‘Speaking Our Minds’, Explore Course Jan/Feb 2017; a reading group/set of lectures around the book *Speaking Our Minds* by Thom Scott-Phillips, Palgrave Macmillan, 2015

Chapter 2 summary

The second chapter makes two main points. One is that it gives an account of how code model communication systems evolve. The other is that it shows that combinatorial communication in a code model system is extremely unlikely to emerge. The author contrasts the evolution of code model systems with the evolution of an ostensive-inferential communication system (aka the human one).

The evolution of a communication system may seem like a chicken-and-egg problem: how could a signal evolve in a signal producer before a response to it in a responder? The other way, how could a response behaviour evolve in a responder before a signal in a signal producer? The answer is to think about the definition of communication.

Communication can be thought of as a system where both the signal and response have evolved, where the signal behaviour and the response behaviour has been subject to natural selection, in such a way that we can think of this as designed behaviour. When a deer roars in the rutting season to tell alert a potential mate to its presence, both the roaring and the response to the roar are designed behaviours. However, we can imagine situations where only one half of the equation may be the case, and indeed we see such halfway systems very commonly in nature. In the case where only the response to some other behaviour/state in the environment has been designed, we talk about the information provided by that behaviour/state as a *cue*. For example, when a potential predator appears on the horizon, a prey species may have evolved to run away from it: there is a designed response to some information, but the behaviour that caused the information to be used by the prey species was not designed (the predator obviously walks about for all sorts of reasons); there is no communication here. The other way, where the signal behaviour is designed but the response isn’t, we talk of *coercion*. A chameleon’s camouflage for example has evolved by natural selection (has been designed) to effect a positive response for the chameleon (or perhaps a lack of a negative response, such as being seen and eaten). But its predators haven’t evolved anything to respond to this signal, so they are not being communicated with by the chameleon. They are being coerced not to see (and so catch and eat) the animal.

Back to the evolution of communication systems in code model systems (the chicken and egg problem just mention). What we can now see is that there are two routes to communication: the cue-first route, or the coercion-first route. An example of a cue-first route is the way dogs communicate with other dogs through their urinating behaviour. Initially, dogs who strayed out of their familiar territories may have simply involuntarily urinated (perhaps because this is just how dogs respond to being a bit worried). This would have provided a cue to other dogs, who would have evolved to respond to the information gained from the urinating behaviour. Plausibly, they would have used it to know whether to instigate conflict or not. Now there is a cue. Then, there would have been selection pressure on dogs to produce ‘more or less urine’ possibly in different places; that is, natural selection would select dogs based on their production of urine. At this point, then, when the response and the signal behaviour (which was initially a cue) are both designed (the products of natural selection), we can say that there is a code model communication system in place. This cue-first route is called *ritualization*. There is a similar logic for a coercion-first route to communication,

called sensory manipulation, which I will also briefly address (though it seems it is less common that the ritualization route).

I suspect we'll be unlikely to get this far but in case we do:

The unlikeliness of combinatorial communication in such code model systems is one of the more subtle points of the book but certainly an important one, and I will do my best to articulate it clearly. Perhaps here, we can just take one example, the putty-nosed monkey's pyow-hack signal. 'Pyow' is an alarm call for leopards (monkeys climb trees), 'hack' is for eagles (monkeys hide in bushes). If leopards and eagles ever appear together, what will the monkeys do? They will produce both signals and basically run away, to get elsewhere than where they are. Now, if it so happens that natural selection selects the monkeys precisely for this ability to signal a movement away from where the monkeys currently are (even in the absence of the leopards and eagles), then we will see the way that 'pyow-hack' becomes a new signal, with a new meaning, just meaning 'let's get moving'. Now, this is a possible story, but it relies on quite specific things 'happening to be the case' (the presence of eagles and leopards sufficiently often, and the utility of moving on from where the monkeys are sufficiently often). Also, it is quite easy to see how—instead of re-using two current signals—the monkeys may have developed a completely different sound to signal 'let's get moving' (but it just so happened that they already had something that natural selection could work on, with the pyow-hack combination). That new sound solution is essentially how almost all animals always do it. The point is that it is far more likely that they would have come up with a new sound. It was rather unlikely that evolution could recruit a pre-existing response to two separate pre-existing signals (so this is an instance of ritualization, incidentally, because the pyow-hack combination was initially just a cue that the monkeys had a response to based on their designed responses to pyow and hack individually; pyow-hack was not a designed signal). But it happened once then, and the code model based on cue-first or coercion-first evolution predicts that there will be occasional instances like this. But it's just far more likely that animals will evolve a brand new standalone signal, and so that's what we see far more of.

As we know from the first chapter, human communication is not understood with the code model and so is not constrained in the way that code model communication is. Putting signals together is practically automatic once one can signal that one is signalling something. Homesigners (deaf children born of hearing adults who invent their own communication system) do it fairly effortlessly (and this, I believe, provides an example of the sort of de novo signalling I was looking for last week!).