LETTER

Endogenous or exogenous? The data don't say

Steven T. Piantadosi[a,1] and Celeste Kidd[a]

In an exciting in-depth study of Korean language learners, Han, Musolino, and Lidz (1) show that children often arrive at grammars that do not match their parents. Learners appear to choose between multiple linguistic systems that are consistent with their most direct observed evidence. The authors frame these results as informing the nature vs. nurture debate: because learners acquire a grammar that is not determined by their input, they must be bringing information to the problem "on the basis of an internally driven learning mechanism" (1).

The primary data point for this claim, however, is peculiar: Han et al. (1) show a lack of correlation between parents' and children's grammatical systems. It is worth noting that low correlations are unreliable with such small samples (2), but if these results were about another cognitive domain—IQ, for example—a null correlation between parents and children might have been taken as strong evidence for exogenous influences (i.e., factors other than those that are genetically specified). After all, if variation does not come from genetics, what does it mean for it to be endogenous?

Support for endogenous pressures can be found in places in which learners substantially alter their input, including regularization, creolization, productivity, and language change. Such phenomena demonstrate children do not acquire perfect copies of their parents and often add something remarkably new. Unlike these cases, Han et al.'s (1) results are consistent with learners who shrug and pick an option at random when faced with underdetermining evidence. This could not support any interesting form of endogeneity or nativism: Learners who randomly choose a bit of information about how language works cannot support the view that information is built-in, by the definition of information.

Furthermore, learning data includes more than parental use of isolated constructions. There are many other sources of influence, including peers, siblings, media, and sociolinguistic factors. As Han et al. (1) point out, the components of children's developing grammar may affect each other through indirect routes, perhaps changing the probability of acquiring certain classes of grammatical rules or structures. The grammatical differences are therefore not necessarily underdetermined by input. Individual differences in memory, motivation, or attention may influence acquisition and performance in the experiment, meaning the root cause of the variation may not even be linguistic.

There is a clearly fascinating question of how learners could possibly come by the knowledge that permits them to consider the multiple grammars that Han et al. (1) outline. This question has been the target of the most important work in language acquisition from both empiricists and nativists. Although there is no known psychological mechanism that could learn these grammars, there is equally no known genetic mechanism by which such knowledge could be "built in" (3). It is provable, however, that even the details of grammatical knowledge are learnable in principle (4). This means that although the variability that Han et al. (1) observe is fascinating, its existence is consistent with both internal and external pressures, as well as reasonable versions of both nativism and empiricism.

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2 Schönbrodt FD, Perugini M (2013) At what sample size do correlations stabilize? *J Res Pers* 47(5):609–612.
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4 Chater N, Vitányi P (2007) 'Ideal learning' of natural language: Positive results about learning from positive evidence. *J Math Psychol* 51(3):135–163.

[a]Department of Brain and Cognitive Sciences, University of Rochester, Rochester, NY 14614

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[1]To whom correspondence should be addressed. Email: spiantado@gmail.com.