Externalization and Emergence: On the Status of Parameters in the Minimalist Program

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1. The Tension Raised by Parameters in a Minimalist Setting

It is widely assumed that the Minimalist Program imposes a boundary condition on theories of language, namely, that the human language faculty (FL) has a Principles–and–Parameters (P&P)-like architecture (Chomsky 1981, 1993). Hornstein *et al.* (2005: 5), for example, maintain that this perspective represents the "consensus view of the overall structure of the language faculty". Accompanying this core tenet is the Strong Minimalist Thesis (SMT), which holds that FL is perfectly/optimally designed to meet the interactive needs of the language-external (but organism-internal) cognitive sub-systems with which it interfaces, namely, the conceptual–intentional (C–I) and sensorimotor (SM) systems. Taken together, these two hypotheses raise a fundamental tension that is rarely considered. One goal of this brief is to bring this issue to light in hopes of stimulating sustained productive discussion and thus begin chipping away at admittedly broad and challenging related inquiries.

The basic question that the SMT raises in a P&P-model of grammar is this: To what extent would a parameter-free FL represent a departure from optimal design? One might put it another way. Why did FL evolve with flexible (i.e. parameterizable) principles over a more minimal/streamlined format consisting solely of fixed principles? We might reason that the net effect of a rigid FL would be to minimize surface language variation. From the perspective of communicative economy, this would appear to be a non-trivial boon. Thus, in light of the SMT, the P&P hypothesis raises challenging questions about the evolution of FL and the origin of parameters (i.e. the roots of language variation). Given the success of the model in resolving tensions of descriptive and explanatory adequacy, it is unlikely that the P&P lens will be abandoned anytime soon. Pursuing the SMT alongside the parameterized FL hypothesis thus forces one to confront a formidable question. In what way can the flexibility of parameterization be squared with the optimal design of FL?

Before addressing this issue, it is important to acknowledge that although

rarely discussed, the problem of language variation (*qua* the existence of parameters) arises independently of the SMT in the P&P tradition. Baker (2001: 207) provides a good overview, remarking: "[…] the silence on this point is striking. Rarely is the question even framed". He then goes on to consider a number of cultural/sociological and evolutionary/biological proposals, ultimately rejecting each and concluding that the existence of parameters/variation is for the moment an unexplained mystery. Here, Chomsky's (1975) distinction between *mysteries* and *problems* is relevant. Unlike problems, which resemble questions that have been addressed by way of scientific progression along established channels and thus have a solvable quality, mysteries are open questions that by their very nature seem to limit progress and/or derive from human cognitive limitations. If the existence of parameters is a true mystery in this sense, as Baker suggests, one could argue that the pursuit of the roots of language variation is, for the moment, pre-mature or possibly even ill-conceived. In this squib, I'd like to suggest that the minimalist perspective concerning the asymmetrical relationship between language and its cognitive interfaces, familiar from mid-1970s biolinguistic theorizing, provides a lens through which the 'mystery' of language variation can be reinterpreted as a 'problem' (albeit a formidable one).

2.   Some Evolutionary–Developmental Approaches to Parameterization

One well known socio-evolutionary approach to the origins of linguistic variation is Dyson's (1979) idea that parameterization affords the advantage of enabling the formation of separate and distinct social groups, thus promoting accelerated evolution and ensuring the survival of the species by means of genomic diversification. Ultimately, though, this proposal can be rejected on the grounds that parameterization would offer no significant contemporaneous selective advantage, only a long-term one, which is antagonistic to the principles of natural selection. Furthermore, as Baker (2001) points out, parameters are over-engineered for the purpose of group formation and identification, given that variability of pronunciation alone would suffice to distinguish one group from another.

On the bio-evolutionary side, a greater number of proposals exist. Pinker & Bloom (1990) suggest that at the point of FL's evolution, the existing cognitive mechanisms were powerful enough to facilitate parameter setting so that there was simply no adaptive pressure to specify/crystallize those parameters. Simply put, there was little risk that language learning would be compromised under a parameterized FL. Pinker (1994) speculates that parameterization arose to offset changes to FL induced by inevitable random genetic variation, thus keeping mutual intelligibility in check by means of providing the resources for interpersonal grammar synchronization. See Baker (2001) for a critique of these proposals. Another speculation, first discussed years ago in class lectures by Noam Chomsky and then later independently proposed by Massimo Piattelli–Palmarini (Noam Chomsky, p.c.), is that variation/parameterization involves a 'mini-max' problem: Leaving principles open/unspecified reduces genetic information, but increases the cost of acquisition. One conceivable solution is that the

existing parameters are an optimal trade-off. See Chomsky (2004: 166) for discussion on this point.

3.   Biolinguistic Approaches to Parameterization

Returning to the issue at hand, that is, coming to grips with the existence of a parameterized FL under the SMT, two ways of proceeding immediately suggest themselves. The first possibility is to maintain the minimalist null hypothesis: FL evolved with a P&P-style architecture. The difficulty with maintaining this perspective is that it isn't clear on what grounds the existence of parameters renders FL perfectly engineered to meet the needs of the C–I and SM interfaces. On the face of things, the flexibility afforded by parameterization seems irrelevant to the rigid demands imposed on language by the cognitive interfaces. To make matters worse, existing research on variation/parameterization from the mathematical perspective shows that given that a parameterized FL affords no environmental advantage, there is selective pressure to reduce/eliminate parameterization from the language faculty (Nowak *et al.* 2001). How might a parameterized architecture be justified on minimalist terms, then?

     One approach would be to maintain that the evolution of a system with both principles and parameters might be justified on naturalistic grounds (Chomsky 1980), thus sidestepping the issue raised by the SMT. Along these lines, one might speculate that parameterization is not inherently unique to FL, but rather emerges as a recurring principle of design/organization in the organic world. Certainly, this view would be harmonic with Jacob's (1976) analysis of biological speciation. If true, the question of the evolution of parameterization in FL would be subsumed under the much larger question concerning the emergence of parameter-like organization in the biological world. In other words, on this approach, speculation concerning the compatibility of parameterization and optimal language design would lie beyond the scope of linguistic inquiry, falling instead within the domain of the biological sciences. We might view this as another instance of minimalism making non-trivial inroads in the natural sciences. See Boeckx (2006) for other examples. This possibility, though certainly not implausible, does not seem particularly promising.

     Another option would be to maintain the existence of parameters, yet hypothesize that FL evolved without them, optimally meeting the needs of the C–I system along the way. On this approach, parameters would be viewed as emergent properties of the language system, as opposed to defining core compo-nents of FL architecture as in previous GB and minimalist conceptions. This is precisely Chomsky's (2008) current position. Accordingly, the problem of reconciling the existence of parameters with optimal design (as well as the more basic question concerning the existence of parameters/variation) is largely mis-conceived. Chomsky argues for the primacy of the relationship between FL and C–I on a number of grounds. As such, the externalization of language (the latter, a set of mind-internal conceptual/symbolic representations) via Spell-Out to the SM system is viewed as a secondary phenomenon. Under this perspective, language externalization involves mapping a newly evolved computational system optimally designed to interface with C–I to an independent and unrelated

SM module that has been intact in the species for hundreds of thousands of years. Regardless of whether or not the recruitment of earlier hominid SM systems was accompanied by special adaptation, a mapping of this sort (a sort of work-around solution) poses a cognitive problem of sorts. The problem arises in virtue of the fact that systems designed without each other in mind must now interface, creating tensions of compatibility that limit the generative capacity of at least one of the interacting systems. Within this set of assumptions, it becomes possible to maintain that parameterization reflects the different, but limited ways of solving this cognitive problem. Distinct linguistic communities may have solved it in different ways and at different times, thus yielding the observable surface diversity of languages we observe today. Because the mapping from syntax to semantics would pose no such cognitive problem, given the optimal design of the computational system, the existence of an inherently parameterized syntax would be surprising. Thus, under this conception of language, diversity or parameterization would not enter into the evolution of FL, a line of thought that is reminiscent of work carried out in the embodied cognition tradition (see Clark 1998, among others). Baker (2001: 215) alludes to the possibility of a biological explanation of parameters along similar lines: "Parameters might have been a biological accident rather than an adaptation". He also considers the possibility that "parameters might exist because of physical necessity". This view, perhaps the most interesting of the views considered thus far (and perhaps the most compelling as well, given Occam's Razor-style considerations), has important implications for the architecture of FL. If correct, parameters would reduce to emergent properties of the language system imposed by the mapping to SM. They would thus have no independent status in the architecture of the language faculty, as conceived of in the GB era.[1] This sort of position is pursued by Boeckx (forthcoming), who maintains that variation emerges as a natural consequence of a genetically underspecified FL that is shaped largely by language-external principles such as computational efficiency (i.e. Chomsky's 2005 'third factor' in language design). A consequence of this epiphenomenal take on variation, then, would be to limit the domain of parameterization to the PF side of grammar. In

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[1]   An anonymous reviewer points out that treating parameters as epiphenomena raises several important questions. One, if parameterization is related to externalization, a secondary phenomenon, could parameters be random? Two, does this imply that parameterization can tell us little about the architecture of the language faculty? Space reasons preclude a detailed response to these questions. I refer the interested reader to Boeckx (to appear), who suggests that parameterization is a consequence of underspecified computational possibilities, which although underspecified, impose certain limitations on possible structures. For example, symmetric Merge allows for either head-initial or head-final structures. This would suggest that rather than being random, parameters are actually constrained by the interplay between the possibilities made available by the computational system and the requirements imposed by the SM system. With respect to the implications for the architecture of the language faculty, note that the position offered here, if true, provides corroborating evidence for the primacy of the mapping from syntax to C–I, a non-trivial architectural claim. Furthermore, if parameterization is an epiphenomenon of externalization, then it becomes possible to reanalyze phenomena once thought to be strictly syntactic in terms of morphophonology, thus expanding the analytical channels and pathways exploitable by linguistic theory. See Boeckx (to appear) for further discussion.

other words, a corollary of the emergence/externalization hypothesis is the conclusion that parameterization/variation does not exist on the LF wing. Clearly, this position is at odds with work on semantic parameterization, for instance, Chierchia's (1998a, 1998b) Nominal Mapping Parameter, a purported semantic parameter regulating the ability of languages to use bare nominal expressions in argument or predicate positions, a dimension along which languages vary in limited ways. The position also conflicts with claims of pragmatic variation sometimes cited in the literature (cf. Matthewson 2006 on presuppositional cross-linguistic variation) and attempts to unify syntactic and semantic parameters (cf. Svenonius & Ramchand 2008 on the specification of meaning in the narrow syntax versus negotiation of meaning by C–I). The role and status of semantic parameters within FL architecture would thus need to be rethought if the emergence/externalization hypothesis is on the right track. At the very least, it is clear that this view of parameterization leads to interesting questions and conceptual consequences that are well worth exploring.

4.   Conclusion

To the extent that the minimalist perspective on parameters makes predictions and is falsifiable (e.g. all linguistic variation is morpho-phonological in nature), inquiry into the nature and origin of linguistic variation can in principle proceed along the familiar channels of scientific methodology. In this way, what once appeared to be a 'mystery', can now be regarded as a 'problem' with a theoretically discoverable solution.

In closing, the problem of variation raised in this squib highlights the sort of issue that both arises under a biolinguistic perspective and sharpens under minimalist scrutiny. It is hardly worth stating that further work is needed on this topic as many of the details of FL remain perched on the horizon of scientific inquiry. By considering the issue of parameterization raised by the SMT, however, I hope to have initiated a baby step in the right direction.

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