DO LAB ATTESTED LEARNING BAISES PREDICT THE STRUCTURE OF A NEW NATURAL LANGUAGE?

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Typological analysis clearly shows that the world's languages are not evenly distributed among all logically possible patterns. Recent studies (i.e. Culbertson, Smolensky, Legendre, 2012; Fedzechkina, Jaeger, Newport, 2012; Culbertson & Newport, 2015) on the emergence of language structure in the lab find that the most common typological patterns in languages around the world are generally the patterns adults prefer when learning an artificial language. Accordingly, the researchers conclude that these most common patterns are the product of learner biases (cognitive or communicative) toward certain types of structure. Here we explore this question in a new natural language: Nicaraguan Sign Language (NSL). We investigate whether signers of this new language will use the most typologically common orders for the elements of a noun phrase.

NSL, one of the youngest languages known to science, was born in the late 1970s with the founding of a new school for special education. The first students to enter the school were homesigners: isolated deaf individuals who develop their own gesture systems in order to communicate with the individuals around them. When these homesigners came together in the 1970s, the stage was set for the creation of a new language, and the first cohort of NSL was formed. Though instruction was in written and spoken Spanish, students soon began to communicate with one another manually. As succeeding cohorts of students learn NSL, the language itself is changing rapidly.

Following Culbertson et al. (2012) and Culbertson & Newport (2015), we examine the ordering of noun, adjective, and number elements within noun phrases in NSL. Culbertson and colleagues find that harmonic orders (in which the adjective and number are either both prenominal or both postnominal) were preferred over non-harmonic orders (in which the noun comes between the other two elements), consistent with the typological pattern reported by Dryer (2008). We showed participants a series of cards depicting a set of objects (e.g., dogs or cars); set size varied from 1 to 4, and objects were either large or small. We asked participants to describe the content of each card, and determined the

ordering of noun phrase elements produced by signers in three successive age cohorts of NSL: Cohort 1 (n=9) who came together in the 1970s and formed NSL; Cohort 2 (n=9) and Cohort 3 (n=6) who were exposed to NSL upon school entry between the early 1980s and early 2000s. NSL signers have been shown to build increasingly complex linguistic structure over successive cohorts (Senghas & Coppola, 2001). Data collection was carried out in 2009 and again in 2015. The 2009 data collection included 6 participants (3 from Cohort 1, and 3 from Cohort 2); data was collected from all 24 participants in 2015, including the original 6.

In 2009 (Figure 1), we found that Cohort 1 signers and Cohort 2 signers preferentially produced harmonic orders (either noun-adjective-number or noun-number-adjective), with no significant difference between cohorts (β=-.90, p=.45). This pattern is in keeping with Culbertson et al.'s predictions—individuals creating a new language prefer harmonic orders, potentially reflecting the same biases that have shaped the attested typological pattern.

Interestingly, in 2015 (Figure 2), the pattern we observed was the same for Cohort 1, but not for Cohorts 2 and 3. Cohort 1 signers still preferred harmonic orders. In fact, all three Cohort 1 signers tested at both time points preferred harmonic orders in both 2009 and 2015. However, Cohort 2 signers now more often used non-harmonic number-noun-adjective order, and for Cohort 3 signers this was the most preferred order. The preference for non-harmonic order increases significantly with later cohort (β=-5.24, p<.02). Strikingly, this means that individual signers in the second cohort moved away from the harmonic pattern. Of the 3 Cohort 2 signers tested in both 2009 and 2015, all preferred harmonic orders in 2009 but only 1 of 3 still showed a harmonic preference in 2015.
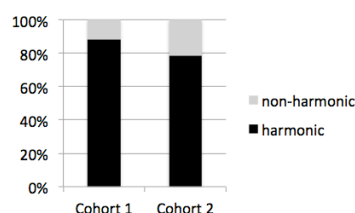

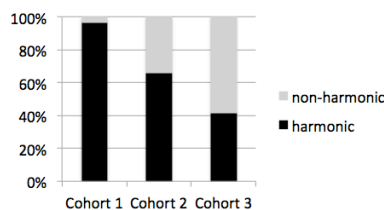Figure 1. Noun Phrase Ordering in 2009.

Figure 2. Noun Phrase Ordering in 2015.

We thus see harmonic ordering in the earliest stages of this new language, as the typological and experimental data would predict. The intriguing result is the relatively quick transition from a harmonic pattern to a non-harmonic pattern in Cohorts 2 and 3. Future work is needed to explore pressures leading NSL away from the typologically robust harmonic pattern (e.g., influences from Spanish, which has a non-harmonic pattern, that might be transmitted through co-speech gesture).