

Can pattern recognition explain grammatical learning?

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In his keynote article, William O’Grady argues that the Amelioration Hypothesis — language acquisition is a side-effect of processing amelioration — can account for perceived linguistic gains in knowledge and skills, obviating the need for language acquisition *per se* and rendering it but an “illusion”. In this commentary, I will first touch on theoretical questions raised by the article, and then I will discuss some methodological problems with the use of scope as evidence for Processing Amelioration; I conclude with a discussion of language processing evidence for grammatical learning.

The article sets up a theoretical debate in terms of two views, *UG*, “an inborn system of categories and principles,” and *Emergentism*, non-linguistic “processing, pattern recognition and pragmatics” (O’Grady, 1), thus opposing a modular multi-mechanism approach to a routine-based single mechanism one. Two inconsistencies emerge from this philosophical dichotomy, the presumption of simplicity of Emergentism’s single mechanism, faced with the apparent necessity of inborn linguistic properties for the pattern-recognitionist approach.

The modular approach accepts a coalition of resources, ranging from language construction / restructuring of morphosyntactic representation to the roles of processing and frequency in real-time implementation. UG-based approaches to second language (L2) assume that changes effected through (what passes for) acquisition are dependent on primary linguistic data (PLD) as perceived, parsed and internalized into dedicated neural pathways of L2 knowledge (Herschensohn 2000, Carroll 2001, White 2003). Carroll, for example, elaborates a detailed hierarchy of linguistic and cognitive mechanisms to describe her Autonomous Induction hypothesis. In contrast, Emergentism eschews specialized linguistic knowledge or mechanisms as the drivers of these changes: “routines do the work traditionally assigned to the grammar [...] routines predict and explain what appears to be development” (O’Grady, 3); routines replace what had hitherto been labeled grammatical rules and principles. In this associationist view, processing, pattern recognition

and frequency should suffice to describe and explain the development of language mastery in children and adults.

Nevertheless, Emergentism presupposes a foundation of linguistic features, relationships and principles: “+/-voice, +/-coronal, +/-nasal, etc. [...] or the particular notions that turn out to be semantically relevant in language (tense, gender, modality) [...] determined by the properties of inborn articulatory/perceptual and conceptual systems” (O’Grady, 2); predicate argument structure and interpretation (O’Grady, 3–9); quantifiers, scope and c-command (O’Grady, 10–26). Intangible logical operators and c-command appear to be as illusory as language acquisition, since they are equally invisible, so to speak, but more importantly, why are they presupposed at all if they are unnecessary? On the one hand, Emergentism claims to use only non-linguistic forces and propensities to explain language development as progressive improvement in language use. Yet on the other, it posits linguistic features and principles as elements of its set of inborn primitives. In contrast, UG — albeit focusing on interlanguage competence as principal domain of investigation — appeals to many resources, potentially including Processing Amelioration. Emergentism at once denies linguistic mechanisms while requiring linguistic primitives, suggesting that pattern recognition alone cannot explain grammatical learning.

Seeking an adequate evaluative measure of the Amelioration Hypothesis, O’Grady turns to scope in Korean and English, a phenomenon that would clearly qualify as poverty of the stimulus (PoS) in a UG framework (Schwartz & Sprouse 2013). Scope entails subtle and sometimes ambiguous interpretations, is infrequent in input (e.g. 23 examples out of ten million words in the Korean corpus examined), is not taught (L1 or L2), and is not corrected. Misinterpretations of scope would not be corrected by negative evidence or recasts for any learner. Indeed, these are the very reasons O’Grady chooses scope, with English and Korean differing in interpretation preference for co-occurrence of negation and universal quantification (1).

- (1) a. Mike didn’t eat all the cookies.
 b. Mike-ka motun kwaca-lul an mekessta
 Mike-NOM all cookie-ACC not ate

The English preferred interpretation is a partitioned set (he ate some, not all cookies, *not* > *all*), whereas the Korean preference is the full set (all the cookies were not eaten, *all* > *not*). The UG account relies on the Scope Principle (c-command determines scope), an analysis established independent of the acquisition facts at hand and that is reflected in the word order in (1). The eventual mastery of scope interpretation for both L1 and L2 learners, with the preferences appropriately weighted toward Korean or English, could be cited as evidence for PoS and

hence UG approaches. O'Grady, however, argues for ease of processing whereby "an item can be interpreted immediately upon being encountered, with no subsequent revision to its interpretation" (O'Grady, 13). In the Korean and English data here, it appears that *c*-command and first item encountered coincide, so on these grounds alone one could not compare the two approaches. There are additional methodological issues that cloud the picture.

Using data from L1 development and comparing child and adult acceptance rates for two acceptable interpretations are problematic. For the children, there is a confound between linguistic and cognitive development: which comes first, mastery of *not*, *all* or the concepts underlying the words? Predicting that "children will initially not have a strong preference" (O'Grady, 16) is a fairly safe shot since young children are linguistically and cognitively ingenuous, incapable of making metalinguistic judgments. If these abilities are yet unstabilized in the child group, the rates for children cannot reliably be compared to a presumably stable group of adult judgments. As for the adults, what could be the reasons motivating their preferences? Given the rarity of the construction, frequency of input (leading to pattern recognition) is not a candidate; a more likely answer might be a pragmatic explanation, "if a speaker wishes to express the *all* > *not* interpretation, it is more informative to do so via an unambiguous pattern such as *Mike didn't eat any cookies*" (O'Grady, 16). For UG accounts, in addition to the theoretical tip of the scales for *c*-command, the English avoidance of *all* > *not* could be influenced by pragmatics, a domain outside core syntax. UG accounts might appeal to pragmatics (as does O'Grady), but they would not, however, attribute a scope preference to a grammatical rule or parameter (unless the structural relationship of *c*-command is considered a rule). It is then unclear how O'Grady's evidence for eventual mastery of scope interpretation (with appropriate preferences) is "a promising example of processing amelioration" (O'Grady, 16) or that it is induced by pattern recognition or frequency, neither of which is prevalent in the scope evidence.

There is no doubt that frequent repetition of routines leads to automatization of whatever is being learned, from coordinating clutch and accelerator while driving a car to using gender agreement in an L2. O'Grady says that speed and reduction of errors resulting from repetition are in themselves sufficient to describe the changes that have taken place: there is only surface evidence, there is no deeper grammatical knowledge; there are only exemplars, constructions and patterns that are at the ready for deployment in production or interpretation. Can we know anything more about human processing abilities and knowledge beyond this surface behavior? Recent electrophysiological studies indicate qualitative changes in neural reactions to grammatical versus lexical phenomena in L2 learners and may give another perspective (See Tanner, this issue, for further discussion of ERP evidence).

Osterhout et al. (2008) describe how beginning French L2 learners followed longitudinally over one year using Event Related Potential (ERP) measurements (detected over the scalp by electrodes) to grammatical and lexical anomalies develop responses that qualitatively resemble those of French native speakers. For natives, lexical anomalies (*deux et deux font livre* ‘two and two make book’) elicit a negative wave about 400 milliseconds after the event (the offending word). Grammatical anomalies (*tu mangez une pomme* ‘you-sg eat-pl an apple’) elicit a positive-going wave 600 ms after the event. The French students, tested on pseudo-words after just a few weeks of instruction, showed N-400 responses (as did native controls), even though they were incapable of consciously distinguishing words and non-words. A subgroup of the students showed N-400 responses to grammatical as well as lexical anomalies (unlike native speakers). By the end of the year, this “fast learner” group showed P-600 responses to grammatical anomalies that were qualitatively similar to French natives. The learners’ responses changed over the course of a year from a lexico-semantic response to a morphosyntactic one. If we look at this data from the perspective of the Amelioration Hypothesis, we see that all the learners got better with practice, but that there was a qualitative change from processing in a strictly lexical manner to processing in a grammatical manner. The ERP study hypothesizes “that our learners were progressing through discrete stages of syntactic learning: they began by memorizing particular combinations of words and morphemes, and only later induced general syntactic rules” (Osterhout et al. 2008, 515). UG approaches that take processing and pattern recognition into account can use these resources to scaffold eventual restructuring of the grammar; Emergentism’s rejection of grammar and acquisition denies restructuring and qualitative differences in language processing (lexical versus morphosyntactic), thus eliminating pattern recognition as an explanation of the observed changes.

References

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