

## Branching, blending, and the evolution of cultural similarities and differences among human populations

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### Abstract

It has been claimed that blending processes such as trade and exchange have always been more important in the evolution of cultural similarities and differences among human populations than the branching process of population fissioning. In this paper, we report the results of a novel comparative study designed to shed light on this claim. We fitted the bifurcating tree model that biologists use to represent the relationships of species to 21 biological data sets that have been used to reconstruct the relationships of species and/or higher level taxa and to 21 cultural data sets. We then compared the average fit between the biological data sets and the model with the average fit between the cultural data sets and the model. Given that the biological data sets can be confidently assumed to have been structured by speciation, which is a branching process, our assumption was that, if cultural evolution is dominated by blending processes, the fit between the bifurcating tree model and the cultural data sets should be significantly worse than the fit between the bifurcating tree model and the biological data sets. Conversely, if cultural evolution is dominated by branching processes, the fit between the bifurcating tree model and the cultural data sets should be no worse than the fit between the bifurcating tree model and the biological data sets. We found that the average fit between the cultural data sets and the bifurcating tree model was not significantly different from the fit between the biological data sets and the bifurcating tree model. This indicates that the cultural data sets are not less tree-like than are

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the biological data sets. As such, our analysis does not support the suggestion that blending processes have always been more important than branching processes in cultural evolution. We conclude from this that, rather than deciding how cultural evolution has proceeded a priori, researchers need to ascertain which model or combination of models is relevant in a particular case and why.

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## 1. Introduction

The processes responsible for producing the cultural similarities and differences among human populations have long been the focus of debate in the social sciences, as has the corollary issue of linking cultural data with the patterns reconstructed by historical linguists and by biologists working with human populations (e.g., Bellwood, 1996; Boas, 1940; Boyd & Richerson, 1985; Cavalli-Sforza & Feldman, 1981; Cavalli-Sforza, Piazza, Menozzi, & Mountain, 1988; Durham, 1991; Goodenough, 1999; Hurler, Matisoo-Smith, Gray, & Penny, 2003; Jones, 2003; Kirch & Green, 1987; Kroeber, 1948; Lumsden & Wilson, 1981; Mesoudi, Whiten, & Laland, 2004; Moore, 1994; Morgan, 1870; Petrie, 1939; Renfrew, 1987, 1992; Rivers, 1914; Romney, 1957; Schmidt, 1939; Smith, 2001; Smith, 1933; Terrell, 1988; Welsch, Terrell, & Nadolski, 1992; Whaley, 2001). Currently, debate is focused on two competing hypotheses, which have been termed the branching hypothesis (also known as the “genetic,” “demic diffusion,” or “phylogenesis” hypothesis) and the blending hypothesis (also known as the “cultural diffusion” or “ethnogenesis” hypothesis; Bellwood, 1996; Collard & Shennan, 2000; Guglielmino, Viganotti, Hewlett, & Cavalli-Sforza, 1995; Hewlett, de Silvestri, & Guglielmino, 2002; Kirch & Green, 1987; Moore, 1994, 2001; Romney, 1957; Tehrani & Collard, 2002). Other models have been proposed (e.g., Boyd, Borgerhoff Mulder, Durham, & Richerson, 1997), but to date, these have received little attention in the literature.

According to the branching hypothesis, cultural similarities and differences among human populations are primarily the result of a combination of within-group information transmission and population fissioning. The strong version of the hypothesis suggests that Transmission Isolating Mechanisms, or TRIMS (Durham, 1992), impede the transmission of cultural elements among contemporaneous communities. TRIMS are akin to the barriers to hybridisation that separate species and include language differences, ethnocentrism, and intercommunity violence (Durham, 1992). The branching hypothesis predicts that the similarities and differences among cultures can be best represented by the type of branching tree diagram that is used in biology to depict the relationships among species (Fig. 1). The hypothesis also predicts that there will be a strong association between cultural variation and linguistic and biological patterns (e.g., Ammerman & Cavalli-Sforza, 1984; Bellwood, 1996, 2001; Cavalli-Sforza, Menozzi, & Piazza, 1994; Cavalli-Sforza et al., 1988; Diamond & Bellwood, 2003; Kirch & Green, 1987, 2001; Renfrew, 1987).

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