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UNDERSTANDING CUMULATIVE CULTURAL EVOLUTION

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In a narrow critique of two early papers in the literature on cumulative cultural evolution, Vaesen et al. (1) misunderstand the work they critique, mischaracterize multiple lines of research and ignore much evidence. While largely recycling prior criticisms, they provide no new models, evidence or explanations (2).

Not only do their criticisms of Henrich's and Powell et al.'s (3, 4) modeling assumptions miss their mark (2), but Vaesen et al. also ignore many other models that don't rely on these assumptions yet arrive at similar predictions. These other models variously include conformist transmission and explore these processes using non-Normal distributions, discrete-traits and networks, etc. (2, 5). Of course, no one expects demographic/population variables to be the only things that matter, as cultural packages related to clothing or housing, e.g., will vary with latitude for reasons unrelated to demographics, risk or mobility.

Vaesen et al are correct that these models assume that at least some individuals can sometimes assess the relative success or payoffs of different traits or individuals; but they are incorrect in claiming that there is little evidence for such learning. First, they ignore a vast body of laboratory evidence showing that infants, children and adults use cues of success, skill, or competence in learning (2, 6). Second, Vaesen et al. also ignore work showing that (a) Hadza and Ache foragers acquire cultural information obliquely from broad networks (7) and (b) success-biases are well documented in traditional populations (2). Finally, the studies cited by Vaesen et al. do not support their claims about vertical transmission; instead, all support the two-stage learning process used by Henrich, Powell et al., and many others. Here, individuals initially learn from their parents, and then update only if they observe others who are more successful than their parents. Evidence from fisher-horticulturalists and foragers support this pattern and shows that second stage updating from non-parents is particularly prevalent in domains with high variation in skill/success. For example, Aka foragers learn from great hunters and prestigious shamans (2).

Vaesen et al. ignore laboratory tests of these models (2). Using novel learning tasks, several experiments show how group size and interconnectedness influence the accumulation of skill, know-how and complexity, and some demonstrate the 'Tasmanian effect'(8). If the models are so poor, it's peculiar that they have withstood multiple experimental tests by independent researchers.

Vaesen et al. cite studies by Collard that do not find a significant relationship between census population sizes and complexity. However, the theory predicts it is the size of the population that shares information—the *effective cultural population size* (3)—that matters, and if there is extensive contact between local or linguistic groups there is no reason to expect census population size to correspond to the theoretically-relevant population. Inappropriately, Collard used highly interconnected populations, and makes no effort to measure these interconnections or deal with the conceptual problems of using census estimates. Finally, Vaesen et al. ignore important findings linking population size to both linguistic complexity and innovation rates (2, 9, 10).

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