issues have experienced a renaissance in recent years, given considerable advances and discoveries in cognitive science. These efforts created new solutions and new methods for the origins and evolution of human language within the specific sciences. Nevertheless, possibly the most important point of concurrence among researchers is that language evolution research must be cross-disciplinary in order to cope with the complexity of language evolution and provide sufficient constraints on theorizing to make it a legitimate scientific enquiry (cf. Christiansen & Kirby 2003 for a general review, see also Bickerton 2003; Christiansen et al. 2002; Tomasello 2002; Hauser, Chomsky & Fitch 2002).

A strongly debated issue concerns whether human language originated in gestures (cf. Arbib 2002; Corballis 2003, 2010; Donald 2005) or emerged from vocal interactions (cf. Dunbar 2003; Owren, Amoss & Rendall 2011; Studdert-Kennedy 2000). By taking a look at our closest relatives, the apes, evidence suggests that while their vocal communication is quite fixed and cognitively hard-wired, their abilities of gestural communication are highly flexible and play a major role in social interactions (cf. Tomasello & Zuberbüler 2002). Considering the fact that vocal communication plays a predominate role in today's human language use, we should ask i) how gestural and vocal communication interacted in the course of language evolution and ii) what were the potential factors prompting the shift to the superiority of vocal communication.
We used computer simulations to examine these potential factors. The basic idea is to construct a causal network (CN) of dependent and independent variables involved in

the way our ancestors used language. CN is constructed as such, that the independent variables are of a type for which findings from anthropology/archeology exists, giving these variables an empirical foundation (here: brain size and elders rate). CN is depicted in Figure 1.
In our experiments, we simulated populations of aging agents (dying elders and newborns) divided into subgroups (children, men, women and elders) faced with situations (cf. Table 1) affecting their language use (vocal or gestural);
e.g. because any modality may be more or less beneficial in a given situation. The behavioral modalities and therefore the probabilities of communication in situations change over time, according to CN, whose independent variables also change over time (according to empirical findings).
In our model each agent has a fitness value and a memory for 'situation-modality'-mappings influencing their fitness. The population dynamics leads to

Situation	Probability of vocal communication
social playing	.1
hierarchy fights	.8
tool use	.2
hunting	.9
gathering	.8
warning	.9

Table 1: The set of situations which i) our ancestors were probably exposed frequently and ii) played an important role in shaping communicative abilities is listed in the left column. The corresponding probabilities of vocal communication for an early point in time of human evolution are listed in the right column.

a reproduction distribution proportional to the fitness values. The results show that specific settings of the aforementioned independent variables lead to a more slower or faster emergence of predominately vocal language use (see Figure 2 for an exemplary course). These results give exposures for the proportion of vocal language use at particular points of time in the process of language evolution.

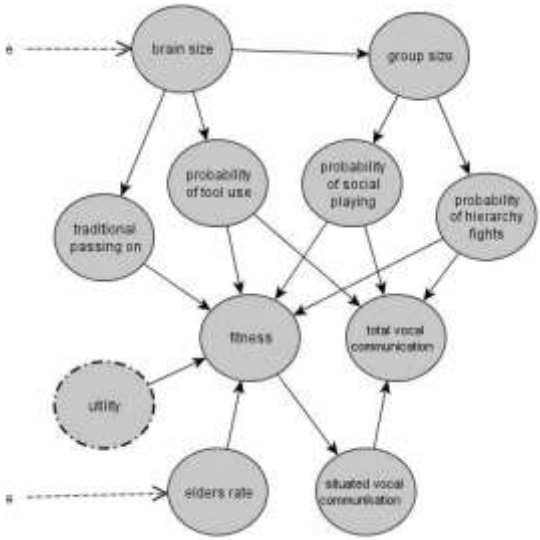


Figure 1: The causal network of dependent and independent variables involved in our ancestors' communication.

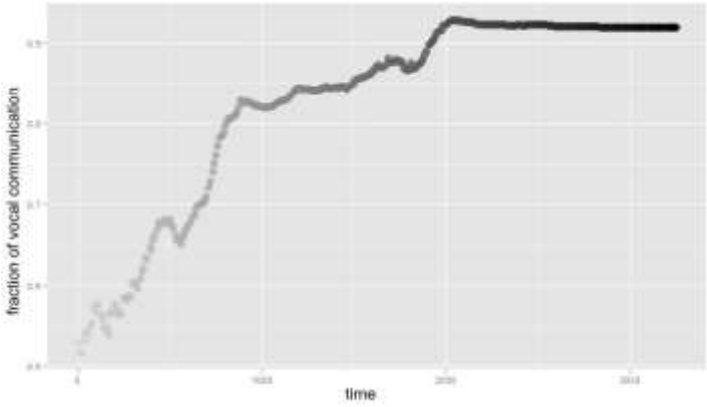


Figure 2: Exemplary course of the fraction of vocal communication averaged over the whole population over time for specific parameter settings.

References:

[1] Arbib, Michael A. (2002), Grounding the mirror system hypothesis for the evolution of the language-ready brain. In: A. Cangelosi & D. Parisi (eds.), Simulating the Evolution of Language. Berlin: Springer, 229-254.

[2] Bickerton, Derek (2003), Symbol and structure: A comprehensive framework for language evolution. In: M. H. Christiansen & S. Kirby (eds.), Language Evolution. Oxford: Oxford University Press, 77-93.

[3] Christiansen, Morten H., Rick A. Dale, Michelle Ellefson & Christopher M. Conway (2002), The role of sequential learning in language evolution: Computational and experimental studies. In: A. Cangelosi & D. Parisi (eds.), Simulating the Evolution of Language. Berlin: Springer, 165-188.

[4] Christiansen, Morten H. & Simon Kirby (2003), Language evolution: Con-sensus and controversies. In: Trends in Cognitive Sciences 7(7), 300-307.

[5] Corballis, Michael (2003), From hand to mouth: The gestural origins of language. In: M. H. Christiansen & S. Kirby (eds.), Language Evolution. Oxford: Oxford University Press, 201-218.

[6] Corballis, Michael (2010), Mirror neurons and the evolution of language. Brain and Language 112, 25-35.

[7] Donald, Merlin W. (2005), Imitation and Mimesis. In: S. Hurley & N. Chater (eds.), Perspectives on Imitation: From Neuroscience to Social Science, Volume 2: Imitation, Human Development, and Culture. Cambridge, MA: The MIT Press, 2005, Ch. 14, 282-300.

[8] Dunbar, Robin (2003). The origin and subsequent evolution of language. In: M. Christiansen & S. Kirby (eds.), Language Evolution. Oxford: Oxford University Press, 219-234.

[9] Hauser, Marc D., Noam Chomsky & W. Tecumseh Fitch (2002), The faculty of language: What is it, who has it, and how did it evolve? In: Science 298, 1569-1579.

[10] Owren, Michael J., R. Toby Amoss & Drew Rendall (2011). Two organizing principles of vocal production: Implications for nonhuman and human primates. American Journal of Primatology 73(6), 530-544.

[11] Studdert-Kennedy, Michael (2000). Evolutionary implications of the par-ticulate principle: Imitation and the dissociation of phonetic form from semantic function. In: C. Knight, M. Studdert-Kennedy & J R. Hurford (eds.), The Evolutionary Emergence of Language. Cambridge: Cambridge University Press,161-176.

[12] Tomasello, Michael (2002), Some facts about primate (including human) communication and social learning. In: A. Cangelosi & D. Parisi (eds.), Simulating the Evolution of Language. Berlin: Springer, 328-340.

[13] Tomasello, Michael & Klaus Zuberbühler (2002), Primate vocal and gestural communication. In: M. Bekoff, C. Allen & G. Burghardt (eds.), The Cognitive Animal: Empirical and Theoretical Perspectives on Animal Cognition. MA: The MIT Press, 293-299.

The Complexity of Action as Compared to That of Language

Hiroyuki Nishina, Dept. of Philosophy, Saitama University, Japan.
hrnshn@mail.saitama-u.ac.jp

The system of the monkey brain for visuomotor control of hand movements for grasping was reported to have its premotor outpost in an area called F5 which contains a set of neurons, called mirror neurons [1]. They are active not only when executing a grasp but also observing a human or other monkey execute a similar grasp. Based on this, an evolutionary theory was proposed (MSH): the parity requirement for language in humans is met because brain mechanism supporting language evolved from mirror system for grasping [2, 3]. There is a semantico-syntactic discrepancy between MSH, provideing a neurological basis for the claim that hominids had a (proto)language based on manual gestures, and UG [4], abstracting common properties from particular languages. From the former, arguments for protolanguage, private and public, before the birth of language are expected [5]. Not until then can we expect the latter's result before, since generative grammar has LF as its interpretive semantics. Merger operates for building a syntactic clause and a proposition as well [6]. Minimalism is evacuating UG from syntax, installing its properties into lexical items as grammaticalized functional features [7], so the parametric syntax is no more available [8]. The mirror neurons led to a straightforward semantic analysis that listening to sentences expressing the mouth, hand, and foot actions activates different sectors of the premotor cortex, which coincide with those active during the observation [9].

We have attempted to compare the complexity of human actions with that of language, focusing on rotation formulae, which we used as a model in which to valuate in a modal-logical semantics of action verbs [10~15]. All the rotations on joints in an action are decomposed as a joint's causations of another joint or an endpoint to "move" at a distinct interval. For a kicking action we could construct an indeterministic finite automaton (IFA), such that Q: end-points and joints, Σ: moving(1) and non-moving(0), δ: "cause-to"-move relation, $q0 \in Q$, and $F \subseteq Q$. It is well-known that any IFA can be converted into a deterministic FA. FA is known to be equivalent to regular grammar (RG). By Chomsky hierarchy, the inclusion relations of the languages generated by grammars are: Regular Language$\subset$Context-Free Language$\subset$Context-Sensitive Language [16]. Swiss German, with its appropriate case-marking even within the cross-serial-construction, is weakly non-context-free, but linear-parsable [17]. The complexity of our sample action is that of RG, one level and a bit simpler than Swiss German. There is already some evidence that a Bengalese finch's song has a RG [18]. This syntax can produce all the possible song sequences the bird produces. Our grammar for an action changes according to its type, due to the relevant joints and endpoints. Action grammars can be connected sequentially, in parallel and alternate manners. The

productivity of human actions seems much higher than that of a bird's songs. We explore the possibility of language origin as seen from the complexity derived from the causative analysis of actions.

References:

[1] Rizzolatti, G., L. Fadiga, V. Gallese and L. Fogassi (1996), "Premotor Cortex and the Recognition of Motor Actions", Cognitive Brain Research 3: 131-141.

[2] Rizzolatti, G. and Arbib, M. A. (1998). Language within Our Grasp. Trend in Neuroscience 21: 188-94.

[3] Arbib, M.A. (2005). The Mirror System Hypothesis: how did protolanguage evolve? In Tallerman, M. (ed.): Language Origins: Perspectives on Evolution, Oxford University Press: 21-47.

[4] Chomsky, N. (1981). Lectures and Government and Binding: the Pisa Lectures. Foris.

[5] Hurford, J. R. (2007). The Origin of Meaning, Oxford University Press.

[6] Hinzen, W. (2012) The Philosophical Significance of Universal Grammar, Language Sciences.

[7] Chomsky, N. (2001). Derivation by Phase. In M. Kenstowicz (ed.), Ken Hale: A Life in Language. MIT Press: 1-52.

[8] Boeckx, C. (2011). Approaching Parameters from Below. In Maria di Sciullo, A and Boeckx (eds.): The Biolinguistics Enterprise, Oxford University Press.

[9] Aziz-Zadeh, L., Wilson, S. M., Rizzolatti, G., Lacoboni, M. (2006). Congruent embodied representations for visually presented actions and linguistic phrases describing actions. Current Biology, 16: 1818-1823.

[10] Nishina, H. (2007). The Modal-Logical Interpretation of the Causation of Bodily Actions. In: Schalley, A. S., Khlenzos, D. (eds.): Mental States, Vol. 1.: Evolution, Function, Nature, John Benjamins, Amsterdam: 123-152 .

[11] Gamut, L.T.F. (1991). Logic, Language and Meaning. University of Chicago Press, Chicago University Press.

[12] Lakoff, G. (1970). Irregularity in Syntax. Holt Rinehart and Winston.

[13] Parsons, T. (1985). Underlying Events in the Logical Analysis of English, In E. LePore & B. P. Mclaughlin '85. Actions and Events, Blackwell : 235-267.

[14] Jackendoff, R. (1983). Semantics and Cognition. MIT Press.

[15] Jackendoff, R. (1990). Semantic Structures. MIT Press.

[16] Chomsky, N. (1956).Three Models for the Description of Language". IRE Transactions on Information Theory (2): 113-124.

[17] Shieber, M. Stuart (1985), Evidence against Context-freeness of Natural Language, Linguistics and Philosophy, Vol 8.: 333-343, 1985.

[18] Okanoya, K. (2004). Song Syntax in Bengalese Finches: Proximate and Ultimate Analyses, Advances in Study of Behaviour: 297-346.

September 12th, afternoon

Epistemological Issues in Social Primatology and Human Ethology

Nathalie Gontier, Dutch Free University of Brussels, Belgium & Centre for Philosophy of Science, University of Lisbon, Portugal.
nathalie.gontier@vub.ac.be; nlgontier@fc.ul.pt

Both social primatology and human ethology are fields that arose as direct outgrowths of investigations into human uniqueness first addressed by philosophers.

For centuries, philosophers had taken it as a given that human language, rationality, morality, culture and knowledge were human-specific traits. It were especially moral philosophers such as Adam Smith, Thomas Hobbes, David Hume, Jean Jacques Rousseau, Immanuel Kant and Johann Gottfried Herder that would start the first naturalistic inquiries into the origin of human language and culture. Rather than regard the latter as a (divine) given, they recognized that such traits were behavioral and cognitive, and that they arose historically in man.

Philosophical inquiries paved the way for the early natural history students who investigated the natural history of human languages and cultures. This would give rise to historical linguistics, where authors such as Auguste Schleicher formulated theories on the natural history and affinity of languages. Later, Charles Darwin and the social Darwinists would speculate upon the evolutionary origin of language and human cultural evolution. With the rise of ethology and primatology, these inquiries eventually emancipated from philosophy and early social Darwinism. For the first time in history, scholars actually tested some of the classic assumptions on human uniqueness in regard to language, culture, rationality and knowledge. Classic divides such as the nature/culture or innate/acquired debate became reformulated into debates over continuity and discontinuity, quantitative versus qualitative changes and gradual or saltational evolution. These inquiries gave rise to instructionist/behaviourist, cognitivist and selectionist schools of thought.

This talk will trace the historical roots of studies into human language evolution. It will be reviewed who first introduced these questions, and in what context; how inquiries into

human uniqueness were received and examined; and how emancipated current theorizing on language and cultural evolution really is from the old doctrines introduced by moral philosophers and early social Darwinists.

Secondly, it will be reviewed how the three major doctrines, instructionist/behaviourist, cognitivist and selectionist schools, differentially tackle the problem of human language origins. What was the rationale behind the different methodologies put forward by scholars active within these different schools of thought? How do they differ from one another and what problems can and can they not answer with their field-specific methodologies? Are the approaches put forward naturally exclusive, or do they all contribute to finding an answer to the question how language evolved?

Finally, it will be examined how studies on human language evolution can be facilitated by taking on an applied evolutionary epistemological approach.

Ethical challenges in primatology research

Constança Carvalho, Centre for environmental and marine studies (CESAM), Univ. Aveiro, Portugal (constanca.carvalho@sapo.pt) **& Luis Vicente,** Faculty of Science, Univ. of Lisbon, Portugal (lmvicente@fc.ul.pt)

Ape research has always been controversial, even in some studies performed in the wild. On the one hand, our similarities and common ancestry make them valuable pieces to understand the puzzle of our evolutionary story line, which has been the main justification for the use of apes in comparative scientific research. On the other hand, that same similarities have granted apes, namely chimpanzees (*Pan troglodytes*) and bonobos (*Pan paniscus*), public sympathy which led to a progressive decrease in public support to ape use in invasive research and has strengthened the laws on this matter worldwide. But where can we draw the ethical line? What criteria have been used to define what is acceptable and what is not? Are there still research fields where invasive and/or captive ape research is still a necessary evil? And what does invasive mean? What are the available alternatives for a more ethical science in the 21st century?

In our lecture we will try to address these questions by revisiting some of the most important insights on human evolution that has arisen through ape experiments, discussing their costs and benefits from both scientific and ethical points of view.

We will also present the replacement, reduction, refinement (3Rs) framework that is legally required in biomedical research and discuss its application in captive ape

research, namely the replacement that can easily be achieved through more ethical experimental designs.

How Humans Became Behaviorally Modern

Rita Nolan, Professor of Philosophy Emeritus, Stony Brook University, NYC, USA.
ritanolan@optonline.net

My aim is to explain the importance of this moment to future researchers on the theory of Behaviorally Modern Humans, humans who display art, language, and abstract thought. In the last century, theories of Modern Humans focused on language, aiming to discern the differences between human communication and primate communication using methodologies of comparative communication studies. Current debates concern whether vocal or gestural differences best account for the differences between human and other primate communication systems. I begin with an account of the Standard Model of human cognition that was assumed by Twentieth Century research on Modern Humans. I then provide an account of efforts to replace that model that were rejected by major research programs. I conclude with an exposition of current results from different sciences that, taken together, mandate a replacement of that Standard Model.

In the Twentieth Century a conception of human intelligence proposed by modern empiricism, the "Standard Model," was the accepted base for research on human mentality (e.g., Russell, Wittgenstein's Tractatus, Chomsky). According to that model (Hume and Locke), empirical science concerns ideas resulting from perception while relations among ideas are the provenance of logic. Applications of the Standard Model took human language to be the feature of Modern Humans that first needed theoretical explanation. Current research comparing communication strategies of other primates with human systems have focused on comparative gestural and vocal features. However, these are not the features that carry the burden of explaining the Behavioral Modernity that catapulted humans to the top of the heap: art, language, and abstract thought.

The Standard Model was buffeted by many efforts to show its inadequacies, rejected because they did not satisfy the requirements of the Standard Model. More tenuous speculations offered a different approach to the theory of Modern Humans, particularly, Cassirer and Langer, who argued that Modern Humans are those who have the forms of symbolism required for the production of art.

Results of the last decade in behavioral neuroscience (Rizzolatti, on Mirror Neurons), cognitive psychology (Thomasello, on shared intentionality), and archaeology (Henshilwood, on the Blombos artifact), taken together, provide high initial plausibility that Deliberate Artifacts of Material Culture preceded and facilitated the origination of language and abstract thought.

This hypothesis offers a causal explanation for the appearance of all three features: art, language, and abstract thought. Art production requires the de-coupling of the goal of a deliberate action from its agent and the agent's activity, independent of whether the ascribed goal/intention "correctly" attributed a goal to the agent. This de-coupling cannot be supposed to have occurred in gestural or vocal activity because of the ephemeral nature of the products of those activities. Only Deliberate Artifacts of Material Culture persist after their production and are thus able to be invested with "meaning" that can be de-coupled from the agent and the agent's activity, meaning that can be invested by a community in the product of that activity.

Lord Monboddo's Ourang Outang and the origin and progress of language

Stefaan Blancke, Department of Philosophy and Moral Sciences, Ghent University, Belgium
St.blancke@gmail.com

During the Enlightenment, an increasing number of encounters with great apes from both Africa and South East Asia sparked an intense debate about whether these animals should be considered human or not. Language played an important part in these discussions. Not only did the participating authors – anatomists, taxonomists, philosophers – differ in their opinion over whether language should be regarded as an essential part of human nature, but they also thought differently about the linguistic competence of the great apes. After briefly sketching this debate, I will focus on one of the participants, Lord Monboddo. Renowned by his contemporaries both for his knowledge and his eccentricity, this Scottish judge claimed that the Ourang Outang – then used as a generic name referring to the great apes, not to the species *Pongo pygmaeus* – shared so many morphological and behavioral traits with humans that its human status could not be denied. Moreover, as the Ourang Outang could be regarded as a man living in a primitive state, the study of these creatures could teach us many things about the nature of man, his origins and the progress modern man had gone through to arrive at its current state. In that regard, Monboddo was also convinced that the Ourang Outang had the capacity to acquire language, but that the circumstances he lived in had not yet urged this primitive human to develop this faculty. He could simply

do with more primitive forms of communication such as shouting and gesturing, and the study of these forms of communication could tell us a great deal about the origin and progress of language – the title of the first of Monboddo's two major works, *Of the origin and progress of language*. However, when carefully instructed, an Ourang Outang might just learn to speak a language and in one of his manuscripts, *Of the Ourang Outang and whether he be of the human species*, Monboddo, as one of the first, even suggests to do the experiment and actually teach a young ape a language. Such an experiment sounds quite familiar to our modern ears. Of course, the metaphysical background against which Monboddo developed his ideas about the linguistic capacities of the great apes was entirely different from the evolutionary perspective of contemporary researchers. His intellectual heroes were the Greek philosophers, Plato and Aristotle, he pictured the world as a great chain of being and believed that in the course of human history, hairy and crawling apelike creatures had transformed into modern humans like caterpillars change into butterflies. However, it is striking to see how even in such an entirely different worldview, these animals inspired the same questions that still fascinate us today.

Politics, primates and primary sources in South African social history

Sandra Swart, History Department, Stellenbosch University, Rep. South Africa.
sss@sun.ac.za

A white mine captain referred to African miners as 'baboons': a label a magistrate considered to be hate speech, referring the case to the equality court. A middle-manager was taken to the equality court for calling the African National Congress "a real monkey government" and the president "the biggest baboon, controlling all the other monkeys". An accused shoplifter sought to sue after a news editor reportedly referred to him as "just another monkey". A Durban businessman was ordered to pay R15 000 in damages after a ten-year old African boy returned from a birthday party with "I am a monkey" painted on his chest and "I am a gorilla" (misspelled) on his back. The boy's father testified "I was very upset by this reference to an African person as a monkey or baboon… it is invasive of our human dignity." African youths laughed at a British tourist on a tour of the Zululand battlefields, calling him a "white baboon". The national police commissioner referred to a foreign murder accused as a murdering monkey. The Public Protector forced an apology out of him – not for his impropriety in labelling the defendant guilty before he stood trial – but for the simian simile. Julius Malema, ANC's firebrand Youth League President, attacked the opposition leader for "dancing like a monkey". He also warned an anonymous whistleblower who exposed his

corruption in securing government tenders, “It there is a baboon, come explain yourself, you coward. You don’t have a face, you bloody ape.”

So in South Africa monkeys matter. These scattered vignettes above from modern post-Apartheid society reflect the discursive and political power of the “monkey metaphor”, which has its own history, which this paper explores in overview from the mid-seventeenth century to the present. As Darwin jotted in a notebook in 1838, “He who understands the baboon would do more towards metaphysics than Locke.” This paper tries to “understand” both powerful primates – *Papio ursinus* and *Homo sapiens* – by analysing their shared history in South Africa’s profoundly damaged society. It offers a social history of the relationship between human and chacma baboon, from the latter’s discursive deployment South Africa’s heated political present, to historicizing their role in human social and political imaginings. The discussion ends with the case of the so-called 'Baboon Boy' of South Africa. Scientists were fascinated by this man, Lucas, about whom a collection of pseudo-scientific myths arose, as it became known the first “authenticated case of a human child adopted and raised by infrahuman primates”. Over the next decade, the South African (and indeed European and American) presses carried sensationalist reports regarding this case, the new “Tarzan of the veld”. The case offers a lens into understanding the developing toxic taxonomies of racialised hierarchy and an international academic debate on “feral children”, using the suite of controversies the “baboon boy” unleashed in both international and local academic circles and the popular press in the 1930s and 40s.

ORGANIZING AND PARTNER INSTITUTIONS

Centre for Philosophy of Science of the University of Lisbon (CFCUL)

CFCUL

Centro de Filosofia das Ciências
da Universidade de Lisboa

http://cfcul.fc.ul.pt

The Centre for Philosophy of Science of the University of Lisbon (CFCUL) officially started its activities in July 2003 and it is composed of an interdisciplinary team that includes integraded members and collaborators, national and international, with distinct institutional affiliations. The CFCUL also has the support of three prestigious consultants.

The CFCUL develops its activities within six Research Groups, and aims to promote the development of the Philosophy of Science in Portugal by supporting and favouring research in the field of Philosophy of Science, by participating in Research Projects, by collaborating with national and international teams, by doing research supervision of Post-graduate students, by linking research and Post-graduation through the Master and PhD Programmes in History and Philosophy of Science of the FCUL, and the Master in Bioethics of the Faculty of Medicine of the University of Lisbon.

The CFCUL aims also to spread knowledge in the field of Philosophy of Science, by promoting national and international Colloquia, Conferences, Workshops and other meetings, by promoting a Philosophy of Science Permanent Seminar and other conference cycles, by publishing the results of the research (papers, books and dissertations), by setting up the journal “Kairos, Philosophy & Science”, and five publication series: Philosophy of Science Notebooks, Thesis, Documenta, Evolution: Foundations and Challenges, and Image in Science and Art.

Minding Animals International

http://www.mindinganimals.com/

The CFCUL is a partner of Minding Animals International.

Minding Animals International (MAI) provides an avenue for the transdisciplinary field of Animal Studies to be more responsive to the protection of animals. MAI aims to enable discourse between the various interests within this rapidly developing transdisciplinary field in ways that will improve the status of non-human animals and alleviate nonhuman animal exploitation. As such, MAI facilitates research in Animal Studies as a conduit of non-governmental politics and action. MAI acts as a bridge between academia and advocacy and is a network of now more than 3,000 academics, artists, activists and advocates, dedicated to the study and protection of all planetary life through the advancement of Animal Studies. That includes our distinguished patrons like Marc Bekoff, Jane Goodall, Peter Singer and John Coetzee. Minding Animals wishes From Grooming To Speaking well, and welcomes all conference delegates to contact Minding Animals to join us on the road to nonhuman animal protection.

USEFUL INFORMATION

TAXIS IN LISBON

RADIO TÁXIS
Tel. 218 119 000

TÁXIS DE LISBOA
Tel. 217 932 756

LISBON METRO

Please see the metro diagram in the flyer included.

HOW TO GET TO "FÁBRICA BRAÇO DE PRATA" BY TAXI

Address: Rua da Fábrica do Material de Guerra, n.º 1

Right next to "Praça 25 de Abril" and near the train station "Braço de Prata".

In front of the Post Offices (in Portuguese, "Correios") of "Poço do Bispo".

The trip will take around 15 minutes from the town center.

HOW TO GET TO "FÁBRICA BRAÇO DE PRATA" BY BUS

Bus (Company Name: Carris): 28, 718, 755, 210 (night bus)

CFCUL

Centre for Philosophy of Science of the University of Lisbon

https://cfcul.fc.ul.pt

Faculdade de Ciências da UL
Campo Grande, Edifício C4,
3º Piso, Sala 4.3.24
1749-016 Lisboa, Portugal

tel: 21.750.03.65
email: cdlisboa@fc.ul.pt

FCT Fundação para a Ciência e a Tecnologia

Minding Animals

Faculdade de Ciências

Universidade de Lisboa