

September 1st, 2022

Dear Dr. Emily Chenette,
Editor-in-Chief, PLOS ONE

This letter is submitted in support of the research paper *Introducing spatial availability, a singly-constrained measure of competitive accessibility*. I am the lead and corresponding author, and a doctoral graduate student in the School of Earth, Environment and Society at McMaster University. The co-authors are Prof. Antonio Paez, from the School of Earth, Environment and Society at McMaster University, Prof. Christopher. D. Higgins, from the Department of Geography & Planning at University of Toronto Scarborough, and Prof. Moataz Mohamed, from the Department of Civil Engineering at McMaster University.

This paper introduces *spatial availability*, a modified form of the gravity-based accessibility indicator. As this journal is the largest home for accessibility-related research, your diverse readership knows how powerful accessibility measures can be in assessing the potential for spatial interaction between origins and opportunities. However, issues related to the measures' interpretability have been scrutinized by recent literature, such as those on the topic of balanced floating catchment areas and competitive measures. Reckoning with these interpretability issues, we apply an opportunity-side single constraint to derive spatial availability so that the number of opportunities allocated to origins within the region are preserved. This yields a measure that provides a more meaningful and interpretable indicator of spatial structure.

Through examples we detail spatial availability's formulation, calculate job access for an empirical employment travel survey (TTS) from the Greater Golden Horseshoe area in Ontario, Canada, and contrast results with a traditional accessibility measure. We demonstrate that traditional accessibility consistently overestimates workers' job access in origins within and near the opportunity-dense city of Toronto relative to our measure. This overestimation is a result of unconstrained multiple counting of opportunities and, as a by-product, serves to relatively underestimate access values in the regional periphery.

In summary, since spatial availability only allocates as many opportunities as available in the region, the resulting access can be simply interpreted on an opportunity-per-capita basis. We thus argue that assessing any type of opportunity from a spatial availability perspective can offer a more meaningful measure of spatial opportunity distribution, for accessibility-based researchers, planners, and decision-makers.

We look forward to hearing from you and your expert reviewers. On behalf of my co-authors, I would like to thank you in advance for your attention. This article is currently available as a preprint on the OSF server here: <https://osf.io/sjd5n/>

Sincerely,

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