Why Talk ?

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A fundamental and neglected issue

What is language good for? For a long time, the question has remained not only unanswered, but not even asked. The classic 'reason' invoked to avoid the issue was that language benefited the species as a whole. This way of reasoning is simply wrong (Williams 1966). If information has any value, it is in the interest of no one to give it for free. And if information has no value, why are there ears ready to listen to it? The reason why we talk, and so much, still requires a biological and social explanation.

Many authors consider that language is used for sharing (Corballis and Suddendorf 2007; Györi 1997; Ritt 2004: 1; Pinker and Bloom 1990), exchanging (Carruthers 1996: 231-2) or trading (Pinker 1994: 367) knowledge and information, and that this is the reason why it exists. Another frequently mentioned function of language is that it makes social cooperation possible (Brinck 2004; Carruthers 1996: 231-2; Gärdenfors 2006 ; Nowak and Komarova 2001; Sterelny 2006), but also that it enables behavioural manipulation (Nowak and Komarova 2001; Worden 1998). Some authors consider that its primary role is to teach offspring (Castro *et al.* 2004; Fitch 2004). Most of these authors would consider that language is immediately *useful*, because it provides increased mastery over the material world, as when individuals go hunting or scavenging (Bickerton 2009; Snowdon 2001). The impact of language on material life seems *obvious* to many authors; most of the scholars above use this adjective. For example:

> "The adaptive significance of human language is obvious. It pays to talk. Cooperation in hunting, making plans, coordinating activities, task sharing, social bonding, manipulation and deception all benefit from an increase in expressive power." (Nowak and Komarova 2001)

> "Language also allows [humans] to share knowledge. Each individual can thus learn about the experience of others and avoid repeating their mistakes. […] It is obvious, then, that language is a good thing to have, both for us as individuals and for our species as a whole." (Ritt 2004: 1-2)

The attribution of 'obviousness' is based on the current ecological success of our species in invading the world these past millennia. The correlation between this ecological feat and the use of language is far from perfect, though. Until the advent of agriculture, the demography of *Homo sapiens* was comparable with that currently documented for great apes (Ray 2003). This means that despite its use of language, our species spent 90% of its existence stagnating at a relatively low level of ecological performance. People intelligent enough to create masterworks like the Lascaux cave paintings were certainly talking like any extant population, but this did not bring them any closer to dominating the material world.

If language does not owe its existence to its practical virtues, what about its social role? Robin Dunbar (1996) famously drew attention to this aspect of language, comparing it with social grooming in apes. But as acknowledged by Dunbar himself, there is more to human conversation than mere bonding signals, as otherwise synchronized grunts would do the job. Language is presented as a tool for enhancing cooperation (Dunbar 1996; Gärdenfors 2006) or even as a cooperative activity in its own right. This supposed link with cooperation requires closer examination.

The term 'cooperation', in this context, is used in three ways. It may mean that language is like a *game* in which partners obey definite rules (Grice 1975). This is of little help here, as it does not say much about the function of language. Competitive sports such as tennis are depicted as purely

cooperative according to this definition, which misses the point that the main purpose of the players is to defeat their opponent.

The term 'cooperation' is also used in a loose sense, meaning *concerted action*. It is true that the possibility of concerted action is considerably enhanced by the use of language. However, language use does not correlate well with concerted action. Many kinds of collective action, such as hunting, can be performed without language, as numerous animal predators show (Bshary *et al.* 2006; Boesch 1994). On the other hand, language is mostly used during casual conversation, when there is no material task to perform (see next section).

When 'cooperation' is used in its strict sense, it means *reciprocal altruism.* Strict cooperation raises the problem of cheating. Cooperative behaviour is vulnerable to invasion by cheats taking advantage of the altruism of others without giving anything in return. This problem applies to language when it is conceptualised as reciprocal altruism. Reciprocity is inherently unstable (Axelrod and Hamilton 1981; Dessalles 1999; Nowak 2006). For some authors, cooperation could be enforced by self-policing in the speaking community, using gossip to build or damage reputations (Dunbar 1996). But this only moves the stability problem one step further, as reputational policing is just cooperation at a higher level.

Contrary to what we would expect from cooperation models, humans need no prompting to talk. On the contrary, talkative individuals abound, making the price of information very low or even negative – as when we make an effort to avoid someone's conversation. As Geoff Miller (2000: 350) puts it:

> "[Reciprocal cooperation] does not describe the human species as I know it. Watch any group of people conversing, and you will see the exact opposite of the behaviour predicted by the kinship and reciprocity theories of language. People compete to say things. They strive to be heard. […] Those who fail to yield the floor to their colleagues are considered selfish, not altruistic. Turn-taking rules have emerged to regulate not who gets to listen, but who gets to talk."

Miller here notes that most judgments about the function of language reflect personal conviction or intuition, not observational data. A notable exception is Robin Dunbar, who pioneered the ethological study of human language. Dunbar's claim that the biological function of language is to contribute to social bonding is fundamental, and the present chapter supports it. However, this does not imply that cooperation plays any role in this process. As I will suggest, conversational moves, far from being cooperative offers, are more like competitive advertising.

In what follows, I will first mention several facts about spontaneous language that show how peculiar a behaviour it is. I will show typical examples illustrating the two main forms that language behaviour takes. These two modes will be presented as fulfilling two functions. As an attempt to explain language uniqueness, I will observe that the classical social primate order has been disrupted at some point in human phylogeny. Language, or something like language, will be shown to be the expected consequence of the new hominin order.

What is spontaneous language like?

Human language is uniquely pervasive of every aspect of life. Yet although it can be used for co-ordinating collective action, the primary context, by far, is casual conversation. Human beings devote one third of their waking time, *i.e.* six hours a day, to language activities (Mehl and Pennebaker 2003). They do so pro-actively, speaking some 16,000 words daily on average (Mehl *et al.* 2007). An especially talkative individual may utter about 50,000 words a day. This invasion of the acoustic space does not fit with depictions of language as cautious cooperation in which information is bestowed parsimoniously as a valuable gift. Rather it seems to resemble competitive social signalling (see chapter 30).

Verbal activities can be classified under two main headings: *conversational narratives* and *argumentative discussion* (Bruner 1986: 11; Dessalles 2009). During narratives, individuals draw attention to current or past events that are described in some detail (Norrick 2000). During discussion, individuals point to inconsistencies or suggest ways of increasing logical consistency (Dessalles 2009). Let us examine these two modes in turn.

Spontaneous narrative behaviour

Until recently, it remained largely unnoticed that spontaneous narratives constitute a massive phenomenon that may occupy up to 40% of conversational time (Eggins and Slade 1997). Conversational narratives assume a characteristic form. One person, the narrator, may hold the floor for several minutes, recounting one situated event. 'Situated' means that the four W's (when, where, what, who) get instantiated. Most narratives are delivered sequentially, in what Deborah Tannen (1984) calls 'story rounds'. In such a round, each story is closely related to the one preceding it.

A fundamental question is: What makes an event narratable? It has been noted that to qualify, an event must be out of the ordinary (Labov and Waletzky 1967; Polanyi 1979). My own work on conversational narratives led me to the conclusion that narratable events must be *unexpected*, every included element contributing to making it seem maximally unexpected (Dessalles 2010; see www.simplicitytheory.org for a theoretical definition of 'unexpectedness'). For instance, recounting that your cousin came to visit you yesterday does not make a story; after all, she might come every day. Likewise, the presence of water in your bathroom is not worth talking about, unless it's a leak or other unexpected event involving water. Conversely, any sufficiently unexpected state of affairs may make a relevant story. This includes events already known to the audience, as unexpectedness can be re-experienced (Norrick 2000: ch.4). The following example shows a typical narrative (from my own corpus, original in French).

P- I don't know if you heard that… these dolls that were sold a few days ago.
D- Oh yeah, no no, completely crooked, or whatever.
P- Crooked, ugly, deformed dolls.
L- E.T. ?
D- no no no no
P- Crooked by nature. And then, the point was not… they were supposed to be adopted by the little girls, with a certificate of adoption, and… it was all the rage, everything disappeared! They didn't… The producers weren't able to match the demand, and one mentioned the case of a fellow who went to England to buy one because his daughter unconditionally wanted a doll like this
O- [laughs]
P- and he was unable to find one, [laughs] so for fear that she would get depressed because of that he went abroad to buy it in England!
M- And there were awful struggles!

In this story, unexpectedness comes from the contrast between the ugliness of the dolls and the fact that girls wanted them so intensely. The narrator's emphasis is on both aspects: the ugliness ("Crooked, ugly, deformed") and the girls' craziness about the dolls ("it was all the rage"), aims at amplifying the contrast as much as possible.

Another crucial (but optional) feature of narratable events is that they arouse *emotion*. People systematically attempt to share emotional events with close acquaintances (Rimé 2005). The following conversation, recorded in a Japanese family, retells a past emotional event (original in Japanese; see full excerpt in Dessalles 2011).

T- Once, when Risa was little, her friend came here. […] And there, just over the railroad crossing… She had left one hour earlier but she hadn't arrived at her home. And then I got the phone call [from her family] saying that she hadn't arrived yet so something had gone wrong. I began to worry about her so I went to the station. And right there, a girl had just got run over.

[…]

T- There were a lot of onlookers so I asked them what was going on. And then they said that a girl had been run over and I was like 'Oh my !', you know, I was scared. Then I asked the policeman [whether she was the girl] and then he said he wasn't sure […] so I was afraid it was her. But after that, it turned out to be that she had taken a detour because of the train accident.

The episode, as T experienced it by the time of its occurrence, is emotional by nature, as it deals with the death of a child. Its intensity comes from its unexpectedness: such accidents are rare and usually concern people one does not know (see www.simplicitytheory.org). Emotional unexpected experiences make the best stories. They tend to be shared the very day of their occurrence (Rimé 2005: 90).

Why does *Homo sapiens* feel the urge to share unexpected and emotional experiences? Before considering this issue, let's turn to the other major conversational mode.

Argumentative discussion

Argumentative discussion makes up the greater share of conversational time. Discussion is what people use language for when they are not telling stories. Unlike narratives, discussions need not deal with situated events. Discussion is nonetheless highly constrained as well.

The fundamental question about spontaneous discussion behaviour is: What makes an issue debatable? The answer is straightforward. Any debatable issue is based on a *contradictory* situation that requires a logical solution (Dessalles 2009). The contradiction may oppose beliefs (epistemic issue) or involve desires (epithymic issue). You may wonder why your colleague is present at work, as you believed she was on holiday in Mexico, and start an epistemic discussion on the topic. You may complain about the fact that the new carpet is red, as you asked for a grey-blue carpet, and start an epithymic discussion to deal with that issue.

The above conversation about the railroad crossing continued with an epistemic discussion (original in Japanese).

S- Was that a suicide?

T- Ummm I guess she just got run over. Since she was merely a junior high school student so I'm not sure. Even if she committed suicide, anyway, she was just a junior high school girl.

S- For a student in junior high school to commit suicide, I guess it means that he or she suffered terrible bullying or was highly addicted to drugs or something.

T- We don't know whether she committed suicide or she got run over, but I found the article about the accident in the next morning's newspaper.

The suicide hypothesis provides a tentative logical explanation for the accident. The mention of bullying and of drugs is another explanatory attempt, this time to make the girl's suicide logically more consistent.

Why does *Homo sapiens* feel the urge to discuss logical issues with conspecifics?

Conversational moves are social signals

In 1962, the publication of "How to do things with words" (Austin 1962) popularized the idea that language may be just a particular way of performing acts. However, no general theory of action is able to predict that people systematically maximize unexpectedness when retelling an event, or systematically anchor their discussions to some logical inconsistency. As the above example illustrate, most of our conversational moves are not even related to any material task. Contrary to what uninformed authors have conjectured about the function of language, as we mentioned at the beginning of this chapter, language does not systematically deal with important matters. The fact that little girls are prepared to buy crooked dolls is unlikely to change the survival chances of the people involved in the conversation. Most conversations are about futile matters that have no

tangible bearing on the participants' life. If language has a systematic impact, it is not in the material world.

If talking does not boil down to performing tangible acts, perhaps are we talking just because we enjoy doing so! But any biologically relevant behaviour is under control of the pleasure/displeasure rewarding system. The pleasurable aspect of talking provides no information about the corresponding biological function, beyond the fact that it does exist.

In line with Dunbar's claim about the role of language in establishing and maintaining social bonds, I will propose that human beings choose their friends according to their conversational competence. If we follow this logic, the significance of speech lies, not in its tangible effects *per se*, but in the quality signalled by the performer. *Talking is signalling*. By talking in a relevant way, individuals demonstrate their ability to generate unexpectedness and emotion through narratives; and they show off their ability to deal with logical consistency through discussions. This behaviour seems to be universal in our species (Scalise Sugiyama 2001; Dessalles 2011).

If narrative and argumentative skills are what people assess in their actual or potential friends, several pieces of the puzzle fall into place. We can understand why language is competitive signalling, as individuals are in competition to attract friends. We can also understand why conversational topics are often futile, as the immediate utility of words is not what matters. The fact that people are at least as prone to speak as to listen also now makes sense. We also expect both genders to speak equally (Mehl *et al.* 2007), something that scenarios based on courtship (Miller 2000) or on teaching (Fitch 2004) cannot explain. The importance of generating unexpectedness also accounts for the huge vocabularies found in human languages. Adult human beings can understand tens of thousands of words, a fact that utilitarian theories of language would have a hard time explaining. Since most unexpected situations are rare (see www.simplicitytheory.org), a large vocabulary is needed to describe them when they occur; and as we saw in the excerpt about dolls, precise words are also needed to highlight the contrast on which the unexpectedness is based. Lastly, one understands why conversation is not a strictly dyadic process, as we would expect from reciprocal altruism, but is generally collective (Dunbar *et al.* 1995), as the above excerpts illustrate.

Two points still require an explanation. Why are unexpectedness, emotions and logical consistency so crucial for human sociality? And why are they apparently not so important in other primate species?

The demise of the strongest

Primate societies are in part based on the rights of the strongest. Even if primates, especially chimpanzees, are able to form alliances that may slightly alter the rule, even if females seem to have their say on which male will reign over the community, male reproductive success is strongly correlated with the ability to enforce supremacy through physical coercion. In Darwinian terms, the stakes are maximal. A study in the Budongo free-ranging chimpanzee community in Uganda showed that the top-ranking male, or α-male, sired 40% of the next generation born in the group; the β-male fathered 20% of the children and the γ-male 7% (Reynolds 2005).

Imagine you are the γ-male. Moving up through the hierarchy is risky. You have to defeat in battle individuals that in the past proved stronger than you. You will think twice before venturing to challenge them. To help you in this choice, big males engage in displays that allow you to gauge their strength. Now imagine that the rule of the game is slightly changed: you may use a weapon, such as a sharp stick or a big stone, to kill the male next up in rank while he is sleeping or when his back is turned. There is a fantastic payoff for the γ-male to do so: he will get 20% of the Darwinian prize instead of only 7%. For an unknown reason, despite their ability to use tools (but see Gruber *et al.* 2011) and to throw stones (Osvath 2009), chimpanzees don't kill using surprise. Murder does

exist among chimpanzees, but only using bare teeth (Reynolds 2005: 154). Once, for whatever reason, easy killing became possible among our hominin ancestors, the absolute right of the strongest instantaneously became obsolete.

Since the possibility of risk-free killing is universal and systematic in our species, we know for sure that the preceding story did happen at some point in hominin phylogeny. Dating the use of lethal weapons such as stones and sticks is difficult, as it may *not* have resulted in significantly increased violence (Wrangham *et al.* 2006). Easy murder may be at least as old as *Homo*. Weapon transportation is one of the reasons that have been invoked to explain why hominin bipedal locomotion evolved, despite its poor energetic efficiency (Boehm 2000: 181). If we push the hypothesis to the extreme, the use of weapons to resist (or enable) risk-free killing within the community might be concomitant with the divergence of the hominin lineage. Note that this hypothesis differs from the classical "man-the-killer" schema (Dart 1953), as we are speaking here of increased *within-group* killing risk. At the other extreme, the fact that easy killing using weapons could have a recent, purely cultural origin can be excluded. Murder and killing threats are ubiquitous and universal in our species (Hill *et al.* 2007). Considering the Darwinian stakes of resisting coercion and of suppressing competitors, both within and between the sexes, it is unthinkable that weapons were not used for these purposes by our ancestors as they are used in contemporary societies.

The advent of weapons, whenever that occurred, may not have increased the overall level of violence. But it would have had a dramatic impact on the pre-existing social order, leading to a new balance of power. As soon as safe killing is possible, top-ranking individuals become the designated target of subordinates. As a result, we expect an inverted hierarchy (Boehm 2000; Knight, *this volume*), in which each individual submits to the group and avoids showing any desire for dominance. We also expect allies to be selected using different criteria. Physical strength is no longer an asset. What, then, should be the qualities of greatest value in a friend?

From muscle to information displays

Most readers of this book live in integrated societies where police and justice deter potential killers from taking their life. They might forget that in a typical hominin context, the only valid life insurance is to have friends. Individuals must sleep, and they happen to have their back turned to potential murderers. Only friends may offer protection against actual killing and death threats. Those who fail to get appropriate protection from friends are more likely to get intimidated, exploited and even killed by those who have been more successful in the social game.

This new social order turns out to be an efficient one, as human societies are not significantly more violent than primate communities (Wrangham *et al.* 2006). It's simply that the rules of the game have changed: information has replaced muscle as the principal social asset. In the risk-free killing context of hominin societies, ideal friends must have are these qualities:

(Q1)   They anticipate danger and help you avoid being taken by surprise.

(Q2)   They are not themselves a danger to you.

(Q3)   They are ready to share time with you.

These criteria are automatic consequences of the possibility of easy killing: one needs friends to be protected. Any other qualities we may think of, such as being a good cooperator, being courageous, being intelligent or being efficient in some specific skills such as hunting, are of subordinate importance in comparison with the three qualities above.

In the context that followed the transition to risk-free killing, it became crucial not only to attract friends, but also to be accepted as a friend. The logical consequence is that individuals

displayed qualities (Q1)-(Q3). My suggestion is that that the human form of communication, or rather one of its previous forms such as protolanguage (Bickerton 1990), emerged in that context.

How far does language fit this display function? Let's consider narrative behaviour first. As illustrated above, every element in a conversational narrative is designed to make the reported event maximally unexpected and emotional (note that unexpectedness doesn't need to be experienced in real time; see www.simplicitytheory.org for a theoretical definition of unexpectedness). This property of human narrative is not fortuitous.

Unexpectedness is the only reliable indicator of danger when danger comes from other members of one's own species. Animal species can evolve to delineate and anticipate external danger such as predators. Individuals instinctively know or learn where and when their lives are at risk. But when danger comes from group mates, it cannot be so easily circumscribed. To what extent can one guard against murder? It is difficult for potential murderers to prepare their act without interfering with the normal course of events. Attending to any unexpected modification of the surrounding world is the best available strategy for potential victims to avoid being caught by surprise.

Permanent alertness is not sufficient. To survive in an easy killing context, one must surround oneself with vigilant friends. To appear as ideal friends, individuals of our species, and presumably in earlier hominin species as well, take every opportunity, even the most futile ones, to show off their ability to spot unexpected events. Human infants, by the age of 9 months, begin to point to unexpected things (Carpenter *et al.* 1998) and then do so systematically through adulthood. Declarative pointing is not known to exist in other species (Tomasello 2006) or is far from being systematic. The closest behavior is the alarm call, when not directed toward kin (Zuberbühler 2006). Unlike alarm calling, the human propensity to signal unexpectedness is not bound to any specific class of events. Animals are sometimes curious about certain classes of events, but they make no systematic attempts to share their curiosity (Tomasello 2006). This refutes the idea that the communication of information would require special cognitive prerequisites such as some form of "theory of mind". If pointing to unexpectedness was advantageous to the pointing individual, animals would do it systematically, even by reflex.

The communication of unexpectedness through narratives or even through pointing gestures matches the display of quality (Q1): in an easy killing context, one is more prone to become acquainted with individuals who are able to spot unexpected states of affairs, rather than with individuals who are blind to novelty, to unusualness, to exceptions or to coincidences. The former individuals are subjectively perceived as interesting and the latter as boring (Polanyi 1979). According to Rimé (2005: 177):

> Whoever knows about some news, such as an emotional event affecting a third party, holds a key to the extraordinary, since any emotional event by definition involves a dimension of novelty or of unexpectedness. We already discussed the fascination triggered by such events. By communicating information about such an event to others, one gets an opportunity to exert this fascination on them. One is sure, therefore, to elicit their best interest, and to attract to one's own person the greatest attention. And we exist to a very large extent through the attention we receive (original in French).

Our unique attraction for unexpected events and for those able to signal them makes perfect sense if language is used to show off one's ability to anticipate danger. It reveals that our ancestors could survive because they chose alert friends and because they demonstrated their own alertness to those friends.

As the railroad crossing example illustrates, the unexpected events that humans share in narratives are often emotional ones. Why are we actively seeking to share our emotions in minute detail with conspecifics? The answer is not straightforward, as emotional communication seems to have only drawbacks. It reveals our weaknesses and it makes us predictable. It is expected to lower

our value on the friendship 'market' and to limit our freedom. What we observe is the exact contrary! As Rimé (2005: 130) puts it:

> The more a person confides in another about intimate events, the more the listener will express affection for her. It also works the other way around: those who confide about themselves develop affection for those who listen to them. (original in French)

There is something paradoxical in the fact that revealing our intimate preferences and sometimes our vulnerability can make us socially attractive. The paradox disappears if one realizes that by sharing our emotions, one displays quality (Q2). Ideal friends, in an easy killing context, should be predictable. This may be the reason why emotion sharing is so prevalent in human spontaneous communication. By sharing emotional events, one makes oneself perfectly readable and predictable to close acquaintances. This behaviour makes sense if it is a way to demonstrate one's reliability and dispel any suspicion that one could be a threat to them.

People not only recount experiences. They also engage in sometimes lengthy discussions. These discussions deal with inconsistencies concerning either beliefs or desires. Elsewhere, I surmised that discussion emerged as an anti-liar device (Dessalles 1998). There is a danger that individuals distinguish themselves by lying about their supposedly unexpected experiences. One possible protection against a lie is to restrict communication to checkable events. This is presumably the form of communication for which protolanguage was best suited (Dessalles 2008). The other protection against liars consists in checking the consistency of their testimony. In our species, individuals not only take every opportunity to check the logic of what they hear or see, but they do it publicly. The corresponding ability has turned into a fourth quality that ideal friends should have:

(Q4)   Ideal friends are able to detect inconsistencies or to restore consistency.

Conversely, individuals who lack the ability to reason logically are easily deceived and can easily be taken by surprise. Conversational discussions, even when they are about futile topics, would be the manifestation of the tendency to display (Q4). The human capability to deal with displaced reference and with abstract ideas can also be related to the selection pressure created by (Q4) (Dessalles 2008; 2009).

Discussion

In this chapter, I outlined a scenario in which giving honest information to conspecifics, as humans do in spontaneous conversation, is a profitable strategy, not only for listeners, but primarily for speakers. The scenario has two strong points: it shows how language can be an "evolutionarily stable strategy" (ESS) (Dessalles 2010) and it is consistent with the way language is universally used in our species. By contrast, cooperative scenarios fail to explain why most conversational subject matters are futile or inconsequential for addressees' survival. They do not explain either why spontaneous talk is directed almost without discrimination toward several individuals simultaneously, with no expectation of reciprocity (Dunbar *et al.* 1995). The scenario developed in this chapter also explains several important aspects of language that are not addressed by alternative explanations or that are at odds with them.

- o *Inconsequentiality.* The fact that any unexpected situation can be taken as an excuse to prove one's vigilance explains why most conversations are about futile matters.

- o *Vocabulary size.* The fact that communication is about unexpected situations, which are by definition rare, contributes to explaining why vocabularies are large and not limited to a few dozen words.

- o *No sex difference.* Contrary to models that link language to courtship (Miller 2000), the present model excludes any significant difference in the use of language according to gender, a fact that observation confirms (Mehl *et al.* 2007).

o *Prosociality*. Human beings are known to differ from other primates by their prosocial attitudes towards conspecifics (Warneken and Tomasello 2006). Instead of attributing this difference to proximal causes such as education or norms (Rachlin 2002; Tomasello 1999), the present model contributes to showing that prosocial attitudes can be beneficial in the easy killing environment that our ancestors experienced for the first time. This explanation is compatible with models of competitive helping (Barclay 2011).

Scenarios of the evolutionary emergence of language are often considered speculative, as if there were a large set of equally likely alternatives to choose from. Indeed, various models have addressed aspects of the problem (some are listed in Johansson, *this volume* and in Knight, *this volume*). However, the present scenario has a rare feature, which is to show how language behaviour (conversation) can be an ESS. Its main hypothesis, the fact that our lineage differs from other species in the possibility of risk-free killing, is a plausible one, as it is known that weapons have been available to hominins for a long time.

As it stands, the model provides a selection pressure for language. However, it does not by itself predict all aspects of language, including syntax and the prevalence of argumentative discussion in conversations. Elsewhere (Dessalles 2009), I tried to delineate and to justify a three-phase evolutionary development for language. In the first phase, communication is bound to the here-and-now. Pointing gestures and isolated words are locally optimal for this function. In a second phase, hominins of our lineage acquire the ability to combine meanings. This second phase is characterized by the use of protolanguage (*i.e.* syntaxless word strings) (Bickerton 1990) which is locally optimal for an almost-here-almost-now form of communication. The third phase concerns our own species. Our ancestors acquired the ability to oppose mental representations. This opened the way to negation and argumentation, which evolved primarily as an anti-liar device. Syntax (as a way to express logical predicates) and recursion (as a way to determine predicates' arguments) evolved as tools in support of discussion behaviour.

The model offers many testable consequences. The most obvious is the obligatory link between communication and social bonding. Nowadays, this link can be observed in the functioning of social networks on the Web. On social news networks like Digg or Twitter, social links crucially depend on the freshness and originality of the news (Lerman and Gosh 2010; Kwak *et al.* 2010). This emerging collective behavior might be an indirect consequence of a tendency deeply rooted in our biology, which dates back to the time when human beings became a deadly threat to each other.

The development of the present model was dictated (1) by the urge to find a selection pressure for language (how does speaking benefit speakers?) and (2) with a view to explaining language behaviour *as it is* and not as we might imagine it. Language is a disproportionate behavior that requires much of our brain resources, much effort to acquire narratable information and much of our time to tell it. I submit that this unique biological development, and presumably some other proper features of the human species, can be linked to the use of deadly weapons, a behavioural trait that characterizes *Homo sapiens* and probably some other hominin species. It relies on the hypothesis that teaming up with informative individuals brings additional protection by diminishing the chances of being killed by surprise.

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