Language structure is partly determined by social structure, says psychology study

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Psychologists at the University of Pennsylvania and the University of Memphis have released a new study on linguistic evolution that challenges the prominent hypothesis for why languages differ throughout the world.

The study argues that human languages may adapt more like biological organisms than previously thought and that the more common and popular the language, the simpler its construction to facilitate its survival.

Traditional thinking is that languages develop based upon random change and historical drift. For example, English and Turkish are very different languages based upon histories that separate them in space and time. For years, it has been the reigning assumption in the linguistic sciences.

The recent report, published in the current issue of *PLoS ONE*, offers a new hypothesis, challenging the drift explanation. Gary Lupyan, a postdoctoral researcher in the Department of Psychology in Penn's School of Arts and Sciences, and Rick Dale, an assistant professor in psychology at the University of Memphis, conducted a large-scale statistical analysis of more than 2,000 of the world's languages aimed at testing whether certain social environments are correlated with certain linguistic properties.

The researchers found striking relationships between the demographic

properties of a language — such as its population and global spread — and the grammatical complexity of those languages. Languages having the most speakers — and those that have spread around the world — were found to have far simpler grammars, specifically morphology, than languages spoken by few people and in circumscribed regions. For example, languages spoken by more than 100,000 people are almost six times more likely to have simple verb conjugations compared to languages spoken by fewer than 100,000 people.

Larger populations tend to have simpler pronoun and number systems and a smaller number of cases and genders and in general do not employ complex prefixing or suffixing rules in their grammars. A consequence is that languages with long histories of adult learners have become easier to learn over time. Although a number of researchers have predicted such relationships between social and language structure, this is the first large-scale statistical test of this idea.

The results draw connections between the evolution of human language and biological organisms. Just as very distantly related organisms converge on evolutionary strategies in particular niches, languages may adapt to the social environments in which they are learned and used.

"English, for all its confusing spelling and exceptions — if a baker bakes, what does a grocer do? — has a relatively simple grammar," Lupyan said. "Verbs are easy to conjugate and nouns are mostly pluralized by adding 's.' In comparison, a West African language like Hausa has dozens of ways to make nouns plural and in many languages — Turkish, Aymara, Ladakhi, Ainu — verbs like 'to know' have to include information about the origin of the speaker's knowledge. This information is often conveyed using complex rules, which the most widely-spoken languages on earth like English and Mandarin lack."

Lupyan and Dale call this social affect on grammatical patterns the

"Linguistic Niche Hypothesis." Languages evolve within particular socio-demographic niches. Although all languages must be learnable by infants, the introduction of adult learners to some languages (for example, through migration or colonization) means that aspects of a language difficult for adults to learn will be less likely to be passed on to subsequent generations of learners. The result is that languages spoken by more people over larger geographic regions have become morphologically simpler over many generations.

A remaining puzzle is why languages with few speakers are so complex in the first place. One possibility, explored by researchers, is that features such as grammatical gender and complex conjugational systems, while difficult for adult learners to master, may facilitate language learning in children by providing a network of redundant information that can cue children in on the meanings of words and how to string them together.

The results and theory proposed by Lupyan and Dale do not aim to explain why a specific language has the grammar it does. Because the findings are statistical in nature, many exceptions to Lupyan and Dale's theory can be identified. Their work, however, provides a comprehensive analysis of how some social factors influence the structure of language and shows that the relationships between language and culture is far from arbitrary.

Provided by University of Pennsylvania

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