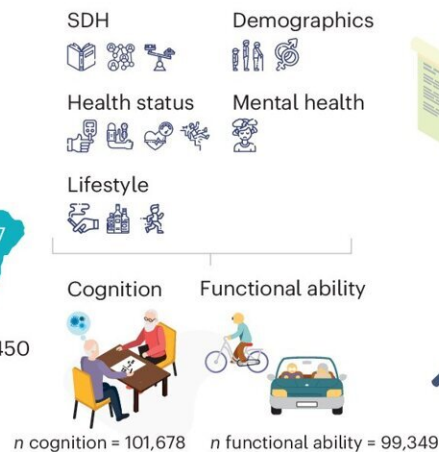


New study reveals urgent need for region-specific models to improve brain health in diverse settings

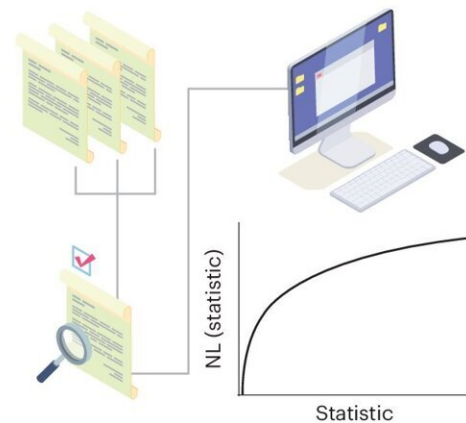
June 17 2024

Methodological workflow

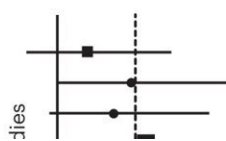
a Selected studies



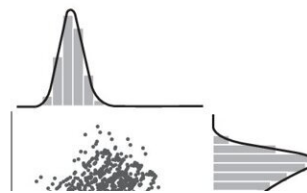
b Effect size extraction and transformation



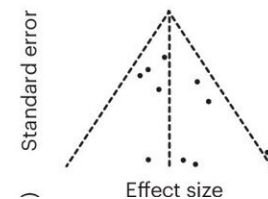
c Effect size pooling



d Outlier detection



e Publication bias analysis



Methodological workflow. Credit: *Nature Aging* (2024). DOI: 10.1038/s43587-024-00648-6

A pioneering study [published](#) in the journal *Nature Aging* has unveiled significant heterogeneity in the risk factors affecting healthy aging in Latin America and emphasized the limitations of current models of brain health, which are primarily based on data from high-income countries.

The research was conducted by researchers from Trinity College Dublin (Ireland), and by colleagues in Universidad Adolfo Ibanez (Chile) and Pontificia Universidad Javeriana (Colombia) among others.

The study developed a metanalytical approach with 146,000 participants and findings emphasize how current models of brain health may not apply to the diverse populations of Latin America.

Towards tailored and personalized models of healthy aging and brain health

Latin America faces unique challenges in promoting healthy brain aging, including genetic admixture (shaping [genetic variation](#) and disease risk), [adverse childhood experiences](#), socioeconomic inequities, and health disparities. Both physical and social exposomes significantly influence brain health, differing from the patterns observed in high-income countries.

The study involved a comprehensive meta-analysis of multiple studies, ultimately including over 146,000 participants. Results highlighted significant but heterogeneous effects on cognition and functional ability, with varied impacts from demographics, mental health, health status, and social determinants.

This study revealed substantial variability in how risk factors impact

cognition and functional ability across Latin American populations. This variability underscores the inadequacy of one-size-fits-all models developed from high-income countries. High heterogeneity, outliers, variations between countries, and lack of robust computational approaches have affected the reliability of existing data.

Toward a better science of healthy aging and brain health

Agustin Ibanez, first author of the study, Atlantic Fellow at the Global Brain Health Institute, Trinity College Dublin and Director of BrainLat UAI, said, "The study confirmed an emerging idea that global models of brain health, predominantly based on data from high-income countries, may not be universally applicable.

"Our work shows significant heterogeneity in risk factors affecting cognition and functional ability across Latin American populations, highlighting the inadequacy of current models based on data from high-income countries."

There is an urgent need for comprehensive and harmonized data collection efforts to capture the diverse factors influencing healthy aging in Latin America.

Carlos Coronel, Atlantic Fellow at the Global Brain Health Institute, Trinity College Dublin, co-author said, "Developing predictive models tailored to the region's unique demographic, genetic, and socioeconomic contexts is essential. Bridging this gap requires advanced computational approaches that integrate theories of brain function and its interaction with the exposome."

The study recommends implementing robust methodological approaches,

promoting data-driven and [machine-learning techniques](#), and focusing on [social determinants](#) of health and other socioeconomic disparities. On those social factors,

Commenting on those social factors, Joaquin Migeot, co-author and postdoctoral researcher at BrainLat, said, "The need to address the aggregated effect of various exposures throughout life entails a high dimensionality of variables.

"To manage this complexity and derive meaningful conclusions, the use of machine learning techniques is essential to facilitating a more comprehensive and accurate understanding of how multiple exposures impact brain health. These efforts will inform tailored policy and health care interventions, improving brain health and aging outcomes in Latin America."

Sandra Baez, co-author and professor at Los Andes University (Colombia) and Atlantic Fellow at the Global Brain Health Institute, Trinity College Dublin, said, "This study is a significant step towards understanding the unique factors that impact aging and brain health in Latin America. Our findings advocate for a more nuanced and region-specific approach to developing [brain](#) health models tailored to diverse and underrepresented populations."

More information: Agustin Ibanez et al, Healthy aging meta-analyses and scoping review of risk factors across Latin America reveal large heterogeneity and weak predictive models, *Nature Aging* (2024). [DOI: 10.1038/s43587-024-00648-6](https://doi.org/10.1038/s43587-024-00648-6)

Provided by Trinity College Dublin

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