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Development and Validation of a Walking Space Measure

INVESTIGATORS Weimo Zhu, Yong Gao, Youngsik Park, Lin Yang, &
Divya Chandrasekhar, University of Illinois at Urbana-Champaign

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ABSTRACT

There is growing interest in understanding environmental impact on physical activity (PA) behaviors. Traditional measures of PA, however, focus only on the activities and provide little information on the interaction between the environment and PA. In this study, the primary investigator proposed a concept/measure of physical activity space (PAS). This measure recognizes that PA is a spatial human behavior; therefore, spatial characteristics must be measured so that PA can be better understood. The purpose of this study was to develop a walking space measure and evaluate its psychometric quality.

The walking space measure is an integration of two measurement devices: AMP331 activity monitor system and GeoLogger GPS data logger. The former is an accurate device that can record a person's steps as well as the time when steps are taken, and the latter is a versatile device for collecting detailed spatial and temporal travel data. A total of 31 healthy adults participated in the study; all participants wore both devices - from the time they awoke to the time they retired - for 21 days. In order to check the accuracy of location recording and travel distance, participants were asked to walk with a research assistant (RA). The RA served as a "shadow observer," during a 1-hr "validity" walk in the study. The RA also wore a set of devices, documented the major building or street intersections, and recorded travel distance using a measuring wheel.

Preliminary data analyses found that, on average, this group of participants took 7,628 steps a day. During the "validity" walk, the participants walked on average $4,654 \pm 2,168$ steps and $3,211.63 \pm 1,025.69$ m, which is consistent with those recorded by the measuring wheel ($3,338.29 \pm 833.03$ m) and by the RA's AMP 331. Some inconsistencies were found between the GeoLogger's recorded locations and the locations recorded by the RA. An effort is being made to understand the sources of the error. In conclusion, preliminary results of the study indicate that the walking space of an individual can be accurately measured by the walking space measure created, but the large location errors should be investigated.

FURTHER INFORMATION

Please visit the University of Illinois at Urbana-Champaign [Kinesmetrics Laboratory website](http://www.kinesmetrics.org).

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