Rethinking Michael Tomasello's social-pragmatic theory of language acquisition

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"It seems unlikely that genes actually transmit behavior as we observe it in the living animal because the course that an individual takes in its peregrinations through life must necessarily depend on environmental contingencies which could not have been 'programmed and prepared for' in advance. Inheritance must confine itself to propensities, to dormant potentialities that await actualization by extra-organic stimuli, but it is possible that innate facilitatory or inhibitory factors are genetically transmitted which heighten the likelihood of one course of events over another. When put into these terms, it becomes quite clear that nature-nurture cannot be a *dichotomy* of factors but only an *interaction* of factors. To think of these terms as incompatible opposites only obscures the interesting aspects of the origin of behavior." (Eric Lenneberg, *Biological Foundations of Language*)

Abstract: In the last decades, psychologist Michael Tomasello became a leading critic of Noam Chomsky's generative grammar. Within the framework of his cognitive-functional linguistics, which is associated with emergentism and cognitive linguistics, Tomasello challenges the central pillars of generativism, including the innateness thesis, autonomy of syntax hypothesis, and language module alike. Considering the influence of Tomasello's ideas, this paper rediscusses the theoretical foundations of his work. The objective in doing so is to reaffirm the validity of generativism's theoretical assumptions. Notwithstanding this, it is argued that it seems possible, and even necessary, to integrate many aspects of emergentists' discussions regarding language acquisition and Tomasello's cognitive-functional linguistics into a research program grounded in a modular conception of language.

Keywords: Michael Tomasello; Emergentism; Generative Grammar; Universal Grammar; Autonomy of Syntax Hypothesis.

Introduction

In 1975, two of the most important thinkers of the 20th century met at Royaumont Abbey, near Paris, to debate their ideas concerning human cognition in general and language in particular. On one side, French psychologist Jean Piaget, the father of the constructivist view of learning, defended the conception that language is a

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product of general intelligence, disregarding the existence of a linguistic mental module. On the other side, American linguist Noam Chomsky, the father of generative grammar, took the opposite view, postulating the existence in the human mind/brain of a "language faculty" (Piatteli-Palmarini 1980). A few years after this event, Piaget's position would be endorsed by a group of linguists, under the leadership of George Lakoff and Ronald Langacker, who would become the central figures of the so-called cognitive linguistics. However, despite the importance of the research that has been developed by cognitivists since the 1980s, another non-modular school of thought seems to surpass cognitive linguistics nowadays, at least in certain circles, as an alternative theoretical framework to generativism: *emergentism*, also known as *connectionism*, or *constructivism*, among other terms (e.g., Bates and Goodman 1999: 31–32). Nonetheless, emergentism explicitly takes cognitivism as a reference against generative grammar (e.g., Tomasello and Bates 2001a: 8). So it is not surprising that one of the main figures of emergentism these days, psychologist Michael Tomasello, not just linked himself to cognitive linguistics (e.g., Tomasello 1999: 107) but also named his work as "cognitive-functional (usage-based) linguistics" (Tomasello 2003b: 2).

Considering the great influence exerted by Tomasello on current discussions about the nature and origin of language, I reexamine in this paper the foundations of his linguistic theory. My main goal in doing so is to problematize Tomasello's "culturalism", i.e. his assumption that human cognition has cultural origins and language is a product of the human biological capacity to live culturally – that is, in a socially shared environment in which the skills and knowledge acquired by the group are taught to the new generations. Based on this principle, Tomasello concluded that the cultural creation of language resembles the cultural creation of mathematics, chess and money, for example, with initially simpler cultural stages that become more complex over time. Against this culturalist view of language, I emphasize the expressive differences between deductive, conscious, and instructed learning of mathematical tools such as calculus, games such as chess, and social conventions such as monetary ones, on the one hand, and intuitive, unconscious and uninstructed learning of language, on the other. By doing so, I intend to reaffirm the modular theory of language against Tomasello's cognitive-functional linguistics and emergentism itself. Notwithstanding this, I also argue that it seems possible, and even necessary, to integrate many aspects of

emergentists' discussions regarding language acquisition and Tomasello's cognitive-functional linguistics into a research program grounded in a modular conception of language.

1 A new psychology of language

According to Tomasello (1998a: x–xi, xix), cognitive-functional linguistics shares both with Piagetian constructivism and with Lakoff's (e.g., 1987) and Langacker's (e.g., 1987) cognitivism the rejection of the Chomskyan hypothesis of the autonomy of syntax – i.e., the conception that the syntactic component is independent of the other linguistic components – and the disbelief in the nativist theory of language – or, in generative terms, the hypothesis of the existence in the human mind/brain of a "Universal Grammar" (UG), understood as 'a characterization of [the] innate, biologically determined principles, which constitute [...] the language faculty' (Chomsky 1986: 24). For Tomasello (1998a: xi), there is a biological basis for language, but not in the form of an autonomous generative grammar. Thus, according to this author, language is a product of 'more general biological predispositions,' including the abilities to create and learn symbols, to form concepts and categories, to process vocal-auditory information, and to interact and communicate with other persons intersubjectively. Based on these premises, Tomasello (1998a: xx) argued with his 'new psychology of language' that the structures of language are taken directly from human cognition, and, therefore, linguistic communication, including its grammatical structures, should be studied in the same basic manner using the same basic theoretical constructs as all other cognitive skills.

To better understand Tomasello's perspective, it is necessary to go back to the beginnings of emergentism. In the 2005 essay "Words and Grammar," Virginia A. Marchman and Donna J. Thal analyzed emergentism's first steps in the 1970s. Recalling the role played by psychologist Elizabeth Bates as the great precursor of this field of research, Marchman and Thal pointed out that Bates was never convinced of the empirical validity of the Chomskyan model of language acquisition. Thus, alongside colleagues such as Brian MacWhinney, Jeffrey Elman, and Catherine Snow, Bates

developed an alternative model in which grammar is constructed by the child through general cognitive processes, not from a language-specific mental organ. '[...] the child's acquisition of grammar is guided, not by abstract categories, but by the pragmatic and semantic structure of communications interacting with the performance constraints of the speech channel,' said Bates and MacWhinney (1979: 168–169). For these theorists, grammars are actually 'emergent solutions to the problem of communicating non-linear meaning onto a linear speech channel' (Bates and MacWhinney 1979: 169). More specifically, for emergentists (e.g., Bates and MacWhinney 1989: 31), in the process of language acquisition, children try to extract and reproduce linguistic patterns from the 'emergent solutions' people around them use to communicate with each other. So, according to the adherents of this school of thought, the language structure emerges from listening and talking activities (e.g., MacWhinney 1999a: xi).

Considering this treatment of the question of language acquisition, MacWhinney stated in the preface to the 1999 collection *The Emergence of Language* that emergentism substitutes the opposition between nativism (the UG hypothesis) and empiricism (the idea that language is a product of general intelligence) with a new conceptual framework designed to account in mechanistic terms for interactions between biological and environmental processes. Therefore, in emergentism, the opposition *nature x nurture* is replaced by the conception that structures – including brain structures – emerge from the interaction of organic and non-organic processes (e.g., Bates 1979: 17–18; Dale and Goodman 2005: 74–75; MacWhinney 1999a: xi). '[…] those who disagree with Chomsky tend to argue in favor of an interactionist account, where learning plays a central role but does so within biological constraints,' pondered Bates and Judith Goodman (1999: 31). Thus, for emergentists, genes play a central role in constraining outcomes (e.g., Elman et al. 1996: 7). Consequently, for the adherents of this theoretical framework, the question concerning the origin of knowledge – including linguistic knowledge – is not nature *or* nurture; it's nature *and* nurture (e.g., Elman et al. 1996: 357; Tomasello 2022: 5, 40–41).

Nonetheless, in opposition to the nativist (or innatist) view of language acquisition – which is also based on the conception that nature and nurture interact in this process (e.g., Chomsky 2015 [1965]: ch. 1, § 8; 2007 [1979]: 82; Jackendoff 2003: ch. 4; Lenneberg 1967: 22; 1975: 18, 26, 32; Lidz and Gagliardi 2015) – emergentists criticize the notion that there are genes specific to language (e.g., Elman et al. 1996:

372–378). Thus, for these researchers, the modular conception of language does not make sense, even though it makes sense to them to conceive that the human mind/brain is modular. 'To us the interesting question is not whether or not the brain is modular (it clearly is), but how and why it gets to be that way,' asserted Elman et al. (1996: 101). In fact, to the emergentists, the main point is the difference between '*starting* modular and *becoming* modular' (Elman et al. 1998: 101). In other words, in the opinion of emergentists, what matters most is understanding to what extent the modular structure is pre-existing as opposed to emergent and what are the functional contents of the modules (Elman et al. 1996: 101). The answers to these questions, stated Elman et al. (1996: 101), will vary, depending on the modules involved. On the one hand, they said, the retina is a module whose structure is highly pre-determined. The visual and auditory cortex, on the other hand, are modules that are partially pre-determined but in a highly indirect way – i.e., both the structure and content of these areas are highly dependent on appropriate input during development. Therefore, without visual and auditory stimuli, these modules do not emerge. Language, the emergentists argue, works like the visual and auditory cortex, not like the retina, since it depends on appropriate input to emerging (e.g., Elman et al. 1996: 123–124, 170, 357).

2 A social-pragmatic theory of language acquisition

Tomasello incorporated the emergentists' ideas into his cognitive-functional linguistics, which is based on the assumption that the essence of language is its symbolic dimension, understood as the fact that human beings use conventional linguistic symbols for purposes of interpersonal communication (Tomasello 2003a: 283). Besides, assuming Bates' perspective against generativism and her conviction that 'language can be viewed as a new machine created out of various cognitive and social components that evolved initially in the service of completely different functions' (Bates 1979: 31), Tomasello (2003a: 283) claimed that the grammatical dimension of language does not derive from a specific biological adaptation, but rather from historical and ontogenetic processes. 'When humans use symbols to communicate with one another, stringing them together into sequences, patterns of use emerge and are grammaticized into constructions,' said Tomasello (2003a: 283). 'New generations of children inherit these linguistic constructions in the sense that they are exposed to

utterances that instantiate them, from which they themselves must (re)construct the abstract grammatical dimensions of the language they are learning. They do this using biologically inherited cognitive skills falling under the general headings of intention-reading and pattern-finding.' Therefore, to Tomasello (2003a: 328), in the process of language acquisition, children utilize a variety of cognitive and social-cognitive processes that originate from outside the domain of language per se, including perception, memory, joint attention, intention-reading, categorization, analogy, and so on.

To clarify his 'social-pragmatic theory of language acquisition' (Tomasello 2003a: 90; 2008: 155), Tomasello observed that at around 9–12 months of age, human infants begin to understand the communicative intentions of other persons as embodied in acts of symbolic communication – that is, in gestures and especially in utterances – and to imitate them. 'Language emerges in human children in the months following the first birthday – and not before – because this is when these fundamental skills of intention-reading are solidly in place,' pondered Tomasello (2003a: 90). According to him (2001: 180; 2003a: 143), children understand the communicative functions of utterances that embody various syntactic constructions, as well as some of their constituents, by reading the intentions of the speaker. Then they find patterns across item-based constructions by schematizing and making analogies. 'When people repeatedly use the same particular and concrete linguistic symbols to make utterances to one another in "similar" situations, what may emerge over time is a pattern of language use, schematized in the minds of users as one or another kind of linguistic category or construction,' claimed Tomasello (2003a: 99). The pattern X VERB*ed* Y *the* Z, he said by way of example, is a construction of English that signifies some kind of transfer of possession (either literal or metaphorical). Thus, according to Tomasello's theory, using their cognitive and social-cognitive skills, including the ability to read the intentions of the speakers, children in the process of acquiring English understand the use of concrete linguistic symbols by people signifying some kind of transfer of possession (either literal or metaphorical) and at some point, they find the pattern X VERB*ed* Y *the* Z.

To further elucidate Tomasello's perspective regarding language acquisition, it is important, first of all, to highlight the fact that his cognitive-functional linguistics is associated with construction grammar (e.g., Croft 1998, 2001; Diessel 2019, 2023; Fillmore 1988; Goldberg 1995, 1998, 2006, 2019; Hoffmann 2022) as well as with

Langacker's cognitive grammar (Tomasello 2003a: 5, 98). It is worth remembering that, due to the existence of linguistic particularities such as idioms, construction grammar and Langacker's cognitive grammar, unlike Chomskyan generativism, refuse the complete distinction between lexicon and grammar. Actually, in both theoretical frameworks, lexicon and grammar are seen as a continuum. Based on this assumption and taking into account idioms and fixed grammar structures, some linguists proposed the hypothesis that the relation of form and meaning found in these constructions pervades the human language as a whole. For instance, at the end of the 1988 paper "Regularity and Idiomaticity in Grammatical Constructions: The Case of *Let Alone*," Charles Fillmore, Paul Kay, and Mary Catherine O'Connor considered the possibility that the principles underlying the production of an English construction such as *let alone* ("I barely got up in time to eat lunch, let alone cook breakfast," "I doubt you could get Fred to eat shrimp, let alone Louise squid," "I was too young to serve in World War Two, let alone World War One," and so on) are the same principles underlying the production of any English construction. In the 1999 paper "Grammatical Constructions and Linguistic Generalizations: The *What's X Doing Y?* Construction," Kay and Fillmore accepted this position and analyzed a particular type of English construction presented in sentences such as "What is this scratch doing on the table?," "What's a nice girl like you doing in a place like this?" and "What am I doing reading this paper?". Assuming that it is possible to generalize the 'aspects of form and meaning that are shared' by these sentences, Kay and Fillmore established the abstract construction *What's X Doing Y?*, which is supposed to be part of the linguistic knowledge of English speakers. The same procedure, said Kay and Fillmore, can and must be applied to other grammar structures, including verbal phrases, relative clauses, passives, and so on.

In turn, cognitive grammar, according to Langacker (2007: 422), belongs to cognitive linguistics, which is part of functionalism – i.e., the tradition according to which the meaning and use of linguistic forms should be studied in communicative acts, thus opposing the abstract study of linguistic forms that is done in formalist theoretical approaches such as generative grammar. Among the central assumptions of cognitive grammar are the understanding that language is an integral facet of cognition rather than a separate module (2007: 422), the conception that grammatical and semantic analysis are inseparable (2007: 423), and the notion that there are no definite boundaries between

"linguistic" and "extralinguistic" structures (2007: 425; 1987: § 2.1.2). By recognizing the resemblances between cognitive grammar and other theoretical frameworks, in particular construction grammar, Langacker (2007: 421) observed that cognitive grammar shares with them the general vision of treating semantics, lexicon, and grammar in a unified way, as well as the ideas that constructions (not "rules") are the primary objects of description, that lexicon and grammar are not distinct, but a continuum of constructions (form-meaning pairings), and that constructions are linked in networks of inheritance (or categorization). Besides, Langacker (1987: 12) developed his cognitive grammar based on the assumptions that 'meaning is what language is all about' and 'grammar is simply the structuring and symbolization of semantic content.'[2]

Having adopted cognitivism and confronting the Chomskyan hypothesis of the existence of a Universal Grammar, which would restrict the linguistic options available to the child in the process of language acquisition, Tomasello (2008: 11) argued that a language is a cultural product that is transmitted to the new generations growing up in a linguistic community. 'Linguistic conventions […] basically codify the ways that previous individuals in the community have converged upon to manipulate the attention and imagination of others in specific ways' (Tomasello 2008: 103). Based on this idea, Tomasello (2008: 218–219) claimed that most of what makes human communication so powerful is the 'psychological infrastructure' that is present already in species-unique forms of gestures such as pointing and pantomiming, which according to him were the first uniquely human forms of communication (Tomasello 2008: 2; 2022: 98). To Tomasello, in fact, language is built upon, and relies totally upon, this psychological infrastructure (Tomasello 2008: 218–219). 'Without this infrastructure, communicative conventions, like *gavagai*, are only sounds, signifying nothing,' observed Tomasello (2008: 219), using the famous example given by the philosopher Willard van Orman Quine to support his thesis of the indeterminacy of translation.

3 Simple syntax, serious syntax, and fancy syntax

[2] For a discussion of the theoretical and empirical limitations of Langacker's cognitive grammar, see Silva (2024).

Detailing the process that supposedly led to the conventional creation of human languages, Tomasello (2008: 244) asserted that there were three major motives of human cooperative communication: requesting, informing, and sharing. His basic idea is that the purpose for which one communicates determines how much and what kind of information needs to be 'in' the communicative signal, and therefore, what kind of grammatical structuring is needed. Thus, explained Tomasello, since requesting prototypically involves only two persons (you and me) in the here and now and the action I want you to perform, combinations of natural gestures and/or linguistic conventions do not require any real syntactic marking but only a kind of 'simple syntax' – 'even though with modern languages we may formulate quite complex requests,' admitted Tomasello (2008: 244). But when we produce utterances designed to inform others of things helpfully, stated Tomasello, there would be a 'serious syntax' as a result of the fact that informing often involves all kinds of events and participants displaced in time and space, creating functional pressure for doing such things as marking participant roles and speech act functions. Finally, argued Tomasello, when we want to share with others in the narrative mode about a complex series of events with multiple participants playing different roles in different events, there would be a 'fancy syntax' because we need even more complex syntactic devices to relate the events to one another and to track the participant across them.

Additionally, without giving further explanations of what he meant by 'simple syntax,' 'serious syntax,' and 'fancy syntax' and without justifying the fact that we can formulate with modern languages quite complex requests with multiple participants playing different roles in different events outside the here and now, Tomasello (2008: 245) stated that grammatical constructions were conventionalized in different groups of human beings via grammaticalization and other cultural-historical processes. 'Each of the different languages of the world, both spoken and signed, has its own syntactic and other grammatical conventions for structuring utterances so as to solve the various problems raised by informative communication' (Tomasello 2008: 275). However, pondered Tomasello (2008: 275–276), his more functional view of grammar does not deny that there might be very general processing or computational principles that in some way shape or constrain the kinds of grammatical patterns that human beings may conventionalize, like indicating first the agent of an action. 'But what grammar consists in most immediately is a set of conventional devices and constructions –

conventionalized differently in particular languages – for facilitating communication when complex situations outside the here and now need to be referred to,' he assured (Tomasello 2008: 275–276).

Given, therefore, that for Tomasello the conventional devices and constructions of a grammar are the result of a historical-cultural process, and not of a biological process (2008: 295–296), it is understandable why there would not be, in his view, innate and biologically determined principles constituting something like a language faculty, as Chomsky and his followers argue. More specifically, to Tomasello (2008: 313), the UG hypothesis is not impossible, but in his opinion, there is no evidence of it empirically, no precise formulation of it theoretically, and no need for it at all, 'if the nature of language is properly understood.'

In his 1999 book *The Cultural Origins of Human Cognition*, Tomasello presented in more detail what he believes to be the proper understanding of the nature of language. In this book, Tomasello argued that language is a product of humans' biological capacity for living culturally – i.e., the humans' biological capacity to understand conspecifics as intentional/mental agents like the self (Tomasello 1999: 1–12, 53, 90). According to Tomasello (1999: 5–6), there are three kinds of cultural learning: imitative learning, instructed learning, and collaborative learning. These three types of cultural learning, said Tomasello, are made possible by a very special form of social cognition: the ability of individual organisms to understand conspecifics as beings like themselves who have intentional and mental lives like their own. To Tomasello, it is this ability that enables individuals to imagine themselves 'in the mental shoes' of some other person, so that they can learn not just from the other but through the other. 'This understanding of others as intentional beings like the self is crucial in human cultural learning because cultural artifacts and social practices – exemplified prototypically by the use of tools and linguistic symbols – invariably point beyond themselves to other outside entities: tools point to the problems they are designed to solve and linguistic symbols point to the communicative situation they are designed to represent' (Tomasello 1999: 6). Therefore, concluded Tomasello, to socially learn the conventional use of a tool or a symbol, children must come to understand why (toward what outside end) the other person is using the tool or symbol.

4 Analogies and disanalogies

Undoubtedly, Tomasello expressed his ideas clearly and coherently. However, it is not difficult to identify gaps in his line of argument. First of all, learning and using tools have very significant differences from learning and using linguistic symbols. On the one hand, the knowledge that speakers have about the phonological structure and syntactic structure of their languages is intuitive, unconscious, and acquired in childhood without any instruction – although appropriate stimuli are necessary, as repeatedly stressed by Chomsky (e.g., 2015 [1965]: ch. 1, § 8; 1988: 159; 1986: xxv–xxix). On the other hand, the knowledge that members of a community have about a particular tool, such as an axe, a loom machine, or a computer, is deductive, conscious, and often acquired after a long period of instruction. In addition, linguistic knowledge (in the Chomskyan sense) is basically the same among speakers – pathological cases and mental disorders aside – but the knowledge that individuals have of the most diverse tools varies enormously among them, depending on factors such as personal talent, learning interest, practical experience, and so on.

Another obstacle to Tomasello's social-pragmatic theory of language is the considerable differences between first language acquisition during the so-called 'critical period' (Lenneberg 1967: ch. 4) – or 'sensitive period,' as emergentists prefer (e.g., Clancy and Finlay 2001: 324; Elman et al. 1996: 283) – and learning a non-native language after the critical period as well as learning how to use a tool. Considering the importance of this question to the credibility of Tomasello's theory, one would expect a substantial discussion on this topic in *The Cultural Origins of Human Cognition*. However, Tomasello doesn't even mention this issue in his book.

In the 2003 book *Constructing a Language*: *A Usage-Based Theory of Language Acquisition*, Tomasello filled this gap by reserving two short paragraphs of the book's nearly 400 pages to address the subject (Tomasello 2003: 286–287). Given the brevity of the exposition, Tomasello did not even mention the most important examples presented by the generativists in favor of the critical period hypothesis, such as the famous case of the girl Genie (e.g., Curtiss et al. 1974; Fromkin et al. 1974). It is worth remembering that Genie was a victim of severe child abuse, neglect, and social isolation. The extent of her isolation prevented her from being exposed to any

significant amount of speech in her first years of life – that is, the so-called critical period, understood as a biologically determined stage of development in which an organism is optimally ready to acquire some competence that are part of typical development. As a result of her abuse, Genie did not acquire a first language during her childhood. At 13 years old, she was rescued, and a group of psychologists and linguists, among other professionals, began to work with her, trying to facilitate her cognitive and social development. At around 15 years old, Genie was presenting a good amount of vocabulary and she could accurately name most objects she encountered. Nonetheless, she had great difficulty with learning and using basic grammar, mainly producing short sentences such as "Eat lunch on plate," "Genie angry at teacher," and "I want go school." In contrast to her linguistic abilities, Genie's nonverbal communication increased significantly. For instance, she invented a system of gestures and pantomimed certain words as she said them. Despite this, her conversational competence remained very low compared to normal people. Genie, in fact, had a severely limited grammar that lacked functional structure, alongside excellent vocabulary learning ability, good ability to initiate and sustain topics, excellent ability to apprehend complex hierarchical structure outside the realm of grammar, good ability to logically sequence pictures into stories, ability to count, ability to draw in silhouette and capture in drawing juxtapositions of objects and events that she could not communicate verbally, powerful non-verbal communicative ability, and superior visual and spatial cognition (Curtiss 2013: 68).

Ignoring case studies such as Genie's, Tomasello cited in *Constructing a Language* research conducted by Elissa L. Newport (1999) and Newport, Daphne Bavelier and Helen J. Neville (2001) on how immigrant children develop a deeper knowledge of the language spoken in their new country than their adult peers. While acknowledging that children show more progress in acquiring a second language than adults, Tomasello countered the conception that this is due to the critical period by arguing that other studies that followed Newport's revealed a continued decline in people's language abilities as they age rather than an abrupt decline. More specifically, Tomasello denied the validity of the critical period hypothesis by stating that there is not a well-defined critical period. However, there does not seem to be any proponent of the critical period hypothesis who would see this as a problem. That's because none of these theorists set a deadline for a child to acquire a language as a native speaker. It is

no coincidence that Elman et al. (1996: 289) observed that children from 4 years to adolescence present a slow decrease in capacity for second-language learning and recovery from aphasia. The critical period hypothesis, said MacWhinney (2005: 104–105), 'holds that, after some time in late childhood or puberty, second languages can no longer be acquired by the innate language acquisition device, but must be learned painfully and incompletely through explicit instruction.' But the fact acknowledged by Elman et al. and MacWhinney that the length of the critical period has not been precisely defined does not pose a problem for this hypothesis. After all, no one has delimited childhood, puberty, or adulthood precisely, even so, we admit the existence of life stages.

Refuting the critical period hypothesis, Tomasello also argued that compared to children, adults have a first language that has been learned and entrenched for a longer period, creating more interference problems. The counterpoint to this reasoning is that children can continue to "learn" throughout their lives the language of their country of origin and the language of their new country without there being "interference" or predominance of the language "learned" earlier. Besides, according to Tomasello's point of view, the first language of a child should always be his/her dominant language, but that simply is not the case (e.g., Birdsong 2014, 2018; Flege et al. 2002; Grosjean 2008, 2010). In fact, there are many cases of immigrant children and young people who lose their first language or who have as their first language the language of their new country instead of the language spoken by their parents, to which they were previously exposed for much longer (e.g., Grosjean 2010: 234ff; Grosjean and Byers-Heinlein 2018: 14–15).

Without mentioning these problems in his theory – as well as the fact highlighted by Elman et al. (1996: 119) and by Bates and himself (2001c: 17) that the early human capacity to discriminate all speech-relevant sounds is progressively lost and only the relevant sounds to the infant's native tongue are retained – Tomasello also stated, contradicting the critical period hypothesis, that in most immigrant situations children receive much more and much better experience with language in the social settings in which they participate (such as all-day school) than do adults. Leaving aside the difficult discussion about the criteria that would define one linguistic experience as better than another, it is noticeable that even immigrant adults with excellent social experiences, such as academics and artistic and sports celebrities, never reach the level

of knowledge of a new language that children reach. In other terms, as emphasized by Elman et al. (1996: 348), late learners of a language (either first or second) exhibit poorer performance than early or native learners: 'Late learners tend to have incomplete control of morphology, and rely more heavily on fixed forms in which internal morphological elements are frozen in place and therefore often used inappropriately. Young native learners, in contrast, commit errors of omission more frequently.'

Without dwelling on the analysis of discrepancies such as these, Tomasello also asserted, against the critical period hypothesis, that children are more flexible learners than adults in general, not only when it comes to language. In fact, as Tomasello pointed out, it is usually easy to recognize skiers, tennis players or pianists who began learning their respective activities in childhood rather than adulthood. However, as underlined above, in the case of language, there are no significant differences in knowledge among speakers who acquire a language during the critical period, unlike what happens with activities such as skiing, playing tennis or playing the piano, in which the differences between individuals are striking, even among those who learned a sport or a trade in childhood. It is not surprising, therefore, that in the introduction to the book *Language Development: The Essential Readings*, Tomasello and Bates emphasized the differences between the way children learn a language and the way they learn a game such as tennis:

> At first glance, the way children learn a language seems straightforward. They observe what other persons are doing with language, and they 'do the same thing'. But anyone who has attempted to learn a foreign language knows that this general description obscures many difficulties. (One might just as well say that to become a champion tennis player one has simply to watch champion tennis players and do what they do. (Tomasello and Bates 2001a: 1)

Inconsistent with this statement, Tomasello has been affirming and reaffirming for decades his social-pragmatic theory of language acquisition. To better substantiate it, Tomasello also argued that the creation of the abstract structures that are embodied in the grammars of natural languages resembles the creation of other cultural-historical phenomena such as algebra, money, and a game like chess, with initially simpler

cultural stages that become increasingly complex over the generations (e.g., Tomasello 1999: 45–48; 2003: 291–292; 2008: 6–7; 2019: 19–20).

The point once again is that the linguistic knowledge of speakers is intuitive, unconscious, and acquired without any instruction, while one's knowledge of mathematics and chess is acquired over many years of training and with varying degrees of depth depending on the interest, dedication, and skills of the individuals. Therefore, as asserted by Elman et al. (1996: xi), 'human children and adults [...] know how to speak a language (many people know several),' but just 'some of us know how to build cars, and others know how to solve partial differential equations.' Moreover, in the case of learning mathematics, games such as chess and car building, there is no "interference" at all as in the learning of a second language by an adult. Not to mention the fact, admitted by Tomasello himself (1999: 45), that the level of mathematical complexity varies greatly between different cultures, unlike what happens with language. 'There are many disanalogies between language and mathematics (which is more closely related, both logically and historically, to written language),' conceded Tomasello (2003a: 17). Nevertheless, Tomasello maintained his theory, also comparing the cultural creation of language to the cultural creation of money (e.g., Tomasello 1999: 94–96; 2003a: 291; 2008: 238). 'Just as money is a symbolically embodied social institution that arose historically from previously existing economic activities, natural language is a symbolically embodied social institution that arose historically from previously existing social-communicative activities,' said Tomasello (1999: 94). In this case, it seems fair to ask why all cultures have complex forms of linguistic communication, whereas just some cultures have monetary systems (varying in complexity). Besides, Tomasello's theory is apparently undermined by a case study such as Chelsea's (Grinstead et al. 1996: 305–306). Like Geni, Chelsea was not exposed to any significant amount of speech in her first years of life and, as a result, she did not acquire a native tongue during her childhood. However, as an adult, Chelsea learned how to use money, but her grammar remained exceedingly rudimentary.

5 An innate property of the human auditory system

Tomasello, who barely addressed phonological issues (cf., e.g., Tomasello 2003a: 59–62), also did not explain in terms of his cultural theory of language the fact highlighted by Bates and himself (2001a: 2; 2001c: 17) that research with newborns indicated that prenatal experience with maternal speech can influence their perception of speech cues important for discriminating among speakers as well as their perception of linguistically-important speech sounds (DeCasper et al. 1994; Ramus et al. 1999). This fact by itself disproves Tomasello's social-pragmatic theory of language acquisition and his claim that language emerges in human children in the months following the first birthday because this is when fundamental skills of intention-reading are solidly in place. This understanding is reinforced by another fact highlighted by Bates and Tomasello (2001a: 3): the existence of empirical evidence that young infants, including newborns, can discriminate between sentences drawn from their mother tongue and sentences from a language belonging to another rhythmic class (Ramus et al. 1999). Actually, as stressed by Bates and Tomasello (2001b: 16), in the 1970s researchers such as Peter Eimas (1975) had already revealed that infants at 2 and 3 months of age can discriminate phonological contrast. 'It is now quite clear that the ability to perceive speech contrasts is present very early and is probably (within limits) an innate property of the human auditory system,' acknowledged Tomasello and Bates (2001b: 16). And the fact, discussed by Tomasello and Bates (2001b: 3; 2001c: 16–17), that similar abilities are shared by non-human species, in no way minimizes the problems that the phonological component of language presents to Tomasello's social-pragmatic theory of language acquisition.

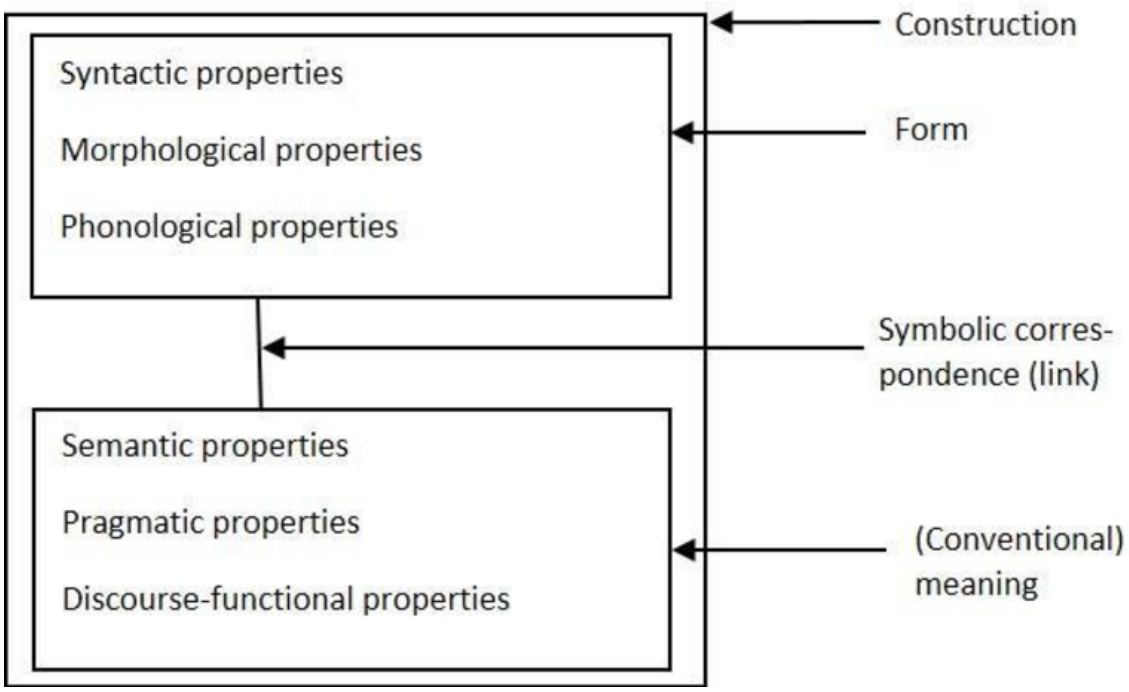
The phonological component of language also represents a challenge to Tomasello's theory, as well as to cognitive linguistics, for other reasons. It is worth noting that phonology is underrepresented in cognitive linguistics. In fact, as observed by Jan Nuyts (2007: 550), cognitive linguistics is predominantly oriented to semantic phenomena. Considering this, it is no wonder that Langacker (2007: 443) recognized that his own theoretical discussion regarding phonology is 'at best programmatic,' that Margareth H. Freeman (2007: 1193) declared that cognitive phonology is 'in its infancy,' and that John R. Taylor (2003: 265) stated that 'cognitive linguistic treatments of phonological issues are still very thin on the ground.' Actually, according to Taylor (2007: 580), phonology has tended to be neglected by cognitive linguistics researchers, among other reasons, because 'phonological units such as phoneme, syllable, and foot

have no conceptual content in themselves and cannot therefore be reduced to matters of conceptual structure and its symbolization.' So, it is not surprising that Geoff Nathan's essay on phonology published in the *Oxford Handbook of Cognitive Linguistics* is basically a summary of the history of phonology in the 20th century that announced 'what a cognitive phonology will look like' (Nathan 2007: 611). It is not surprising either that Nathan's 2008 book *Phonology: A Cognitive Grammar Introduction* is essentially 'an introduction to most aspects of contemporary twenty-first century phonology,' as the author stated in the first line of the preface.

Since most constructionist approaches have been heavily influenced by cognitive linguistics (Goldberg 2013: 16) and considering that 'construction grammar presents a general theory of syntactic representation for cognitive linguistics' (Croft 2007: 463), it is understandable that phonology is also underrepresented in this framework. In fact, like the emergentists, construction grammar researchers scarcely address the highly complex phonological structure of language (cf., e.g., Hayes 2009). For instance, in his 2019 book *The Grammar Network: How Linguistic Structure is Shaped by Language Use*, Holger Diessel stated that his work 'delineates a theoretical network model of grammar in which all concepts of grammar (e.g., constituent structure, argument structure, word classes, grammatical relations, morphological paradigms and constructions) are defined by various types of links, or relations, that indicate associations between different linguistic elements' (Diessel 2019: 9). Nonetheless, as revealed by the list above, Diessel barely discussed phonological concepts. Likewise, the only analysis of the phonological component of language in *The Oxford Handbook of Construction Grammar* is the one presented by the generativist Ray Jackendoff in the essay "Constructions in the Parallel Architecture."

Significantly, in his essay "Construction Grammar," William Croft (2007: 463) pondered, completely ignoring phonology, that the notion of a construction has been generalized in construction grammar and that it has become 'a uniform model for the representation of all grammatical knowledge – syntax, morphology, and lexicon.' Actually, as observed by Jackendoff (2007: 73), every theory of grammar treats words as triples of phonological, (morpho)syntactic, and semantic information. Construction grammar is not different in this respect. However, as stressed by Croft (2001: 14–15; 2007: 464), construction grammar represents a reaction to the so-called "componential model" of the organization of a grammar, according to which different types of

properties of an utterance – its sound structure, its syntax, and its meaning – are represented in separate components, each of which consisting of rules operating over primitive elements of the relevant types (phonemes, syntactic units, semantic units). According to the componential model of the organization of a grammar, stated Croft, each component describes one dimension of the properties of a sentence. In other terms, the phonological component consists of the rules and constraints governing the sound structure of a sentence of the language; the syntactic component consists of the rules and constraints governing the syntax – the combinations of words – of a sentence; the semantic component consists of rules and constraints governing the meaning of a sentence. In sum, each component separates each specific type of linguistic information that is contained in a sentence: phonological, syntactic, and semantic. In turn, said Croft (2007: 463), constructionist approaches assume that all levels of grammatical description involve conventionalized form-meaning pairings – that is, a "construction". The figure below represents the symbolic structure of a construction:



Croft (2001: 18)

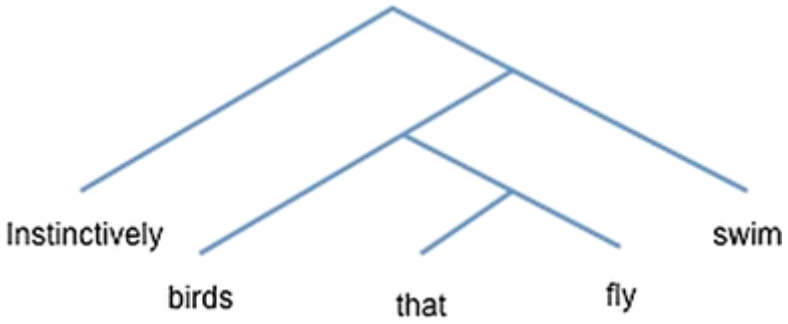
It is worth mentioning that the notion of construction is 'hotly contested' (Hilpert 2014: xi). For instance, according to Adele Goldberg (2013: 15), this concept includes morphemes, words, idioms, and abstract phrasal patterns (such as X VERB*ed* Y *the* Z). However, it is debated by constructionists whether morphemes and/or words can be considered constructions. Besides, there is no consensus about the definition of construction nor about which types of linguistic units it encompasses (cf., e.g., Ungerer and Hartmann 2023). Moreover, by assuming that all levels of grammatical description involve conventionalized form-meaning pairings, constructionist approaches underrepresented in their linguistic models the highly complex rules and constraints governing the sound structure, the syntax, and the meaning of the sentences of a language (cf., e.g., Adger 2013; Jackendoff 1996, 2003: 179–182, 194–195; Lidz and Gleitman 2004; Lidz and Williams 2009). Apparently not noticing these problems, Tomasello has built his cognitive-functional linguistics upon highly vulnerable premises.

6 Arbitrary languages

As might be expected, the syntactic component of language also presents serious challenges to Tomasello's culturalism. To cite just one example, Tomasello never explained in terms of his theory the fact, stressed for decades by Chomsky in favor of the Universal Grammar hypothesis, that human languages are hierarchical, rather than linear (cf., e.g., Adger 2013, Berwick and Chomsky 2016, Piatteli-Palmarini and Berwick 2013, Lidz and Gagliardi 2015). The point is: since each of the different languages of the world, both spoken and signed, has its own syntactic and other grammatical conventions for structuring utterances so as to solve the various problems raised by informative communication, as Tomasello claimed, how come none of them has a linear syntax? In other words, since grammatical constructions were conventionalized in different groups of human beings via grammaticalization and other cultural-historical processes, as Tomasello argued, why haven't they done so either hierarchically, or linearly? Moreover, given that, according to Tomasello, new generations of children inherit linguistic constructions using biologically inherited cognitive skills falling under the general headings of intention-reading and pattern-

finding, why do children never consider rules based only on the linear order of sentences (cf., e.g., Musso et al. 2003)?

As a matter of fact, in a sense, linear languages are much simpler than hierarchical languages. However, the syntactic operations of human language are based on the hierarchy of constituents, not on their linearity. In the sentence "Birds that fly instinctively swim," observed Robert Berwick and Chomsky (2016: 103ff), the adverb "instinctively" can be associated with the preceding verb (fly instinctively), or the following one (instinctively swim). However, in the sentence "Instinctively, birds that fly swim," the adverb is interpreted only with the linearly more remote but structurally closer verb "swim," not the linearly closer but structurally more remote verb "fly." According to Berwick and Chomsky, that is the case because "swim" is just one hierarchical level "down" while "fly" is two levels "down" (see figure below). So "instinctively" is actually closer to "swim" than it is to "fly" in terms of the structural distance. "Apparently, it is not linear distance that matters in human syntax, only structural distance," concluded Berwick and Chomsky (2016: 116).



Berwick and Chomsky (2016: 117)

Based on a wide range of similar phenomena (cf., e.g., Allott et al. 2021; Chomsky 2015 [1965], 1981, 1986, 1995; Piatelli-Palmarini and Berwick 2013; Roberts 2017), Chomsky raised both the autonomy of syntax hypothesis – given that syntactic aspects such as the hierarchical structure of human languages are apparently independent of other linguistic components and other cognitive structures – and the UG

hypothesis. And it is important to consider that the syntactic structures that Chomsky and his followers have been analyzing since the 1950s are much more complex than the syntactic patterns that are discussed by Tomasello, such as X VERB*ed* Y *the* Z. Taking this into account, Jackendoff (2003: 83) pondered that many advocates of emergentism either are not aware of the complexity of linguistic structure or explicitly wish to deny it since a less complex structure requires a less elaborate learning theory. 'Vision also seems intuitively simple too, yet no one in cognitive science believes any more that the visual system has a simple structure or that the brain just "learns to see" without any specialized genetic support,' stressed Jackendoff (2003: 83).

Another critic of emergentism, Kevin R. Gregg (2003: 67) analyzed what are the necessary cues for a person to acquire, for example, the concept of subject in English. Contradicting the emergentist Nick Ellis (1998: 653), to whom the cues in the sentence "The boy loves the parrots" are preverbal positioning ("boy" before "loves"), verb agreement morphology ("loves" agrees in number with "boy" rather than "parrots"), sentence-initial positioning and the use of the article "the," Gregg questioned, first of all, in what sense these 'cues' are cues. After all, he observed, what the environment can provide is only perceptual information – in this case, the sounds of the utterance and the order in which they are made. So, stated Gregg, for 'boy before loves' to be a cue that the subject comes before the verb, the learner must already have the concepts of subject and verb. In the sentences "The mother of the boy loves the parrots" and "The policeman who followed the boy loves the parrots," pondered Gregg based on the generativist claim that human language syntax is hierarchical, "the boy" is preverbal but is neither subject nor agent. Thus, he asserted, there is no reason to think that "comes before the verb" is going to be useful information for a learner or a hearer, in the absence of knowledge of syntactic structure. Moreover, said Gregg, what decides that "preverbal position" is a cue and that "presence of utterance-final sibilant", for example, is not? Considering that the emergentists do not give plausible answers to these questions, Gregg reiterated Chomsky's argument of the poverty of stimulus – i.e., the understanding that the amount of information available from natural sentences is far too limited to allow the language learner deriving the linguistic principles used in the

ambient language unless guided by an innate mechanism (a "language acquisition device," in Chomsky's terms).[3]

Admitting the scientific validity of the emergentism's claim that the child's acquisition of grammar is guided, not by abstract categories, but by the pragmatic and semantic structure of communications interacting with the performance constraints of the speech channel, Jackendoff (2003: 78ff) cogitated the possibility that some aspects of language might be reduced to more general principles of the mind/brain. The problem with this hypothesis, said Jackendoff, is that it tries to reduce all language learning to general human intelligence. Contrary to this stance, Jackendoff emphasized, in line with Gregg, that syntactic structures and phonological structures are qualitatively different from all the rest of the brain, and there is no compatibility between general principles and the unique character of linguistic categories and hierarchies. In fact, linguistic concepts such as subject, verb, vowel, syllable, etc. do not seem to have analogs in other cognitive systems, as well as syntactic and phonological operations. It is no coincidence that the example presented by Chomsky to Piaget against constructivism and taken up by him in his lectures held in Nicaragua in the 1980s (Chomsky 1988) remains significant: to form interrogative sentences from the assertive sentence "The man who is tall is sad," the speakers always choose to move the main verb of the sentence ("Is the man who is tall sad?"), not the first one (* "Is the man who tall is sad?"), even though both options are logically possible. If in the process of language acquisition children merely find patterns across item-based constructions by schematizing and making analogies, as claimed by Tomasello in accordance with other emergentists (e.g., Ambridge and Lieven 2015: 482, 489–490, 499), it would be expected that at least some of the children would choose to move the first verb of the sentence, not the main verb. But this does not happen because the operation is always based on the hierarchy of constituents and not on their linearity. Consequently, the hypothesis that there are innate mechanisms that restrict the linguistic options available to speakers is supported.

However, examining the syntactic operation presented by Chomsky to Piaget, Tomasello (2009: 85) stated against the argument of the poverty of stimulus: 'If children understand NPs with relative clauses – if they understand that the whole phrase

[3] See, for example, Chomsky (2015 [1965]: ch. 1; 1986: ch. 1; 1995: ch. 1), Crain et al. (2021), and Lasnik and Lidz (2017). For a defense of the argument of the poverty of stimulus against emergentism, see, for example, Berwick et al. (2013), Chomsky (2013), and Lidz and Gagliardi (2015).

is used to make one act of reference – then there would never be any temptation to extract an auxiliary from it; they would simply understand that that unit stays together as one functional unit.' Following Gregg's analysis of what are the necessary cues for a person to acquire the concept of subject in English, it seems fair to ask what are the necessary cues for a person to acquire the concepts of noun phrases (NPs), relative clauses, phrase, and auxiliary in English or other languages. And what are the necessary cues for a person to acquire the understanding that NPs with relative clauses are units that stay together as one functional unit? There is no reason to think that "NPs with relative clauses" is going to be useful information for a learner or a hearer, in the absence of knowledge of syntactic structure. Besides, as observed by Gregg, what the environment can provide is only perceptual information – in this case, the sounds of the utterances and the order in which they are made. Taking all these into account, as well as the fact that 'so many logically possible rules do not appear to be part of any human language' (Grohmann and Kambanaros 2021: 700), it also seems fair to reiterate Chomsky's argument of the poverty of stimulus and the hypothesis that the types of grammar the child needs to consider in the process of language acquisition must be narrowly constrained by the language faculty – a hypothesis that has been supported with repeated testing (e.g., Kam et al. 2007, Kam 2009; Kam and Fodor 2013; Thompson and Newport 2007). So, considering that 'children do not seem able to learn any arbitrary language' (Elman et al. 1996: 342; Elman 1999: 10) with arbitrary rules (e.g., Chomsky and Moro 2022; Culbertson and Newport 2015; Folia et al. 2010; Gómez and Gerken 1999, 2000; Moro 2016), it makes no sense to say, as Tomasello does, that a language is a cultural invention.

It is worth adding, however, that many aspects of a language are clearly a cultural invention – or a cultural convention. For instance, in many of the Australian Aboriginal languages, category membership is reflected in the inclusion/exclusion marking in their pronominal systems. The Warlpiri language, for example, has a complex pronominal system that marks inclusion and exclusion: *Ngaju* (I), *Nyuntu* (you), *Ngali* (you and I), *Ngali* (both of us, including you), *Ngajarra* (both of us, excluding you), etc. The relevance of marking inclusion and exclusion in the pronominal system of Aboriginal languages such as Warlpiri is due to the fact that in the cultures in which these languages are spoken, the establishment of kinship schemes is a socio-cultural trait of the highest importance. This is because such schemes carry

norms and values that imply respect, obligations and specific responsibilities, depending on whether or not there is kinship between people and the degree and nature of that kinship. As a consequence of the weight of kinship relations among aborigines, in many of their languages kinship schemes are even morphosyntactically codified (Hale 1966; Walsh and Yallop 1993). Similar linguistic phenomena have been discussed for decades by several authors (cf., e.g., Palmer 1996; Sharifian 2011). The key question, of course, is to determine what is biological (nature) and what is cultural (nurture) in language.

7 Double dissociation

Another serious obstacle to emergentism and Tomasello's social-pragmatic theory of language acquisition is the fact, recognized by Tomasello himself (e.g., 1999: 6–8, 215), that individuals with Autism Spectrum Disorder (ASD) do not have the socio-cognitive abilities that are allegedly necessary to socially learn the conventional use of a tool or a linguistic symbol – something like a Theory of Mind (Tomasello 2003a: 12), which refers to our ability to make accurate guesses about what people might be thinking or feeling or willing to do – but many of them have a high level of language proficiency. Children with ASD, asserted Tomasello (1999: 92), 'have problems in imitative learning, they do not engage in symbolic play normally, they do not seem to have self-understanding of the same type as typically developing children, and they have difficulties in learning and using linguistic symbols in communicatively appropriate ways.' Despite this, contradicting Tomasello's theory of language acquisition, children with high-functioning autism – an unofficial term used for people whose autism symptoms appear mild – as well as children with Asperger Syndrome develop and maintain normal or near-normal grammars (e.g., Curtiss 2013: 76; Ozonoff and Miller 1996; Rumsey and Hanahan 1990; Smith and Tsimpli 2021; Tsimpli et al. 2017).

Although this fact seems to undermine his social-pragmatic theory of language acquisition, Tomasello barely discussed how children with ASD acquire language (e.g., Tomasello 1995: 152; 1998: x; 2003a: 66–67; 2019: 146). For instance, in briefly addressing the serious problems that autism brings to his cultural theory of language,

Tomasello observed in half a paragraph of the 2008 book *Origins of Human Communication* that children with autism have some skills for understanding the basics of intentional action – for example, that others have goals and see things –, but they have very poor skills of joint attention and collaboration (Tomasello 2008: 142–143). Taking into account this situation, Tomasello asserted that 'there is a very strong correlation in children with autism between skills of joint attention and communication such that children with autism who are capable of engaging more readily in joint attentional behaviors [...] are the ones who subsequently acquire more sophisticated skills of gestural and linguistic communication.' However, this conclusion seems to ignore the existence of individuals with ASD, or some other mental disorder, that have high phonological and morphosyntactic competence and very poor pragmatic abilities.

For instance, in the 1981 paper "Selectively Intact Grammatical Development in a Retarded Child,"[4] Susan Curtiss and Jeni Yamada described the case of Antony, whose profile is quite the opposite of Genie's. Antony was a child of 6–7 years old with an IQ estimated between 50 and 56 (the average IQ is 100). According to Curtiss and Yamada, his language was well-formed phonologically, morphologically, and syntactically. His grammar was fully elaborated with inflectional and derivational bound morphology, for example. Besides, it included syntactic structures involving movement, embedding, and complementation. However, Antony's language was semantically quite deficient. His lexical specifications were incomplete and sometimes inaccurate. For example, his errors with lexical substantives involved confusion or inadequate definitional differentiation between words within a particular semantic area, such as "birthday" for "cake", and "cutting" for "pasting". Moreover, propositional content, unless quite simple, was often confusing and incompletely expressed. Therefore, Antony frequently failed to grasp the intent or full meaning of his own and others' utterances, causing consistent communication failures.

That same year, Curtiss also published the paper "Dissociations between Language and Cognition: Cases and Implications," in which she presented data from case studies of children – including Genie and Antony – showing clear dissociations between language and nonlanguage cognitive abilities. Based on the case studies discussed in the paper, Curtiss concluded that apparently lexical and relational semantic

[4] The expression "mental retardation" has gradually been abandoned since the 1980s and the 1990s in favor of the expression "intellectual disability."

abilities are deeply linked to broader conceptual development but morphological and syntactic abilities are not. Nonetheless, observed Curtiss, the development of a normal linguistic system, one in which grammar is systematically related to meaning, requires concurrent and concomitant linguistic and nonlinguistic cognitive development. In other terms, stated Curtiss, while the acquisition of syntax and morphology may to some extent proceed independently of other cognitive development, normal language in which meaning is systematically related to the syntactic and morphological structure would seem to depend on the development of nonlinguistic cognitive knowledge alongside the acquisition of the grammar.

In the 1990 book *Laura*: *A Case for the Modularity of Language*, Yamada described another case of a person whose language was remarkably preserved, even in the face of a relatively severe intellectual disability. According to Yamada, Laura presented a dramatic contrast between complex linguistic abilities and markedly depressed nonlinguistic cognitive abilities, with a testable IQ in the low 40s. For instance, at 16 years old, Laura could not read, tell time, give her age, count, or do simple problem-solving, but her language was rather well-developed (Yamada 1990: 7). In fact, like Antony, Laura revealed an extensive knowledge of English syntax in her language production. Her linguistic sophistication was especially evident in her use of syntactically and morphologically rich structures that are relatively late acquisitions in normal development, including the use of passive sentences and subordinating conjunctions of time, causality, and so on (Yamada 1990: 27–35). Nevertheless, like Antony's, Laura's language was semantically deficient (Yamada 1990: 39–62). She seemed to grasp the meaning of many words she used, though she apparently understood others only partially and still others minimally, if at all. Besides, she had a limited understanding of the notion of a joke, for example. Considering these particularities, Yamada (1990: 6) observed that Laura's case supports a modularity model. 'Her profile refutes the contention that cognitive, social-interactive, and perceptual factors can account for language acquisition and supports the notion that language is a highly evolved, specialized human ability driven at least in part by a set of principles seen in no other cognitive domain,' stated Yamada (1990: 6). 'In addition, this case shows that various aspects of language are separable and differentially related to nonlinguistic abilities.' Moreover, stressed Yamada (1990: 112), 'Laura's profile

challenges the conceptualization of grammar as semantically based and the notion that syntax depends upon semantic.'

Many works that came to light after Yamada's research also challenged non-modular linguistic theories. In the 1995 book *The Mind of a Savant: Language Learning and Modularity*, for example, Neil Smith and Ianthi-Maria Tsimpli presented ample evidence that supports Curtiss's and Yamada's conclusions. In this book, Smith and Tsimpli reported on the case of the autistic *savant* Christopher Taylor. At 29 years old, Taylor had a mental age of 9,2 years old and an IQ of 56. He could not, for instance, cross the road alone, do up his own buttons, shave, or dress himself. Nonetheless, besides English, his native language, Taylor had some knowledge (ranging from fluency to the bare elements) of 15 languages: Danish, Dutch, Finnish, German, Modern Greek, Hindi, Italian, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Turkish and Welsh. 'Christopher's condition is correctly characterized in terms of an intact language module co-existing with an impaired central system,' observed Smith and Tsimpli (1995: 67). In fact, Taylor had considerable semantic and pragmatic problems (Smith and Tsimpli 1995: 63ff), including autistic traits such as a poor Theory of Mind (Smith and Tsimpli 1995: 183) and difficulties to understand jokes, irony, and metaphors (Smith and Tsimpli 1995: 74ff). Based on Taylor's case study, and assuming Jerry Fodor's (1983) modular theory, Smith and Tsimpli not only defended the existence of a 'language module' in the human mind/brain but also hypothesized that the syntactic representation and the phonological representation belong to the language module, while the pragmatic interpretation requires the language module as well as the central mental systems (not modular), in which general and encyclopedic knowledge are stored (Smith and Tsimpli 1995: 30).

This line of argument is reinforced by the fact that deaf adults who were not exposed to a sign language until adulthood manifest significant grammatical deficits together with normal (even superior) non-verbal communication and normal cognitive function, not to mention number knowledge and arithmetic ability (Curtiss 2013: 77). Individuals with acquired agrammatical aphasia also have intact intelligence, revealing another dissociation of grammar from extra-grammatical cognition (Curtiss 2013: 79). Besides, adults with Dementia of the Alzheimer's Type (DAT), for example, have a particular kind of dissociation. Alongside cognitive dissolution, progressive dementia is characterized by lexical and other forms of semantic loss, even early on. So, while non-

linguistic cognition and extra-grammatical aspects of language, such as lexicon and discourse function, deteriorate, phonological and morphosyntactic knowledge appears to remain largely intact, often until the late stages of DAT (Curtiss 2013: 80).

Considering the phenomenon of double dissociation between the ability to use language and the sociopragmatic ability to communicate, which has been studied for decades, Curtiss (2013: 80) stressed that language, like other cognitive systems, is not all of a piece, and that different subsystems within language – lexicon, pragmatics, and the computational system (the grammar) – can be selectively impaired in development and breakdown. Further evidence that language is not all of a piece comes from children with Specific Language Impairment (SLI) who had only a phonological deficit, only a syntactic deficit, a selective lexical impairment, or a selective pragmatic deficit (Curtiss 2013: 86). Thus, as it seems, language has indeed different subsystems. To sustain this position, Curtiss (2013: 81) emphasized that many researchers have noted selective deficits in pragmatics, typically following damage in the right hemisphere of the brain, where the grammar and the lexicon remain essentially intact, while 'non-ordinary' language, including the capacity to appreciate metaphors and jokes, is affected.

As a matter of fact, many studies with patients who have suffered some damage in the right hemisphere of the brain – due to a stroke, for example – corroborate the existence of selective deficits in pragmatics (e.g., Baron-Cohen 1988; Champagne-Lavau and Joanette 2009; Lomlomdjian et al. 2017). As detailed in these studies, those patients – like individuals with high-functioning autism or Asperger Syndrome (cf., e.g., Williams and Wright 2004) – typically present logical, fixed, concrete, literal ways of talking and thinking; a tendency to have a literal understanding of metaphors, analogies and idiomatic expressions; difficulties using and interpreting prosodic resources and gestures, and so on. In turn, patients who have suffered some damage in the left hemisphere of the brain typically present difficulties using and understanding syntactic, phonological, and semantic proprieties. All these facts, notwithstanding the controversies regarding what are the main language structures and pathways in the brain (e.g., Desai and Riccardi 2021; Ferstl et al. 2008; Gitelman et al. 2005; Grodzinsky and Santi 2008, 2009; Malik-Moraleda et al. 2022; Willems and Hagoort 2009), contradict the emergentists' non-modular conception of language as well as Tomasello's social-pragmatic theory of language.

8 Universal Grammar *and* general cognitive mechanisms in language acquisition

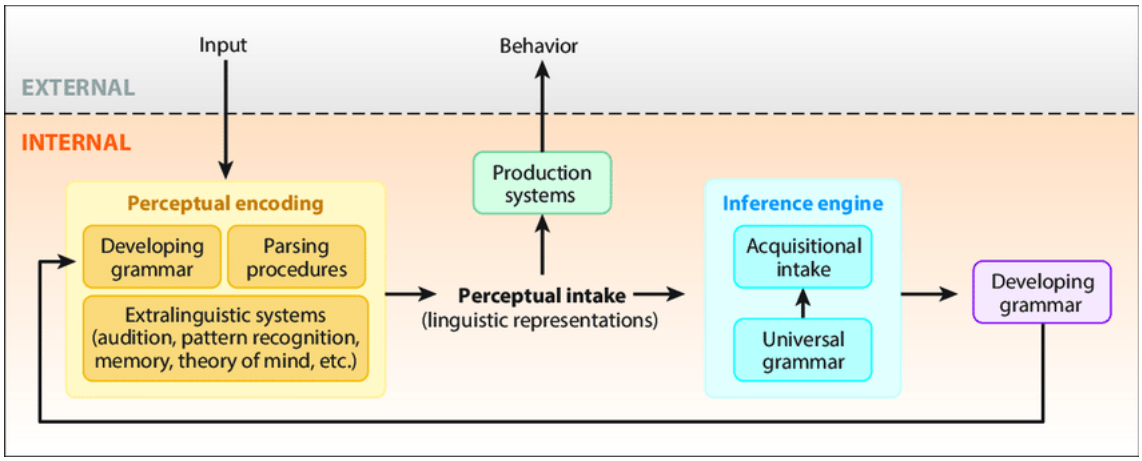
At this point, after analyzing theoretical and empirical problems of emergentism and Tomasello's cognitive-functional linguistics, it is important to highlight the fact that it seems possible, and even necessary, to integrate many aspects of emergentists' discussions regarding language acquisition and Tomasello's cognitive-functional linguistics into a research program grounded in a modular conception of language. First and foremost, it is plausible Tomasello's statement that in the process of language acquisition, children utilize a variety of cognitive and social-cognitive processes that originate from outside the domain of language per se, including perception, memory, joint attention, intention-reading, categorization, analogy, and so on. That really seems to be the case, especially concerning the semantic component of language (cf., e.g., Ambridge and Lieven 2011; Bavin 2009; Bloom 2000; Brooks and Kempe 2014; Jackendoff 1983, 2003; Lenneberg 1967; Piaget 1998 [1923]; Pinker 1984, 1989; Rowland 2014; Rowland et al. 2020; Tomasello 1992). The question now, therefore, is how to unite emergentist theories of language acquisition with the generativist hypothesis of Universal Grammar.

In fact, at the end of the 2011 textbook *Child Language Acquisition: Contrasting Theoretical Approaches* – in which the generativist approach to language acquisition is systematically compared to the emergentist approach –, Ben Ambridge and Elena Lieven not only observed that research on the underpinnings of language acquisition has moved rather far from the simplistic debate over whether or not humans have an innate, genetically specified language module but also stated:

> All researchers agree that there is clearly some genetic involvement in speech and language, which is neither completely domain-specific (since speakers are talking about something, it is not entirely clear what complete specificity would mean) nor completely domain-general (again such a strong position would be nonsensical; clearly speech is not the same as – for example – vision). (Ambridge and Lieven 2011: 368)

Although many researchers, including Bates, Langacker, and Tomasello, apparently believe that the genetic involvement in speech and language is completely domain-general, it really seems that the genetic basis of language is neither completely domain-specific nor completely domain-general. Actually, researchers like Charles Yang (2002), Akira Omaki and Jeffrey Lidz (2015), and Lidz and Annie Gagliardi (2015) have developed models of language acquisition based on the conception that our ability to acquire language derives in part from innate constraints on the range of possible languages (i.e., Universal Grammar, which is domain-specific) and in part from information in the linguistic environment that learners must use to map their experience onto the appropriate representations (that is, domain-general mechanisms). In other words, these researchers believe that linguistic innate constraints are necessary but not sufficient to explain language acquisition.

In the paper "How Nature Meets Nurture: Universal Grammar and Statistical Learning," for example, Lidz and Gagliardi presented a language acquisition model that allows the integration of key ideas from emergentism and generativism. Their model separates language acquisition into three components: (a) the intake component identifies the features of the information to which learners are sensitive; (b) the UG component identifies the class of representations that shape the nature of human grammatical systems; and (c) the inference component identifies how learners combine the intake with UG in selecting a particular grammar (Lidz and Gagliardi 2015: 334–335). 'We believe that deconstructing a language acquisition device into separate components for input sensitivity, a rich space of representations and rational statistical inference can explain many key results from both traditions of research in language acquisition,' stated Lidz and Gagliardi (2015: 335) referring to generativism and emergentism. In fact, they stressed, the presence of UG does not remove the need for a learning theory that explains the relation between input and the acquired grammar. That is, UG must be embedded in an architecture that allows learners to extract information from the input. This information is used to identify which of the resources defined by UG is applicable to any given sentence or sentence type (Lidz and Gagliardi 2015: 336). Such a model of language acquisition is illustrated by the figure below:



Lidz and Gagliardi (2015: 336)

The dashed line, observed Lidz and Gagliardi (2015: 336), represents the division between what happens in the external world and what happens within the child's learning mechanism. The arrow from Universal Grammar to acquisitional intake represents the predictive process about what the learner should expect to find in the environment. More specifically, the input feeds into a perceptual encoding mechanism, which builds an intake representation. This perceptual intake is informed by the child's current grammar, along with the linguistic and extralinguistic information-processing mechanisms through which a representation from that grammar can be constructed. To the extent that learners are sensitive to statistical-distributional features of the input, argued Lidz and Gagliardi, that sensitivity will be reflected in the perceptual intake representations.

Lidz and Gagliardi (2015: 337) also observed that the inference engine is based on the idea that every possible grammar defined by UG makes predictions about what the learner should expect to find in the environment. So, the acquisitional intake compares those predicted features against the perceptual intake representation, driving an inference about the grammatical features responsible for the sentence under consideration. This inference updates the grammatical knowledge, which is added into the developing grammar. For the purposes of learning, the updated grammar feeds the perceptual processes through which subsequent sentences are analyzed. Moreover, in line with generativist theorists like Toben Mintz (2003) and Lisa Pearl (2021) and following emergentists like Goldberg and Tomasello – who defend the idea that in

learning a language children use their skills of categorization and statistical learning on the utterances they experience (cf., e.g., Goldberg 2006: 2, 21; Tomasello 2003: 41) –, Lidz and Gagliardi (2015: 337ff) asserted that language learners are sensitive to statistical features of their environment. To prove their point of view, Lidz and Gagliardi (2015: 345ff) examined structural features of ditransitive constructions cross-linguistically. By doing this, they showed how Goldberg's construction grammar and Tomasello's cognitive-functional linguistics can be incorporated into a research program grounded in a modular conception of language.

As a matter of fact, unlike Goldberg and Tomasello, Lidz and Gagliardi acknowledge the existence of Universal Grammar, even though according to them it does not by itself define a learning mechanism, but rather must be paired with an inference mechanism that links the representations provided by UG with the data of experience. However, Lidz and Gagliardi emphasized based on empirical research and linguistic phenomena such as those mentioned in section 6, some of the statistical sensitivities of the learner are defined by UG, allowing for the inferences from which learners build a grammar of the target language, licensing knowledge about phenomena that fall outside of experience. 'When we see learners generalizing to structures that are sufficiently dissimilar from their input experience, we find clear candidates for the contribution of UG while still recognizing the statistical sensitivities of language learners,' Lidz and Gagliardi pondered (2015: 341).

In sum, according to Lidz and Gagliardi, the types of grammar the child needs to consider in the process of language acquisition are indeed narrowly constrained by the UG, as assumed by generative grammar, but the UG does not remove the need for a theory of learning that explains how experience contributes to language acquisition, as stressed by emergentism. For sure, emergentist models of language acquisition are highly concerned about the importance of extralinguistic systems (that is, general cognitive mechanisms), like pattern recognition, memory, Theory of Mind, etc., in the process of developing a grammar (cf., e.g., Bates and Goodman 1999; Ellis and Larsen-Freeman 2009; Rowland 2014; Rowland et al. 2020; Tomasello 2003). By combining these extralinguistic systems with Universal Grammar, a model of language acquisition such as Lidz and Gagliardi's not only allows the union of generative grammar and emergentism but actually makes it necessary.

9 Two empirical questions

As observed before, it makes sense Tomasello's claim that in the process of language acquisition, children utilize a variety of cognitive and social-cognitive processes that originate from outside the domain of language per se (i.e., extralinguistic systems in Lidz and Gagliardi's terms), including perception, memory, joint attention, intention-reading, categorization, analogy, and so on. Nonetheless, the problem is that Tomasello restricted the process of language acquisition to the use of these cognitive and social-cognitive skills by children, despite limiting his analysis to constructions like X VERB*ed* Y *the* Z. Besides, as discussed before, by pushing his assumptions too far, Tomasello has developed fragile theories such as that human cognition has cultural origins and that the cultural invention of language resembles the cultural invention of mathematics, chess, and money.

Tomasello's social-pragmatic theory of language acquisition, in particular, as detailed above, seems to be disproved by the huge differences between learning and using tools and learning and using linguistic symbols as well as by double dissociation phenomena such as those previously described. Here, it is worth remembering that Tomasello himself recognized that individuals with Autism Spectrum Disorder (ASD) do not have the socio-cognitive abilities that he claimed to be necessary to socially learn the conventional use of a tool or a linguistic symbol – something like a Theory of Mind (ToM) – but many of them have a high level of language proficiency. Notwithstanding this, if these individuals with ASD who develop and maintain normal or near-normal grammars seem to contradict Tomasello's theory, it does not mean that social-cognitive processes like joint attention, collaboration, and intention-reading are not important for a child to acquire and develop language. Actually, much empirical research supports the idea that a Theory of Mind has a significant role in the process of language acquisition and development (cf., e.g., Andreou et al. 2020; Durrleman et al. 2015; Durrleman 2017; Schroeder et al. 2021).

For instance, in the 2016 paper "Autism Spectrum Disorder and Specific Language Impairment: Overlaps in Syntactic Profiles," Stephanie Durrleman and

Hélène Delage examined the hypothesized link between pronouns and ToM. It is known that children with autism display difficulties with pronouns, especially those of the first and second person. Some of them use the second-person pronoun "you" or the third-person pronoun "he/she" to refer to themselves and use the first-person pronoun "I" to refer to the person addressed. This problem may be reflective of their difficulties in ToM and in grasping speaker-listener roles. To experimentally investigate this issue, Durrleman and Delage tested 28 children of similar nonverbal cognitive level: 14 children with ASD, aged 5; 9 to 16; 9, and 14 typically developing children, aged from 6; 4 to 9; 1. Considering that false belief reasoning emerges around 4–5 years of age in typically developing children, but has an extended developmental course in children with ASD, all of the 28 participants were tested on ToM via four false belief tasks, including control questions that required the children to recall where the object was initially placed (memory question) and where the object was located at the end of the story (reality question). To test the production of first-person accusative pronouns, Durrleman and Delage administered a shortened version of the Production Probe for Pronoun Clitics (Tuller et al. 2011) eliciting eight responses of the type: "Elle me mord" ("She is biting me") via pictures and interactions with the experimenter, and these were interspersed with four fillers eliciting intransitive verbs such as: "il nage" ("He's swimming"). The task started with a warm-up phase ensuring that children understood what was required of them. All of the 14 participants with ASD succeeded at the (memory and reality) control questions of the ToM task, ensuring that they were able to understand the task. As for the test question requiring them to predict where the doll would look for a desired object (based on a false belief), five children succeeded in these four questions, whereas the others displayed varying degrees of failure, ranging from failing all four to only one. The typically developing children (i.e., the control group) succeeded on all of the questions, including on false beliefs. So, those children with ASD who performed similarly to the controls were those who had ceiling performance. The ASD group with this level of performance consisted of 5 children, while there were 9 who did not show this ability. According to Durrleman and Delage, the study indicated that these two groups of intact versus atypical ToM performance did not differ on non-verbal reasoning or age, but they differed on first-person production rates. More specifically, the group with intact ToM showed high performance for first-person pronouns, while the group with ToM difficulties showed lower performance for

this same pronoun. Therefore, concluded Durrleman and Delage, this study showed that the accurate use of the first-person pronoun relates to better ToM skills.

Similar results were presented by other studies about morphosyntactic deficits and general cognitive skills, regarding, for example, the relationship between false belief reasoning and the comprehension of embedded clauses by typically developing children and children with ASD (Schroeder et al. 2021), and the use of relative clauses by typically developing individuals and individuals with ASD (Durrleman et al. 2015). These results apparently support Tomasello's assertion that there is a very strong correlation in children with autism between skills of joint attention and communication. To Tomasello, as mentioned in section 7, children with autism who are capable of engaging more readily in joint attentional behaviors are the ones who acquire more sophisticated skills of gestural and linguistic communication. However, as also stressed before, this conclusion seems to ignore the existence of individuals with ASD or some mental disorder, such as the polyglot-*savant* Christopher Taylor, who have high phonological and morphosyntactic competence and very poor pragmatic abilities.

Reassessing Taylor's case, Smith and Tsimpli (2021: 383ff) observed that his atypical language acquisition is best exemplified by two aspects of his linguistic performance: dissociations within his native language (English) and his inability to learn "wild" grammars – i.e., grammars that violate universal principles of language design (UG). According to Smith and Tsimpli, Taylor understands, speaks, and judges English sentences of varied lexical and syntactic complexity as expected of a native speaker of the language. For instance, long-distance wh-questions, island conditions (e.g., "*Who did John wonder when Mary met?"), sequence-of-tense phenomena (e.g., "Mary said she was/*is pregnant"), morphosyntactic agreement patterns, negative inversion, and other "core" phenomena of English grammar are within his native ability. In contrast, Taylor judges discourse-relevant structures such as topicalization (e.g., "John, I like") and dislocation (e.g., "John, I like him") as ungrammatical, fails to understand rhetorical questions and the use-mention distinction exemplified in "Dogs have four legs" vs. "'Dogs' has four letters." Besides, he fails to recover from temporary structural ambiguity in garden-path structures. 'This asymmetry between his language skills appears to partly profile Christopher's language talent and communication deficit in a telling way,' pondered Smith and Tsimpli (2021: 384). 'Christopher's inability to interpret irony and metaphor, metalinguistic negation, and

figurative language in general fit his quasi-autistic profile in a similar way.' Considering this situation, Smith and Tsimpli asserted that Taylor's uniqueness is a challenge if language ability is not understood as distinct from communication skills. Besides, Smith and Tsimpli emphasized:

> Christopher's atypical acquisition strongly suggests that the complexity of language structure is learnable without a supporting, communicative and discourse-sensitive context. Syntax, morphology, the lexicon, and syntactic dependencies can be acquired within a learning scaffold that retains a certain autonomy and domain-specificity in cognitive architecture. Christopher's unusual – but deficient – working memory, his autistic traits, and his savantism allow us to document a case of atypical language learning where nonverbal cognition is severely challenged, motor, visuo-spatial, communicative, and learning skills are also poor, and language alone is spared. (Smith and Tsimpli 2021: 385)

This conclusion seems to support Smith and Tsimpli's (1995) hypothesis that there are syntactic and phonological representations completely internal to the language module, while pragmatic interpretation is an interactive process involving the output representations of the language module and central systems (non-modular) of the mind/brain, where general or encyclopedic knowledge is stored. Moreover, Taylor's case apparently confirms Curtiss' (1981) thesis that the acquisition of syntax and morphology may to some extent proceed independently of other cognitive development, but the acquisition and development of a normal language (that is, one in which meaning is systematically related to the syntactic and morphological structure) seem to depend on the development of nonlinguistic cognitive knowledge alongside the acquisition of the grammar. To what extent the acquisition of phonological and morphosyntactic knowledge is independent of other cognitive development and to what extent the acquisition and development of a normal language depend on the development of nonlinguistic cognitive knowledge are two empirical questions. To address both of them appropriately, it is indispensable to study language pathologies as well as atypical language acquisition (Lenneberg 1967: viii; Smith and Tsimpli 2021; Tsimpli et al. 2017). Furthermore, to investigate these questions, it seems necessary to

use a modular and multi-componential model of language acquisition that can incorporate generative and emergentist research, such as Lidz and Gagliardi's.

Conclusion

In the 1992 essay "Word Meanings and What it Takes to Learn Them: Reflections on the Piaget-Chomsky debate," Jackendoff observed that not a small part of the problem in the discussions that Piaget and Chomsky had about language and cognition was that Chomsky's argument focused almost exclusively on complex details of the learning of syntax, about which Piaget had virtually nothing to say, while Piaget's ground for argument was conceptual learning, about which Chomsky had virtually nothing to say. 'So the debate was not carried on in common territory, which led to a certain amount of the mutual misunderstanding and rancor,' pondered Jackendoff (1994 [1992]: 129). Likewise, the debate between emergentists and generativists for the last decades has not been carried on in common territory, which also led to mutual misunderstanding and rancor. However, nowadays, due to the development of modular and multi-componential models of language acquisition such as Lidz and Gagliardi's, it seems possible to reconcile many aspects of nativism and empiricism and to reframe classical questions concerning language and language acquisition in better terms.

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