PARROT "PHONOLOGICAL REGRESSION": EXPANDING OUR UNDERSTANDING OF THE EVOLUTION OF VOCAL LEARNING

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Development of vocal learning was a critical aspect in the evolution of spoken language, mainly because such learning allows for cultural transmission of the complex communication patterns that are the hallmark of human language. Notably, few nonhumans engage in such behavior. Oscine songbirds are the most commonly studied of these exceptional nonhumans, and research demonstrates striking avian-human parallels with respect to the ontogeny and neurological bases of vocal communication (e.g., Jarvis et al. 2005). Parrots also engage in vocal learning, but, unlike most songbirds, are adept at vocal mimicry (Chakraborty et al., 2015)—the capacity to reproduce, exactly, sounds such as those of human speech. Given that Grey parrots (*Psittacus erithacus*), at least, have shown some ability for referential use of such speech and advanced cognitive capacities (e.g., Pepperberg, 1999; Pepperberg & Carey, 2012), they could provide a particularly good model for studying how vocal communication may have evolved (e.g., Pepperberg, 2013).

One aspect of human language, with likely evolutionary importance, that of pre-speech babbling, has been studied extensively in both children and songbirds (e.g., Doupe & Kuhl, 1999) and somewhat in parrots. In parrots, however, researchers either investigated development of conspecific vocalizations in the wild (Berg et al., 2011) or the vocalizations of an adult bird, already fluent in human speech, that was learning novel labels (Pepperberg, Brese, & Harris, 1991). The development of human speech in a juvenile parrot, however, had not been tracked.

A recent study of such tracking found an interesting aspect of vocal learning, that of "phonological regression", also seen in children, even if rarely reported (e.g., Bleile & Tomblin, 1991): Here, young children sometimes nearly perfectly produce words at a very early stage, but these correct first productions are then followed by less faithful renditions, only to be returned later to relative accuracy. Fledgling

songbirds may similarly occasionally countersing with adults using a fully adult rendition, then return to subsong before fully developing their vocalizations (e.g., Baptista, 1983). The present study examined the trajectory of vocal development of a young Grey parrot (Athena) as she learned referential English. By tracking Athena's acquisition of vowel-like sounds over the course of fifteen months, using audio recordings and acoustic software programs, her vocal development was analyzed over time, from her first squeaks to her more distinct pronunciations, and her progress compared with human children and other parrots in the lab. Not one, but multiple U-shaped curves characterized her acquisition of isolated labels, from what initially seemed to be almost exact renditions of an English label, to much less clear versions, and on to more faithful copies. The results indicate that, like human children, parrots can experience the phenomenon of phonological regression, a finding which provides additional evidence for avian-human vocal learning parallels.

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