Project summary

The overall aim of the Marie Curie Reintegration Grant #PIRG-GA-2009-256413 has been to shed light on the nature of language variation (*logodiversity*).

Since the late 1970s, there has been a general consensus in theoretical linguistics regarding how children reliably and uniformly acquire the language(s) used in their environments. The theoretical model, known as "Principles-and-Parameters", posits that certain properties of all languages are innate, and that linguistic variation is highly constrained. Although the general idea turned out to be productive, a range of considerations that I have discussed in my work ("Approaching parameters from below", "What principles-and- parameters got wrong") suggests that the model linguists have worked with must be drastically rethought to incorporate insights from allied disciplines, but also from a range of alternative linguistic traditions. Developing such an alternative model has been the major focus of the Logodiversity project, and will continue to inform my future work. Questioning the foundational assumptions of "Principles-and-Parameters" has led me to not only focus on the details of linguistic variation, but also forced me to ask myself whether what we know about human evolution and the human brain can constrain our theoretical proposals, and whether the tools of theoretical linguistics could be formulated in such a way as to be testable by research pursued in other disciplines.

My book *Elementary Syntactic Structures* (Cambridge University Press), develops the overall hypothesis that emerged in the context of this project, incorporates the central results of the articles and book chapters over the past four years.

Concretely, in line with recent calls in favor of a more developmental/emergentist approach to the logical problem of language acquisition, my project has examined the feasibility of constructing the range of options that the child could use to acquire her language without postulating an a priori switchboard (the classical Parametric model), and has drawn several architectural conclusions from such an attempt.

Among the most salient ones:

i. Since parameters (not, of course, their values) are assumed to be universal, the syntax that constructs parametric spaces, which I contend is narrow syntax, must be universal as well: parametric syntax cannot exist.

ii. Although some lexical choices may have logical consequences giving rise to limited cascade effects, the parametric space is only partially hierarchical, and likely takes the form of crossing lines on a subway maps (intersections), rather than nested dependencies. The learning path that emerges is far more complex than the one entertained in the current literature, and resembles a landscape where multiple learning paths may lead to the same point (parametric value).

iii. Constructing a parametric space is inevitable if Universal Grammar is as minimally specified as a rigorous approach from below suggests

iv. Constructing a parametric space is a partial return to Piaget's Constructivism, currently being revived in developmentalist models in biology.

The results of my research on the nature of language variation suggest that there are deeper layers of linguistic variation that have so far been ignored, but that more directly relate to the underlying biology of language: current psycholinguistic, neurobiological and genetic research has greatly increased the degree of variation regarding language and

linguistic phenomena. In particular, it seems to cast doubt on the purportedly homogeneous nature of the language faculty. 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 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. Exploring the implications of this is at the forefront of my current research agenda. My recent publications in *Frontiers* and *Biological Theory* present concrete results from work on genetics and neuroscience done in collaboration with Antonio Benitez-Burraco (U. Huelva) over the past year and a half.

In collaboration with my PhD student, Evelina Leivada, I have explored the possibility of exploiting recent models in computational psychology (specifically, so-called hierarchical Bayesian learning models) to formulate predictions in the context of typical language acquisition in children (model published in *Language Sciences*), taking into account the severe limitations of more standard approaches in this context (*Plos One* publication).

My move to the Universitat de Barcelona has put me in a more fruitful environment to deepen my investigation into the nature of language variation. It has allowed me to teach in an international recognized MA program (MA in Cognitive Science and Language), and has given me the possibility to set up a research group (the Biolinguistics Initiative Barcelona) that boosted my research activities. In all these activities, my MARIE CURIE grant has been explicitly acknowledged, and the nature of the project is highlighted on our group's website (<http://biolinguistics-bcn.info/>), where most of our research results are downloadable.

During this period I have done work that led me to receive the II Joan Sola International Prize for research on Catalan philology (awarded for joint work with Txuss Matin). I have also become an external Collaborator of a major research project "An integrated generative biolinguistic approach to the design, development, and evolution of the human language faculty" (PI: Koji Fujita) [Japan], and also began to collaborate with Aritz Irurtzun and his team at CNRS-Bayonne.

In the course of this project, I have given over 60 presentations at international venues, and organized 8 workshops on themes directly bearing on the nature of language variation in language. Thanks to the project we were also able to host 25 lecturers from abroad, who helped direct and re-direct our research, providing valuable feedback, as well as adding new perspectives we would not have otherwise considered. Close to 60 publications emerged from this project.

The Logodiversity project also allowed me to contribute to the improvement of the Open-Access Biolinguistics journal (www.biolinguistics.eu), as well as to the editing of the Oxford University Press monograph series *Oxford Studies in Biolinguistics*.

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