

Commentary
Origins of Human Communication

Michael Tomasello
The MIT Press, Cambridge, 2008

Alessandra Chiera[†]
alessandra.chiera@uniroma3.it

Over the last years an ever-increasing number of works has turned attention to the topic of the human language evolution from several points of view (e.g., Burling, 2005; Corballis, 2002; Christiansen & Chater, 2008; Christiansen & Kirby, 2003; Deacon, 1997; Dunbar, 1996; Fitch, 2010; Knight et al., 2000; Pinker & Bloom, 1990; Tallerman, 2005; Wildgen, 2004). The common thread connecting these even different approaches is the research of the distinctive traits that enabled language appearance. It is however possible to distinguish between about two cornerstones of the thinking behind this enterprise: on the one hand, a group of scientists emphasizes the features that make language a unique ability of *Homo sapiens* and that cannot be interpreted in terms of skills shared with closely related animals; on the other hand, referring to a strictly Darwinian tradition, some scholars state that the essence of human language has to be investigated starting from the abilities which underlie both animal and human communication.

Noam Chomsky, the leading figure of the former discontinuist perspective, has highlighted the centrality of a specific component – Universal Grammar (UG) – at the core of the language faculty which represents a unique sudden endowment of our species completely autonomous from other cognitive systems. By virtue of this specialty inherent human beings, looking at the non-linguistic devices that are in common with other species appears totally worthless within an account of human language (Chomsky, 1988, 1996): the latter, in such a definition, is a human-only system.

On the contrary, the continuist perspective stresses the relationship between communication and other cognitive skills rejecting the idea that human language might have arisen from a single unexpected break in the

[†] Department of Cognitive, Educational and Cultural Studies, University of Messina, Italy; Department of Philosophy, Communication and Visual Arts, Roma Tre University, Italy.

evolutionary course. From this point of view, the animal kingdom instead represents a great test bench for pinpointing the prerequisites of language.

In his book *Origins of Human Communication* (2008), Michael Tomasello examines the evolutionary roots of human language and offers a theory consistent with such latter tradition, proposing that the fundamental elements of our communication system do not concern with a linguistic component isolated by other capacities but are rather traceable in general cognition. Already at the time of publication of his scathing review of Pinker's *The Language Instinct* (1994) – unsurprisingly entitled *Language Is Not an Instinct* (1995) – Tomasello had called the need for a specific language device into question. By taking into account the evidence brought by Pinker, the review highlighted their compatibility with a series of different models as much biologically founded as the UG hypothesis: in the specific Tomasello's view, the biological foundation of language was interpreted «just not in the form of specific linguistic structures preformed in the human genome» (Tomasello, 1995, p. 32) but in terms of general cognitive and social abilities «some of which are shared with other primates and some of which are uniquely human» (Tomasello, 2008, p. 208). The rejection of the Chomskian tradition is definitively accomplished in *Origins of Human Communication*:

It is not that the evolution of some kind of innate syntactic template such as universal grammar is impossible, it is just that currently there is no evidence for it empirically, no precise formulation of it theoretically, and no need for it at all – if the nature of language is properly understood (Tomasello, 2008, p. 315).

The main reason for renouncing UG and taking the side of pre-linguistic skills at the bottom of human language origin entails a simple but effective argument: considering the rise of human communication starting from a symbolic code means assuming a preexisting form of communication which is merely encoded (Tomasello, 2008, p. 58). But this approach falls into a clear fallacy: it takes for granted from the beginning something that must be explained. If our aim consists in accounting for human language, we cannot start from language but rather from how non-conventional encoded communication has been able to make inroads. That is, language is not linguistic in nature but relies on some kinds of more basic capacities. Thus, research in the pre-linguistic abilities exhibited by children and some

nonhuman animals may fruitfully inform a model of language evolution outlining the main skills that fostered it.

Put aside the thesis of an innate linguistic component which defines the speciality of human species, Tomasello suggests instead – on the base of studies in such areas – that some forms of *mental attunement* have to be considered foundational (Tomasello, 2008, p. 59). This burning move prepares the ground for an appealing model that emphasizes the pragmatics nature of language origins. Many authors have drawn attention to the appearance of communicative systems from a pragmatics point of view (e.g., Arbib, 2012; De Ruiter et al., 2010; Sperber & Origgi, 2010; Sperber & Wilson, 2002). In *Origins of Human Communication*, Tomasello develops a specific pragmatics account centered on the idea that communication is a kind of coordination problem born in social contexts. The proposal is worth considering as it is outlined.

Referring to the first insights of Paul Grice (1957, 1975), he hypothesizes a strong relationship between the cooperative structure typical of human communication and the cooperative structure of human social interactions. More specifically, communication can be considered to be a form of social interaction supported by cooperative interests and, lastly, as part of a biological adaptation for collaborative activities (Tomasello, 2008, p. 110). The main focus is interestingly on a capacity hold to be essential both in human cooperation and communication, namely the capacity of constructing common ground and joining the same attentional frame. Along with Tomasello, we consider the notion of common ground as a very key concept within a theory of human communicative systems. Already H.H. Clark (1996) has characterized communication as a joint activity which largely depends on the ability to keep common attention, to share the relevant background knowledge and joint experience in order to get the content across and make sense in the exchanges. The focal point about how we get to manage this common ground is that it takes a specific infrastructure at the bottom. The question of the underlying infrastructure represents a very settling topic.

Outside and within the paradigm which conceives communication as a form of interaction, there are many attempts to investigate this infrastructure. And of these, the so-called *Tacit Communication Game* (TCG) represents an interesting experimental study worth mentioning. The scholars (de Ruiter et al., 2010; Noordzij et al., 2010; Newman-Norlund et al., 2009) submit a communication task that involves the control of geometrical shapes on a grid

by the side of two subjects focusing on what they refer to as “interactional intelligence” (Levinson, 1995) namely the ability to convey and recognize each other’s intentions independently from a linguistic pre-established code. Looking at this capacity allows to identify the mental strategies used by people in order to construct a common ground and get across meaning when they do not have a common code. The results reveal some important data concerning the ability to communicate even in sub-optimal situations and to develop novel ways of interaction; more specifically, they highlight that communication is a strictly cooperative enterprise and this feature appears necessary to produce a code starting from poor means of expression. The hard work in nailing the TCG task indeed rests on the capacity of speaker and hearer to collaborate and progressively give each other’s feedbacks, moreover showed by neurophysiological analysis concerning the comparison of cerebral responses: the activated regions were the same during the planning phase of the sender and the comprehension phase of the receiver. According to the authors, the findings support the idea of a specialized communicative intelligence consistent with the cognitive architecture suggested by Sperber and Wilson (2002) that emphasize the specific role of a pragmatic module of Theory of Mind (ToM) in language functioning and origin.

Obviously Tomasello fully agrees with an approach that stresses the need of cooperative prerequisites for the origin of human communication, nevertheless, he suggests a different infrastructure at their base. The ability of attributing mental states to others represents, even in his model, a core competence for communicative systems but it is included in a domain-general device that entails *cooperative* motivations and that triggered shifts to shared activities driven by joint goals, that is, new inferential processes prerogatives solely for humans. Here is the critical point that needs to be taken into account more in detail before making some comments.

This device is a sole infrastructure of *Homo sapiens* because it appeared when human cooperative activities differentiated themselves from the other animal forms of cooperation. In other words, Tomasello suggests that humanity entailed the rise of a new collaborative species with truly cooperative and altruistic goals that have to be distinguished by the other animal ways of collaborating. Even great apes – our closest animal relatives – have social goals but not cooperative ones: the difference making difference consists in their motivations which, he points up, are deeply selfish, competitive and supported by *I-mode modality* contrary to the *we-mode modality* that drives human

motivations. According to the author, in order to comprehend human language what needs to be analyzed is such crucial step; actually, it accounts for a structural change in the nature of communication. When this new social-cognitive and emotional infrastructure arose, it spawned first forms of communication that initially had individualistic imperative uses – as requests involving mutual interests – but gradually fostered more cooperative interactions. The complex recursive mindreading sustained by the tendency to be helpful has, in this way, made the forms of collaborative activity more organized and consequently even «the mentalistic and altruistic structure» (Tomasello, 2008, p. 334) of human cooperative communication which rests on that scaffolding has been refined.

Tomasello is not denying that apes hold some essential mechanisms underlying the cooperative dimension of language; he acknowledges that they are able to understand that others have perceptions and aims, they feel forms of empathy, they hatch out plans in order to influence others' behavior for their benefit and exhibit a series of capacities typical of individual intentionality. What non-human primates miss, making them intellectually different from humans, is sharing intentions engaging with others in a truly cooperative way that involves the ability to be interchangeable and really disinterested. Without this further crucial step, language simply cannot come alive.

In what follows we will discuss those which are considered to be in our opinion two main criticisms of Tomasello's theses. The first one deals with the idea that an exclusive scenario of cooperation and altruism that deployed itself only within the rise of *Homo sapiens* may account for a continuist model of language as Tomasello holds to be true; moreover, tied to this doubt, some counter-arguments have been developed to strongly call the hypothesis of humans as the only cooperative beings into question.

The second criticism concerns more closely the cognitive architecture which is accorded the fundamental status in Tomasello's opinion: he claims that a general mechanism of mindreading represents the device through which addressing the language origins issue and more specifically accounting for a key switch that led to a new ability involved in mental attunement and sharing common ground, named the *bird's eye view*. We will claim that it is controversial that the ToM mechanism alone – irrespective of whether it is interpreted as a specialized device or a general one – could explain the pressures that fostered these essential features of human communication.

Concerning the question of *Homo sapiens* as the only cooperative species, Tomasello's position has been refined and strengthened several times shifting conclusions about unique features but it is quite clear: as already said, although apes show many complex cognitive and social abilities, there is something missing in their cooperative skills which is at the base of their inability to develop language. That this lacking competence marks a crucial difference between humans and other animals is often underlined by Tomasello so much that he entitled his article with Rakoczy (2003) *What Makes Human Cognition Unique* wherein they consider the shift from individual to shared and collective intentionality the core transition inherent humanity. And indeed, a point frequently stressed concerns the thesis that in order to account for human communication one doesn't ultimately look into animal interpersonal activities but rather into human cooperation which is «unique in the animal kingdom in many ways, both structurally and motivationally» (Tomasello, 2008, p. 6). To this extent, the only scenario we might be interested in is that of how the human lineage formed collaborative alliances and social groups. In other words, although a kind of psychological infrastructure needs to be in place before language could arise in humans, actually the cooperative character rising in human nature sets its communication systems apart from those of all other living species.

Why Tomasello arrives at conclusions so widely different from an approach previously stated to be truly continuist? The answer lies, according to him, in the experimental findings achieved with non-human primates who point out a fairly individualistic behavior opposed to the human eusociality, well manifest already in very little children. What makes humans *super cooperators* individuals (Nowak & Highfield, 2011) is the co-evolution of cognitive and cultural abilities (Tomasello, 2008, p. 354) wherein cumulative cultural learning plays a settling role. Many counter-arguments have been developed to contrast the idea that cooperation is an exclusive human skill. For example, de Waal has produced several pioneering works on the pro-social attitudes of non-kin primates, on their sense of fairness and emphatic feelings, showing moreover that apes are able to monitor interactions in which they participate keeping track of each individual's support to common aims (de Waal, 2009). Other authors have tested the collaborative capacities of primates as well. Hare and Kwetuenda (2010) have recently experimentally documented that bonobos exhibit altruistic behaviors preferring to share food with a conspecific individual rather than consuming it alone. Along this line, Boesch and

colleagues (2009, 2010) has founded that wild chimpanzees help neighboring conspecifics in flights against opponents and do care for the welfare of other unrelated group members, for instance adopting orphaned youngsters. Moreover, Greenspan and Shanker (2004) have shown that the bonobo (*Pan Paniscus*) Panbanisha possesses advanced representational abilities allowing him to use gestures in declarative and informative forms besides in imperative ones. On the whole, there is a large number of evidence in favour of the existence of mutualistic and altruistic behaviors in animals that highly weakens Tomasello's evolutionary story (Reboul, 2010).

Furthermore, in *Origins of Human Communication* the idea that the cooperative dimension of human cognition is dominant to competition while the latter represents the hallmark of all nonhuman interactions is taken for granted. To this extent, Tomasello ignores coercion and deception as critical evolutionary forces even in the cognitive evolution of humans. Against this position, many theories claim that complex skills evolved in a competitive scenario wherein the fight between cheaters and cheater detectors fostered new pressures – that is ascribable to the Machiavellian Hypothesis developed by Whiten and Byrne (1997). Moreover, Cavalli-Sforza (2010) has emphasized that group competition has characterized the evolution of *Homo sapiens* more than cooperation, making it the most overbearing ape.

Such considerations suggest that an exclusive competitive account of animal behavior as well as an exclusive cooperative description of human behavior must be blended. What comes to light is that the debate concerns the emphasis put to the similarities on the one hand and the differences with animals on the other hand. Tomasello, though addressing an evolutionary account and contrary to the early assumptions, stresses the aspects that in his opinion provide human uniqueness. Nevertheless, the considered findings suggest to set less clear boundaries between ape and human socio-cognitive skills (Ferretti & Adornetti, 2012). Moreover, the thesis of human speciality based on the role of cultural development evokes the dual inheritance approach carried on by Richerson and Boyd (2005) and the idea that when biology meets culture something totally changes – theses that are at least liable to suspicion from a Darwinian perspective; namely, Tomasello's model is only plausible to the extent that we support a discontinuist view of human nature.

Let us see the second criticism. Tomasello argues that a crucial phase in the evolution of the cognitive infrastructure supporting human language is represented by the emergence of an essential ability that is, creating common

ground. This critical dimension of human communication enabled the richness of meaning exchanges and the possibility to go beyond the ambiguity of reference, something that is absolutely unknown to any animal form of communication. It is not specified exactly how humans acquired this tool that allowed them to act together on a common ground but it is maintained that human culture played a leading role in fostering it. In this last part, we will state that an effective functional communication actually requires such capacity but it can be explained in fully biologically and continuist terms. More specifically, in our opinion this explanation is achievable provided that the early forms of mental attunement and cumulative common ground engaged on first communicative exchanges are interpreted as proto-conversational.

These critical features in fact arise only in the speech triangle context wherein speaker, listener and topic need to be aligned. It is here that common conceptual ground shared by communicative subjects has to be inferred, maintained and monitored in a situation in which it is not static but continuously dynamics and cumulative. Tomasello has never explicitly focused attention on the role of conversation in the origin of language, except in the brief response to commentaries written with Carpenter and colleagues (2005) where they highlighted that apes are not able to engage in proto-conversation. Because of this omission, his model falters in explaining the core element of human cooperative communication which rests on its dialogic nature (Pickering & Garrod, 2004). A theoretical account of the origins of human language that lies on conversational dimension may explain how mental attunement and keeping track of common ground have led to a key notion of Tomasello's overall theory, that is, the notion of *bird's eye view*. The ability to have a bird's eye view of the scene entails that an individual involved in a social activity as communication can understand the global scene from a neutral perspective. In this way, one can simultaneously engage in shared activities, in paying attention to the topic and understanding if the interlocutor is also paying attention to it. It is a kind of multiple dimension in which the subjects are able to act together and progressively increase their common ground. This does not imply that we converse performing cumbersome recursive computations such as "what would he think I would think if he..." (Clark & Marshall, 1981). Just in some situations, when something goes wrong and we have to ask for clarifications or realize repairing strategies, we explicitly experience the efforts required to achieve the greater level of sharing common ground, that is, the conceptual alignment between speaker and hearer (Garrod

& Pickering, 2009). Therefore, the bird's eye view makes this alignment possible; obviously, this kind of phenomenon is a late product of evolution but it represents the needle that from the beginning guides the communicative exchanges.

The next step involves the following question: is it enough an infrastructure centered on a ToM mechanism to account for the properties just considered? In Tomasello's view, the mindreading device sustaining *we-mode* cooperation represents all that is necessary. Nevertheless, the idea that a single device may explain the complex abilities that triggered human communication is controversial (e.g., Ferretti & Adornetti, 2014). It has been recently emphasized that although an approach focused on identifying the mechanisms underlying specific aspects of language elaboration has undeniable advantages, however, what characterizes human language is traceable in a more holistic perspective. A similar observation is even more likely considering the properties that we conceive with Tomasello as essential, especially from a conversational point of view. Consistent with this idea, many authors have highlighted the explicative value of reframing the question of language in terms of brain *network* (e.g., Fedorenko & Thompson-Schill, 2014; Novick et al., 2009; Ramachandran, 2012). To this extent, human language was triggered by cross linkages between different areas wherein functionally specialized and domain-general systems started to work together eliciting global connections. In this approach, the breakdown of devices involved in language elaboration would lose distinguishing features that appear only at the level of this widespread activation. For instance, the domain-general cognitive control system takes advantage of such network and seems to play a key role in language processing (Knudsen, 2007; Thompson-Schill et al., 2005). A speculative hypothesis might claim that such a kind of system has been critical in making the early poor means of expression well-articulated, fostering forms of explicit control and monitoring of the conversational setting.

Probably, this structured network that allows information to be broadcast even explicitly is a specific characterization of *Homo sapiens* that lacks in other non-human primates (de Winter & Oxnard 2001; Gazzaniga, 2008; Shea et al., 2014). Nevertheless, this consideration does not undermine the Darwinian framework: referring to the cognitive architecture underlying the switch from proto-conversational to effective interactive communicative exchanges as a matter of networking, rather than a rise of a unique endowment or a feature prompted by human culture, provides a truly evolutionary account. In fact,

what establishes the peculiarity of human communication does not rely upon a magic ingredient lacking in the animal kingdom but on the cerebral reorganization which functioning might have allowed new abilities as the bird's eye view.

Tomasello has contributed to add an important piece to the research but the puzzle regarding language origins and evolution requires still a very long way to be solved. The commitment of providing a comprehensive theory accounting for the many small steps that gradually led from the communicative skills of our closely related animals to the complexity of modern human language is a very living matter.

REFERENCES

- Arbib, M. A. (2012). *How the brain got language: The mirror system hypothesis*. Oxford: Oxford University Press.
- Boesch, C. (2009). *The real chimpanzee: sex strategies in the forest*. Cambridge: Cambridge University Press.
- Boesch, C., Bole, C., Eckhardt, N., & Boesch, H. (2010). Altruism in forest chimpanzees: the case of adoption. *PLoSOne*, 5(1), e8901.
- Burling, R. (2005). *The talking ape: How language evolved*. Oxford: Oxford University Press.
- Cavalli-Sforza, L. L. (2010). *La Specie prepotente*. Milano: Editrice San Raffaele.
- Chomsky, N. (1988). *Language and problems of knowledge: The Managua lectures*. Cambridge: MIT Press.
- Chomsky, N. (1996). *Language and mind: Current thoughts on ancient problems (part I)*. Paper presented at Universidad de Brasilia.
- Christiansen, M.H., & Chater, N. (2008). Language as shaped by the brain. *Behavioral and brain sciences*, 31(05), 489-509.
- Christiansen, M.H., & Kirby, S. (Eds.). (2003). *Language evolution*. Oxford: Oxford University Press.
- Clark, H.H. (1996). *Using language*. Cambridge: Cambridge University Press.
- Clark, H.H., & Marshall, C.R. (2002). Definite reference and mutual knowledge. *Psycholinguistics: critical concepts in psychology*, 414.

- Corballis, M.C. (2002). *From hand to mouth: The origins of language*. Princeton: Princeton University Press.
- De Ruiter, J.P., Noordzij, M.L., Newman-Norlund, S., Newman-Norlund, R., Hagoort, P., Levinson, S.C., & Toni, I. (2010). Exploring the cognitive infrastructure of communication. *Interaction Studies*, 11(1), 51-77.
- De Waal, F. (2009). *The age of empathy*. New York: Harmony.
- De Winter, W., & Oxnard, C.E. (2001). Evolutionary radiations and convergences in the structural organization of mammalian brains. *Nature*, 409(6821), 710-714.
- Deacon, T. (1997). *The symbolic species. The co-evolution of language and the brain*. New York: WW Norton & Company.
- Dunbar, R., (1996). *Grooming, gossip, and the evolution of language*. London: Faber and Faber Limited.
- Fedorenko, E., & Thompson-Schill, S.L. (2014). Reworking the language network. *Trends in cognitive sciences*, 18(3), 120-126.
- Ferretti, F., & Adornetti, I. (2012). *Dalla comunicazione al linguaggio. Scimmie, ominidi e umani in una prospettiva darwiniana*. Milano: Mondadori Università.
- Ferretti, F., & Adornetti, I. (2014). Against linguistic Cartesianism: Toward a naturalistic model of human language origins and functioning. *Language & Communication*, 37, 29-39.
- Fitch, W.T. (2010). *The evolution of language*. Cambridge: Cambridge University Press.
- Garrod, S., & Pickering, M.J. (2009). Joint action, interactive alignment, and dialog. *Topics in Cognitive Science*, 1(2), 292-304.
- Gazzaniga, M.S. (2008). *Human. The Science Behind What Makes Us Unique*. New York: Ecco.
- Greenspan, S.I., & Shanker, S.I. (2004). *The first idea. How Symbols, Language and Intelligence Evolved from our Primate Ancestors to Modern Humans*, New York: Basic Books.
- Grice, H.P. (1957). Meaning. *The philosophical review*, 66, 377-388.
- Grice, H.P. (1975). Logic and conversation. In P. Cole, & Morgan, J.L. (Eds.), *Speech Acts*. New York: Academic Press, 41-58.

- Hare, B., & Kwetuenda, S. (2010). Bonobos voluntarily share their own food with others. *Current Biology*, 20(5), R230-R231.
- Hindy, N.C., Solomon, S.H., Altmann, G.T., & Thompson-Schill, S.L. (2013). A cortical network for the encoding of object change. *Cerebral Cortex*, bht275.
- Knight, C., Hurford, J., & Studdert-Kennedy, M., editors (2000). *The Evolutionary Emergence of Language: Social Function and the Origins of Linguistic Form*. Cambridge: Cambridge University Press.
- Knudsen, E.I. (2007). Fundamental components of attention. *Annual Review of Neuroscience*, 30, 57–78.
- Levinson, S.C. (1995). Interaction biases in human thinking. In Esther N.G. (Ed.) *Social intelligence and interaction*. Cambridge: Cambridge University Press, 221–260.
- Newman-Norlund, S.E., Noordzij, M.L., Newman-Norlund, R.D., Volman, I.A., Ruiter, J.P.D., Hagoort, P., & Toni, I. (2009). Recipient design in tacit communication. *Cognition*, 111(1), 46–54.
- Noordzij, M.L., Newman-Norlund, S.E., de Ruiter, J.P., Hagoort, P., Levinson, S.C., & Toni, I. (2010). Neural correlates of intentional communication. *Frontiers in neuroscience*, 4.
- Novick, J.M., Kan, I.P., Trueswell, J.C., & Thompson-Schill, S.L. (2009). A case for conflict across multiple domains: Memory and language impairments following damage to ventrolateral prefrontal cortex. *Cognitive Neuropsychology*, 26(6), 527–567.
- Nowak, M., & Highfield, R. (2011). *SuperCooperators: Altruism, evolution, and why we need each other to succeed*. New York, NY: Martin Free Press (The).
- Pickering, M.J., & Garrod, S. (2004). Toward a mechanistic psychology of dialogue. *Behavioral and brain sciences*, 27(02), 169–190.
- Pinker, S. (1994). *The Language Instinct*. New York: William Morrow and Company.
- Pinker, S., & Bloom, P. (1990). Natural language and natural selection. *Behavioral and brain sciences*, 13(04), 707–727.
- Ramachandran, V.S. (2012). *The tell-tale brain: A neuroscientist's quest for what makes us human*. New York: WW Norton & Company.
- Reboul, A. (2010). Cooperation and competition in apes and humans: A comparative and pragmatic approach to human uniqueness. *Pragmatics & Cognition*, 18(2), 422–440.

- Richerson, P.J., & Boyd, R. (2005). *Not by genes alone: How culture transformed human evolution*. Chicago: University of Chicago Press.
- Shea, N., Boldt, A., Bang, D., Yeung, N., Heyes, C., & Frith, C.D. (2014). Supra-personal cognitive control and metacognition. *Trends in cognitive sciences*, 18(4), 186-193.
- Sperber, D., & Origgi, G. (2010). A pragmatic account of the origin of language. In R. K. Larson, V. Déprez, & H. Yamakido, (Eds.), *The Evolution of Human Language: Bilingual perspectives*. Cambridge: Cambridge University Press, 124-132.
- Sperber, D., & Wilson, D. (2002). Pragmatics, modularity and mind-reading. *Mind & Language*, 17(1-2), 3-23.
- Tallerman, M. (Ed.). (2005). *Language origins: Perspectives on evolution*. Oxford: Oxford University Press.
- Thompson-Schill, S.L., Bedny, M., & Goldberg, R.F. (2005). The frontal lobes and the regulation of mental activity. *Current opinion in neurobiology*, 15(2), 219-224.
- Tomasello, M. (1995). Language is not an instinct. *Cognitive development*, 10(1), 131-156.
- Tomasello, M. (2008). *Origins of human communication*. Cambridge: MIT Press.
- Tomasello, M., Carpenter, M., Call, J., Behne, T., & Moll, H. (2005). In search of the uniquely human: Response to commentaries. *Behavioral and Brain Sciences*, 28, 721-727.
- Tomasello, M., & Rakoczy, H. (2003). What makes human cognition unique? From individual to shared to collective intentionality. *Mind & Language*, 18(2), 121-147.
- Thompson-Schill, S.L., Bedny, M., & Goldberg, R.F. (2005). The frontal lobes and the regulation of mental activity. *Current opinion in neurobiology*, 15(2), 219-224.
- Whiten, A., & Byrne, R.W. (Eds.) (1997). *Machiavellian intelligence II: Extensions and evaluations*. Cambridge: Cambridge University Press.
- Wildgen, W. (2004). *The evolution of human language: scenarios, principles, and cultural dynamics*. Amsterdam: John Benjamins Publishing.

