

# WHAT WERE WE TALKING ABOUT? EXCHANGING SOCIAL MODELS AS A ROUTE TO LANGUAGE

MARTIN EDWARDES

*Department of Education and Professional Studies, King's College London,  
Franklin-Wilkins Building, Stamford Street,  
London SE1 9NH, United Kingdom*

This paper looks at the role that social calculus and the exchange of social models could have played in the process leading to human language. It considers the nature and source of social calculus, its place in the evolution of humans, and its consequences for language. The paper is exploratory rather than evidential, but it does provide a plausible explanation for the appearance of grammatical form in human language.

## 1. Introduction

There has been considerable discussion on the “how” (e.g. Aitchison, 1996) and “why” (e.g. Dunbar, 2009) of language origins, and some discussion on the “who” (e.g. Johansson, 2013). The “where” of language origins is also now agreed: it is most likely to have happened in Africa, between the evolution of *Homo sapiens* and our diaspora across the globe (e.g. Tattersall, 2009). However, the “what” question remains largely unaddressed: what particular communicational activity required the suite of functions that typifies human language? It is not enough to view the versatility of grammatical language as the reason for its appearance; that is putting the effect before the cause. Instead, there must have been a particular cognitive function which could only be shared using a complex, language-like system; and, to become shareable, it must have involved information which was advantageous to both sender and receiver.

This paper considers the sharing of knowledge about social relationships as a primary linguistic event, and looks at the events that could have brought it about. Sharing social information is a communicative activity which seems to be exclusively human, a necessary feature of the reputation-driven (Engelmann *et al.*, 2012), altruistically punishing

(Boyd *et al.*, 2003), reverse-dominant (Boehm, 1999) culture of modern humans. The paper relies, and builds upon, Dunbar's gossip hypothesis (Dunbar, 1996); but it looks at the cognitive and communicative structures that underlie gossip, rather than the grooming and socialisation functions that gossip provides.

## **2. A cognition of social relationships**

A key feature of human socialisation is the ability to map relationships between others in our social group. Like many other animals, we are able to cognitively model other individuals and our relationships with them; and, like other primates, we can also model relationships between other individuals, and use those models to adjust our relationships with those other individuals.

At first glance, the modelling of relationships between other individuals (the two argument form of A-relationship-B) would seem to be a simple extension of our capacity to model our own relationships with others (the one-argument form of relationship-A). There is, however, a considerable difference between the two forms. Relationship-A represents the capacities to reliably identify other individuals, and to associate emotional tags with those individuals; and both of these capacities seem to be evolutionarily quite ancient (e.g. Cooper *et al.*, 2003). These relationship-A models are intimately personal: they represent our own image of the other individual, and our own emotional reaction to that individual; the modelled other and the emotions attached to that modelled other are closely intertwined.

This contrasts with the A-relationship-B model, where the images of the other individuals and the modelled emotional relationship between them are not our own images of, and relationships with, those individuals. Personally, I may be inimical to both Alf and Beth, but I have to be able to model their friendship as something separate to my own emotions. This also means that my model of Beth's image of Alf has to be different from my own image of Alf; but the two images also have to represent the same individual. This problem multiplies as the number of group members increases: I have to try to retain models of everyone's images of everyone, and somehow produce a coherent understanding of the actual relationships in the group. Where relationship-A modelling

requires a simple social arithmetic, A-relationship-B modelling requires a social calculus, or computational grammar.

So in this modelling of group relationships we have a complex cognitive activity that requires many of the functions that typify human language. It involves segmentation, in that the modelled individuals and the modelled relationships have to be slotted into a standard form of A-relationship-B; it involves differentiation, in that the relationships and modelled individuals serve different functions in the standard form; it involves abstraction, in that the relationship A has with B is distinct from my relationships with A and B; and it can involve directionality, in that the relationship in A-relationship-B may not be the same as in B-relationship-A. This last function may rely on the capacity to attribute false beliefs to others, a capacity which chimpanzees do not share with us (Call & Tomasello, 2008); and which, therefore, may well be exclusively human – at least in terms of currently primate species.

A-relationship-B calculus is, however, quite ancient in other ways. Cheney and Seyfarth (2007) show how modern baboons (*Papio hamadryas ursinus*) maintain social hierarchies in which each baboon knows their place. They must give deference to those above them to avoid confrontation, and they expect deference from those below them. The hierarchy is linear and, by itself, it involves simple relationship-A modelling. However, baboons also keep track of the interactions of others in their group. They are able to identify who is making a call from the call itself, and they pay more attention when, for instance, a threat bark from a subordinate is followed by a fear bark from a dominant. Female baboons also seem to understand a hierarchy of families overlaying the individual hierarchy: after a confrontation, a reconciliation with another member of the antagonist's family counts as a reconciliation with the antagonist.

The best explanation for this is that baboons have a cognitive social calculus of A-relationship-B constructs, although they do not use this calculus in their communication. This may be because all baboon signals collocate with the event or object being signalled, as seems to be the case for all nonhuman primates; but the value in communicating A-relationship-B constructs is that they can be signalled when the events and objects are not present. The capacity to reference absent, and

therefore unreal, objects and events is another capacity which may be exclusive to humans among current primate species.

The question for the evolution of language, therefore, is not how A-relationship-B constructs became part of our social cognition, but what led to them becoming communicable. The answer to this question is likely to involve the development of a whole series of cognitive and physical capacities which all need their own explanation. However, the long time period between the likely appearance of social calculus in cognition and its use in communication provides a relaxed timetable for the evolution of all of the necessary capacities. The six million years from the chimpanzee-human common ancestor to modern humans is time enough.

For instance, there is enough time for a full phonological explanation, from complex sounds being made as costly signals (Gintis *et al.*, 2001), through an attentional language-like phonology (MacNeilage, 2008), into a situation where the complex sounds take on their own arbitrary meanings (Hurford, 2007).

There is time for the development of a fully co-operative culture, involving vigilant sharing to ensure equitable distribution of resources (Erdal & Whiten, 1994), reverse dominance to suppress alpha behaviour within groups (Boehm, 1999), and co-operative signalling based around modelling the needs and expectations of the signal receiver (Dessalles, 2007). This emphasis on overt collaboration over competition would create a species in which co-operation is the norm, and non-co-operative behaviour is altruistically punished (O’Gorman *et al.*, 2009).

Vigilant sharing can also lead to joint attention, turning the individual’s attention outward onto shared events and, in turn, leading to co-operative deixis (Tomasello, 2008). This generates an environment where cultural transmission of complex skills becomes possible: intentional teaching and learning can happen, and a cultural “ratchet effect” can take hold (Boyd *et al.*, 2011). Knowledge becomes robust: it is duplicated across several brains, ensuring that it is not lost when individual brains die.

Within the development of our co-operative culture, there is enough time to explain the co-evolution of human culture and the co-operative

signalling needed to support that culture. How this co-evolution could have happened has generated many complementary and competing explanations (e.g. McNamara *et al.*, 2008; Ambrose, 2010; Pinker, 2010; Jablonka *et al.*, 2012), and it should not be seen as either simple or inevitable. However, while there is currently no single explanation for the co-evolution, the timescale means that we do not need to introduce a sudden or catastrophic evolutionary event to justify its development.

### **3. Sharing social relationships**

None of these effects, by themselves, required a language-like communication system; but they did set the scene, leading up to the point when humans first began to share ideas that did require productive complexity, such as social calculus. This was, of course, the moment when we began to use gossip as a social lubricant (Dunbar, 1996); so it is likely that the sharing itself was motivated by the need to create new ways of grooming, or socialising with, each other.

An interesting feature of this sharing of social models is that it doesn't necessarily rely on truth-values. Any information you share with me about your perception of the relationship between Alf and Beth tells me something about your own relationship with each of them, regardless of whether the utterance represents the actual relationship between Alf and Beth. There is useful information in your utterance beyond what the utterance says, a "meta" level which makes the utterance worth listening to regardless of direct semantic content. Because the receiver is listening to the sender as well as the message, the mere act of utterance creates value in the utterance.

This new way of meaning changes the signalling costs and benefits for both sender and receiver. Utterances can be cheap (and potentially dishonest) in terms of their direct message, while still being costly to the sender (and valuable to the receiver) in terms of their metamessages. In this environment, the true cost of information-giving is reputation, backed by altruistic punishment (Fehr & Gächter, 2002), which will tend to keep the direct message honest; but the difficult-to-fake information in the metamessages provides an added bonus for the receiver.

Once A-relationship-B utterances are being exchanged, other cognitive and linguistic capacities begin to emerge naturally from the signalling environment. These include:

- Reflective selfhood – when someone offers me a social model that includes me as one of the protagonists, I have to be able to make an image of myself as a third party in the same way I make third-party images of others;
- Grammatical persons – when images of other and self are part of communication, the privileged communicative roles of sender and receiver need to be recognised and modelled;
- Temporality and modality – once the irrealis boundary of absent reference has been crossed, and the need for signal accuracy has been mitigated, it is possible to introduce information which is not current or even not actual;
- Recursion – because of the conditionality of truth in the offered models, tagging received A-relationship-B models with the identity of the sender (C) provides deniability when they are re-broadcast; which, in turn, means that tagging received A-relationship-B-by-C models with the identity of the sender (D) becomes valuable ... and so on. In theory, this iteratively nested tagging requires – or provides – the infinite recursion proposed by Hauser *et al.* (2002). However, as Dunbar (2004) shows, the number of nested levels actually possible is heavily constrained.

These capacities can emerge naturally out of the sharing of social models, using cognitive mechanisms developed for other purposes (Edwardes, 2010 & forthcoming); like the sharing of social models, they do not each need their own genetic explanation. So, while they extend the range and power of language, they do not rely on a cognitively specialised language engine for their expression. Instead, language develops as a series of responses to particular communicational needs.

#### **4. Conclusion**

This paper started with a specific question: what particular communicational activity required the suite of functions that typifies human language? While the sharing of social relationships may not be the only answer possible, it does seem to satisfy many of the issues that an attempt to answer this question inevitably raises. It does not need a

special genetic explanation because it seems to be a relatively ancient cognitive mechanism; and, because it does not rely on special genetic explanations, it can be incorporated into a standard model of human evolution. In terms of communication, it does not require novel cognitive systems; and, while it does rely on a new communicative need, that need is justifiable in fitness terms. Finally, the sharing of social relationships is itself a productive explanation for other aspects of being human, such as our capacity to model ourselves objectively.

Shared social calculus may not be the final answer to the question posed above; but, like any scientific hypothesis, it provides an effective working model until something better comes along.

## References

- Aitchison, J. (1996). *The Seeds of Speech: language origin and evolution*. Cambridge: Cambridge University Press.
- Ambrose, S. H. (2010). Coevolution of Composite-Tool Technology, Constructive Memory, and Language: Implications for the Evolution of Modern Human Behavior. In *Current Anthropology Volume 51, Supplement 1, June 2010*, S135-S147.
- Boehm, C. (1999). *Hierarchy in the Forest: the evolution of egalitarian behaviour*. Cambridge: Harvard University Press.
- Boyd, R., Gintis, H., Bowles, S. & Richerson, P. J. (2003). The evolution of altruistic punishment. In *PNAS*, vol. 100, no. 6, 3531-3535.
- Boyd, R., Richerson, P. J., & Henrich, J. (2011). The cultural niche: Why social learning is essential for human adaptation. In *PNAS*, vol. 108, suppl. 2, 10918-10925.
- Call, J. & Tomasello, M (2008). Does the chimpanzee have a theory of mind? 30 years later. In *Trends in Cognitive Sciences, Vol.12, No.5*, 187-192.
- Cheney, D. L. & Seyfarth, R. M. (2007). *Baboon Metaphysics: the evolution of a social mind*. Chicago: University of Chicago Press.
- Cooper, J. J., Ashton, C., Bishop, S., West, R., Mills, D. S. & Young, R. J. (2003). Clever hounds: social cognition in the domestic dog (*Canis familiaris*). In *Applied Animal Behaviour Science 81*, 229-244.
- Dessalles, J. L. (2007). *Why We Talk: the evolutionary origins of language*. Oxford: Oxford University Press.
- Dunbar, R. I. M. (1996). *Grooming, Gossip and the Evolution of Language*. London: Faber & Faber Ltd.
- Dunbar, R. I. M. (2004). *The Human Story: a new history of mankind's evolution*. London: Faber & Faber Ltd.

- Dunbar, R. I. M. (2009). Why only Humans Have Language. In R. Botha & C. Knight (Eds.), *The Prehistory of Language*. Oxford: Oxford University Press.
- Edwardes, M. (2010). *The Origins of Grammar: an anthropological perspective*. London: Continuum.
- Edwardes, M. (forthcoming). Awareness of self and awareness of selfness: why the capacity to self-model represents a novel level of cognition in humans. In *Selected Papers from the UK Cognitive Linguistics Conference 4, July 2012*.
- Engelmann, J. M., Herrmann, E. & Tomasello, M. (2012). Five-Year Olds, but Not Chimpanzees, Attempt to Manage Their Reputations. In *PLoS One, Vol. 7, Issue 10*, e48433.
- Erdal, D. & Whiten, A. (1994). On Human Egalitarianism: An Evolutionary Product of Machiavellian Status Escalation? In *Current Anthropology, Vol. 35, No.2*, 175-183.
- Fehr, E. & Gächter, S. (2002). Altruistic punishment in humans. In *Nature, vol 415, 10 January 2002*, 137-140.
- Gintis, H., Smith, E. A. & Bowles, S. (2001). Costly Signaling and Cooperation. In *J. theor. Biol. 213*, 103-119.
- Hauser, M. D., Chomsky, N. & Fitch, W. T. (2002). The Faculty of Language: what is it, who has it, and how did it evolve? In *Science vol 298 22 November 2002*, 1569-1579.
- Hurford, J. R. (2007). *The Origins of Meaning: language in the light of evolution*. Oxford: Oxford University Press.
- Jablonka, E., Ginsburg, S. & Dor, D. (2012). The co-evolution of language and emotions. In *Phil. Trans. R. Soc. B 2012 367*, 2152-2159.
- Johansson, S. (2013). The Talking Neanderthals: What Do Fossils, Genetics, and Archeology Say? In *Biolinguistics 7*: 035-074.
- MacNeilage, P. (2008). *The Origin of Speech*. Oxford: Oxford University Press.
- McNamara, J. M., Barta, Z., Fromhage, L. & Houston, A. I. (2008). The coevolution of choosiness and cooperation. In *Nature, Vol 451, 10 January 2008*, 189-192.
- O’Gorman, R., Henrich, J. & Van Vugt, M. (2009). Constraining free riding in public goods games: designated solitary punishers can sustain human cooperation. In *Proc. R. Soc. B 276*, 323-329.
- Pinker, S. (2010). The cognitive niche: Coevolution of intelligence, sociality, and language. In *PNAS 11 May 2010, vol. 107, suppl. 2*, 8993-8999.
- Tattersall, I. (2009). Human origins: Out of Africa. In *PNAS, vol. 106, no. 38*, 16018-16021.
- Tomasello, M. (2008). *Origins of Human Communication*. Cambridge: MIT Press.