A criterion method for measuring route distance in physically active commuting

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Purpose

Distance is a variable of pivotal importance for analysis of many different issues of physically active transportation. Thus, there is a need for accurate and reliable methods for determining route distances. The aim of this study was therefore to scrutinize if distances of commuting routes drawn by physically active commuters and measured with a digital curvimetric distance measurement device could serve such a purpose.

Methods

Participants were recruited when they walked or bicycled in the inner urban area of Stockholm, Sweden. Questionnaires and individually adjusted maps were sent twice to the participants (n=133). Commuting routes from home to work were drawn on the maps. These were measured using a digital curvimetric distance measurer which was carefully checked for validity and reproducibility. Marked origin and destination points were checked for validity using stated addresses and geocoded site search systems. 19 commuters were followed with GPS for validity checks of drawn routes. An analysis of the effect of any deviations between GPS route tracings and drawn routes on distance measurements was undertaken.

Results

The intra class correlation of test-retest was 0.999 (p ≤ 0.001). Thus the test-retest values accumulated along the line of identity. The typical percentage error for the method was 2.4 per cent. The map markings of the routes’ origin and destination points were accurate and reproducible. GPS tracings of actual commuting routes taken (n=19) displayed in six cases slight deviations from the routes indicated by the commuters on the maps. However, these deviations played an insignificant role (0.4 per cent) for distances measured.

Conclusion

Routes drawn on maps by physically active commuters represent a valid and reproducible basis for distance measurements in physically active commuting.

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