



## Keynote and Invited Symposia Abstracts

(Byre Auditorium)

Wednesday 10th August p. 2

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—Wednesday 10th August—

## *Keynote*

### **Primate Semantics**

Philippe Schlenker

*Institut Jean Nicod, Paris*

We will summarize initial results of an emerging field of ‘primate semantics’, which offers articulated analyses of the ‘literal meaning’ of monkey calls, and of additional mechanisms of ‘pragmatic enrichment’. We will argue that the combination of tools from linguistics and primatology offers new heuristics for comparative studies across species, and that these may in some cases help reconstruct the evolution of monkey communication over millions of years.

## *Invited Symposium*

### **Animal Communication**

Organizers: Amanda Seed, Verena Kerkeken, Derek Ball, Juan C. Gómez

Speakers: Katie Slocombe, David Shuker, Dorit Bar-On

Animal communication is one of the quintessential interdisciplinary topics where Linguistic, Psychology, Philosophy, and Biology, among other disciplines, are 'condemned' to interact and co-operate. This symposium – an outgrowth of our co-disciplinary AHRC Project *Rethinking Mind and Meaning* – focuses on the problem of *intentional communication* in animals: what should we understand as “intentional communication”? What are the behavioural criteria and conceptual definitions that can be used across disciplines to tackle this issue in a meaningful way? What is the use and impact of the increasingly wider phylogenetic scope of animal communication studies?

**Katie Slocombe.** *Are wild chimpanzee alarm calls produced intentionally?*

Whilst great ape gestures have been claimed to be the product of first order intentional processes (recipient directed, voluntary, goal-directed), non-human primate vocalisations have traditionally been characterised as the product of zero order intentional processes (reflexive products of arousal/emotional processes). This distinction has often been used to argue that language was most likely to have had a gestural rather than vocal origin, but we argue this is premature in the absence of explicit tests for intentionality in great ape vocal production. We applied the criteria widely used to identify first order intentional gesture production in great apes to the alarm calling behaviour of wild chimpanzees. We presented wild chimpanzees with a moving model python in different social situations and assessed whether alarm calling behaviour showed evidence of social use, audience checking, gaze alternation and persistence. We found that soft huus given in immediate response to the snake seemed to be the product of zero-order intentional processes, whilst alarm huus and waa barks had the hallmarks of first order intentional signals. These

data challenge the traditional distinction between intentional gestures and unintentional vocalisations.

**David M Shuker.** *Sexual communication in animals, or why not all male leafhoppers are well intentioned.*

To study communication in humans and other animals, we need a lexicon of words with their associated meanings that allow us to trace how communication evolves across species. Attributes of human communication, including of course language, need to be defined in ways that are inclusive of other animals and their communication systems, otherwise human communication is defined, a priori, as something different and “special”. There are many challenges however. For instance, in non-human animals, we can only infer the information content and functional relevance of communication through the scrutiny of how signals are displayed and modified by senders, and how receivers in turn respond to those signals and in what context. Put another way, we can only infer “meaning” in terms of behavioural outcomes of both sender and receiver. In this presentation, I will explore how sexual communication in animals provides extraordinary examples of information-rich, nuanced, and context-dependent signalling, and use courtship behaviours across birds and insects to scrutinise definitions of intentionality and meaning. I will argue that sexual communication provides an important testing ground for understanding what is and what is not special about human communication.

**Dorit Bar-On.** *Expressive Communication and Origins of Meaning*

The task of explaining the evolution of language is often presented by leading theorists in explicitly Gricean terms. After distinguishing ‘two hard problems’ of language evolution, I offer a critical evaluation of the Gricean conceptualization of the first ‘hard problem’. I take issue with the claim that solving the first problem requires explaining how, specifically, signal producers could become genuine Gricean speakers. I then motivate an alternative, non-Gricean conceptualization of the first task. The alternative focuses on the potential of non-Gricean, expressive communication – of the sort we share with many nonhuman animals – to illuminate the origins of meaning. On the conception advocated in e.g. Bar-On 2103a, 2013b, and forthcoming, expressive communication involves animals’ openly – but not necessarily intentionally – showing (and in that sense sharing) their states of minds with each other. This means that our extinct nonhuman predecessors were already proficient – though non-Gricean – sharers of psychological states. The problem of explaining the emergence of meaningful language then becomes to understand how nonlinguistic expressive behaviors could become transformed into meaningful symbolic expressive vehicles.

—Thursday 11th August—

## *Keynote*

### **What Does it Feel Like to Feel One's Body as One's Own?**

Frederique de Vignemont

*Institut Jean Nicod, Paris*

When I complain, “I feel pain in my shoulder”, there are two occurrences of the first person pronoun: at the level of the subject of the painful experience (I feel pain) and at the level of the body part in which I localize pain (in my shoulder). The first expresses the subjectivity of my sensation. The second expresses the awareness of my body as my own. Most philosophical interest has focused on the first, but what has been called the sense of bodily ownership – for sake of a better name – has also recently come into the limelight both in the philosophical literature (e.g. Alsmith, 2015; Bermudez, 2011, 2015; Billon, forthcoming; Dokic, 2003; Martin, 1995; Peacocke, 2015) and in the psychological literature (e.g., Garbarini et al., forthcoming; Makin et al., 2008; Serino et al., 2015; Tsakiris, 2010). Here I will defend a reductionist approach, according to which the sense of ownership can be reduced to some specific properties of bodily experiences. But which properties?

I will first consider the dominant reductionist approach, which reduces the sense of bodily ownership to the spatiality of bodily experiences, a proposal that can be phrased along the following lines:

*The sense of bodily ownership consists in the sense of the spatial boundaries of one's body.*

I will argue that the spatial distinction between inside and outside does not suffice for the first-personal dimension of the sense of bodily ownership. I will then analyse whether the sense of bodily ownership can borrow, so to speak, its self-referentiality from the self-referentiality of agency.

*The sense of bodily ownership consists in the sense of the spatial boundaries of one's body as being under direct control.*

More specifically, one may suggest that the sense of bodily ownership is grounded in the sensorimotor representation of the body known as body schema. However, this agentic hypothesis faces a number of difficulties that cannot be solved without further refinements. In particular, I will argue that one needs to distinguish between two distinct kinds of body schema: the working body schema involved in instrumental actions, and the protective body schema involved in self-defence. I will then propose what may be conceived as an affective conception of the sense of bodily ownership:

*The sense of bodily ownership consists in the sense of the spatial boundaries of one's body as having a special significance for the self.*

On this view, one feels as one's own the body represented in the protective body schema. The affective conception falls in line with both the spatial and the agentic conceptions because it posits at the core of bodily ownership a specific type of body representation that fixes the boundaries of one's body and that is sensorimotor, but it includes a new dimension, namely, the affective one. The protective body schema indeed represents the body that has a special significance for the evolutionary needs

and interests of the organism. This will lead me to define the phenomenology of ownership as a narcissistic feeling to file with other affective feelings such as the feeling of familiarity.

## *Invited Symposium*

### **Bodily Awareness**

*Organizer: Louise Richardson*

Speakers: Louise Richardson, Elena Azañón, Alisa Mandrigin, John Schwenkler

Bodily awareness is special. Though, arguably, it is a form of perception, it differs from other kinds of perception in having only one object: the perceiver's body. It also seems to bear unique relationships to, for example, self-consciousness, action and other varieties of perception, especially touch. And it is special in its diversity: 'bodily awareness' is a catch-all term that can encompass, for example, pain and proprioception as well as representations of the body uncovered by psychologists and neuroscientists. In our first talk, Elena Azañón will present an overview of the different representations of the body involved in tactile perception, and in particular in tactile localization. Alisa Mandrigin will also be concerned with the role of different kinds of representation of the body. She will develop Gareth Evans' claim that the spatial content of bodily awareness should be explained in terms of dispositions to act, arguing that this claim is consistent with evidence for a double dissociation between the representation of the body involved in action and the representation(s) of the body involved in conscious bodily

awareness. Whilst Mandrigin will be concerned with the role of action in bodily awareness, John Schwenkler will address the role of bodily awareness in action. In our third talk he will argue, after Elizabeth Anscombe, that awareness of what one is doing is not restricted to awareness of one's bodily movements. According to Schwenkler, bodily awareness does not have a privileged status in awareness of our actions. Rather, awareness of one's own active bodily movements is often grounded in awareness of things distant from one's body.

**Elena Azañón:** *The role of body representations in the construction of somatic percepts*

Perceiving touch involves referring afferent somatosensory inputs to models of one's own body. When a stimulus touches the skin, its initial representation is in a somatotopic frame of reference anchored to the skin surface, which takes no account of the shape of the touched limb, its size, or its position in space. Thus, even one of the most fundamental of somatic abilities, the localization of where on the body touch has occurred, requires the link between somatotopic information and a representation of the body surface (Head and Holmes, 1911). Furthermore, veridical perception of the size of objects touching the skin requires that afferent information be integrated with representations of the size and shape of the body. This is because judging how far apart two touched locations on the skin are, or how big an object is, do not appear to be specified by any afferent signal, but seem to require referencing to a representation of body size and shape (Longo, Azañón & Haggard, 2010). Finally, perceiving the location where a touch occurred, beyond its location on the surface of the skin, requires the mediation of the preceding body representations plus information about the configuration and posture, particularly but

not solely, of the touched body part (Azañón & Soto-Faraco, 2008; Azañón, Stenner, Cardini, & Haggard, 2015; Medina & Coslett, 2010).

In this talk I will give an overview of the different body representations used in the construction of somatic percepts, focusing mainly on the process of tactile localization, beyond somatotopy. I will also include indirect evidence supporting the use of postural archetypes when encoding touch in external space. Related to these archetypes or canonical representations, I will end by showing that processing of touch is influenced not only by online and offline body representations, but also by preceding information about the most likely location of touch.

### *References*

Head, H., & Holmes, G. 1911. Sensory disturbances from cerebral lesions. *Brain*, 34, 102–254

Longo, M. R., Azañón, E., & Haggard, P. 2010. More than skin deep: body representation beyond primary somatosensory cortex. *Neuropsychologia*, 48, 655–68.

Azañón, E., & Soto-Faraco, S. 2008. Changing reference frames during the encoding of tactile events. *Current Biology*, 18, 1044– 1049

Azañón, E., Stenner, M. P., Cardini, F., & Haggard, P. 2015. Dynamic tuning of tactile localization to body posture. *Current Biology*, 25, 512–517.

Medina, J., & Coslett, H. B. 2010. From maps to form to space: touch and the body schema. *Neuropsychologia*, 48, 645–654.

**Alisa Mandrigin:** *The where of bodily awareness*

Bodily experience has spatial content. Healthy subjects are, for example, able to perform actions directed on specific body parts in response to bodily sensations and somatosensory touch, and they are able to make accurate visual judgements about the location of those sensations. Yet, providing an account of this spatial content presents us with particular challenges. In particular, and in contrast with the exteroceptive senses, there is no point of origin from which a set of coordinate axes could be thought to originate (Bermúdez 1998). How then, can we account for the spatial content of bodily awareness? Relative to what is a location given?

I'll develop and defend an approach, based on Gareth Evans' (1982, 1985) account of the egocentric spatial content of exteroceptive perceptual experience, that seeks to get around this problem by saying that spatial content can be explained in terms of dispositions to act (Smith 2009). A central challenge that this affordance-based view of the spatial content of bodily experience faces is that there is psychological and neurological evidence of a double dissociation between two kinds of body representation: one body representation that governs and guides action, and a distinct body representation (or set of representations) that are involved in conscious experience of the body.

I will focus on this evidence and it's interpretation, arguing that we can in fact take the results to be consistent with the view that the body schema for action has a role to play in our bodily awareness of spatial location.

**References**

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Evans, G. 1982, *The varieties of reference*. Oxford: Clarendon Press  
Evans, G. 1985, 'Molyneux's Question'. In *The collected papers of*

*Gareth Evans*. Oxford: OUP

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15,1: 82-99

**John Schwenkler:** *What do we know when we know our actions?*

Many philosophers agree that in ordinary circumstances a person will have a special sort of knowledge of what he or she is intentionally doing. But what is the content of this knowledge? Noticing that sometimes people fail to act as they intend to, we are tempted by a familiar strategy of retreat: much as the possibility of illusion or hallucination is supposed to show that the reach of perceptual experience stops short of the world, so the possibility of failure in agency shows that the content of an agent's knowledge should be pushed 'back and back; first to the bodily movement, then perhaps to the contraction of the muscles, then to the attempt to do the thing, which comes right at the beginning' (Anscombe, 1957, 53).

Anscombe claimed in section 30 of *Intention* that this strategy 'is an error', as in cases of skilled action a person's clearest grasp of what she is doing will be in terms of what is happening at a distance from her proximal bodily movements. My talk will develop and defend a version of Anscombean position, arguing in favor of what I term the thesis of Distal Priority:

(DP) In many cases, an agent's (real or apparent) awareness of her bodily movements is grounded in her (real or apparent) awareness of what she is doing in terms of what happens at a distance from those bodily movements themselves.

I will show that (DP) is supported on experimental and phenomenological grounds, and consider its broader implications.

### *References*

Anscombe, G.E.M. 1957. *Intention*. Harvard University Press.

—Friday 12th August—

*Keynote*

*Attributing Knowledge versus Attributing True Belief*

**Jennifer Nagel**

University of Toronto

Recent research into mental state attribution has focused intensely on the capacity to attribute false beliefs. It is remarkable that we are able to grasp not only what others know about our shared environment, but also what others mistakenly take to be the case. Somehow, out of the countless ways in which an observed agent could be wrong about the world, we can identify just the right natural misconception and keep track of it, even as we also keep track of the divergent way in which reality itself is unfolding. But how do we come to calculate the content of this misconception? I argue that close examination of this question, starting with developmental research, is instructive for epistemologists working on the relationship between belief and knowledge.

## *Invited Symposium*

# **Lessons From Epistemology and Developmental Psychology**

**Organizer: Aidan McGlynn**

*Speakers:* Aidan McGlynn, Kathi Puddifoot, Josephine Ross, Susanna Schellenberg

**Kathy Puddifoot:** *Dissolving the Epistemic/Ethical Dilemma Over Stereotyping*

It has been argued that humans face an ethical/epistemic dilemma over stereotyping, including the implicit stereotyping involved with implicit bias: ethical demands require that we treat people equally, as equally likely to possess certain traits. In contrast, if our aim is knowledge or understanding we should reflect social inequities meaning that members of different social groups are statistically likely to possess different features. I use psychological research on stereotyping to argue that more often than not the best choice from the epistemic perspective is the same as the best choice from the ethical perspective: to avoid stereotyping even when this involves failing to reflect social realities in our judgements.

**Susanna Schellenberg:** *Perceptual Discrimination and the Epistemic Force of Experience*

Drawing on work from cognitive psychology, I argue that perceptual states have epistemic force due to the properties of the discriminatory

capacities that constitute perceptual states. Perceptual experience is fundamentally a matter of discriminating particulars in one's environment. Such discriminatory activity allows for border and edge detection, scene segmentation, and region extraction.

I argue that the epistemic force of perceptual experience stems from the metaphysical primacy of employing discriminatory capacities in perception over subjectively indistinguishable bad cases, such as, illusions and hallucinations.

**Josephine Ross:** *What do psychologists know about the development of self-reflection?*

Empirical evidence suggests that very young infants behave intentionally, and enjoy the influence their actions have on the world. Newborns also engage in self-directed touch, exploring their own face and body with their hands. However, it is not until the end of the second year of life that psychologists think that infants are able to step outside of this subjective experience of the self, cognitively reflecting on themselves from a second person perspective. This 'objective' self-awareness is typically measured by psychologists through the onset of mirror self-recognition. To test for mirror self-recognition, the child is marked on the face without their knowledge. Since the child can't feel the mark, their subjective experience of the self can't alert them to its presence. However, the mirror provides an accessible objective perspective on self. If the child has the capacity to take this perspective, they will reach up to touch the mark on their face when shown their mirror image. This self-directed behaviour shows that the child equates the mirror image with their own body (first because it moves when they move, and later because they recognise their own features).

Natural demonstrations of objective self-awareness are also provided by 2-year-old's ability to flexibly use and understand self-referent language (I, me, you, mine), and to produce simple self-descriptions and self-evaluations (e.g. I am a good boy).

By the time children are eight, they have a coherent idea of their own personality traits, dispositions and self-worth. However, despite a huge body of work on the adult self, relatively little is known about how children come to recognise themselves in the mirror, how they gather the self-knowledge that populates their self-concept, or how the capacity for objective self-awareness functionally influences children's cognition and behaviour. Moreover, very little is known about how children self-reflect on a metacognitive level. The first empirical evidence of children accurately recalling their own thoughts is delayed until at around 4 years; at which point children are just as accurate at recalling their own thoughts as they are at predicting or recalling the thoughts of other people. From a developmental perspective then, we don't appear to have privileged access to our own minds. This begs the question, to what extent is self-reflection special?

—Saturday 13th August —

## *Keynote*

# **Conceptual and Empirical Dissection of ‘Culture’: A Comparative and Evolutionary Perspective**

Andrew Whiten

*University of St Andrews*

We are fortunate that so many species and grades of our close and less-close primate relatives remain alive today, making it possible through comparative research to infer the evolutionary foundations of many human capacities, culture among them. Commonalities between species in their cultural attributes, such as between chimpanzees and their closest animal relatives, humans, permit inferences about the nature and scope of culture in our most recent common ancestors. Commonalities between broader taxonomic groups support inferences to be projected yet further back in time. Conversely, identifying the differences in such comparisons clarifies the developments specific to each species since divergence from common ancestors.

It does not take us far in such work to ask simplistically, “does species X display culture (or not)?”. Instead more insights are to be gained by dissecting culture into components, that may in principle vary quite independently of each other, and use these as a more complex framework for comparisons. In past years I have developed a scheme that makes distinctions between three major aspects of potential cultural variation amongst different species. These three are further subdivided into subcategories, in all cases with an eye both on their evident importance in human culture, and how

manifestations of them may be empirically established, even if in more elementary forms, in non-human species.

Instances addressed by this scheme must already have met the criteria for traditions – actions and ideas that are repeatedly socially transmitted between individuals, and thence spread across time and/or space. The first aspect of comparison concerns the resultant distribution patterns of traditions in time and space; the second aspect concerns the underlying transmission processes such as imitation and teaching; and the third aspect addresses the contents of culture, such as songs, predatory technology or religious beliefs.

I shall illustrate these distinctions and their subdivisions in a comparison of culture as manifested in humans and in the species of animal whose social learning and traditions we have learned most about: chimpanzees. We live at an exciting time when, by contrast with our near-total ignorance of the lives of our sister species in the wild just a half century ago, we now have decades of research discoveries from multiple communities across Africa, together with a multitude of ingenious and telling behavioural experiments tackling the issues at stake. Appropriate conceptual frameworks and targeted empirical investigations are vital partners in the research enterprise.

### *References*

Whiten, A. (2005). The second inheritance system of chimpanzees and humans. *Nature*, 437, 52-55.

Whiten, A. (2011). The scope of culture in chimpanzees, humans and ancestral apes. *Phil. Trans. R. Soc. B* 366, 997-1007.

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## *Invited Symposium*

# **The Nature and Evolution of Culture**

**Organizer: Andrew Whiten**

*Speakers:* Andrew Whiten, Daniel Cownden, Richard Moore, Jonathan Birch

The nature and evolution of culture has a history of empirical investigation spanning over a century, but has more recently become a particularly vigorous area of research across comparative, evolutionary and developmental psychology, anthropology and archaeology (Whiten et al., 2011). This body of work has begun to attract significant discussion by philosophers, and engagement between the psychological and philosophical literatures.

This symposium includes two largely empirical contributions and two more philosophical perspectives. Contributors have converged towards a focus on a set of fundamental issues in the subject, that centre around two essential, yet antagonistic, phenomena that underwrite cumulative culture, often regarded as the mode that distinguishes human culture from that of other species. These are (i) the processes that maintain cultural consistency over time, including cultural transmission, imitation, and conformity; and (ii) non-conformist innovation. Both are necessary to cumulative culture, the first in maintaining cultural continuity over what may be long cross-generational periods, in between steps up the 'ratchet' of cumulation, and the second in creating those novel steps. The two effects are opposites in that one involves continuity and conformity to what exists, the other non-conformity and the creation of discontinuities. How these relate to each other and what explains the dominance of one rather than the other in any one instance, are fundamental questions in contemporary developments in our subject.

Andrew Whiten draws on his research with both human and non-human primates, as well as a broader animal database, to argue that two social learning phenomena that have generated separate literatures deserve a conceptual integration. These are overimitation, the copying of aspects of other's action even when visibly causally ineffectual, and conformity, typically conceptualised as (blindly) doing what a majority of others do. Whiten offers a concise review of key recent findings in these topics and a conceptual scheme to potentially integrate them.

Daniel Cowndon et al. continue on the theme of conformity, challenging the established models whereby cultural conformity is driven by an exaggerated form of frequency-dependent transmission in which individuals copy the options of others with a level of probability beyond the frequency of the option they witness. An alternative model is offered which is in some ways simpler but more realistically deployed over longer periods, that also generates conformity and in-group cultural homogeneity.

Richard Moore contrasts two fundamental models for the nature of human culture, one that emphasises high fidelity, replicative imitation as key, and another (that has received more philosophical input) that instead emphasises transformative aspects of cultural acquisitions, under the banner of cultural attractor theory (CAT). These camps have been involved in some recent vigorous debates. Moore offers critiques of current formulations and a revised account of CAT that he argues is more viable.

Finally, Jonathan Birch critiques past explanations of the evolution of human hyper-cooperation and offers instead a model in which cultural conformity is core. He contrasts a new model of 'cultural kin selection' based on cultural homogeneity between individuals who may be related only by marriage, and prior, problematic

alternatives including genetic kin selection and cultural group selection.

## *References*

Whiten, A., Hinde, R. A., Stringer, C. B. & Laland, K. N. (2011). Culture Evolves. *Philosophical Transactions of the Royal Society B* 366, 938-948.

### **Andrew Whiten:** *Conformity, Non-conformity and Over-imitation in Cultural Cognition*

I offer a concise overview of research by my own group and by others that grapple with two important topics in the study of cultural transmission, analysed from an evolutionary perspective. The two topics, over-imitation and conformity, have generated largely separate research literatures that hardly ever refer to each other, but I propose that they should, because they share the fundamental and powerful cultural feature that social learning from others over-rides personal information.

In over-imitation, that Victoria Horner and I first identified a decade ago, a child faithfully copies even those acts of another that appear manifestly causally ineffectual. Conformity in its most intense form involves abandoning personal preferences in favour of the alternative information or behaviours of a majority of others, but is manifested in other ways too. Whereas there is evidence suggesting that over-imitation is special to humans, there is growing evidence that conformity may be more widespread among species. I review examples from both developmental and comparative studies to construct conceptual schemes in which the nature and scope of both over-imitation and conformity can be situated.

Studies of over-imitation began only a decade ago, but have already become a substantial focus in developmental psychology. The core phenomenon has been replicated in several very different cultures around the world (Nielsen et al., 2015), and surprisingly, found to become stronger with age, rather than waning with the growth of cognitive sophistication (McGuigan et al., 2011). Limited evidence suggests that our closest ape relatives are immune from the effect, opting to omit from their copying of others any elements that appear visibly causally ineffectual (Whiten, 2011). Two major classes of function have been proposed. One is an informational function, in which overimitation acts as a rule of thumb that copying the intentional actions of an apparently competent individual typically pays off, especially when the target of their actions is causally opaque, a common occurrence within the complexities of human technologies. The other function is more social and can take various forms, from acting like others to identify with them and reinforce social bonds, to acquiring cultural conventions and rituals. There is accumulating evidence that both of these non-exclusive functions are important, but context specific.

Conformity can also serve informational or social functions, or both, and may take forms conceptualised in different ways in the literature (Claidiere & Whiten, 2012), which I dissect.

I suggest that two partially overlapping phenomena offer a useful way to conceptualise diverse manifestations of conformity: copying a majority of others just because they are the majority; and being prepared to abandon personal judgments or preferences in favour of copying others. Evidence for each of these is accumulating in humans studies, including a small but rising tide of child studies, and from a diversity of animal species including the primates I specialise in, to other vertebrate and perhaps even invertebrate species.

I conclude by offering a conceptual scheme that accommodates overimitation, conformity and non-conformity.

### *References*

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### **Daniel Cownden:** *Conformity and Anti-conformity in the Absence of Frequency Dependent Transmission Biases*

In the modelling literature on cultural evolution and gene-culture co-evolution, conformist transmission plays a critical role in establishing group homogeneity and allowing for cultural group selection. While there are many ways that conformity at the group level might be achieved, there has been a special focus on individual level transmission biases whereby individuals are directly sensitive to the frequency of a cultural trait within the population. At the individual level, a conformist transmission bias has been defined as a learning strategy causing a learner to be more likely to adopt a behaviour displayed by the majority of individuals in the population than would

be expected if the learner based their adoption decision on a randomly chosen demonstrator. This particular form of frequency dependent transmission bias has theoretical appeal because it provides a simple way of efficiently utilizing social information in the face of uncertainty. Despite its theoretical appeal, frequency dependent transmission biases at the individual level have remained empirically elusive.

Many models of cultural evolution compress learning over an individual's lifetime into a single abstracted learning event. This simplification, though often justified, makes it difficult to link the population level predictions of such models with the individual level mechanisms that drive them.

This in turn causes difficulties when integrating empirical investigations of individual learning strategies with these abstract models. There is an emerging body of empirical and theoretical work which makes a clear distinction between the display of a cultural trait and the probability that the trait will be displayed, and uses this framework to study social learning in an iterated, multi-stage framework. This approach allows for a tighter link between individual learning mechanisms and population level dynamics. The result we put forward in this paper arises from this same distinction between displays and the probability of display.

Here we will demonstrate how, even in the absence of individual frequency biased transmission, conformity or anti-conformity is likely to emerge at the population level. Specifically, we show that within an iterated learning context, population level conformity or anti-conformity tends to arise when individuals have a discrete repertoire of two or more variants of a trait, each of which is displayed with some probability, and social learning is such that observing someone else display a trait variant increases the

probability that the observer will display that variant in the future. Many cultural traits can be thought of in this way. Some examples are washing hands after using the toilet, wearing a hat or not when it is cold out, the kinds of foods that can be eaten at lunch, and how to sign off on emails.

**Richard Moore:** *Imitative Learning, Cultural Attractors, and the Evolution of Culture*

A recent debate in the study of cultural evolution concerns the cognitive abilities and processes that explain the emergence of culture. Proponents of the Imitation Hypothesis (IH), including Richerson & Boyd (2005) and Tomasello (2008), argue that the evolution of human forms of culture can be attributed to the emergence of high fidelity mechanisms of social learning, in particular teaching and imitation. Teaching and imitation are important, because they allow for the fast and accurate copying of behaviours between individuals, in ways that facilitate the emergence of increasingly complex forms of technology over successive generations of learners.

An alternative view of cultural evolution (Sperber, 1996; Claidière and Sperber, 2007; Claidière, Scott-Phillips & Sperber, 2014; Morin, 2015), Cultural Attractor Theory (CAT) holds that the Imitation Hypothesis view under-estimates the extent to which culture is not replicative but transformative. Proponents of this view argue that in typical cultural transmission chains, individuals do not simply reproduce behaviours but reconstruct them, crucially changing cultural ideas and artefacts in the process. Since these authors argue that cultural transmission is not preservative but transformative, they must explain why some cultural behaviours remain stable over time. They do this by positing the existence of 'cultural attractors'.

These are cognitive biases, often but not exclusively grounded in modular adaptations, that cause us to reproduce preferentially some patterns of cultural behaviour at the expense of others.

In my talk, and building on recent work by Acerbi & Mesoudi (2015) and Buskell (2015, submitted), I make two points related to the ongoing debate between proponents of the IH and CAT.

First I argue that, while proponents of CAT have characterised their view as in opposition to IH (e.g., Morin, 2015), the views are largely consistent and potentially complementary. This is because IH is primarily concerned with the question: how does cumulative culture become possible given the cognitive limitations of human learners? In contrast, CAT is concerned with a different question, namely: why do some but not all cultural traditions persist? For the most part, answers to these questions need not be incompatible.

Second, I develop a concern raised by Buskell (2015), according to which current formulations of CAT are both circular and uninformative. This concern arises because, on some formulations of CAT (Morin, 2015; Scott-Phillips, in press), cultural attractors appear to be whatever explains the tendency of some traditions to persist at the expense of others; and they seem to play their explanatory role by virtue of being culturally attractive.

In response to this worry, I consider whether and how CAT could be formulated in a way that preserves some of the valuable insights developed by its proponents, while liberating it from charges of superficiality and triviality; and that would enable us to make non-trivial, testable predictions about the emergence of mechanisms of cultural learning in phylogeny.

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**Jonathan Birch:** *Cultural Kin Selection and the Deep Structure of Human Communication*

A crucial stage in human social evolution involved the evolution of cooperation between members of different residential bands: that is, the emergence of a “tribal” level of social organization (Chapais 2008,

2010). A puzzling part of this transition was the evolution of cooperation (or, at the very least, peaceful interaction) between male affines, i.e. males of adjacent bands related by marriage rather than blood. In this talk, I argue that no satisfactory explanation of this phenomenon has yet been provided, and I outline a tentative account that appeals to a form of “cultural kin selection”.

I begin by criticising an explanation for cooperation among affines that appeals to genetic kin selection (Chapais 2008, 2010). The idea here is that, since brothers-in-law have a shared inclusive fitness interest in the well-being of the same female, we should expect that “brothers-in-law should refrain from attacking one another” (Chapais 2010, p. 41). I argue that, although the brother of the focal female may have an inclusive fitness incentive to behave less aggressively towards her husband than he otherwise would, the same cannot be said of the husband: he has no incentive to behave less aggressively towards the brother, since the brother invests nothing in his offspring. On the contrary, the husband has an incentive to exploit the predictable non-aggression of the brother by behaving more aggressively towards him.

I then consider a second possible explanation that appeals to cultural group selection (in the sense of Richerson et al. 2016). The thought here would be that multi-band “tribes” with more cooperating affines would have outcompeted multi-band “tribes” with fewer. The problem here is one of circularity: this explanation takes for granted the population structure we are trying to explain. We should not assume from the outset that there are well-defined multi-band units, since cooperation among affines is a precondition for the existence of such a unit.

I then sketch an explanation that combines the strengths of the preceding two while avoiding their drawbacks. Chapais

is correct to focus on kin selection and patterns of relatedness in inter-band interactions rather than on competition among large multi-band groups, given that our aim is to explain the origin of such groups. His mistake, I suggest, is to consider only genetic relatedness. Cultural relatedness – i.e. similarity between individuals with respect to their cultural variants – is also crucial, since it generates the correlation between the strategies of affines that is missing in Chapais's picture. I suggest that the sort of pair bonding characteristic of human relationships between siblings and spouses could reasonably be expected to generate positive cultural relatedness between genetically unrelated affines, in the form of positively correlated beliefs, desires, values, habits and so on.

The upshot would have been that individuals with variants promoting non-aggression would have been differentially likely to have affines with those same variants. This provides a non-circular explanation for cooperation among affines that puts culture at the centre of the picture.

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