Arbitrary choices, arbitrary results: Three cases of multiverse analysis in L2 research

(as *Tutorials*)

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Abstract

Second language (L2) researchers report on a dataset that is the product of active decision-making process throughout the stages of data collection, processing, and analysis. In a (relatively) nascent discipline such as applied linguistics, these decisions often entail selecting from multiple options that may be equally reasonable. Such a research process runs the risk of introducing researcher degrees of freedom and leaves room for questionable research practices where one selectively reports on a specific series of decisions that aligns with the researcher's hypothesis. In this paper, we follow the idea introduced by Steegen et al. (2016) and suggest that instead of focusing on a single dataset, researchers should analyze the entire set of alternative datasets, or the *multiverse* of datasets, that correspond to a large array of equally reasonable options in data collection, processing, and analysis. Conducting multiverse analysis is critical because different datasets lead to different statistical results; hence, data multiverse implies a multiverse of statistical results. Multiverse analysis allows researchers to assess to what extent their statistical results are sensitive to their decision-making. It is thus an approach to improving transparency in scientific reporting. In this paper, we first introduce the concept of multiverse analysis and describe why it benefits applied linguistics research. We then present examples of multiverse analysis, reanalyzing three published studies from the following areas of applied linguistics: psycholinguistic research (Maie & DeKeyser, 2020), vocabulary learning research (Uchihara, 2023), and corpus research (Eguchi & Kyle, 2020). These examples illustrate how applied linguists may conduct a multiverse analysis on their own and draw conclusions based on the multiverse of statistical results. We offer recommendations on how to summarize the results of multiverse analysis and discuss potential actions when one finds diverging results from a multiverse of datasets.

(291 words)

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