

teorema

Vol. XXXIII/1, 2014, pp. 83-94

ISSN: 0210-1602

[BIBLID 0210-1602 (2014) 33:1; pp. 83-94]

The Roots of Current Biolinguistic Thought: Revisiting the “Chomsky-Piaget Debate” in the Context of the Revival of Biolinguistics¹

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RESUMEN

No cabe duda de que el encuentro entre Chomsky y Piaget en Royaumont estableció la agenda para lo que Piattelli-Palmarini (2001) llama la “ciencia cognitiva clásica”, que yo considero que proporciona los fundamentos del campo de la biología cognitiva y, en particular, de la biolingüística. Como revisa este artículo, todos los temas que el encuentro de Royaumont hizo famosos han vuelto a escena en el contexto del resurgir de la biolingüística en los años recientes. Sin embargo, este artículo muestra que, para cada uno de esos temas, las direcciones de investigación favorecen ahora un distanciamiento de aquellos que llegaron a definir la posición “clásica”. Este distanciamiento se subraya reconsiderando las conclusiones alcanzadas por Piattelli-Palmarini en su reevaluación de 1994 del encuentro de Royaumont.

PALABRAS CLAVE: Chomsky, Piaget, biolingüística, gramática universal, ciencia cognitiva, desarrollo.

ABSTRACT

There is no doubt that the Chomsky-Piaget meeting at Royaumont set the agenda for what Piattelli-Palmarini (2001) calls “classical cognitive science”, which I take to provide the foundation for the field of cognitive biology and of biolinguistics in particular. As this paper reviews, all the themes that the Royaumont meeting made famous have come back in the context of the revival of biolinguistics in recent years. This paper, however, demonstrates that for each of these themes, the research directions favored now depart from those that came to define the “classical” position. The departure is highlighted by revisiting the conclusions reached by Piattelli-Palmarini in his 1994 reassessment of the Royaumont meeting.

KEYWORDS: Chomsky, Piaget, Biolinguistics, Universal Grammar, Cognitive Science, Development.

I. A TRUE CLASSIC

Around this time some 40 years ago were laid the foundations of one of the most significant meetings in the history of cognitive science, the justly

famous “Chomsky-Piaget” meeting at Royaumont [see Piattelli-Palmarini (1980)]. Both the history and context of the meeting have already been well-documented [Jenkins (2000, 2013)], and it is not my intention to rehearse it here. Rather, in what follows, I’d like to revisit certain themes of the meeting in the context of the revival of biolinguistic concerns [Boeckx and Grohmann (2007), Di Sciullo and Boeckx (2011), Boeckx (2013)] to see if these would be approached any differently today.

Taking the Royaumont meeting as a starting point for this discussion concerning the roots of current biolinguistics makes a lot of sense because like all classics, it deserves to be rerevisited. And it was in the context of the preparation of the meeting that its organizer, Massimo Piattelli-Palmarini, used the term ‘biolinguistics’ in its modern sense.² Finally, although there have been several assessments of the debate [see especially Piattelli-Palmarini (1994, 2001)], which will form the basis of many passages in what follows), none of them have appeared in the last decade.³

Like other classic debates in science [the Cuvier-Geoffroy debate in biology, cf. Appel (1987)], the Royaumont meeting allows for many readings and interpretations: it’s not always the same ‘winner’ for all generations, nor for all sides. I’m told (Massimo Piattelli-Palmarini, personal communication) that at the closing of the meeting, and in subsequent years, Piaget was seen as the winner for the Piagetians, and Chomsky for the Chomskyans. There is no surprise here, but being a Chomskyan myself, I recently had the opportunity to re-read Piattelli-Palmarini (1980), and reached conclusions that were quite unlike those I reached the first time I read the book. I saw how current debates in the fields of theoretical linguistics and biolinguistics were in an obvious way re-enactments of what took place at Royaumont, hence the importance of the latter, but this time some Chomskyans, myself included, were adopting a position that is much closer in spirit to the one Piaget defended. This convinced me that something was indeed “happening in, and to, cognitive science” [Piattelli-Palmarini (2001), p. 3].

There is no doubt that Royaumont set the agenda for what Piattelli-Palmarini (2001) calls “classical cognitive science”, which I understand as laying the foundation for the field of cognitive biology ‘bio-cognition’ [see Boeckx (2009)]. Rightly so, it places language at the heart of the study of the human mind (what the Scottish Enlightenment called the Science of Man). In so doing, it offers one of the clearest examples of how to do biolinguistics: Royaumont was a truly interdisciplinary meeting, where everyone clearly steered away from behaviorism and assumed that there were biological foundations of language worth looking for. Everyone wanted to figure out (in the words of Jacques Monod, quoted in Piattelli-Palmarini (2001), p. 11) “the limits of the genetic contribution to culture, the boundaries of the *enveloppe génétique* in shaping the human mind” – “the new and promising field, tentatively labeled ‘bioanthropology’.”

As the transcript of the Endicott meeting “A Debate on Bio-Linguistics” (1974), that helped prepare Royauumont makes clear,⁴ the Chomsky-Piaget encounter was conceived on the basis of three powerful impressions:

1. The first, ..., being that we have a new way – since perhaps the fifties – of looking at language.
2. The second major factor that hints at the possibility that a field may exist is the new way of looking at the brain itself.
3. The third and perhaps broadest change in orientation concerns . . . the biology or ethology of communication systems.

These are the same impressions that led Salvador Luria to state the following in his 1976 AAAS address (p. 18-19 of the transcript available online):

In closing, let me single out one frontier that today may seem as unreachable as Mount Everest seemed to be 50 years ago. And yet, it is exciting enough to warrant serious attention. I refer to what I may call Biolinguistics, or the biology of human language.

The reason for singling out this field is two-fold.

First, human language is the special faculty through which all conscious human activity is filtered; a faculty whose development may well have played the driving role in the almost catastrophic evolution from ape-kind to human-kind.

And second, language alone, among the uniquely human faculties of the human brain offers to the scientist a systematic theory, the structural linguistics developed by Chomsky and his colleagues, which may be amenable to confrontation with biological data.

What I mean is that formal language structure, plus some facts already known about language and brain structure, plus the advancing knowledge of brain organization provided by physiologists, hold some promise that between linguistics and neurobiology a kind of convergence may soon be possible that may provide a wedge into the biological exploration of the human mind.

As anyone aware of the revival of biolinguistics will know, these three impressions have come back: we have a new way of looking at language, distinct from the more standard conception that dominated linguistic theory in the 1970s and 1980s (“approaching U[niversal] G[rammar] from below”, as Chomsky (2007) calls it), we think that there is a new way of looking at the brain itself, and maybe also a new way of integrating brain studies and mind studies [Poeppel and Embick (2005)], and there has been a change in orientation concerning the biology or ethology of communication systems, where the Darwinian perspective of ‘descent with modification’ now occupies center stage [see Hauser et al. (2002)]. All of these factors form the basis for the renewed ambition to (using the words of Luria’s quote above) “confront linguistics with biological data”, and the feeling of a (new) “kind of conver-

gence ... that may provide a wedge into the biological exploration of the human mind.” [for further discussion, see Boeckx (2013)].

Not surprisingly, all the themes that Royauumont made famous have come back:⁵

1. The richness and specificity of the (initial state) language faculty
2. The importance of learning, and the genericity of the learning devices at work
3. The well-foundedness of (neo-)Darwinism (epigenesis, laws of forms, etc.)

In each of these cases, however, I feel that the tides are changing, away from the “classical” solutions. To appreciate the change, let me examine more closely the nature of “classical cognitive science”.

II. “CLASSICAL COGNITIVE SCIENCE”

Piattelli-Palmarini (2001), pp. 18, 19, sees classical cognitive science as being “profoundly marked by the following explanatory strategies”:

1. Unrestricted nativism (no capacity or content is deemed too complex or too specific to be imputed to the innate capacities of the brain/mind, if such attribution solves otherwise insoluble problems).

As a consequence, we have:

2. Learning is essentially a triggering phenomenon. As a further consequence, it should be noted that, therefore, no historical statistics of the unfolding of the stimuli over time can be relevant to (classical) cognitive science.
Connectionism and empiricism have reinstated the centrality of statistical analyses of the inputs, setting themselves apart from classical cognitive science. The fact that [Mehler] and other “classical” cognitive scientists for whom I have great respect, are presently tackling precisely such statistical analyses in the domain of phonology and syntax shows that something is changing in the picture.
3. The next classical core tenet is massive modularity.
4. Finally, the signature of classical cognitive science also was drastic restrictions on the number of points of possible variation, and drastic restrictions on the acceptable values at each point (the principles-and-parameters paradigm).

As should be obvious to anyone familiar with cognitive science, Piattelli-Palmarini's portrait of 'classical cognitive science' is Chomskyan through and through, and rightly so. As Piattelli-Palmarini writes in his (1994) assessment of the meeting, Chomsky and Piaget agreed on a lot of things. The only issue was to assess the exact nature of what was then named "the fixed nucleus" (which one may understand as the core biological endowment) and the degree of its specificity. *Prima facie*, Piaget's and Chomsky's positions amounted to complementary strategies: the Piagetian one, which consisted in a *minimization* of the role of innate factors and the Chomskyan one, consisting in a *maximization* of these factors. Not surprisingly, many biologists/non-linguists anticipated a convergence. But such a convergence did not take place at Royaumont (nor immediately after). To quote from Piattelli-Palmarini (1994), "Chomsky stressed the need for specificity, while Piaget stressed the need for generality" [p. 324]:

When [Piagetians] mentioned linguistic examples, these were of a very peculiar generic kind, nowhere near the level of specificity of Chomsky's material. They pleaded for an attenuation of the "innateness hypothesis", so as to open the way to the desired compromise. But Chomsky's counter was characteristically uncompromising: first of all, the high specificity of the language organ, and therefore its innateness, is not a hypothesis, it is a fact, and there is no way one may even try to maximize or minimize the role of the innate components, because the task of science is to discover what this role actually is, not to pre-judge in advance "how much of it" we are ready to countenance in our theories [p. 325]. ...

The discussion often turned around the existence, in language, of components which are not specific to it, but are also common to other mental activities and processes. Again, a division of labor was proposed along these lines. Chomsky had no hesitation in admitting that there are also language factors that are common to other intelligent activities, but rightly insisted that there are many besides which are unique to language, and which cannot be explained on the basis of general intelligence, sensorimotor schemes, communicative efficacy, the laws of logic, problem-solving, etc. These language-specific traits, Chomsky insisted, are the most interesting ones, and those most amenable to a serious scientific inquiry [p.327].

In the words of Piattelli-Palmarini (1994), pp. 319-320, Piaget's "Constructionist" position consisted in saying that:

- Auto-organization and self-stabilization are not just empty metaphors, but deep universal scientific principles.
- There is a necessary, universal and invariable sequence of stepwise transitions between qualitatively different, fixed stages of increasing self-stabilization.
- The logic of these stages is captured by a progressive hierarchy of inclusion between ascending levels of abstraction and generalization.

- The necessary and invariant nature of these transitions cannot be captured by the darwinian process of random mutation plus selection.
- The basic structure of language is continuous with and is a generalization, abstraction from various motor schemata, which are a developmental precondition for the emergence of language.

In other words, Piaget's position was highly dynamic, developmental, and 'diachronic', and involved concepts (nature-nurture interactionism, epigenesis, "order-from-noise", anti-preformationism) that are now extremely popular, and well-regarded. But Piattelli-Palmarini's (1994) assessment was implacable: "Piaget's biology sounded very much like the old nineteenth-century biology; it was the return of a nightmare, with his appeal to grand unifying theories. He sounded like a Lamarckian, with his appeal to genetic accommodation and assimilation, Baldwin effects, etc. ... By quoting a handful of pathetic heretics, obscure Lamarckian biologists who happened to agree with him. The alienation of Piaget from mainstream biology was consummated there and then" [Piattelli-Palmarini (1994), p. 325]. The biological stance in Royaumont was that of strong genocentrism (heavy genetic pre-determination) regarding the fixed nucleus.

As is to be expected, some twenty years after the meeting, Piattelli-Palmarini (1994), p. 334, claimed that "the line of argument developed orally at Royaumont and then sharpened in the published proceedings has not only been preserved in the new theory, but even made more radical. ... None of the highly abstract and tightly knit principles and parameters of universal grammar bear any resemblance whatsoever to derivations from non-linguistic principles (even less to sensori-motor schemata). ... There is no hope, not even the dimmest one, of translating these entities, these principles and these constraints into generic notions that apply to language as a 'particular case'." [Ibid, p. 340] went on to state that "modern biology and evolutionary theory offer further and more radical reasons to refute Piaget's basic tenets about life and evolution. No inheritable feedback is even remotely possible from individual experience to the genes. ... The old grand theories (anti-equilibration, minimization of disturbance, increasing autonomization, increasing adaptation, increasing order from noise, etc.) have never explained anything. It proved impossible to deduce biological structures and functions from first principles. Selection out of a vast innate repertoire is the only mechanism of growth, acquisition and complexification which we can scientifically understand."

The closing assessment of Piattelli-Palmarini (1994), p. 342, could not be harsher:

I wholeheartedly agree with what Chomsky said at the very end of the debate. Little of what we hypothesize today will survive in the long run. Twenty or fifty years from now we will probably have gained much deeper and much better in-

sights into these matters, and not much of present-day theorizing will still be valid. But what is important is that we may look back and ascertain that those hypotheses, those explanations, were at least on the right track, that they were of the right kind.

Piaget's search for a compromise was unsuccessful, simply because the compromise was neither possible nor desirable.

III. POST-CLASSICAL COGNITIVE SCIENCE?

Back in 1994, Massimo Piattelli-Palmarini could still write all of this, in good faith. He could still "highlight some recent developments in linguistics and language acquisition that bear clear consequences on the main issues raised during the debate" [Piattelli-Palmarini (1994), p. 316] in the direction of Chomsky's position. After all, he clearly saw that "[t]he importance of the lexicon has grown explosively" [Ibid., p. 334], that the omnipresent appeal to features made the core language faculty ultra-superspecific, parametric, modular, etc. Back then, the classical cognitive science picture was still firmly in place.

But only a few years later, Piattelli-Palmarini (2001), pp. 3, 4, lucidly wrote that

something is happening in, and to, cognitive science. We are being progressively dislodged from the neat, consistent, and exciting scheme in which we had settled for a long time. I shall call this scheme "classical" cognitive science.

Nothing [is] quite the same any more. An awesome quantity of data had been reaped, and many complications had arisen. Not that the neat former hypotheses were wrong. But they were not quite right either. The picture was more complex, more nuanced.

The solution – any solution – will have to accommodate many distinctions, and relativizations and partializations. I doubt that with some notable exceptions the field will ever be again as exciting and neat as it was even five or six years ago.

This sea-change is even more obvious now, ten years or so after the paragraph just quoted was written. It's a sea-change that has affected both the 'bio' and the 'linguistic' parts of bilingualism. In the context of language, Chomsky (2007), p. 4, has made it clear that "[t]hroughout the modern history of generative grammar, the problem of determining the character of FL has been approached "from top down": How much must be attributed to UG to account for language acquisition? The Minimalist Program seeks to approach the problem "from bottom up": How little can be attributed to UG while still accounting for the variety of I-languages attained?" More and more, you find statements like: "One needs to be mindful of the limited structural modification that would have been plausible under the extremely brief history of *Homo sapiens* evolution" [Yang (2010), p. 1160; see also Hornstein (2009),

Boeckx (2013)]. From an overspecified Universal Grammar [Baker (2005), Pinker and Jackendoff (2005)], we have moved to an underspecified Universal Grammar [Hauser et al. (2002), Boeckx and Leivada (2013)].

In biology, genocentrism is being questioned; laws of forms are making a comeback; epigenetic inheritance, niche construction, and similar concepts are being emphasized [including by Massimo Piattelli-Palmarini: Piattelli-Palmarini (2006), Fodor and Piattelli-Palmarini (2010)].

At the intersection of linguistics and biology there is a conscious attempt to promote Darwin's mechanism of descent-with-modification, as the following quote from De Waal and Ferrari (2010), p. 201 makes clear.

Over the last few decades, comparative cognitive research has focused on the pinnacles of mental evolution, asking all-or-nothing questions such as which animals (if any) possess a theory of mind, culture, linguistic abilities, future planning, and so on. Research programs adopting this top-down perspective have often pitted one taxon against another, resulting in sharp dividing lines. Insight into the underlying mechanisms has lagged behind ...

A dramatic change in focus now seems to be under way, however, with increased appreciation that the basic building blocks of cognition might be shared across a wide range of species. We argue that this bottom up perspective, which focuses on the constituent capacities underlying larger cognitive phenomena, is more in line with both neuroscience and evolutionary biology.

All of these trends are well illustrated in Piattelli-Palmarini et al. (2009). The faculty of Language in the Narrow Sense is being emptied (or the notion altogether rejected) [Boeckx (2013)]; the lexicon is being constructed [Borer (2005), Halle and Marantz (1993), Boeckx (to appear), Blevins (2004)], parameters are said to “emerge” [Boeckx (2011)], and *sui generis* modularity is being questioned [Marcus (2006), Newport (2010), extending arguments of Karmiloff-Smith (1992)]. There is a growing attempt to exploit “order from noise” [Uriagereka (1998)], go beyond nature-nurture and embrace interactionism (beyond I- and E-linguistics) [see, e.g., Anderson (2013)], to move away from “adultocentrism” and put development and learning back on the agenda [see Yang (2004), (2010), Legate and Yang (2012), Lorenzo and Longa (2003), Longa and Lorenzo (2008), Lorenzo and Longa (2009), Longa and Lorenzo (2012), Lorenzo (2013)]. Piaget's “heretics” in biology (Weiss, Bertalanffy, Waddington, etc.), as Piattelli-Palmarini (1994) called them, or their heirs (Stuart Kauffman, Stuart Newman, Pere Alberch) are now everyone's heroes [Pigliucci and Müller (2010), Balari and Lorenzo (2013)].

In light of all these developments, it is far from clear that “those [“classical”] hypotheses, those [“classical”] explanations, were at least on the right track, that they were of the right kind” [Piattelli-Palmarini (1994), p. 342]. Rather, some aspects of Piaget's vision were on the right track, but premature. In some sense, Piaget was a minimalist, a modern biolinguist *ante lit-*

teram. Chomsky's "classical" stance (rich, overspecified UG) may have been a necessary step in the development of the field, but in the long run, at least some aspects of Piaget's vision may prove more productive for biolinguistics. True, he did not have explicit, detailed examples to back up his claims, but many current works in biology-oriented linguistic theory (minimalism) have likewise been criticized for suffering from a loss of explicitness and low level of detail.⁶

The prospects of genuine interdisciplinarity have never been so good, and a suitably modified constructivist, in many ways 'Piagetian' vision, one that emphasizes genericity and tinkering at the brain level [Poeppel and Embick (2005), Poeppel (2011)], appears to be what is needed.

IV. END OF THE "DEBATE", BEGINNING OF A COMPROMISE?

"[Piaget]'s search for a compromise was unsuccessful, simply because the compromise was neither possible nor desirable" [Piattelli-Palmarini (1994), p. 342]. Piattelli-Palmarini's statement may have been too quick. The compromise is desirable, even necessary for biolinguistics, and indeed the lines of research animating the biolinguistic revival are making it possible. Already at Royaumont, Jean-Pierre Changeux had suggested something along these lines:

The specificity of all neuronal contacts cannot possibly be dictated by the genes. ... [we must allow for] a maximum of useful information with a minimum of genes. ... Piattelli-Palmarini (1980), pp. 184ff. The rules might be simple. ... The scarcity of genes ... limits the number of models that come to mind ... [Piattelli-Palmarini (1980), p. 191].

It's remarkable how much we take for granted, how much 'top-down' or 'preformationist' our approach remains, both in language and in biology [cf. Benítez-Burraco and Longa (2010)]. Biolinguistics forces us to revisit the foundations of our field and re-teach them to those who we have alienated by our 'classical' stance. It won't be easy. As Piattelli-Palmarini (2001), p. 20, wrote, taking changes in Jacques Mehler's own work, one can detect "plans to proceed to a non-classical phase ... This is the latest, and possibly the hardest, lesson I'll have to learn." We all have to kill our darlings.

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NOTES

¹ The present work was made possible through a Marie Curie International Re-integration Grant from the European Union (PIRG-GA-2009-256413), research funds from the Fundació Bosch i Gimpera, and a grant from the Spanish Ministry of Economy and Competitiveness (FFI-2010-20634).

² Piattelli-Palmarini did not seem to have been aware of the existence of the term [Meader and Muyskens (1950)]. Lenneberg (1967) was, but he correctly pointed out that this publication “did not aim at a distinct theoretical position” [p. vii] of the sort he and Chomsky went on to articulate.

³ Interestingly, though, a few authors reviewing recent biolinguistic publications like Piattelli-Palmarini et al. (2009), Di Sciullo and Boeckx (2011) have alluded to the Royaumont meeting [see Drummond and Hornstein (2011), Narita et al. (2013)], a correct move in my opinion, for it is indeed Royaumont themes that continue to dominate the current scene, as this paper makes clear.

⁴ Thanks to Noam Chomsky for providing me with a copy of this rare transcript. The transcript I had access to is rough, and does not contain any page number. The passages quoted from it in the text are taken from the very beginning of the transcript.

⁵ Even the origins of concepts have come back, with recent works, especially Carey (2009), revisiting Fodor’s nativist position first defended at the Royaumont meeting – a topic that I will set aside in this article.

⁶ I should point out that I don’t share this assessment, because those who make this critical remark often wish for more detailed discussion of properties of specific languages, but looking at the details of languages need not always coincide with the details of the language faculty. For discussion, see Boeckx (2012).

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