

REPLY TO HENRICH ET AL.:

# The Tasmanian effect and other red herrings

Krist Vaesen<sup>a,b,1</sup>, Mark Collard<sup>c,d</sup>, Richard Cosgrove<sup>e</sup>, and Wil Roebroeks<sup>b</sup>

Henrich and his large group of cosigners (1) miss the point of our paper (2). They believe we were rejecting the relevance of population size in cultural evolution outright, whereas we were critiquing the recent trend in archaeology to use population size to explain patterns in the archaeological record; hence, our title “Population size does not explain past changes in cultural complexity” (2). Perhaps not surprisingly given their misreading of our paper, none of Henrich et al.’s points (1) contradicts our argument.

We argued that the recent wave of studies in which population size is claimed to explain past changes in cultural complexity is problematic. One cause for concern, we averred, is that the models that underpin what we called the “population size approach” only yield a relationship between population size and cultural complexity under certain conditions. Such conditionality holds not just for the models we examined but also for the model that Henrich et al. (1) highlight. Contrary to what they imply, the relationship between population size and cultural complexity is not universal, a point that is illustrated by the fact that some models do not yield the relationship (3, 4). The conditionality of the models means that population size cannot simply be used to interpret changes in the archaeological record. Instead, the conditions in the archaeological case need to be matched to the conditions assumed by the models that support the population size approach. Such matching has not been carried out in any of the archaeological studies that have appealed to population size, and that means their claims are not defensible.

The other point we made is that the population size approach does not fare well at all in relevant empirical

tests. We demonstrated that it fails in the highest profile cases in which it has been used, including the one that gave rise to the term the “Tasmanian effect.” We showed that Henrich’s analysis of Tasmania’s archaeological and ethnographic records (5) is flawed. Subsequently, we demonstrated that the majority of studies that have tested predictions of the population size approach have not supported it. Neither of the points that Henrich et al. (1) make in connection with this part of our paper changes the situation. Their criticisms of Collard’s studies (6) are not only speculative but also ignore the fact that other researchers have obtained the same result using different datasets (7–9). Henrich et al.’s appeal (1) to work focusing on linguistic complexity in the Pacific and patenting activity in the United States has little relevance to the studies that have used population size to explain archaeological patterns, all of which pertain to hunter-gatherer material culture.

To conclude, we stand by our argument. Currently, there is no reason to think that population size explains any, let alone all, changes in cultural complexity in the past. This conclusion has been reinforced by a number of studies published since our paper appeared (4, 8, 10).

## Acknowledgments

We thank Brian Coddling for his feedback on an earlier version of this manuscript. K.V. acknowledges support from The Netherlands Organization for Scientific Research (VIDI Grant 016.144312). M.C. is supported by the Social Sciences and Humanities Research of Canada, the Canada Research Chairs Program, the Canada Foundation for Innovation, the British Columbia Knowledge Development Fund, and Simon Fraser University. R.C. and W.R. acknowledge support from the Australian Research Council (Discovery Grant DP120100580).

- 1 Henrich J, et al. (2016) Understanding cumulative cultural evolution. *Proc Natl Acad Sci USA* 113:E6724–E6725.
- 2 Vaesen K, Collard M, Cosgrove R, Roebroeks W (2016) Population size does not explain past changes in cultural complexity. *Proc Natl Acad Sci USA* 113(16):E2241–E2247.
- 3 Vegvari C, Foley RA (2014) High selection pressure promotes increase in cumulative adaptive culture. *PLoS One* 9(1):e86406.
- 4 Andersson C, Tömborg P (2016) Fidelity and the speed of the treadmill: The combined impact of population size, transmission fidelity, and selection on the accumulation of cultural complexity. *Am Antiq* 81(3):576–590.
- 5 Henrich J (2004) Demography and cultural evolution: Why adaptive cultural processes produced maladaptive losses in Tasmania. *Am Antiq* 69(2):197–214.

<sup>a</sup>School of Innovation Sciences, Eindhoven University of Technology, 5612 AZ Eindhoven, The Netherlands; <sup>b</sup>Human Origins Group, Faculty of Archaeology, University of Leiden, 2333 CC Leiden, The Netherlands; <sup>c</sup>Human Evolutionary Studies Program and Department of Archaeology, Simon Fraser University, Burnaby, BC, V5A 1S6, Canada; <sup>d</sup>Department of Archaeology, University of Aberdeen, AB24 3UF Aberdeen, United Kingdom; and <sup>e</sup>Department of Archaeology and History, La Trobe University, MB 167 Melbourne, Australia

Author contributions: K.V., M.C., R.C., and W.R. wrote the paper.

The authors declare no conflict of interest.

<sup>1</sup>To whom correspondence should be addressed. Email: k.vaesen@tue.nl.

- 6 Collard M, Buchanan B, O'Brien M (2013) Population size as an explanation for patterns in the Paleolithic archaeological record: Caution is needed. *Curr Anthropol* 54(Suppl 8):S388–S396.
- 7 Codding BF, Jones TL (2010) Levels of explanation in behavioral ecology: Understanding seemingly paradoxical behavior along the central coast of Alta California. *California Archaeology* 2:77–91.
- 8 Sealy J (2016) Cultural change, demography, and the archaeology of the last 100 kyr in Southern Africa. *Africa from MIS 6-2: Population Dynamics and Paleoenvironments*, eds Jones SC, Stewart BA (Springer, Dordrecht, The Netherlands), pp 65–75.
- 9 Nelson MC, et al. (2011) Resisting diversity: A long-term archaeological study. *Ecol Soc* 16(1):25.
- 10 Read D, Andersson C (2016) The evolution of cultural complexity: Not by the treadmill alone. *Curr Anthropol* 57:261–286.