



## Comment

The cultural approach to language is ripe, let us expand our options  
to test it empirically  
Commentary on “Modeling the cultural evolution of language”  
by Luc Steels

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For almost two decades now, Luc Steels has been a leading pioneer of two novel approaches to studying language evolution. Methodologically, he has pioneered the *artificial approach* [1, henceforth AA]; theoretically, he has pioneered the *cultural approach* [2, henceforth CA]. In this paper [3], Steels (i) situates these approaches within their broader scientific context, (ii) provides an integrated overview of the main contributions made by these approaches, and (iii) suggests a number of fundamental challenges for the CA. Since my comment concerning (i) and (ii) is extremely terse—Steels offers us a very timely and authoritative review—I will focus on (iii).

Insightfully summarizing the key phenomena linguists have observed in natural languages, Steels identifies three challenges for the CA. The CA “should explain how a language system may emerge and continue to change”, it should “explain how a new language strategy can emerge and propagate in a population”, and it “should explain the semiotic dynamics we see in cultural language evolution”. Steels then describes how these challenges have been tackled empirically by researchers who adopt the AA, providing a number of exciting insights. Here I describe another empirical approach to tackle the challenges identified by Steels and suggest that this approach, which has been labeled *Experimental Semiotics* [4], provides a key methodological complement to the AA.

In the last few years, researchers have begun studying languages that human adults develop *de novo* under controlled laboratory conditions [5–7]. To do this, experimental semioticians ask people to play cooperative games, typically in virtual environments. The games require communication but players cannot use pre-established forms of communication such as spoken or written languages. In order to succeed, players must develop novel languages. Most people do this relatively rapidly, providing new opportunities of investigation for students of language. Some of these opportunities parallel the opportunities offered by the AA, allowing us to test its findings with real human agents [e.g., 8,9]. However, I will not focus on these opportunities here. Rather, I will focus on an opportunity which does not parallel those offered by the AA, therefore providing a methodological complement to it. When faced with ES tasks, people sometime *violate our expectations about their behavior*. These violations are extremely valuable because they

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offer us opportunities to discover *what we do not know about human behavior* and, thus, *what we cannot think of implementing in the AA*. Two ES studies [10,11] provide an example of this. One of the consistent results in these studies was that some participants failed in developing even a minimal communication system, in two–three hours of playing. Most of these failures were due to severe communicative egocentrism [4] which was fairly surprising considering that the participants were all competent communicators in their daily lives. To be sure, subtle egocentric biases have been found before in the context of spoken conversation [12], but when people cannot use language they seem to lose much more substantial portions of their communicative skills. This led to a new question, which is currently being investigated in my lab: How is communicative egocentrism overcome in human social interactions? The answer to this question, as well as the specifics of this example, is not important here. What is important is that this research theme *could not have originated from within the AA*. On the other hand, the AA provides ideal complements to ES. For example, it enables us to investigate population sizes and time-scales currently beyond the reach of experimental semioticians [13,14] as well to investigate agents which, to the difference of human adults, can be stripped of any knowledge about existing human communication systems [15]. In a nutshell, the AA and the ES can provide crucial extensions and controls for each other. And this leads to my final comment.

It is my hope that the AA and ES will cross-breed as much as possible in the future because, together, they can provide a formidable empirical tool for the further development of the CA.

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