

## From metonymy to syntax in the communication of events

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*A modular analysis of spontaneous language use provides support for the existence of an identifiable step in language evolution, protolanguage. Our suggestion is that a grammarless form of expression would have evolved to signal unexpected events, a behavior still **prevalent** in our species. Words could not be so specific as to refer to whole, non-recurring, situations. They referred to elements such as objects or locations, and the communicated event was inferred metonymically. Compositionality was achieved, without syntax, through multi-metonymy, as words referring to elements of the same situation were concatenated into proto-utterances.*

### 1. The plausibility of protolanguage

Many studies on the origins of language naturally assume that language did not emerge all of a sudden as the full-blown faculty that we enjoy now. The idea that language evolution went through an intermediary stage, *protolanguage*, characterized by short non-syntactic word concatenations, has been proposed to account for universal aspects of pidgins and of language ontogeny (Bickerton, 1990). Human beings spontaneously regress to this mode of expression when normal language is unavailable. Requests on Web search engines offer a good picture of protolanguage: they consist of order-free sets of words, devoid of grammatical indication (Silverstein *et al.*, 1999). Users have the reflex of expressing themselves that way as they experience the limitations of the device they are communicating with, and the latter is fortunately able to cope with this simplified language.

To provide support for the protolanguage hypothesis, we attempt to include it in a functional communication system, with its protosemantic and protopragmatic components. The expected outcomes of this reconstruction are the definition of a coherent intermediary step in the phylogeny of language, a better modular description of the human communication faculty, and some testable predictions about the ontogeny of language.

In what follows, we start from a modular description of human pragmatics and make suggestions concerning the nature of *protopragmatics*. Then, we propose that proto-meanings were communicated through *metonymy*. We compare different possibilities for the functional role of protolanguage and discuss their compatibility with the present proposal. Lastly, we briefly address the issue of the transition to language, suggesting that it could have resulted from a new pragmatic function characteristic of our species: argumentation.

## 2. Protopragmatics

Several authors have tried to infer aspects of the protolinguistic competence from the observation of functional components of the human language faculty (Bickerton, 1990; Jackendoff, 1999; Dessalles, 2007a). Though some of these components become apparent only in exceptional situations, *e.g.* in pidgin, others may still be present and functional in the normal use of language. Whenever several functional modules can be isolated in the language competence, it is natural to ask whether these modules appeared simultaneously or in sequence during phylogeny. The question is especially intriguing at the pragmatic level.

Spontaneous language, as it can be observed in naturally occurring conversation, involves two major components: *storytelling* and *discussion* (Bruner, 1986, p. 11). The former consists in reporting or in signaling situated events, whereas the latter consists in discussing problems and issues. Though these two modes are sometimes intertwined in human conversations, each of them may develop during sustained periods, as stories call for stories (Tannen, 1984, p. 100) and arguments call for arguments. Moreover, the narrative and the argumentative component rely on different cognitive abilities (Dessalles, 2007a). Eggins and Slade (1997) observed that storytelling takes up more than 40% of speaking time in their corpus, collected during coffee breaks at work. We made similar measures, through sampling, on one of our own corpora, which consists of 17h of conversations recorded during meals at family gatherings. In that corpus, language is used 11% of the total time for practical purposes induced by the specific situation (essentially proposing and accepting food) and 73% for conversation (the remainder consists in silence (11%) and in ritual activities with small children, such as songs). We found that narratives and signaling represent 26% of conversational time, whereas discussion amounts to 74%.

The significance of spontaneous storytelling for understanding language phylogeny has been underestimated (but see Victorri, 2002). Human beings universally recount or signal a particular class of situations (Van Deusen-Phillips *et al.*, 2001; see Norrick, 2000 for a comprehensive description). Narratable situations have the quality of being *unexpected* (Dessalles, *in press*). Interest is amplified if the

event elicits positive or negative *emotions* (Dessalles, 2007b). The simplest form of communication about events takes the form of signaling. The following conversation took place at a campsite, at a time when self-erecting tents had just been brought out (the original in French).

- (1) L: Oh! The neighbors have a self-erecting tent.  
R: [pretending to speak to some others] He just notices it now!

The next excerpt occurred between two children aged eight and ten. M rushed to signal the unexpected spectacle of dozens of hot-air balloons drifting overhead (the original in French):

- (2) M: Did you see there are again balloons up there this morning?  
Q: Yes, I know.  
M: You, be quiet! I'm not talking to you, I'm talking to the others. [To his father] Did you see there are balloons up there this morning?

Drawing attention of conspecifics to past or current unexpected states of affairs is a reflex in our species that shows up early in ontogeny, even in deaf children who have no access to any well-formed sign language (Van Deusen-Phillips *et al.*, 2001). Normal children, around one year of age, systematically point towards unusual stimuli, trying to attract the attention of the parent (Carpenter *et al.*, 1998).

Apes are never observed to perform such declarative pointing (Tomasello, 2006). Chimpanzees are definitely curious and pay attention to novelty (Nishida *et al.*, 1999), but they rarely share news, and certainly not systematically. It is thus reasonable to suppose that the signaling-narrative component of human pragmatics evolved since our common ancestry with chimpanzees. Our suggestion is that it evolved first (before argumentative behavior) and that its human version is a direct extension of protopr pragmatics.

The claim is not that some hominin species used protolanguage to tell stories the way humans do. Proto-utterances could however be used to systematically signal unexpected and emotional events, as children and adults do in our species, with spatial, if not with temporal, displacement. We try to show now that protolanguage is well-designed to perform this function.

### **3. Protosemantics**

#### **3.1. *The deictic stage***

If hominin communication was already about events, as it is to a large extent in our species, one must figure out how referring to events was possible without full language. The answer is straightforward in the case of immediate events, as pointing

gestures, exclamations and isolated words can perform the task (Jackendoff, 1999, p. 273; Bickerton, 2002, p. 219). This form of communication is, however, exposed to ambiguity (Quine, 1960, p. 31), because it is necessarily metonymic. *Metonymy* here means that a signifier (sound, gesture, word) is used to refer to a whole event, though it is normally associated with only one aspect of it. When the child points to a dancing doll in the experiment designed by Tomasello and his colleagues (Carpenter *et al.*, 1998), the intended meaning is not the indicated location. The pointing gesture is metonymic, as the location is just one of the many properties of the communicated situation.

What allows metonymy to be communicatively efficient is the presumption of relevance<sup>1</sup> (Sperber & Wilson, 1986). When shown a direction or when hearing a word, individuals will look for a relevant stimulus in the immediate environment. As unexpected events are by definition rare, the task of recovering the meaning is most of the time easy. Such a limited mode of communication about immediate events may have constituted a stable step in hominin evolution (Jackendoff, 1999, p. 273; Dessalles, 2007a, p. 180), a possibility that is supported by the fact that the single-word stage is also to be found in human ontogeny, around twelve to eighteen months of age (Bloom, 1993, p. 29). Curious species like chimpanzees are also sensitive to certain dimensions of unexpectedness (Nishida *et al.*, 1999), even if they don't communicate it. We may suppose that hominins' sense of unexpectedness was intermediary between what triggers curiosity in apes and humans.

Some authors have argued that special cognitive abilities, such as the ability to master speaker-hearer-object triadic relations, are necessary to achieve this form of deictic communication (Tomasello *et al.*, 2005). There is no evidence, however, showing that such abilities would be 'difficult' to evolve (once there is some advantage in communicating referentially between unrelated individuals), nor that these abilities are even necessary for deictic communication to exist. Signaling can be a mere reflex on the speaker side, and metonymic interpretation requires only perceptive and associative capabilities.

Things are more complicated when communicated events are distant, as perceptive checking is no longer available. This is where protolanguage strictly speaking enters the scene. The question is to understand how word combinations could be meaningful to our hominin ancestors, enabling them to anticipate the communicated event.

### **3.2. *Meaning fractionation vs. combination***

Several studies on the emergence of referential communication aim at showing that compositional languages systematically emerge when expressive power or learnability is rewarded, under constraints that limit the efficiency of non-compositional

languages. Such constraints are, typically, the risk of mistaking one word for another, due to the limited available sound space (Nowak & Krakauer, 1999). Figure 1 shows how communication efficiency is computed. The probability for agent  $A$  to correctly decode  $A$ 's intended meaning  $m_i$  is  $\sum_j p_{ij}q'_{ji}$ , where the sum is computed over all possible signals  $s_j$  that  $A$  may have possibly chosen to designate object  $m_i$  (with probability  $p_{ij}$ );  $q'_{ij}$  stands for the probability that  $A$  will decode signal  $s_j$  as  $m_i$ .

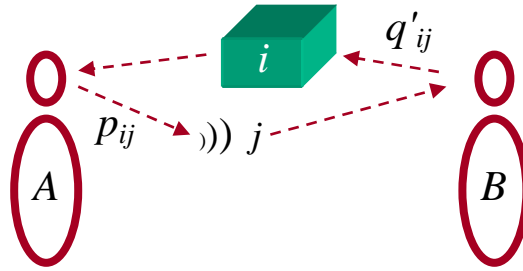


Figure 1: protolanguage as a coding-decoding device

The preceding sum, averaged over all possible meanings  $m_i$ , provides an estimate of the language's efficiency. Efficiency, here, amounts to avoiding decoding mistakes. In this kind of models, communication is reduced to a coding-decoding procedure, a 'codec' for short.

Linguistic codecs can theoretically evolve to become compositional, as compositional codes prove more efficient when the set of meanings is large (Nowak & Krakauer, 1999). Alternatively, compositionality may emerge through a regularization process induced by repeated transmission between generations (Smith *et al.*, 2003). This form of compositionality emerges through a process of fractionation: simple holistic signals referring to complex situations become more and more structured, as their parts refer to elements of the communicated situation. Fractionation creates a semantic mapping  $f$  so that any communicable meaning  $m$  which has internal semantic structure  $m = M(m_1, m_2, \dots, m_k)$  can be expressed with a signal  $s = L(s_1, s_2, \dots, s_k)$  where  $m = f(s)$  and  $m_i = f(s_i)$ . The correspondence between  $L$  and  $M$  is given by the syntax of the language. In the simplest case where structures are 'flat',  $M$  captures the mere co-occurrence of objects  $m_i$  and  $L$  is a simple concatenation of the corresponding signals  $s_i$ .

The kind of compositionality evolved by codec communication systems through fractionation from holistic signals is *weakly* productive. Each new signal-meaning pair must be accepted by the population and become stable to be useful. For this process to work, however, there must be a subset of meanings that are recurrent in communication so that individuals or populations can abstract regular patterns from them. To meet this constraint, protolanguage is often supposed to have been used first for basic needs such as commands, greetings, requests or threats (Wray, 1998, p. 52).

If, as we claim, protolanguage was used (as, in part, language now) to refer to unexpected situations, then a *strongly* productive system was needed from the onset. By definition, unexpected situations are not recurrent. It would be a complete waste to devote specialized signals to rigidly refer to situations of interest which, for the most interesting of them, would occur only once or twice in a lifetime. If protolanguage ever existed and was used to refer to unexpected events, it relied from its very beginning, not on meaning *fractionation* through a regularization process, but on meaning *combination*, possibly through multi-metonymy.

### 3.3. *Multi-metonymy: Compositionality without syntax*

Multi-metonymy is a straightforward extension of the single-word stage: each word in a proto-utterance would independently refer to some aspect of the communicated situation. A proto-utterance like “stranger-plain-fire” could function as a set of independent partial characterizations of a given interesting event, *e.g.* the fact that strangers dared to camp in the neighboring plain. This form of expression implements compositionality (as there is a structure-preserving semantic mapping), though without syntax (Bickerton, 1990, p. 122). Its clear advantage is to reduce ambiguity (Nowak & Krakauer, 1999). It is tempting, then, to infer that protolanguage was compositional from its very beginning.

Such a conclusion would ignore the complexity of multi-word semantic interpretation. Listeners must integrate the different associations triggered by the different words, ‘stranger’, ‘plain’, ‘fire’ into one single state of affairs, instead of imagining several disconnected situations. We humans do have this *semantic synthesis* ability. It is not obvious that we share it with chimps. Chimps may occasionally combine words to designate actions, but not situations (Dessalles, 2007a, p. 181). In some models (*e.g.* Smith *et al.*, 2003), compositionality emerges from cross-associations: associative links triggered by words in a given utterance are combined (mainly by restricting each other) and eventually retrieve some pre-stored meaning. This is how typical Web search engines function. These systems are generally not designed to produce *novel* meanings.

If, as claimed here, the main function of protolanguage was to draw attention to unexpected events that were out of sight, then protolanguage must have had synthetic power, so that individuals could signal situations that had never been encountered before. Synthesis is a requirement, as unexpectedness is likely to become apparent only when the meanings associated with successive words have been successfully combined. The word ‘stranger’ may be associated with strangers in their homeland; the word ‘plain’ to the plain over there and ‘fire’ may typically refer to the fireplace at home. As long as they remain disconnected, these meanings do not make up an event.

The cognitive mechanism through which meanings are combined is certainly not trivial: it must produce meanings that are genuinely novel, since the set of potential unexpected events is necessarily much larger than the set of experienced situations. One possibility is that mental imagery was recruited to achieve this task (Dessalles, 2007a, p. 173).

[...] one of the reasons that imagery is useful is that we can combine objects in novel ways. For example, one can imagine Charlie Chaplin riding a zebra, and “see” whether he would have been able to peer over the top of the zebra’s head. A theory of imagery must explain how familiar components can be arranged in novel ways in images. (Kosslyn, 1994, p. 286)

We don’t know whether apes have the ability to synthesize images, but a reasonable conjecture is that, at some point in the hominin line, this ability was used to create new semantic synthesis abilities. Individuals endowed with this faculty were able, when hearing “stranger-plain-fire”, to form the image of strangers sitting around a fire in the plain. This was enough, in most cases, to anticipate the unexpectedness of the communicated event. The non-trivial character of an image-based semantic synthesis may justify the existence of a single-word stage to be distinguished from protolanguage. Semantic synthesis enabled hominin communication to go beyond the here-and-now of deictic signaling and opened the possibility of spatial displacement.

#### **3.4. *Ambiguity and inference***

Multi-metonymy reduces ambiguity. Is it enough to communicate about events that are out of sight? Human communication is not a mere coding-decoding procedure (Sperber & Wilson, 1986), and presumably neither was protolinguistic communication. Individuals use relevance to guide interpretation. In most concrete situations, multi-metonymy is unambiguous because unexpectedness provides a relevance criterion which is constraining enough. The ‘algorithm’ runs like this: perform associations from what is said or shown, and combine them until they produce an unexpected/emotional event. Whenever the event is within perceptual range, a single word and a pointing gesture will be sufficient for hearers to get the point. But the presumption of unexpectedness/emotion is mostly helpful when the task is to understand a distant scene, as the word combination used to communicate about it can never be of absolute precision. “Stranger-plain-fire” could possibly mean that strangers make fire only when in a plain, or that the fireplace is shaped like the plain in which the strangers live. In most cases, none of these alternative meanings fulfills the requirement of being unexpected and/or emotional, and they are thus rejected.

## 4. The functions of protolanguage

### 4.1. Proximal functions

Among the authors who provided arguments in support of the existence of a stable intermediary state in hominin evolution (Bickerton, 1990; Jackendoff, 1999; Nowak & Krakauer, 1999; Dessalles, 2007a), there is some disagreement about the range of meanings that protolanguage could achieve. A crucial issue is to know whether it was open and infinite as for genuine language, or bound to a limited collection of recurrent situations.

Traditional accounts of language in its early stages mention its putative role in various practical activities thought to be vital in the daily life of naked hominins. A proximal function could have been to increase hunting efficiency by coordinating actions (Jaynes, 1976, p. 133; Bradshaw, 2001, p. 66; Snowdon, 2001, p. 226). Another is to warn of various sorts of danger like predators or to share opportunities like food sources (Lieberman, 1992, p. 23; Bradshaw, 2001, p. 66; Snowdon, 2001, p. 226; Bickerton, 2002, p. 209). Another is the didactic virtue of language, in the context of toolmaking (Lieberman, 1992, p. 23) or more broadly in the transmission of experience from parents to offspring (Bickerton, 2002, p. 221; Fitch, 2004; Castro *et al.*, 2004, p. 725).

If hominins communicated for such practical purposes, then most communicated meanings were recurrent. There was no need for semantic synthesis, since a coding-decoding procedure would allow for unambiguous interpretation. If, as suggested in this paper, hominins used protolanguage to signal unexpected events, then the set of potential meanings was necessarily unbounded, and semantic synthesis was essential to reach them. To decide which proximal function of protolanguage is to be favored, one must consider its ultimate function.

### 4.2. Ultimate functions

‘Ultimate’ functions, in a Darwinian framework, refer to effects that have an impact on differential reproduction *within* the species. Understanding the ultimate function of protolanguage means explaining why we are descended from individuals who used it and not from individuals who did not.

Two types of ultimate functions are generally invoked when the proximal function is supposed to be practical. The first one is group-level information sharing. Hard-won experience, like the location of food sources, could benefit the whole hominin group, leading to its ecological success (Goodson, 2003, p. 74; Castro *et al.*, 2004, p. 734; Ritt, 2004, pp. 1-2). However, information pooling does not explain differential reproduction; in particular, it does not account for the advantage

of speakers over those who choose to remain silent. To solve this problem, several authors consider that language would have emerged, even in its proto-form, as both a cause and an effect of reciprocal cooperation (Calvin & Bickerton, 2000, p. 123; Pinker, 2003, p. 28; Nowak & Sigmund, 2005, p. 1293). Some studies show, however, that grounding language in cooperation leads to difficulties (Dessalles, 1999): reciprocal cooperation in the absence of regulatory authority is unstable as soon as the proportion of cooperators increases. Moreover, if language relied on strict reciprocation, speaking would be a cautious act that always brings valuable information to well-chosen ears, and talkative behavior would never surface. Such a picture significantly differs from current spontaneous human language.

If protolanguage was used mainly for non-practical purposes, for instance to talk about absent individuals (Dunbar, 1996) or, as proposed here, to signal unexpected events, a third kind of ultimate function can be invoked. According to what may be called the *political function* of protolanguage, communication was involved in establishing and maintaining solidarity bonds. Hominins, like chimpanzees, are political species, in which individuals choose each other to form coalitions. Members of such coalitions stand together and take coordinated action. It is crucial for individuals to choose the best coalition partners, if only to resist oppression by other coalitions. In such a political context, communication can be recruited to *advertise* definite qualities that are sought-after when looking for valuable coalition partners.

#### 4.3. *The 'first-to-know' display*

An easy way to determine the biological function of human communication is to slightly impair it. The experiment goes like this: one should try to utter, during one week, only trivial statements like “The door is grey”, “There are eight lamps in this room”, or “My sister owns two bikes”. The negative consequences on one’s social network should be immediate. Though most individuals consider chatter as a relaxed context in which anything may be said, the study of spontaneous conversation reveals that language is a *competitive display in which participants, in turn, demonstrate their ability to be relevant* (Dessalles, 2007a). This competition for relevance makes sense in a political species like ours, in which individuals form sizeable *coalitions*, larger than in any other species<sup>2</sup> (Dunbar 1996). The basic assumption is that at some point in hominin evolution, individuals changed their criteria when choosing allies; qualities like physical strength became less valued, whereas the qualities required for achieving some form of ‘relevance’ became essential. As now in our species, those who failed to demonstrate this form of relevance lost chances of establishing valuable alliances.

The above description of protopragmatics, in which relevant messages must refer to unexpected/emotional events, is consistent with the political function. By announcing unexpected events, individuals engage in a ‘first-to-know’ display in which good performers demonstrate their informational qualities. R and Q’s reactions, in the two conversational excerpts of section 2, are quite revealing in the fact that the display may be competitive. Such reactions that deny the freshness of the news can be almost systematically elicited by signaling events that are partially known by addressees. Individuals who successfully demonstrate, by signaling unexpected events first, that they know before and better than the others show off their value as coalition partners: all things being equal, it is preferable to join them rather than uninformed individuals. This is especially true when deadly weapons such as spears are available to all, as the company of well-informed individuals lowers the probability of being taken by surprise.

In our species, any event that may elicit strong emotion is worth telling (Rimé, 2005; Dessalles, 2007b). More than one half of emotional experiences are communicated (Rimé, 2005, p. 90). A parsimonious assumption is to consider that if protolanguage was used to signal unexpected events, it was used for emotional events as well. This possibility fits well into the political role of protolanguage. Individuals of our own species seek friends who show feelings similar to their own in the same situations: pity, concern, empathy, indignation (at cowardice, cheating or unfairness), or admiration (for selflessness or feats). These preferences make sense if we accept that emotions are hard to fake and reveal personality traits (solidarity, helpfulness, fairness...) which happen to be the qualities of ‘the ideal friend’ in a political context. Reporting emotional events was thus an opportunity for advertising one’s value as potential or actual friend.

## 5. Discussion

The above proposal that protolanguage evolved to advertise ‘political’ qualities is in line with Dunbar’s theory of social grooming (1996), which states that the function of language is to establish and maintain social bonds. It goes one step further, by connecting this ultimate function to a proximal one: signaling events. To be accepted in solidarity networks, human beings now, as presumably some hominin species before them, signal *any* situation that is unexpected or emotional (and not just a certain class of events, as with alarm calls). The ‘first-to-know’ and emotional showing off emerged in the hominin lineage as deadly weapons appeared and informational qualities became more important than physical strength.

This proposal is an alternative to practical scenarios, which see in protolanguage a tool for improving subsistence. Since individuals in other species would

also benefit from better practical knowledge about food sources or shelter, authors are bound to adopt negative thinking about hominin evolution: various limitations (lack of ‘theory of mind’, lack of phonatory organs, lack of various required preadaptations) would have prevented such and such species from evolving protolanguage. By invoking a new selection pressure, caused by the advent of weapons, the present proposal goes back to standard evolutionary methodology, in which adaptations are considered to be local to a niche (Dessalles, 2007a). Protolanguage is presented as an adaptation to the special political niche characteristic of hominins.

Another advantage of presenting protolanguage as a first-to-know and emotional display is to account for the benefit of both speakers (who get opportunities to get into new coalitions or to secure their position in current ones) and listeners (who can appraise potential coalition partners). Moreover, the event signaling function is still heavily present in current spontaneous language. The signaling function also avoids any bootstrapping difficulty, as displaying one’s ability to know first can start with mere pointing gestures.

Last but not least, the signaling function accounts for various properties of human language, which may date back to protolanguage if it ever existed as we defined it. These properties include an open learned vocabulary (necessary to refer to rare events), frequent talk about seemingly futile matters, and ‘omnipotence’, which means the ability to talk about anything that can be experienced, instead of being bound to expressing food location (as bees are), or to coordination signals like orders and requests.

## **6. From protolanguage to language**

Multi-metonymic communication, even guided by the constraint of unexpectedness, cannot reach high precision descriptions. Was the evolutionary emergence of syntactic abilities a response to this ambiguity problem? Indeed, syntactic language is far more expressive and precise than protolanguage. On closer examination, however, syntax appears to fulfill an entirely different function.

Syntax is, by nature, a tool devoted to the expression of *predicates*. Both marking (cases, classes, agreement...) and phrase structure are well-designed to express ‘who did what to whom’ (Jackendoff, 1999; Dessalles, 2007a, p. 224). Simulations have shown that whenever meanings have predicate structure, syntactic language inevitably emerges to express that structure (Batali, 1998; Kirby, 2000). Conversely, *syntax is useless if there is no predicate structure to express*. When communication aims at signaling events, the only structure to convey consists in the co-occurring relevant objects that make up the event, together with the location, and protolanguage is well adapted to it. The great divide between our species and the preceding one may have

been precisely the ability to form predicates<sup>3</sup> (Dessalles & Ghadakpour, 2003). The most apparent property of predicates is that the relations they express, contrary to pointing gestures or proto-utterances, can be *negated*. It is thus natural to explain the emergence of the predicating ability by invoking, not some new referential efficiency it may have brought, but the possibility it offers to express logical doubts about reports of events and thus to protect listeners against lying (Dessalles, 2007a, p. 330). The ability to check the internal consistency of reports opened the possibility of temporal displacement. Without it, hominins were bound to signal events that could be checked with one's own eyes (Palfrey, 2000; Dessalles, 2007a, p. 363).

The next steps in this account are the emergence of syntax (to express predicates) and the argumentative use of language (to negotiate logical consistency). Relevance ends up with two independent dimensions: on the one side, narrative (event-based) relevance dates back to the time of protolanguage and depends on unexpectedness and emotion, whereas on the other side argumentative relevance is properly human.

## 7. Conclusion

If protolanguage ever constituted a long-standing step in the evolution of the language faculty, it must have had a definite function. We suggested that it evolved as hominins engaged in 'first-to-know' competitive displays. The function of proto-utterances was not practical, but referential: individuals strived to attract others' attention to unexpected and emotional events, as they do now, from early infancy on, with language.

Several predictions concerning ontogeny can be derived from this scenario, like the sequence *pointing gesture – single word utterance – partial multiword description – predicative (syntactic) utterance*, and the corresponding sequence *event signaling – event reporting – argumentation*. The signaling function of protolanguage, if correct, has also implications on the ways children will consider communication acts successful. Moreover, it may contribute to explaining why children start to speak so early. Care-takers have preferences associated with children's verbal behavior (Keller, 2007), and early signaling behavior, perceived as 'cute' alertness, may be consequential in this context.

In Molière's *Le Bourgeois Gentilhomme* (1670), M. Jourdain wonders how a short phrase in (supposedly) Turkish, "bel-men", could mean such a complex idea as: "you should go quickly with him to prepare yourself for the ceremony so as to see your daughter right soon and draw up the marriage settlement". By the time of our hominin ancestors, extremely unambiguous signals were useless if they were used to refer to rare, unexpected events. Conversely, a high level of ambiguity was

tolerable, and even significantly increased expressive power, since interpretation was guided by the constraint of unexpectedness. Lexical abilities did not evolve to remove ambiguity, just as hand-pointing never evolved to reach laser precision.

In the present account, compositionality was already achieved through multi-metonymy, which requires listeners to combine the meanings associated with words into a coherent situation. Syntax evolved at a later stage, to express predicates. The consequence of this stepwise evolution is that *protolanguage was not a mere rough draft of human language*, but a genuine faculty, qualitatively different from language, which was locally optimal for its function.

## Notes

<sup>1</sup> Note that Sperber and Wilson do not consider *narrative* relevance, which is our only concern here.

<sup>2</sup> We consider coalition size, instead of group size, to be the crucial factor (Dunbar, 1996, pp. 66-67). The fundamental distinction is that coalition partners choose each other, instead of merely happening to end up together for historical or ecological reasons.

<sup>3</sup> Some authors would consider that a word like “mammoth” uttered together with a pointing gesture would constitute a form of predication (Bickerton, 2002, pp. 219-220; Hurford, 2003). We suggested that there is no continuity with human predicates (Dessalles & Ghadakpour, 2003).

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