

PROSPECTS FOR A COMPARATIVE BIOLINGUISTICS

CEDRIC BOECKX, WOLFRAM HINZEN, ANTONIO BENITEZ-BURRACO

Variation thoroughly pervades language. The human faculty for language FL (i.e. our capacity for acquiring and using a language) manifests itself in the form of many different languages, which are in turn slightly diverse across diverse social groups, interactional contexts, geographical areas, and so on. Ultimately, differences can be found from one person to another, and even regarding the same person, for instance, when confronted with different scenarios. Moreover, the same faculty seems to be also diverse in different individuals. While pathological conditions plausibly represent a breakdown of the faculty, psycholinguistic measures are still varied across the normal population, suggesting the existence of deeper layers of variation, plausibly concerning its biological substrate (see, e.g., Kos *et al.* 2012; Le Floch *et al.* 2012)

Current psycholinguistic, neurobiological and genetic research casts significant doubts on the purportedly homogeneous nature of FL. For instance, psycholinguistic measures are variable across the normal population, suggesting a variable competence/performance within it. At the brain level the boundaries of the ‘language areas’ are rather changeable among the diverse individuals, but also across development. Moreover, many genes contribute to regulate the development (and the functioning) of this neural substrate, but they are (highly) polymorphic, with some variants giving rise to pathological conditions, but with others (perhaps endowed with slightly different functional properties) being present as well within the unaffected population. This seems to challenge the longstanding assumption that the *linguistic genotype* is going to be “uniform across the species (in the absence of a fairly severe and specific pathology)” (Anderson and Lightfoot, 1999).

In this presentation we will specifically discuss whether (and to which extent) this genetic diversity can actually be reconciled with the widespread view of FL as one component of the human mind, qualitatively equal in all human beings. In trying to resolve this conundrum, we will appeal to, and explore the implications of, some fresh hypotheses posited by evolutionary developmental biology (Evo-Devo). In particular, we will argue that developmental dynamics (and hence, an assorted set of regulatory factors) strongly canalizes variation, to the extent that the same phenotype can robustly emerge at the term of growth from (slightly) diverse genotypes. Moreover, we will hypothesise that language disorders could be construed as conditions for which canalization has been unable to achieve particular stages/levels/degrees of (linguistic) development. Importantly, the achievement of a (functional) FL is always attempted, this implying that impaired systems are still adaptive. Simultaneously, compensations (and breakdowns) do not occur randomly, clearly because adaptability is always constrained, but plausibly also because certain cognitive processes (or even specific components of competence) are more vulnerable than others to damage or to developmental disturbances. Crucially, these impaired, delayed, or deviant FLs are yet recognizable as (anomalous) variants of the same (normal) FL. Eventually, even though any of its biological components can be regarded as specifically linguistic, FL itself can actually be characterised as a cognitive faculty or organ, almost certainly because of that pervasive tendency of their components to interface whenever growth takes place in the presence of a suitable amount of linguistic stimuli.

This talk offers a case study of the *genetic variation for UG* in our species, allowing for a unique window, we argue, into a cognitive sub-type that is not organized grammatically: the thought-disordered mind, and at the same time offering a concrete example of what comparative biolinguistics could focus on.

A symptom of schizophrenia, formal thought disorder (TD) is found in a subgroup of the schizophrenia population and manifest in disorders of language. Nonetheless, from its inception, schizophrenia has been considered a *Geisteskrankheit* rather than language disorder, illustrating the fact that since Descartes and the Port Royal tradition (Chomsky, 1966), language has never been conceived as the fundamental organizational principle of the mind, leaving the latter to a ‘Language of Thought’ (LOT) ungoverned by UG, in the sense of Fodor (2008). If no such LOT exists, as suggested in Chomsky (2007) and the ‘Un-Cartesian’ model of UG of Hinzen (2006, 2012), and traditional evidence for ‘modularity’ is highly questionable (see e.g. Brock, 2007, on Williams syndrome), UG should be pursued *as* the theory of a cognitive type identifying a single hominid species (Crow, 2002). In this regard, the Un-Cartesian hypothesis (Hinzen & Sheehan, 2013) makes specific predictions for *how* thought should be disordered if grammar is. We argue that available data confirm these predictions.

Specifically, it has been argued that TD, if a disorder of language at all, is primarily one of ‘expressive semantics’ (McKenna and Oh, 2003). And according to Marini et al. (2008:145), ‘at the level of *syntactic* processing, schizophrenic patients’ speech is usually normal, with no relevant aberrations’. We argue that the relevant notions of ‘syntax’ and ‘semantics’ beg all questions. In particular, the ‘semantic’ abnormalities in question only arise at a *grammatical* level, and *increase* as grammatical complexity arguably does, as in the case of pronominal reference, which is distinctly impaired in schizophrenia (Watson et al., 2012), and governed by the topology of the ‘high’ left edge of the nominal phase according to Martin & Hinzen (2012). More generally, they are centrally associated with the *referential-deictic* function of language, which the Un-Cartesian model of UG argues is the sole contribution of grammar to meaning. Independently, it is clear that grammar (and no other known system) organizes the *truth conditional content* of utterances – a content on which patients with TD and controls plainly do not seem to agree, failing to inhabit the same shared conceptual space that allows normal communication in healthy controls. Longer speech pauses compared to controls at clause boundaries (Barch & Berenbaum, 1997, a.o.), too, in TD, indicates particular difficulties in forming the ‘thought units’ that are the smallest units of grammatical organization according to the Un-Cartesian model.

TD, then, as a case study, illustrates prospects for a comparative biolinguistics: the study of UG *as* the study of the cognitive mind, with variation in the cognitive type observed as there is variation in UG, with no variation in cognitive type observed where UG is not disturbed, as in Broca’s aphasics, whose thought is as normal as is their genetic specification for UG.

In sum, assimilating lessons from evo-devo leads us to expect variation inside UG, and requires us to understand the robustness of the emergence of the language organ in ways that depart from the standard view of the linguistic phenotype.

Selected Refs: Hinzen & Sheehan 2013. The philosophy of Universal Grammar, OUP. Kos et al. 2012. PLOS One. Le Floch et al. 2012. NeuroImage. Levy DL, et al. 2010. J Neuroling. 23. Marini, A., et al. 2008. Schiz. Res. 105. McKenna & Oh. 2005. Schizophrenic speech. CUP. Watson, et al. 2012. BJP 200.