

Going Beyond Walkability: Development of a Neighbourhood Active Living Environment Index in the Oriscav-Lux Study

Juliette Van Beek^{1,2}, Martin Dijst^{1,3}, Olivier Klein¹, Laurent Malisoux⁴, Torsten Bohn⁴, Camille Perchoux¹

¹ Department of Urban Development and Mobility, Luxembourg Institute of Socio Economic Research, Esch-sur-Alzette, Luxembourg

² Department of Geography and Spatial Planning, University of Luxembourg, Esch-sur-Alzette, Luxembourg

³ University of Luxembourg, Esch-sur-Alzette, Luxembourg

⁴ Department of Precision Health, Luxembourg Institute of Health, Strassen, Luxembourg

Purpose: The walkability index (WI) is considered the gold standard in environmental research on physical activity (PA) but overlooks key environmental characteristics conducive for an active lifestyle. We developed a more comprehensive index, the Active Living Environment (ALE) index, assessing additional neighbourhood characteristics potentially encouraging PA.

Methods: Using a subsample of the Oriscav-Lux 2 study ($n = 476$), we calculated the ALE index based on three sub-indicators: 1) amenities, 2) sports facilities, and 3) green and blue spaces. Associations between the ALE index and sub-indicators with device-measured PA outcomes (moderate-to-vigorous PA [MVPA], light PA [LPA] and sedentary time [ST]) were assessed using gamma generalised linear models. Effect modification by lifestyle preferences, education, and sex was explored, and values were predicted for significant interactions ($p < 0.1$). Descriptive and regression results of the ALE index and WI were compared.

Results: The median participant's ALE index score was 35.7 (interquartile range (IQR) = 41.3) and median WI score was 47.2 (IQR = 25.6). Active living scores and walkability were highest in urban communes and densely populated neighbourhoods ($>2,238$ inhabitants/km²). None of the fully adjusted models were significant. However, moderation analyses revealed that women showed increased MVPA with higher scores on the ALE index and the ALE sub-indicator amenities, and increased LPA with higher scores on the ALE sub-indicator sports facilities. For men, these associations were negative. The WI and WI sub-indicator residential density displayed similar results by sex for MVPA and LPA. Participants not prioritising PA benefited from higher scores on the ALE sub-indicator green and blue spaces across all outcomes. Higher education was linked to increased LPA with higher scores on the ALE sub-indicator sports facilities.

Conclusion: The ALE index, incorporating broader built environment characteristics, assessed environmental associations with PA behaviour more accurately among subgroups than the WI. These findings highlight the potential of the ALE index as a tool for creating more inclusive active living environments.

Support/Funding Source: The EU Horizon2020 programme funded the current study (Grant Agreement Number 956780 SUR-REAL). The Luxembourg Ministries of Health and Higher Education and Research funded ORISCAV-LUX. MET'HOOD was funded by the Luxembourg National Research Fund (CORE 2020 programme, C20/BM/14787166).

