



September 8, 2019

Dear Editors of Development Science,

I am hereby submitting for your consideration a manuscript entitled "Continuous Developmental Change Explains Discontinuities In Word Learning" co-authored by Michael C. Frank, Sophie Regan, and myself. The paper explores the idea that some seemingly stage-like patterns in cognitive development can be parsimoniously described in a continuous fashion.

We used as a case study the seminal work of Stager and Werker (1997) showing a discrepancy between children's speech perception abilities and their word learning skills. The development of this discrepancy could be understood in terms of a discrete change in word representation. We introduce a probabilistic model demonstrating that this developmental change can result, instead, from a continuous change in the precision of children's graded word knowledge. Using a small number of free parameters, the model showed a good fit to human data we collected with both preschool children and adults.

We used a case from word learning as an example, but the same idea might apply to other aspects of cognitive development that are typically thought of as stage-like. Computational models, such as the one proposed here, can help us investigate the extent to which such discontinuities emerge due to genuine qualitative changes and the extent to which they reflect the granularity of the researchers' own measurement tools.

I note that: (1) the results reported in the manuscript have been in part presented to the Cognitive Science Society as Fourtassi, A., Regan, S., and Frank, M. C. (2019). Continuous developmental can change explains discontinuities in word learning. *Proceedings of the 41st Annual Conference of the Cognitive Science Society*, but have not been published in any peer-reviewed publication, nor are they under consideration for publication elsewhere; (2) all authors have contributed and agreed to this submission; and (3) none of the authors have any financial interest or a conflict of interest regarding this work and this submission.

The experiment, sample size, exclusion criteria, and the model's main predictions were pre-registered in osf.io. All data and analytic code are available on github.com. The links to the repositories as well as a link to the online experiment are provided in the full version of the manuscript but not in the blind version.

Sincerely,

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