Recursion stands as a fundamental property of human languages since the early days of generative linguistics (Chomsky, 1957) and has more recently been presented as the only uniquely human component of the faculty of language (Hauser, Chomsky & Fitch, 2002). The extent to which language would have a role in the development of the higher cognitive functions (HCF) that characterize human cognition is a question that has intrigued psychologists and philosophers from different stand points (Carruthers, 2011). Being recursion a uniquely human component of the faculty of language, the role ascribed to language in the unique human ability to combine the output of different core systems shared with other species (Spelke & Tsivkin, 2001; Spelke & Kinzler, 2007) may be indirectly related to this property. The question for the role of recursion in language in the development of HCF has, nevertheless, been directly addressed with regard to the final stages of the development of Theory of Mind (ToM) (cf. de Villiers & de Villiers, 2009), giving rise to controversy (cf. Villarinho, 2012). The acquisition of embedded sentences under belief verbs (2nd order embedding being “true recursion”) would provide representational and computational resources for children to be able to ascribe false beliefs, especially when 2nd order reasoning is required (cf. de Villiers & de Villiers, 2009; Hollebrandse et al. 2008). Children would, nevertheless, be prone to avoid recursion when processing language (Roeper, 2011). The term recursion admits different definitions depending on the field of knowledge it is used. In generative linguistics, the notion of recursion as a procedure that calls itself, borrowed from computer programming, could be clearly illustrated in terms of re-writing rules, in the early formalization of human grammars. Since then, recursion has often been used in the sense of productivity, embedding, discrete infinity, and iteration -- notions that, though related with the original concept, cannot be equated with it (Hurford, 2004; Parker, 2006; Marcilese, 2011). Apart from that, once re-writing rules have been abandoned (Chomsky, 1995), it has been harder for a procedure that calls itself to be singled out in a formal model of grammar. Any consideration for the role of recursion in language in the development of HCF requires, therefore, that the meaning of recursion in grammatical computation is made precise. This chapter starts by characterizing the expression of recursion in a minimalist grammar. The constitution of lexical arrays, the application of Select and Merge operations, as well as the properties of the formal features of lexical items are evoked as giving way to the formal expression of recursion in human languages. On-line computation of recursive structures is then considered in the light of minimalist assumptions (Corrêa & Augusto, 2011), focusing on DPs with pre/post nominal modifiers and complement sentences in Brazilian Portuguese (BP). Those aspects
of human cognitive development that may be directly/indirectly promoted or enhanced by recursion in language are then investigated in the context of language processing and acquisition, namely: the ability to combine the output of different core systems and the achievement of the ability to ascribe 2nd order false beliefs. As for the former, two experiments are reported on the comprehension of DPs containing ordinal numerals in recursive pre-nominal modifier sequences by 4-6 year olds and adults speakers of BP. The results are discussed in relation to the acquisition of numerals and children’s alleged avoidance of recursion, given specific processing demands (Marcilese, Corrêa & Augusto, in press). As for the latter, 5-6 y olds’ comprehension of false beliefs expressed by means of embedded and paratactic structures in BP was investigated. Parataxis did not prevent children from engaging in 2nd order false belief reasoning, though better performance was achieved when embedded structures were presented. Recursion in language, in thought and its explicit expression in recursive structures are tentatively considered.

References


