A Perspective on Language Evolution from Studies of the Evolution of Graphical Languages

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Language is a fabric that was woven to hold society together. There is little doubt that as the mental capacities of our species increased, our dependency on language for the binding together of communities also increased. This dependency has reached the point that it is virtually impossible to imagine a modern society without some form of language-based communication. Most of this communication occurs through spoken language, or through the transcription of this spoken language into physical form using character-based encoding schemes. Volumes have been written expounding theories of how these kinds languages have evolved. However, the evolution of these forms of language is a process that spans years, decades, centuries and arguably milleni, and as such, these theories are diffhult to reify with empirical data involving real human communication without having to resort to great leaps of faith. It is important to note that there have been some interesting contributions from studies of the evolution of language using computer-based agents, but these studies intrinsicly lack the richness that is involved when considering 'real humans'. The purpose of this paper is to propose an alternative framework for studying the evolution of language in a laboratory setting using human subjects and suggest a new explanation for the evolution of language.

Recent reserch has shown many relations between spoken dialog and written diologs employing only graphical (non-character based) elements[1]. For example, participants in graphical exchanges match each other's style of drawing more often than would be predicted by chance ([2]). This echoes the accommodation or 'entrainment' phenomena, which includes the matching of lexicon, syntax, and semantics, that have been identified for verbal dialogue[3]. Similarly, it has been shown that under some circumstances, patterns of graphical turn-taking emerge that are similar to those found in conversation[4]. Given these parallels, we wish to suggest that a greater understanding of the evolution of language in general can be from the evolution of these graphical dialogs.

The possibility of successful human communication is often explained by appeal to internalised representations or codes that enable the processing and interpretation of natural languages. Evolutionary theory is often invoked to address difficulties in explaining how such codes could be internalised or naturalised. We argue that no viable evolutionary account has been offered that can explain the how such an internal representation could have evolved. Accounts that appeal to computational advantages face the problem that natural languages are poor media for computation and that it is the development of external representations such as drawings and scripts, not language, that is most tightly correlated with enhanced cognitive abilities. Accounts that appeal to communicative advantage often appeal to some form of group advantage for their evolutionary mechanisms and, as a result, inherit the problems with group selection. We argue that underlying problem is the premise that human communication depends on some form of 'shared' code is incorrect.

We propose instead that the concept of communicative success should be understood in terms of mutual-indiscriminability and that language evolution should be understood in terms of the mutual-modifiability of the artifacts and technologies that are used to support the language. These ideas are illustrated by experiments on the evolution of graphical languages.

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