Prescription: A biological definition of language

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Abstract: Animal communication can be understood in terms of signals to which receivers respond. However, human animals are special in our ability to produce numerous signals that relate to our different languages and cultures. This evolutionary transition is typically seen as resulting from cognitive processes that are computational and/or social. I argue instead that language is fundamentally characterised by how we make receivers respond. I call this behaviour prescription: all signallers behave in the end-directed, intentional way that is characteristic of living organisms, but only human organisms intend to make receivers respond to their signals, as opposed to relying on evolved responses. This biological view of intention contrasts with the psychological or philosophical notion of Intentionality. I show that Intentionality conflates mental and behavioural end-directedness because these two elements are intrinsic to the prescriptive intentions of humans. Like the notion of meaning, Intentionality stems from a sociocentric perspective that precludes an objective view of human cognition and communication. Therefore, I propose the following ecological perspective: human society is composed of different competing groups, institutions that prescribe behaviour around signs and symbols. This institutional niche may correspond to the origin of the hominin lineage, and be a necessary condition for the evolution of the syntactic ability we normally associate with language.

Keywords: animal signals, intention, end-directedness, intentionality, cooperation, institutions, language evolution

1. Introduction

Language is the 'crucial difference' between humans and other animals (Maynard Smith & Harper, 2003, p. 130). The transmission and storage of information that it enables can certainly be regarded as one of the major transitions of life (Maynard Smith & Szathmáry, 1997), along with the special signals we use for that purpose, which we call signs and symbols.

Still, what is language? The general assumption is that it is a system connecting those signals and their respective meanings, but this does not make humans so special. In particular, many birds learn and produce various acoustic signals, and some even appear to combine them into novel meanings (Suzuki, Wheatcroft, & Griesser, 2020). These 'languages' are well understood since biologists have examined the behaviour of signallers and receivers. For example, we can observe that a certain call 'means' that a predator is present. The human case, however, seems to preclude such an objectivity, as meaning becomes a psychological or a philosophical question (Fitch, 2020).

In this article, I examine human behaviour as we do that of birds. This requires avoiding notions that centre around human experience, such as the notion of meaning (cf. Hurford, 2007). I assume that the minds of other animals form representations of reality that can be potentially communicated. However, I reserve the term 'meaning' for the linguistic representations of human minds, as well as to make a clearer distinction between objective and subjective reality. Indeed, when we talk, we often mean things and states of affairs that exist only in our minds, some of which we are planning to bring about. Birds seem to plan their food-caching, but these intentional representations are private and probably limited in creativity (Clayton, Bussey, & Dickinson, 2003; Redshaw & Bulley, 2018). In light of this, I ask the following questions: what do we do after signalling our thoughts that is different from our animal counterparts? Does it explain our ability to imagine all manner of things and states of affairs?

To compare this approach with others, imagine we found a bird that can arrange to hide food together with conspecifics that sing the same songs. This signalling could meet an 'empirical' definition of language as a complex faculty that enables the communication of thoughts and experiences (Fitch, 2017). The animals are effectively talking, transmitting knowledge and establishing social relations, even though they lack religion, institutions or advanced technology (Dediu et al., 2013). In Chomsky's paradigmatic view, however, our minds must be infinitely more powerful, a computational trait that is 'biological' (Hauser et al., 2014). Other theorists disagree and speak of a special ability to instruct the imagination of others (Corballis, 2017b; Dor, 2015;

Everett, 2012). Language here is a 'cultural tool' or a 'communication technology' that we use to solve problems, but this does not make it very different from the vocalisations of birds. Imagine that those hypothetical birds were using some tokens as money, to solve the problem of exchanging their different caches of food. This cooperation could satisfy the philosophical view that unlike other animals, humans can recognise communicative intent (Moore, 2016): the birds recognise that others intend to provide a future reward in exchange for the tokens. But is the resulting behaviour the same as human behaviour?

In the next section, I show that the answer is *no*: the crucial difference between humans and other animals is that we make sure that receivers accept our tokens or respond to our signals. This observation highlights the concept of end-directed behaviour (intention) in biology. Animals may intend to affect the minds and behaviour of others through signals, but only humans do it prescriptively. In section 3, I go on to address the conflation of linguistic and non-linguistic cognition that is encapsulated in the concept of Intentionality (I capitalise the term to distinguish it from intention). In this view, a receiver must perceive the Intentional, descriptive goal of the signaller to cooperate around signs and symbols. This makes language evolution synonymous with cognitive evolution. It requires explaining a special mental ability, which, in my view, results from the prescriptive behaviour of humans. In section 4, I explain that this special human behaviour is not necessarily cooperative. Language can be seen as the most basic institution, and institutions are primarily altruistic. Although altruism is usually understood as a form of cooperation, I propose a distinction between altruism and cooperation. Finally, in section 5, I discuss the evolutionary implications of this definition of language.

2. Language as prescription

Imagine that I am lost in the jungle. I see a signpost that shows a drawing of a person running and other marks I cannot interpret. The first assumption I make is that it was created by a group of people (S) who control this territory and want to change my behaviour. This sign has an aboutness that elicits the concept of running in my mind. Perhaps those people want me to start running, or to avoid running, though I could simply ignore it.

Given the latter possibility, it seems we cannot regard the sign as prescriptive. Signs may affect mental states but cannot determine behaviour. It seems more reasonable to say that the sign is descriptive. What is it informing me about? Perhaps this sign is a joke, or a work of art

encouraging me to reflect on something without any direct consequences for me. Or perhaps it is a symbol that advertises the value of running, and tries to influence or manipulate my behaviour. Is the sign then prescriptive?

In any case, we need not be affected by this confusion, whose origin is in a sociocentric perspective: as a human being, I have a tendency to attend to the sign and immerse myself, as it were, in a society S. I conflate human intention with the sign itself and begin to consider whether I should adjust my behaviour accordingly. Objectively speaking, however, this sign is just a signal, an iconic *scriptum* in the etymology of 'prescribe' and 'describe'; whereas the prefixes pre- and de- relate to the intentions of its originators toward me. In nature, receivers benefit from responding to signals, so they usually do not ignore them (Maynard Smith & Harper, 2003). But this society S is not synonymous with nature, and I have my own intentions as a receiver.

This distinction between society and nature is central to my proposed definition of language, and contrasts with most theoretical views. Signals are said to evolve along with their effects on receivers; and it is debated whether these effects are due to the (descriptive) information that signals encode, or to their (prescriptive) power to influence or manipulate (e.g. Carazo & Font, 2010; Owren, Rendall, & Ryan, 2010; Sterelny, 2012). From this mechanistic perspective, a population of interacting animals is indistinct from a human society, and natural 'law' is akin to cultural norm. However, it is clear that signals evolve because there is something in it for signallers and receivers. Unlike inanimate matter, signallers and receivers are purposeful agents that can form bonds of communication or break them. These situated facts question a theoretical view of cause and effect. They suggest that language itself biases our thinking toward an abstract, sociocentric perspective of interactions.

Similarly, we tend to think of intention as a mental quality that relates to the self and its voluntary actions in the moral context of a society. Intention is a humanistic or folk-psychological concept that we talk about, and that has little explanatory power. But here I propose that we understand intention as a fundamental quality of living organisms, consistently with a view of biology as the study of entities that behave in an end-directed or purposeful manner (Talbott, 2017). This is also consistent with the study of animal communication: as I mentioned in the introduction, biologists speak of meaningful calls because they assume that birds have a behavioural intention to avoid predators, as opposed to a mental intention. In contrast, theorists have often approached language by speaking of Intentional mechanisms and mental directedness.

As I argue in section 3, this latter perspective is burdened by the subjectivity of language, rather than the other way around. For example, we do not say that hormonal signals are meaningful because we do not picture a society of cells that communicate in an intentional way and that may have conflicting goals. We picture the body as a mechanism, and regard the concepts of intention, signal and meaning as metaphorically subjective. But is it accurate to extend this model to the interactions of animals, and specifically apes?

Many nonhuman animals can be said to have beliefs, and even beliefs about beliefs (Fitch, 2020; Hurford, 2007; Shettleworth, 2010). However, theorists tend to view these mental representations from the perspective of our linguistic, Intentional representations, assuming the same conceptual continuity between society and nature (see section 3). In this view, the expression 'there is a predator!' does not refer to anything fundamentally different from a category, concept or protoconcept of predator in the mind of a bird or an ape, a 'meaning' (cf. Hurford, 2007, p. 32). Here I propose a perspective that might be less burdened by language: beliefs are mental representations of reality that are *uncertain*, rather than true, false or similarly continuous with our linguistic attitudes. For example, a bird's belief about the seeds it has hidden under a leaf has a level of *accuracy* that diminishes with time; while as a human, I would say that the seeds are logically either there or not, or I wish that they will be there when I get back. In this way, we can also avoid notions of communicative honesty and trust (e.g. Searcy & Nowicki, 2005; Hurford, 2007, Ch. 9), as well as notions of episodic mental processes, motivational states and voluntary intentions (Redshaw & Bulley, 2018), all of which relate to our linguistic sense of self.

Accordingly, I will refer to nonhuman minds as producing *intentional representations* that resemble what we call plans, but that differ qualitatively from our hopes or 'beliefs' about the future (cf. Hurford, 2007, p. 8). These mental representations strictly concern the organism's goals, and cannot be representations of objective reality (beliefs). For instance, a chimpanzee might believe that there is a fruit hidden somewhere (objective reality), and form an intentional representation of keeping others from finding the fruit. In this representation, the chimpanzee simulates future events, and its final decision to act includes beliefs about where those others presently are and what they are doing.

Let us now turn to the people of S and their interaction with me, which does involve language and some idea of prescription/description. As I mentioned, this can be objectively understood by picturing individuals who want:

P_d) to allow me to behave freely (e.g. inform me that people run), or

P_b) to change my behaviour (to make me run), or

P_{bb}) to change my behaviour in relation to a belief (I must run).

These tactical intentions relate to three kinds of intentions that are potentially characteristic of nonhuman communication (*d, b, bb*). Of course, we mostly see the second kind (*b*) in nature. However, human signallers have a proximate ability to produce and/or modify responses that relates to the communication of beliefs (P_{bb}). This corresponds to a linguistic, prescriptive mode of intention (P). Let us review these concepts next.

Intention d. Nonhuman animals learn and gather beliefs individually, such as 'there is a snake in the bush'. *If* they externalise such mental content through signals, they are effectively describing. That is, if they could talk, the topic would be reality, regardless of whether their propositions are honest or not. For example, the hypothetical birds of my introduction could be volunteering information about the location of food. Their cooperation succeeds because those signals happen to convey accurate representations, but signallers do not intend to affect the minds of receivers or try to make them respond.

Intention b. Consider the case of bird song or other displays that attract mates. These signallers clearly intend to change the behaviour of receivers, but they are not communicating beliefs ('I am so fit!'). This is true even if there is a mental connection between signaller and receiver. For instance, when a chimpanzee requests help, its gesture may invoke the intentional representation of 'helping' (Tomasello & Call, 2019), but it does not invoke 'helper' in the way that a snake call invokes 'snake'. The same is the case in triadic or referential interactions themselves. A dog that signals the presence of food might be trying to share an intentional representation with a helping human (Savalli, Ades, & Gaunet, 2014), but only humans intend to communicate with dogs about food and helpers. Interactions need also not be cooperative. When capuchin monkeys give alarm calls to divert others from food (Wheeler, 2009), they may cause other monkeys to falsely believe that a snake is present, but they probably do not intend to manipulate belief in itself. Chimpanzees, on the other hand, could be doing so when they misrepresent reality to deceive others (Hirata, 2006). This behaviour effectively signals a false state of affairs, for example, not having found any food. Still, the signaller does not communicate a false belief, as if it were deceiving itself.

Intention bb. The snake alarm calls of chimpanzees have been shown to depend on whether receivers are aware of the threat (Crockford, Wittig, & Zuberbühler, 2017). This suggests an

intention to communicate beliefs: the animal tries to make others respond by eliciting the common awareness of a snake. However, communication here is again 'descriptive' in that the chimpanzee merely expects a reaction to an objective threat. Many animals have evolved to share honest information that benefits relatives or associates. But if reactions are not forthcoming, the chimpanzee does not have a special, charitable interest in producing them. A seeming exception is the case of animals that 'prescribe' after having been taught (prescribed) to communicate with humans. Consider the famous case of Kanzi the bonobo, who will explicitly request, for example, that the door be unlocked so that he can see his mother (Segerdahl, Fields, & Savage-Rumbaugh, 2005, p. 59). This request involves referring to the key via the corresponding lexigram on a keyboard, together with a pointing gesture toward the door. But Kanzi does not attempt to communicate the beliefs of a key, a helping human, or the general plan of seeing his mother.

Intentions $P_{bb} \rightarrow P_b \rightarrow P_d$. Humans communicate our desires and plans all the time, which raises the question of how this is possible. In nature, interests conflict; individuals disperse and ignore lexigrams, as I can do in the signpost analogy. The people of S could be signalling 'run' but I might want to do something else. Imagine, however, that the marks I cannot interpret represent snakes. The people of S are signalling that I run 'because there are snakes'. Then some individuals appear, aiming certain vocalisations at me, pretending and pantomiming until I see their intended referent in my mind ('snakes?') and respond accordingly. This signalling seems like intention *bb* above, except that there is a greater uncertainty about the presence of snakes. If I cannot grasp their belief, those people may catch me and put me in a place where they are going to teach me. Or they may begin shouting, gesturing like angry chimps, and eventually force me out of the area (P_b). All this indicates an intention to change my behaviour through a belief (P_{bb}), rather than simply signalling such a belief (intention *bb*) or the corresponding intentional representation that I run (intention *b*). It also becomes apparent why, unlike birds, those people can volunteer information if they so intend (P_d).

As a human, I have the ability to perceive the prescriptive intentions of fellow humans. I can potentially understand what the people of S *mean*, as they require each other to do. Yet I can do this because I have prescriptive intentions, too. I can disagree about the presence of snakes. I can even convince some of those people and start a different culture where we deny the presence of snakes but affirm something else.

What defines language, then, are not abilities we might share with nonhumans, such as

communicating that there are snakes (intentions *d* and *bb*) or just making others run (intention *b*). It is an ability to make others run that communicates there are snakes (P). Prescription *creates* beliefs. Many nonhuman animals, such as food-caching birds, create intentional representations of future states of affairs. Some, like chimpanzees, dogs and bonobos, can also change the behaviour of others accordingly. However, their ability to communicate and enact those states of affairs is limited because they cannot create *beliefs* and project them into the future, changing the behaviour of receivers accordingly. As the signpost analogy shows, prescription may have evolved because it builds on intention *bb*: a nonhuman ape could potentially use its naturally formed beliefs for tactical purposes, individually or in coordination with others (see section 5). Instead of an intentional representation of running, the animal creates a belief: 'there is a runner' (or 'there is a helper', in the case of Kanzi), along with the belief that there are snakes. These beliefs are rationally justified, as it were, because they are part of a pseudo-natural event that these signals invoke in the minds of receivers (I must run/help). Primarily, though, running is a norm that establishes a behavioural relationship between signallers and receivers, as shown by the way in which the people of S try to make me respond. This behaviour enables them to build common beliefs and agree on the signals that represent them, but also to command each other, or at least to communicate their plans and desires.

From a sociocentric perspective, however, those norms are obscured by the epistemic character of beliefs that refer to 'reality'. The people of S are shocked that I am not running, that I do not follow the laws of 'nature' or understand the meaning that is intrinsic to their signs. Conversely, they see their explicit norms as rational and cooperative, rather than based on arbitrary signals. The norm that a door must be opened, such as in Kanzi's example, is based on a belief that people naturally help others to see their mothers. The society's entire activity is similarly organised around beliefs, that is to say, through language.

2.1. Discussion

Signs and symbols are traditionally seen as meaningful in themselves, although their meaning often depends on context. This corresponds to the elusive distinction between semantics and pragmatics (e.g. Szabó, 2006). For example, the utterance 'the door is closed' may describe a state of affairs or mean that the speaker wants the door open, in the same way as a sign does not only refer to snakes but also 'wants' that people run away. The traditional notion of meaning thus carries

a conflation of description and prescription that differs from the objective view of prescription I have proposed above.

Hence, language appears as having an epistemic function and/or a normative function in a continuum with other animals that inform or disinform, cooperate or manipulate; when language is more accurately defined as a human-specific behaviour that combines those two functions (cf. Carazo & Font, 2010; Dessalles, 2014; Owren et al., 2010; Rossano, 2018). For example, Hurford (2007, p. 173) imagines two alternative possibilities for the origin of meaning in a society of apes. In the Independent Description hypothesis, our ancestors had an intention *d* to communicate: 'Utterances with descriptive content arose independently of any illocutionary expressions with intended effects on receivers' (p. 173). On the other hand, the Communicative Act Foundation hypothesis considers those intended effects only, as though human signalling corresponded to intention *b*. Hurford rejects the former hypothesis in favour of the latter, for the same reason a trait of informing others is not likely to evolve without a good social foundation. However, this is a foundation of mental 'meanings' that are also descriptive of something, and in a similar way to human signals (see section 3).

Words certainly seem to 'do things to others' (Austin, 1975), but as the signpost analogy shows, others do not have to let words affect them. In principle, it is irrelevant if there are '*no* expressions in any language which can *only* be used descriptively, that is without the possibility of any socially significant act being carried out when they are uttered' (Hurford, 2007, p. 172, emphasis his). This is evidenced by the puzzling fact that 'The great majority, but not all, of the expressions in a language have meaningful content which is descriptive of some state of affairs' (p. 172). Indeed, it seems that expressions need to describe the world in order to succeed at doing things to others. Hurford claims that expressions like 'Hello' and 'Bye' are an exception. Yet this can be falsified through breaching experiments (Francis & Hester, 2004). Not saying 'Hello' and 'Bye' can be offensive because one does not validate a certain understanding of nature, especially as suggested by the origin of 'Bye' in 'God be with you'. In my analogy, the sign can be seen as a 'Hello' and 'Bye' to me, and my lack of response as a failure to recognise their altruistic intention to warn me (see section 4).

Far from being implicit, these beliefs are closer to the actual use of language. Across cultures, speakers engage in a kind of competitive advertising, eager to express themselves in narratives or argumentation that deal with similar unexpected, illogical events (Dessalles, 2014). In the words

of Dessalles (2011): ‘Argumentation relies on contradiction between beliefs and/or desires … When human individuals are unable to elicit cognitive dissonance in each other’s minds, they remain silent’. Similarly, Barnard (2013) argues that language is far too complex to have evolved as a means of communication, and that myth and storytelling drove its complexity. Still, these authors share Hurford’s assumption that language arose within an already cohesive society. By contrast, a view of language as prescription suggests that every expression conceals an attempt to persuade, and that this lies at the root of all human association, not only what we would call a society. A meaning is a *belief* that is pre-scribed or ‘written before’ some rationally expected events: the speaker believes that the door is closed, so individuals respond to the utterance ‘the door is closed’ by opening the door, in the same way as the utterance ‘there are snakes’ makes them run away. Naturally, these kinds of signals create a need to accept or discuss contradictions among apes that cooperate and compete.

Thus, humans act on other humans by conveying an understanding of the environment, which can be metaphysical or within the grasp of a chimpanzee (Seyfarth & Cheney, 2017a). That is, as signallers, we transmit our beliefs irrespective of their accuracy or truth-value, and we benefit from normatively conforming to them; while as receivers, we benefit from comparing those beliefs with objective reality. To follow the same examples, I might not be interested in opening the door (perhaps it was already open!) or believe that there are snakes.

This trade-off could explain our special ability to read minds. As Tomasello (2018) reminds us, ‘many animal species imagine and track the mental states of others, and they have potentially available to them all the information necessary to understand that others have false beliefs’. Nonhuman apes, like human infants of 1–2 years of age, can indeed *discern* false beliefs. But Tomasello suggests that the genuine understanding of 4–5 year-old children emerges along with an ‘objective perspective’ in which there is a norm-governed discourse about the truth of propositions (Tomasello, 2018). In this way, developing apes discover the world and the mental states of others, building a ‘mental world’ that surpasses animal perception (Astington & Baird, 2005). Here, again, language has a certain descriptive power. Whereas in my view, language is about animal behaviour: children come to understand false beliefs because, having a tactical function, all propositions are potentially deceptive. This is supported by research on the manipulative abilities of apes (Rossano, 2018). It is also supported by the body of research cited by Tomasello, which suggests that executive function and language ability (behaviour) predict

false-belief understanding (mentality), rather than the reverse (e.g. Devine & Hughes, 2014; Milligan, Astington, & Dack, 2007).

So, are the people of S deceiving me with their alarm call? Certainly, if language is a particular trait that appears in 'society', enabling us to perceive truths and falsehoods, and the truth is that there are no snakes in the area, then the people of S are deceiving me. Some theorists view this in a positive light, speaking of a collusion in deception that was necessary for the evolution of speech (Knight & Lewis, 2017). They posit that hominins were pressured by a hostile environment into forming large groups of vocal mimics. These groups were, effectively, societies, so either their members already had the abilities required to learn mimicry (i.e. imitation and possibly false-belief understanding) or the evolution of those abilities was facilitated by that milieu. The basic idea is that mimicry became a costly signalling device for securing trust and inference on the part of receivers. Receivers are members of a society, as opposed to individual organisms, and the signalling is symbolic 'Because it is false' (Sperber, 1975). This draws on an understanding of metaphor and the fact that 'we should not expect indigenous categories to match the way Western science carves up the world' (Knight & Lewis, 2014). Nevertheless, these signals also create a 'mental world', a 'community of minds' with a standard of truth that is seemingly above the lives of animals (Astington & Baird, 2005).

The previous two examples show a level of agreement with the present approach, especially through their assumption that norms enable successful communication. However, theorists adopt a sociocentric perspective that does not question those norms or consider the conflicting interests of individual signallers. As I show in section 4, these conflicts could account for why there are thousands of different societies and languages, and of course mistrust. Conflicts need not result from certainty of deception in an epistemic and/or moral sense, which suggests selfhood, volition, logic, and other aspects of humanity that bear upon a theory of language (cf. Mitchell, 1986). We have an ability to create realities that involve a *degree* of deception shared by signallers and receivers (see section 5). Indeed, it can be uncertain whether there are snakes in an area. The people/hominins of S could be taking advantage of this instinctually rather than willingly, and they could create more accurate, positive beliefs. Their beliefs about food sources, for instance, help them to live comfortably; and their sense of belonging in S through these shared beliefs permeates concepts about reality and unreality, all the way to their belief in a certain snake at the beginning of existence.

Prescriptive signals thus combine natural 'laws' (snakes are dangerous and food nutritious) with human laws (running away from snakes and enjoying the food one is given) that are relatively arbitrary. This conflation of nature and nurture implies role playing that requires offspring with imitation skills. Imitation is known to set us apart from other apes, enabling cumulative culture (Boyd, Richerson, & Henrich, 2011). However, it is unlikely (if not illogical) that the underlying trait of 'allowing words/movements to do things to me' would have evolved without the corresponding 'allow me to do things to you'. Imitative learning probably results from parental prescription, as I discuss in section 5. The tendency of human children to 'overimitate' can be seen as resulting from the arbitrariness of those signals (cf. Keupp, Behne, & Rakoczy, 2018; Rizzolatti, 2014). Because some animal behaviours resemble this interaction, they are sometimes called 'teaching'. But human teaching is not merely instrumental and focused on behaviour. It requires a sensitivity to the mental states of learners that is linked to the production of signals (P_{bb}). The signals of pantomime, mimesis and ritual are no doubt important in this context (Donald, 2017; Fitch, 2017; Zlatev, Żywiczyński, & Wacewicz, 2020). However, this kind of behaviour appears too intricate and meaningless if seen as merely descriptive. In addition, the neural mechanism that it requires is only present in humans, unlike the basic mechanism that mirrors the 'descriptive' intentional behaviour of other apes (Rizzolatti, 2014). Even preverbal infants seem to recognise 'helpers', not merely objects that behave intentionally (Hamlin, Wynn, & Bloom, 2007). Infants are indeed born to parents who produce signals and actively help them to respond appropriately.

The signpost analogy also shows that prescription is independent of whether its signs or symbols are visual, acoustic or gestural (modality). All of it co-evolves with this fundamental behaviour, consistently with recent trends in the study of modality (De Boer, 2017; Fröhlich, Sievers, Townsend, Gruber, & van Schaik, 2019). These bodily aspects can explain why engaging the attention of others is often seen as the hallmark of human communication (Scott-Phillips, 2015). By seeing them in the light of prescription, we can bypass debates over the need to affect mental states for there to be meaning in signals (Moore, 2016). Namely, the 'come to me' gesture of a chimpanzee mother may or may not convey communicative intent; what would make it meaningful is that the corresponding role of the child is enforced somehow. We prioritise mental states because of a sociocentric expectation that others fulfil those roles ('a child must come to its mother'), but this kind of intention (P_{bb}) is not necessary for our signals to actually do things to others (P_b). Conversely, if chimpanzees made referential gestures with full intent that others

acknowledged them, this would not make their group a society in the human, meaningful sense, unless they began to coordinate their behaviour as I have described.

Of course, we use language to theorise about language. The different beliefs our signs and symbols create may sometimes lean toward the normative end, making it hard to see what a snake is and where it might be. Historically, there has been much resistance to such a scientific 'meaninglessness', as illustrated especially by the linguistic turn of 20th Century philosophy (Biletzki & Matar, 2016). There is a preference for the aforementioned dichotomy between semantics and pragmatics, or between a view of expressions as mapping directly onto reality and a view of so-called language games. So far, the scientific study of language has featured a similarly idealistic conflict between the opinion that our individual minds compute meanings, and the opinion that meaning is qualitative and socially created (Corballis, 2017a; Everaert et al., 2017; Harris, 1995). Yet some researchers have raised the issue that the meaning of 'meaning' can be descriptive or prescriptive, or conflate what reality is with what we think it should be (Baumeister & Von Hippel, 2020).

Recent proposals reflect a similar change of perspective. For example, Zlatev et al. (2020) express the need to reframe the ongoing debate by speaking not of language/protolanguage evolution, but of a human-specific communicative system. In the study of animal communication, there are appeals to pragmatics (Scott-Phillips, 2017; Seyfarth & Cheney, 2017b) and to the behavioural aspect of intentionality (Townsend et al., 2017). Kolodny and Edelman (2018) refer to our ancestors' ability to influence the thoughts and behaviour of others in a 'desirable' direction. Still, the assumption remains that signals evolved to describe, as illustrated especially by the desirability of tool-making (Laland, 2017): in our special cultural niche, these adaptive behaviours were taught to the offspring, which led to the evolution of signs and symbols. But, clearly, these signals can also be used arbitrarily to establish what is desirable, such as that tools be made in a meaningful way, or that they be made at all.

3. Intention versus Intentionality

The previous section identified a discontinuity between the signalling intentions of nonhuman animals and those of human ones. This corresponds to a cognitive discontinuity. To follow the same analogy, I can see that the different signals produced by the people of S are about something: they have an 'aboutness' that relates to their meaning. But if I am a wild bonobo, I am not going

to participate in this exercise of collective attention. Thus, attending to a door is not the same as attending to the referent of the expression 'that door over there', though the latter kind of attention may involve an overlap.

The common view of aboutness, however, parallels that of meaning. It pictures a language-like continuity between nonhuman and human minds that makes language difficult to identify as a trait. For example, Shettleworth (2010) considers that asking whether animals can learn language is the wrong question, as 'several features of *language* are shared by the natural communication systems of other animals' (p. 532, emphasis mine). Among these shared features is the aboutness of mental states, which correspond to 'intentional statements' such as Susie's belief that Max is her father (ibid. p. 432). Likewise, Hurford (2007) writes of a certain continuity between mind and language: 'The aboutness, or Intentionality, of modern human utterances [e.g. 'Max is Susie's father'] derives from the aboutness or Intentionality of pre-linguistic mental representations' (p. 173). That is, our ancestors' minds contained descriptive 'meanings' that they did not signal to each other. This cognitive isolation changed at some point, when they developed a shared Intentionality that other animals lack (cf. section 2, intention *bb*).

Like the notion of meaning, Intentionality makes no clear distinction between a mental and a behavioural end-directedness. Both are understood as a kind of intention, since from a sociocentric perspective, attending to something implies a signalled belief and its behavioural consequences. For example, Shettleworth (2010, p. 432) refers to Max as exhibiting Intentionality when he plans to pick up his children from school. Mental states are thus descriptive of snakes, doors, fathers and schools. At the same time, mental states have 'intended effects' (Hurford, 2007, p. 173) when they turn into utterances, as they are related to attitudes such as fearing a snake, wanting to open a door, believing that Max is a father, or planning to pick up children from school. It is not seen that these attitudes are linguistic, and that they relate to the underlying *behavioural* intentions of signallers to make receivers respond (P). In the present view, meaning and aboutness result from those individual intentions. These mental qualities relate to beliefs that exist in the minds of *human* animals, not in some kind of collective mind or in signs and symbols themselves.

Intentionality is often defined along with a disclaimer that it not be confused with intention, yet this confusion is justified. The term arises from the tradition of medieval philosophy (Chisholm, 1967), which on account of its religiosity, did not distinguish between those two ways of interpreting its etymological root *intendo*: i) I turn my attention to something, and ii) I intend to

do something. For instance, aiming toward God (mind) would overlap with aiming to obey God (behaviour). In this view, all behaviour is determined and known by the mind of 'God', though, paradoxically, the individual is able to choose between good and evil behaviour. The same is generally true of mythology, which can be seen as a sociocentric account of nature in which both living and non-living things are imbued with human intention (Barnard, 2013).

The notion of Intentionality was introduced by Franz Brentano, a former Catholic priest, in a philosophical or psychological context. Intentionality is the 'power of minds and mental states to be about, to represent, or to stand for, things, properties and states of affairs' (Jacob, 2019). This definition resembles that of meaning or reference, which can be phrased as the corresponding power of signs and symbols. Indeed, Intentionality posits that linguistic representations, too, have such a 'content' (ibid.), so Brentano's preoccupation may have been the nature of words more than the nature of minds. In emphasising aboutness or mental directedness, Intentionality makes no distinction between what is real and what is imagined. This justifies the notion of 'mental power' in light of the above distinction between nonhuman and human intentions: nonhuman animals probably lack the energy to entertain mental representations of unreal things, properties and states of affairs, unlike human animals, who can afford to maintain a costly brain tissue.

In spite of this limitation, Dennett's notion of the Intentional stance has proven useful in studies of animal communication (Crockford et al., 2017; Dennett, 2009; Maynard Smith & Harper, 2003). Here, too, the lack of distinction between mental and behavioural end-directedness is reflected in the term. The idea that animals have intentions is only an explanatory device, the thinker's stance, and this human subjectivity is equated to the subjectivity of animals under observation. Thus, a chimpanzee 'wants' to communicate that there is a snake in the bush just as a molecule 'wants' to bind to another, and the animal's having a mind depends on the need to explain its behaviour by *speaking* of such a mind. Nevertheless, the all-powerful mind of the thinker knows that behaviour is always determined by physical laws. To be sure, this raises the question whether those laws differ at all from the moral laws that 'determine' human association. It suggests that the subjectivity of language exerts a greater influence on this mechanistic, algorithmic view of life (Dennett, 1995; cf. Lucas, 1961).

Intentionality is naturally understood more as intention than as aboutness in cognitive science, that is, in relation to voluntary actions. Still, it is often referred to as the capacity to understand those actions (e.g. Corballis, 2017b, p. 191; Rizzolatti, 2014): apes recognise when others act

voluntarily, so behavioural and mental end-directedness are assumed to have a special relation. In particular, second-order Intentionality corresponds to intention *bb* above ('I believe that you believe that there is a snake'). This level seems sufficient for language because it enables a reciprocal communication of thought (Schel, Townsend, Machanda, Zuberbühler, & Slocombe, 2013). However, this questions the usefulness of this philosophical idea (see Townsend et al., 2017). Even if chimpanzees were capable of third-order Intentionality, this would not tell us much about the origin and function of a faculty they do not possess. By contrast, the notion that language requires a prescriptive mode of intention explains how higher orders of Intentionality might have evolved, as such an intention concerns behaviour over mentality. Namely, making sure that others will act on the basis of dubious beliefs demands more mind reading: 'I believe that you believe that I believe that "there is" a snake'.

Indeed, other primates do not have language, even though research gives progressively more evidence that they are capable of a necessary and sufficient theory of mind (Krupenye & Call, 2019). They can recognise deception, learn to manipulate symbols and even perform calculations (Livingstone et al., 2014). As I mentioned in section 2.1, they can also distinguish false beliefs (Tomasello, 2018). Still, Tomasello claims that a genuine understanding that others have false beliefs appears only in children of 4–5 years. Tomasello finds explanation in our ability for shared Intentionality, which would have emerged before language thanks to cooperation. But this approach omits the 'uncooperative' aspect of language, or alternatively, the manipulate aspect of 'cooperation' in apes (Rossano, 2018) I address this terminological ambiguity in section 4. Social cohesion takes place with great force around religious, political and monetary referents of dubious reality and that compete against those of others. Children rehearse these and other activities in pretend play (Wyman, 2014), effectively creating a dishonest standard of objectivity. This 'prosociality' relies on our special (prescriptive) intention to reveal or declare our beliefs, for example, that a piece of paper marked with an S is 'money'. Meanwhile, chimpanzees remain in reality. They can spot false belief but communicate true belief, and are far from communicating with a declarative intention. If chimpanzees had evolved such an intention together with shared Intentionality, could they have developed so many different institutions, languages, myths and moneys? In this approach, the answer is necessarily *no*, as cooperative signals have to be honest (e.g. Laland, 2017).

As I have discussed, Hurford (2007) coincides with Tomasello. In the first part of his book,

The Origins of Meaning, he criticises the philosophical assumption of a direct connection between words and reality, but this contrasts with his definition of languages as systems '*for translating* meanings into signals, and vice versa' (p. 3, emphasis mine). His thorough examination of nonhuman cognition would seem to suggest a biological separation between nonhuman 'meanings' and human meanings. However, Hurford adopts Intentionality: 'the significant similarity between *hope* and *want* shows that, if we grant that nonhuman animals can want things to happen, then, as far as wanting overlaps with hoping, they can also hope for things to happen … The human words for Intentional mental states do indeed show a richness that we cannot easily attribute to nonhuman animals, but the difference seems to be a matter of degree ...' (p. 8). Thus, when seeking the 'semantic precursors' of language in the second part of the book, he sees the origin of our idealistic desires in 'Cooperation, Fair Play and Trust in Primates' (Ch. 9). In the same vein, philosopher John Searle (1995) has referred to hyenas hunting a lion as an example of a 'social fact'. Hyenas share an ability for 'collective intentionality' with members of Congress who pass legislation (p. 38), so the difference between the existence of a lion and that of the United States is only a matter of degree.

In *The Social Origins of Language,* Sinha (2014) emphasises the distinction between symbols and signals: a signal 'can be regarded as a (possibly coded) instruction to behave in a certain way. A symbol, on the other hand, directs and guides not the behaviour of the organism(s) receiving the signal but their understanding (construal) or (minimally) their attention, with respect to a shared referential situation' (p. 41). In this semantic account, members of Congress understand the symbols of their country, whereas hyenas merely react to each other's laughter. Zlatev et al. (2020), on the other hand, consider that signals should be distinguished from *signs,* which are less symbolic and more pragmatic. In both cases, theorists assume a collective situation (S) from where it seems irrelevant whether a signpost has guided my understanding (that I must leave an area of land) or it was someone waving their hands at me. This conundrum could be resolved by adopting a biological perspective: signal, sign or symbol will affect my behaviour only if I, a decision-making organism, join those people in a state of shared intention (P).

Sinha (2014) acknowledges the importance of behaviour as 'the leading edge and motor of evolution' (p. 35) but his definition of symbol stresses mentality. The same occurs in the general proposal that language acts as a 'biocultural niche' in the 'semiosphere', that it is a communication technology (Dor, 2015), a cultural tool (Everett, 2012), or the sharing of experience (Corballis,

2017b). These considerations reflect a tendency to attribute at least some objectivity to institutional statuses like marriage and nationality, a 'dual ontology' (Dor, Knight, & Lewis, 2014, p. 5). Specifically, Wyman (2014) argues that children's pretend play may be a rehearsal of a 'serious' institutional reality. However, those culturally-contingent, arbitrary representations cannot be evaluated from a biological perspective. 'Society' cannot be the essence of language or provide a niche for its evolution. Rather, language provides a niche for institutional behaviour that outlines different societies.

4. The institution of language

Near the time of his death in the midst of World War I, Emile Durkheim wrote:

> The great difference between animal societies and human societies is that in the former, the individual is governed exclusively from within itself, by the instincts (except for a limited degree of individual learning, which itself depends upon instinct). On the other hand, human societies present a new phenomenon of a special nature, which consists in the fact that certain ways of acting are imposed, or at least suggested from outside the individual and are added on to his own nature: such is the character of the 'institutions' (in the broad sense of the word) which the existence of language makes possible, and of which language is itself an example. (Lukes, 2007)

Language can indeed be understood as the most basic institution. A person's institutional status of being married, or a land's status of being a country, is declared by people who produce signs. However, this declaration results from the simpler declaration that those signs have a certain meaning. Logically, this cannot be a linguistic declaration in the sense that signs themselves are used to make it. Rather, these are 'certain ways of acting' which are 'imposed, or at least suggested from outside the individual', as Durkheim suggests. That is, language is built upon the prescriptive intentions of individuals.

In section 2, I explained how this mode of signalling can either aim at changing individual behaviour (P_b, P_{bb}) or leave individuals to behave in accordance with their own beliefs (P_d). However, signallers always have an intention to communicate beliefs. Imagine that the people of

S do not react to my disobedience of their sign but continue to express themselves about dangerous snakes in the area. I cannot understand them because I am obeying the signals of another group, which say that there are no snakes in that area. This situation relates to the general confusion around the concept of cooperation: I could say that I am not 'cooperating' with the people of S because I am 'cooperating' with other people. But this terminology does not reflect the logical distinction between a behaviour restricted to one of those groups, and a behaviour of *cooperation* with individuals from either group. I have called the first an *altruistic* behaviour (Maanmieli, 2019a).

The institution of 'money' provides a useful example, through which we can additionally understand linguistic signals as tokens and vice versa. Even though fully fledged monetary economies developed recently, along with writing, the present analysis suggests that the seeds of monetary behaviour are in the institution of language. Money consists of symbolic tokens that enable indirect exchanges of goods and services (Maanmieli, 2019a). However, this function can either result from an arbitrary declaration, such as in the case of a national currency, or it can result from the natural properties (e.g. scarcity, durability) of objects such as beads or gold. The first kind of behaviour depends on the politics that bring about imaginary snakes or a nation (P_{bb}). People want the token because they believe in it, but this intention rests on the norm that I (a potential member of this club of sorts) must accept it as payment. By contrast, the second kind of behaviour depends on the reality of the token's monetary properties, leaving up to me, as an individual organism, whether to accept it or not (P_{d}). In the case of a national currency, only those individuals who recognise what is declared as money will exchange goods and services for it (altruism). Whereas in the case of gold, anyone will exchange them provided they recognise those natural properties (cooperation). Both kinds of belief may overlap (e.g. a gold-backed national currency) and be communicated descriptively by offering the token, which indeed *refers* to potential goods or services. However, only the second kind *stems* from a cooperative referential intention. In other words, a national currency is not a tool in the sense that gold, mathematics or fire are tools that solve problems of exchange, quantities or predators. The same applies to other systems that prescribe behaviour versus those that do not.

Consider now any kind of linguistic signal, sign or symbol in the light of this analysis, for example: '1'. This signal elicits a natural concept of number in our minds because we have entered a state of shared intention around this particular symbol, and no other, in the same way as things

and people acquire institutional statuses. The basis of such an enhanced mental representation is in the cooperative maintenance of an imagined entity, a ‘snake’. However, the concept is naturally independent of any particular signal, as are the concepts of gold or snakes. We benefit from sharing the same linguistic representations of these real entities, so any prescriptive effort by a subset of people to deviate from this norm is necessarily uncooperative and untrustworthy, such as their saying ‘snok’ instead of ‘snake’. Still, these altruists believe that they are cooperative and trustworthy as they preferentially benefit each other. The same would be the case for any other signals and combinations of signals, which can be seen as collectively accepted tokens. Groups may separate from each other, so there would be no reason, in principle, to continue regarding their equivalent signals as uncooperative or untrustworthy. Snakes are simply referred to as *snok*, and a sociocentric perspective disguises the prescriptive nature of language, which can be seen at the boundaries.

4.1. Discussion

Recall the birds of my introduction, whose behaviour strongly suggests that they possess the faculty of language. They are able to interpret complex vocalisations about the location of food, and they recognise that others intend to provide food in exchange for tokens. If these cooperative birds cannot make signal receivers respond, to actually gather food or accept this money, then they do not possess language *as we know it*. Receivers can indeed disperse and accept other tokens issued by other bird cultures.

In reality, experimenters succeed at communicating with birds and other animals because they are *altruistic* with them. They use food and other incentives until their subjects associate *their signals* with a cultural event (Segerdahl et al., 2005). But this does not work the other way around: nonhumans cannot create beliefs (section 2). They cannot make anything stand for food, whether it be a vocalisation, a lexigram, a portable item, or the many other perceptual features we would conceptualise as signals. All of these features can be understood as tokens, in the same way as portable tokens, like dollar bills, are signals. By contrast, a view from ‘within the culture’ assumes that certain informative, meaningful tokens are accepted by individuals, and ignores the altruistic norms that establish the culture. This is understandable, since we have all been born in a human society. Like Kanzi, who was born in captivity, children can but accept these signs and symbols, units of ‘credit’ issued by elders, with which we can buy candy, bananas and tickles. This is not

so bad! It also enables us to cooperate constructively.

The difficulty of understanding language is thus related to the difficulty of defining cooperation (Maanmieli, 2019a; Noë, 2006; West, Griffin, & Gardner, 2007). Many approaches to the way our ancestors began connecting signals and meanings rely on a pre-existing cognitive or cultural niche, in which solving problems and competing against other groups were 'cooperative' activities (Hurford, Studdert-Kennedy, & Knight, 1998). Yet, as above, mathematicians cooperate through a descriptive communication system that solves real problems. They understand the benefit of sharing the same symbolic representation of mathematical concepts. Natural languages, on the other hand, appear to be designed to prevent this cooperation. They do not resemble tools so much as secret codes, and not even the sort of code that is functional and clear for its users, but one that conveys intricate stories and myths (Barnard, 2013). As I have discussed, some theorists find that such a deceptive niche of 'trust' is precisely the key to language (Knight & Lewis, 2017) or consider ritual a necessary step (Fitch, 2017). However, parochial altruism (Rusch, 2014) and human warfare (Kissel & Kim, 2019) would seem not to belong in a genuinely cooperative niche.

Altruism has resulted in a veritable explosion of meanings and languages (Evans & Levinson, 2009). Theorists have tried to explain this by appealing to generative processes that can be syntactic, semantic, pragmatic, act together or separately, and relate to our mysterious proclivity to communicate (Fitch, 2017). Yet, biologically speaking, it is not important whether these processes are recursive, hierarchical or combinatorial, artistic, ritualistic or motivational. What matters is why an animal would accept the resulting tokens. We can assume that a *wild* ape begins to signal the concepts or proto-concepts 'snake', 'fruit' and 'bush' by whatever means, and that some conspecifics accept them. But once a computational process is applied, so that 'snake bush', 'not-snake bush', 'fruit bush' and other units are added to the repertoire, why would they be accepted too? And why accept 'snake' and not 'snok' or 'snaca'? These questions seem particularly taxing for some theories of language (Jackendoff & Pinker, 2005). In a world of conflicting interests and limited muscle power, we do not expect a trait of producing many meaningful signals (let alone an infinite number of meaningful signals) to invade the population. Yet from a sociocentric perspective that is confused with nature, this trait looks rational and adaptive (Pinker, 2010; Pinker, 2015). Symbols, sentences and formulae have meaning in themselves. Life itself is an algorithmic process involving genes, memes and other bits of

information that signallers try to sell to sceptical receivers (Dawkins & Krebs, 1978; Dennett, 1995; Krebs & Dawkins, 1984).

Computational theories also face issues of mathematical logic, which relate to the possibility that consciousness is a non-computational physical phenomenon (Lucas, 1961; Penrose, 1994). Indeed, a bonobo must have some form of consciousness, yet not even a trained bonobo can convincingly use tokens. Kanzi does understand novel utterances such as 'Put [verb] the money [direct object] in the mushrooms [indirect object]' (Kako, 1999). But these syntactic abilities might not be reflecting a computing mind that processes discrete meanings. Like bottlenose dolphins, parrots and humans, Kanzi might just be making conscious inferences (cf. Seyfarth & Cheney, 2017a). This does not mean, however, that this bonobo is gifted to the point of inventing a category-based rule for its own utterances: 'place lexigram first' (Greenfield & Savage-Rumbaugh, 1990, p. 560). This rejection of the computational paradigm pictures Kanzi as a cultural being, who can play with the modality of communication (lexigram first, gesture second). In this view, it is impressive that a bonobo does not use the linguistic categories we humans are accustomed to, such as objects, subjects, nouns and verbs (Kako, 1999). But Kanzi is probably just putting lexigrams first as experimenters have done all his life, resulting in food. He is 'prescribing' human apes based on his intentional representations (see section 2), but he cannot issue tokens at will or create beliefs.

Accordingly, Fitch (2017) refers to *Mitteilungsbedürfnis* ('the drive to share thoughts') as one of the major differences between humans and other apes: 'It is easy to overlook the importance of this trait, but without it the free flow of information that provides a prime benefit of language would slow to a trickle'. In his view, however, this trait is not related to any particular behaviour, and comes along with other 'semantic/pragmatic' components of human communication. These components involve '*more complex meanings* than single word meanings', though it is difficult to arrive at a 'precise delineation of what differentiates humans from other animals in this domain' (ibid., emphasis mine). This seems to make language a computational trait, in agreement with Hauser et al. (2014), a trait we might never understand in light of Darwin's theory.

5. The evolution of institutions

The evolution of language has often been framed as a two-step process, following Bickerton (1990). First, a protolanguage was gradually developed, which involved symbols and simple

grammar. Expressions such as ‘mother meat’ and ‘meat mother’ are examples of protolanguage, while the corresponding expressions ‘mother gave me some meat’ and ‘give the meat to mother’ are considered to have evolved later. Because animals such as dolphins, birds and apes seem capable of the former kind of communication, it seems reasonable that our ancestors should be included. However, we are faced with the question of why language did not evolve in those other animals, or specifically in other apes.

Our lineage includes over 15 species that could have possessed a presumably adaptive protolanguage and yet went extinct. Why did none of these very different, skilled apes evolve to coexist with us, unlike other great apes? New, surprising species, such as *Homo Naledi,* are constantly being discovered. The making of tools, cognitively associated with language, is now known to predate the emergence of the genus (Harmand et al., 2015; Kolodny & Edelman, 2018). Likewise, seafaring seems attributable to the Lower Palaeolithic (Bednarik, 2020, p. 92). This archaeological scenario already suggests the kind of world-changing or niche-expanding ability that Bickerton himself emphasised: ‘It is only because we can imagine things being different from the way they are that we are able to change them’ (1990, p. 2). Still, theorists tend to assume the evolution of what is ‘obviously’ useful about language, such as description and cooperation (Dessalles, 2014; Kolodny & Edelman, 2018).

Consider the oldest known manuport, the Makapansgat cobble (Bednarik, 2020, fig. 2.9). This cobble has natural chipping and wear patterns that resemble a human face; it was presumably taken to this South African cave, miles away from its nearest possible source, by an australopithecine. Here, again, many theorists look for a useful ‘extended mind’ and the ‘exograms’ or ‘external memory’ that aid its ‘processing’ of information (Bednarik, 2014; Donald, 2017; Menary, 2010). These computational metaphors make the circular assumption that the potential for language, at least, was already in place. Besides, chimpanzees do not carry around such representations, even though they are able to recognise facial features. In view of these problems and the importance of behaviour for the evolution of signals (Maynard Smith & Harper, 2003), it is unhelpful to keep looking for the emergence of a cognitive trait, whether it is continuous or discontinuous with other animals. It makes sense to ask why this seemingly maladaptive behaviour arose.

Prescription could have evolved gradually in a kind of self-deceptive process. In section 2, I mentioned the tactical abilities of capuchin monkeys and the referential ability of chimpanzees (intention *bb*). Combining the two, we can imagine an ape that went a step further toward our

tactical ability to affect the beliefs and behaviour of conspecifics. For example, this ape has an increased tendency to make snake alarm calls and to check whether others, who may have the same tendency, believe that the snake is present. Individuals begin to associate with each other as these inaccurate beliefs work against other individuals or groups. This practice brings together a precursor of displaced reference (to a hypothetical snake), a basic form of normativity (to respond to the snake) and an incipient social role. There is something distinctly human about these shared inaccurate beliefs, though they involve little more than a different contextual response. They outline an intersubjective 'reality' that has drifted from reality; that is, the minds of these apes can form beliefs that no other minds can form.

This evolutionary sketch should not be seen as a hypothesis. Our ancestors could have 'carried others around' in various ways, though the Makapansgat cobble might reflect that they did so quite voluntarily. It is as if the people of S carried the signpost with them, making others respond to it. These tokens, and their associated beliefs, are tools that are used with and against others, not unlike the way in which extant apes collude around non-linguistic beliefs (Hirata, 2006; Schel, Machanda, Townsend, Zuberbühler, & Slocombe, 2013). The adaptiveness of prescription is thus not so much in a cognitive ability to avoid predators; it is in a behavioural ability to create beliefs that can help to avoid predators, but also to become predators. Our ancestors could have suggested the belief of a snake to each other through visual and/or acoustic signals, thereby enhancing it with the intersubjective quality of a not-so-real snake. This would have effected a gradual transition to a more active role-playing of 'snakes', which was at first a reaction to the possible presence of snakes.

Hence, there are bodily and vocal communication elements but the latter are more important, in accordance with their suitability for coordinating behaviour (Fröhlich et al., 2019). These declarative signals (a snake call, the face-looking features of a cobble) present the crucial feature of displacement, insofar as their referents (a snake, a face) can actually be found elsewhere (Hockett, 1960). Signals could often be descriptive and accurate, along with a certain ability to distinguish them from inaccurate, normative signals that invoke social fictions. This would result in an enhanced representation of reality through *concepts* that are eminently linguistic, as opposed to the beliefs and intentional representations of other apes (cf. Fitch, 2020; Hurford, 2007). Our ancestors would have begun to communicate about each other, or about snakes, regardless of whether they were present. And they would have done so to various degrees of imagination or

projection, not only either dishonestly or honestly.

Thus, unlike many hypotheses of language evolution, this approach does not picture a semantic system of honest signalling. Instead, it considers abilities that are known to provide fitness gains to primates. It posits a new, competitive niche of coordinated (self-)deception where beliefs are treated as tokens in an increasingly voluntary way. These can be demonstrated and taught to the offspring, who would have been selected for their 'obedience' or imitative skills (see section 2.1). Likewise, the usefulness of manipulating tokens would have created selection pressure for an extended childhood in which to pretend play. Hominin children would have had fun, but also grown up to take tokens seriously insofar as they serve the reproductive interests of an ingroup (Maanmieli & Maanmieli, 2019). This increased inter-group pressure can encourage the creation of more tokens, which can in turn lead to the productivity of modern language (Piantadosi & Fedorenko, 2017). Consider the case of compositional syntax in birds (Suzuki et al., 2020): because they do not have institutions, birds do not experience a great selection pressure to produce and combine many signals. Bird 'cultures' therefore do not appear at the rate human cultures have. Once altruistically accepted, the tokens can be deployed for cooperative purposes, as I discussed in section 4.

This account is consistent with the kind of cooperation-for-competition that exists in primates (Tomasello, 2014). It does not postulate any special environmental conditions that made humans honest or fair. In particular, it does not claim that our ultra-sociality evolved due to the pressures of competing groups (ibid.): logically, primates must have already evolved such an enhanced 'cooperation' if they are to put an increased pressure on neighbouring groups. Instead, it finds support in the uncontroversial idea that cooperation creates selection pressure for tactical deception (McNally & Jackson, 2013), especially in a context of cooperative breeding (Burkart, Hrdy, & Van Schaik, 2009; Isler & Schaik, 2012). Parents and offspring would have formed altruistic coalitions, leading to populations that more accurately resemble the human landscape studied by anthropologists and sociologists.

Indeed, the approach of social anthropology to human origins is markedly different in its emphasis on what may be called the dishonest aspect of human communication (Allen, Callan, Dunbar, & James, 2011; Barnard, 2016; Knight & Lewis, 2014). It involves the notion that being kin is dictated by language (Ball, 2018). This epistemic ambiguity contrasts with the hypothesis that language evolved thanks to the cumulative benefits of teaching genetic kin, a process

facilitated by tool-making and child-friendly forms of speech (Kolodny & Edelman, 2018; Laland, 2017). But our ancestors not only taught skills, they also taught a cultural system of kinship that was reinforced by genetic non-kin through certain norms of address and reference. Teachers and priests of all kinds continue this practice today, along with a seemingly universal asymmetry in the use of kin terms that verges on taboo (Fleming & Slotta, 2015). How could this global phenomenon have evolved in a population that teaches only as far as honesty and inclusive fitness allow? Is it child friendly to refer to oneself as kin in the third person when speaking to children? (Maanmieli, 2019b). These are important questions for any hypothesis of language origins.

Laland's (2017) proposal that 'language' (a powerful system that connects signals and meanings) originated in teaching comes with its own criteria for deciding the validity of competing hypothesis, such as the question of why language is unique to our species. Like other sociocentric approaches, Laland assumes a cooperative disposition between parents and children that is not characteristic of any other species, so his hypothesis passes the test. By contrast, a view of language as prescription does not assume that our species is exceptional in the parent-offspring conflict (Trivers, 1974). It makes the readily falsifiable prediction that taking an active interest in teaching children is not harmonious. Generally speaking, we would expect the teaching of language to be biased toward the interest of parents, to find that children do not usually disperse to other societies, and to find evidence of anti-sociality both between and within groups. Perhaps the most relevant confirmation of this comes from the puzzle of hominin evolution, as I mentioned above. This evidence suggests a severe process of selection that seems more akin to what Bednarik (2020) calls 'unintentional self-domestication', though Bednarik refers to sexual selection in the late Pleistocene.

Self-domestication is, anyway, an important consideration in the field of language evolution. Notably, Thomas and Kirby (2018) suggest that domestication 'set the stage for the cultural evolution of language', although they see language as characterised by structural features. This raises the question of why 'language itself is not part of the domestic phenotype. Why is something "language like" not seen in other domesticated species?' Thomas and Kirby also identify two key traits: i) the central role of learning in the transmission of the communication system, and ii) the ability to recognise the communicative intent of a signal or action. They illustrate each trait through the cases of the Bengalese finch and the dog, respectively, which raises the additional question of why these traits exclude each other in these domesticated species. But these animals have been

bred on the basis of traits such as plumage and temperament, not learning ability or theory of mind, which are mainly by-products. In comparison, a prescriptive mode of intention necessitates both traits, as Dediu et al. (2013) also remark: i) coordinating action (behaviour), and ii) establishing social relationships (belief).

A similar exclusion of traits can be found in extant species of primates. Those that use calls to deceive others live in large, cohesive groups that offer the possibility to develop these tactics, but they display little theory of mind; whereas those that are able to understand deceptive intent live in smaller fission-fusion societies (Hall & Brosnan, 2017). Capuchin monkeys, for instance, have a behavioural kind of sociality that promotes individual deception. Chimpanzees, on the other hand, have a mental kind of sociality that seems to result from a selfish breeding behaviour. As Thomas and Kirby (2018) suggest, the 'poor performance of chimpanzees, relative to dogs, on tasks of co-operative communication stands … as something that might be remedied through a change in chimpanzee temperament'. So, perhaps if the ancestors of chimpanzees had helped each other breed, they would have produced a human-like species; in the same way as if those of capuchin monkeys had preferentially chosen more empathetic mates, at least to the extent that they can engage in coordinated deceptive signalling.

In any case, these considerations are consistent with the general Machiavellian intentions of primate social life, which are known to correlate to the size of the neocortex (Byrne & Corp, 2004). They are also consistent with the focus on proximate mechanisms that is required for the biological study of human cultural evolution (Kolodny, Feldman, & Creanza, 2018), while, at the same time, avoiding sociocentric assumptions of cooperative cognitive processes, such as the systematic making of tools, which more likely result from a pre-existing ability for language.

6. Conclusion

We tend to think that we know what language is because it is intrinsic to our lives and societies. To those who study it, language may appear mysterious instead, as we struggle with the linguistic nature of our minds. Yet as the broad perspective of biology suggests, language does not begin with society or mind, but with behaviour. In the continuum of evolution, there are no major differences in the intentional or purposeful behaviour of organisms (Darwin, 1859). Most animals intend to change the behaviour of others through signals to the extent that this helps them survive and/or reproduce. Some may do it by affecting the beliefs of others (Crockford et al., 2017).

However, only human animals intend to make the behaviour of other animals conform to our signalled beliefs. Therefore, language can be defined as a prescriptive signalling system, one that directs conspecifics primarily. This system can be regarded as an evolutionary transition because it generates those beliefs, information that can be inherited and manipulated in the manner of tokens (Maynard Smith & Szathmáry, 1997). On this scale, it is not important if its complexity appeared only after several million years, together with an explosion of meanings and cultures. What matters is when this mechanism for the transmission and storage of useful and useless information, the source of our humanity, was in place.

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