

Monitoring and improving mobility of the elderly

S.T. Boerema^{1,2}, promotor: H.J. Hermens^{1,2}

1. Roessingh Research & Development, Telemedicine group, Enschede, The Netherlands

2. University of Twente, Faculty of Electrical Engineering, Mathematics and Computer Science, Telemedicine group, Enschede, The Netherlands

INTRODUCTION

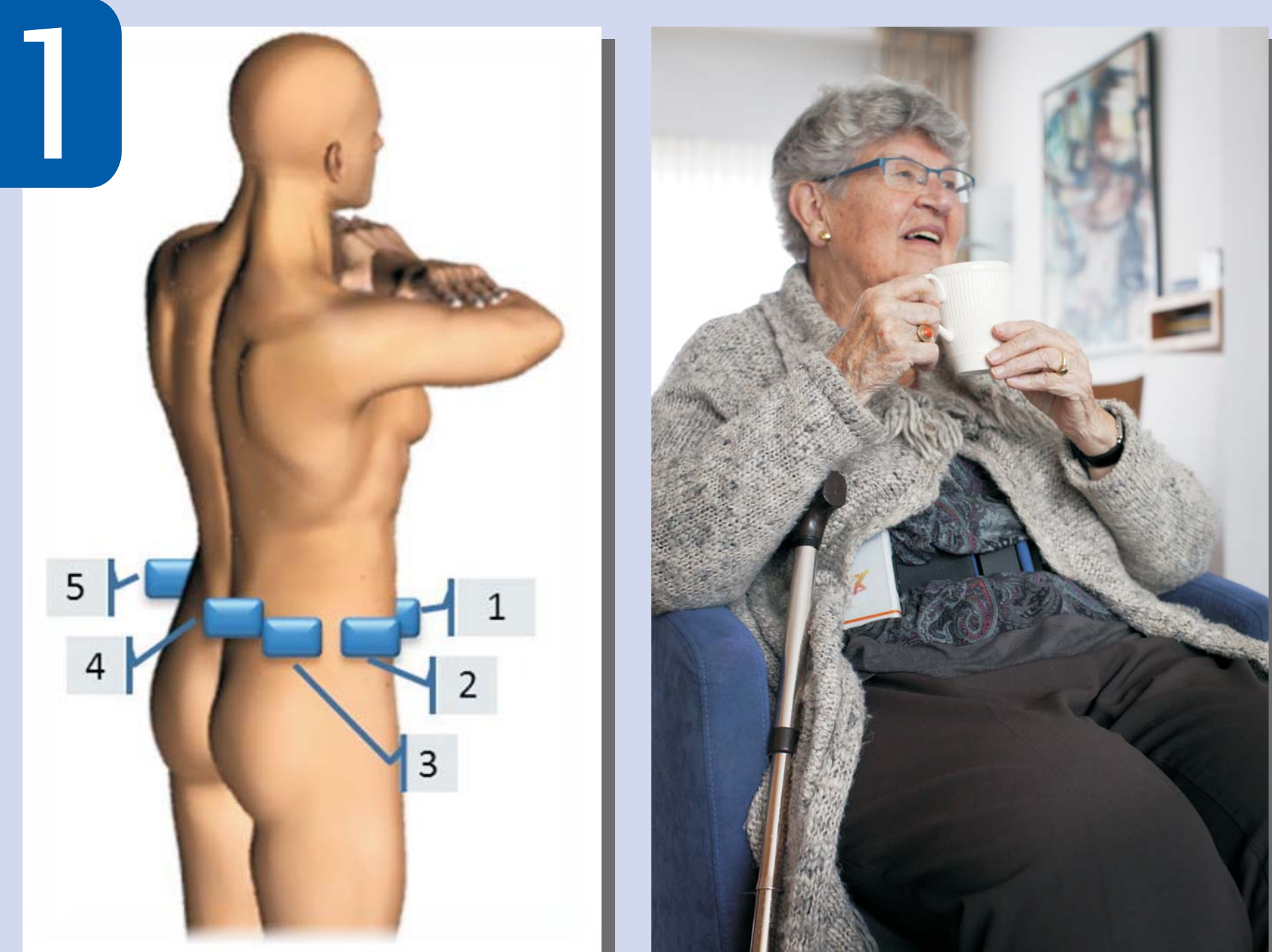
Being physically active (PA) at a high age is important for one's health. And high amounts of sedentary behaviour (SB) are associated with increased risk of morbidity and mortality (e.g. obesity, cancer and cardiovascular diseases), regardless of time spent being active (moderate- to vigorous-intensity physical activity (MVPA)). Although it is contradictory, an individual can be simultaneously very sedentary and sufficiently physically active in the MVPA levels.

Awareness of sedentary behaviour is important. It can aid the aging and their health professionals to determine suitable lifestyle changes for the elderly person. This information can also be used in ambulatory coaching systems and mHealth applications.

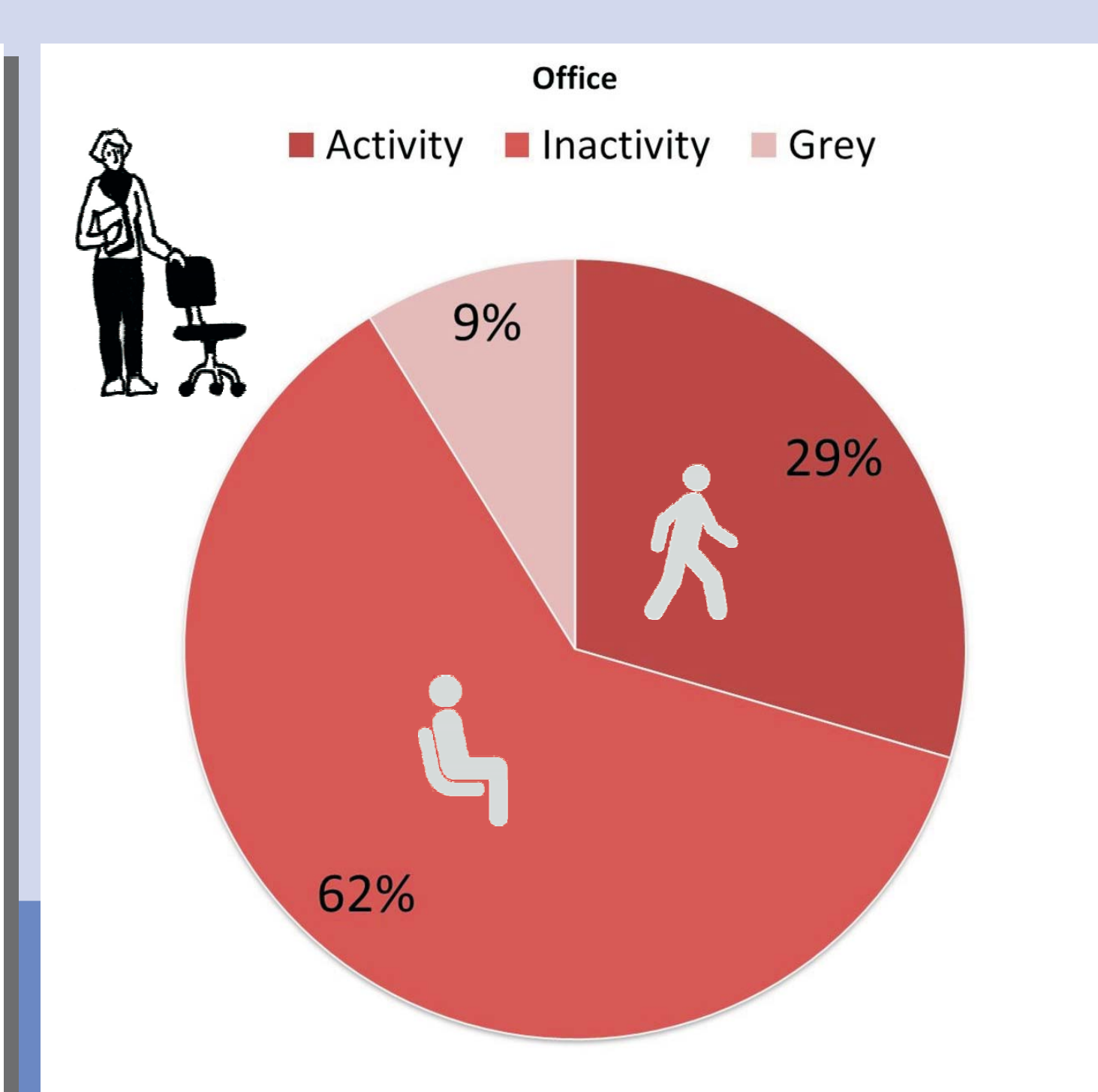
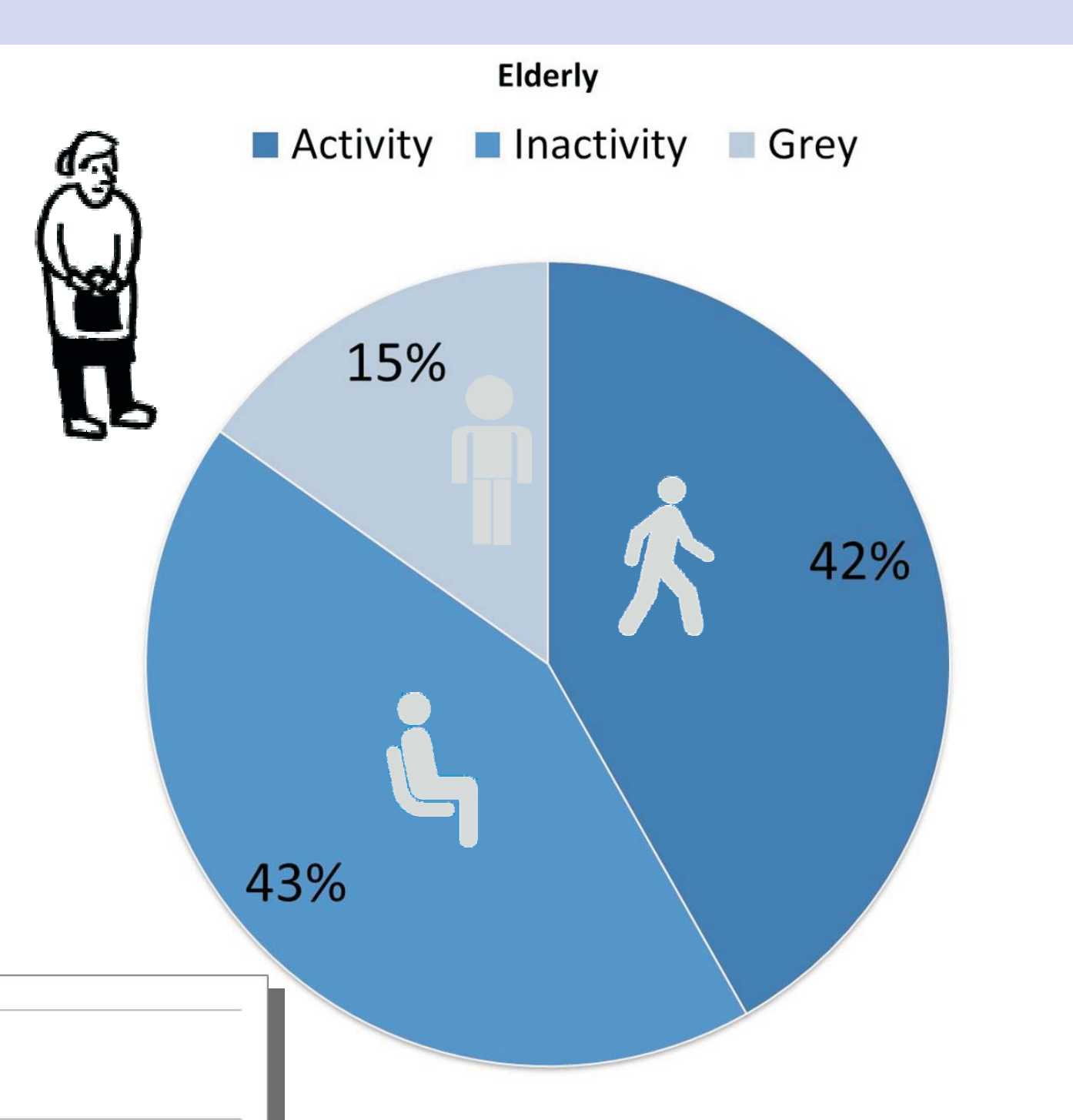
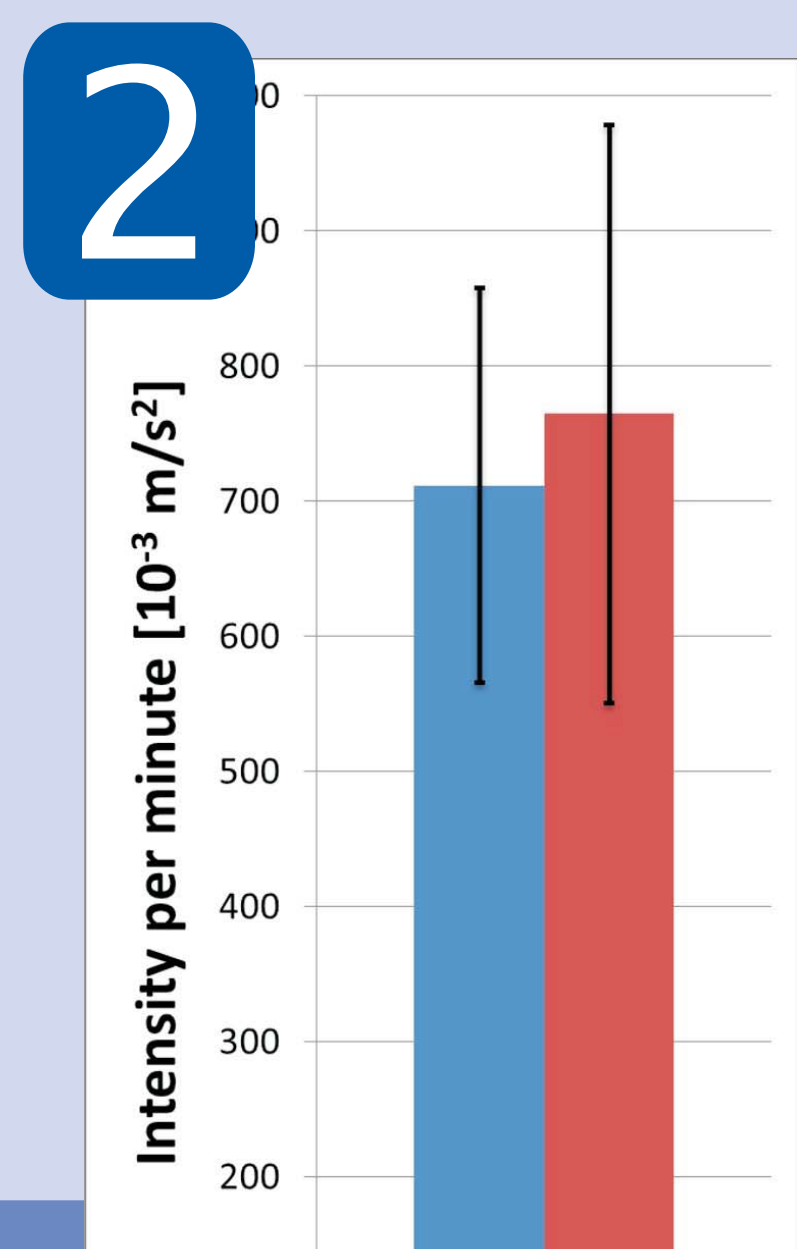
The aim of my study is to improve mobility of the elderly by monitoring PA and SB using subjective and objective tools.

RESEARCH QUESTIONS

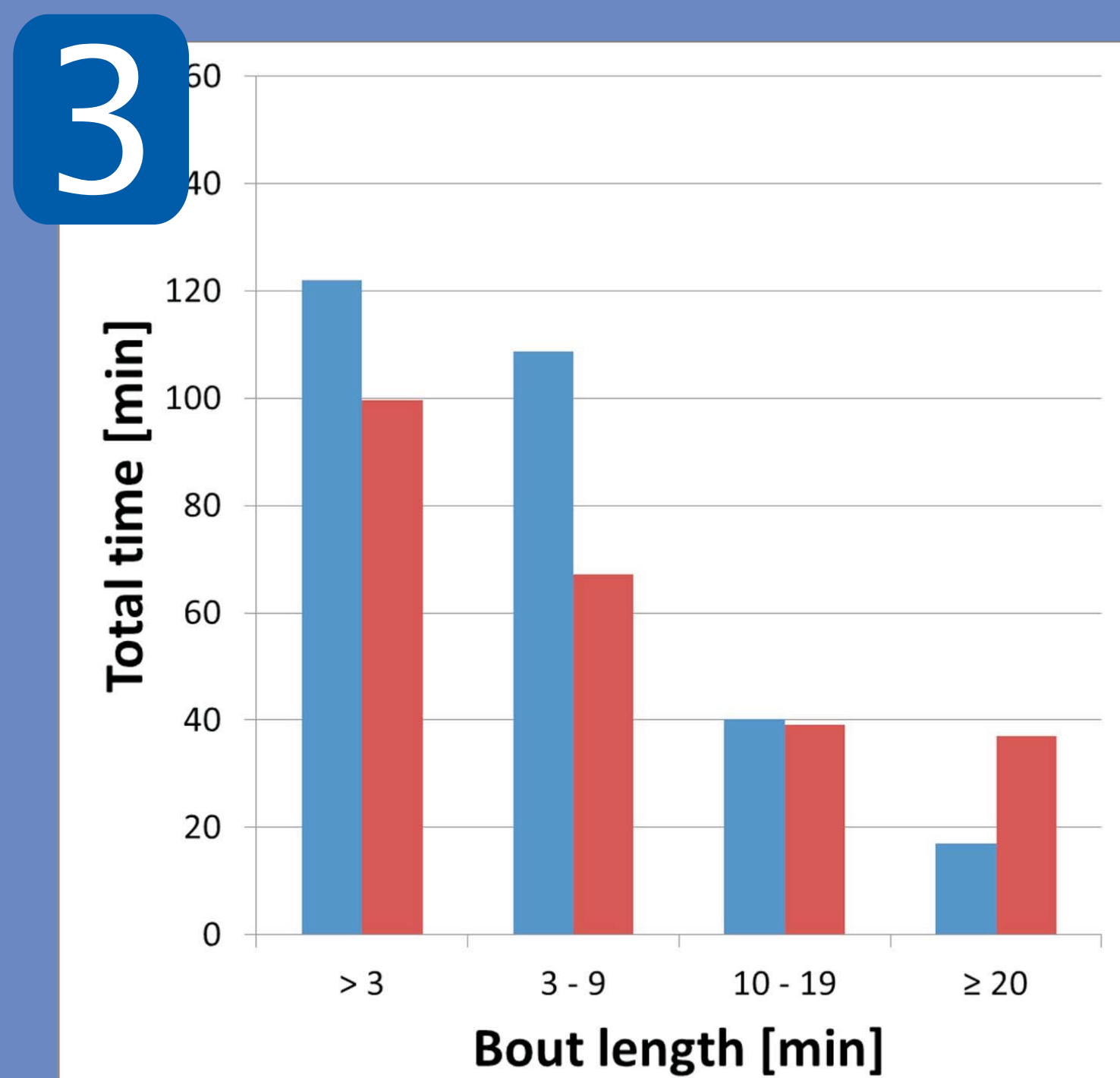
- How can we measure PA with a hip mounted sensor? **1**
- What are the PA & SB patterns of elderly during free living? **23**
- Which measures of PA & SB are most relevant in mobility assessment of elderly? **4**



Activity Monitoring & Position effects. Sensor position effects sensor output. With increasing intensity physical activity the difference between sensor outputs increases for the various sensor positions. The most lateral position (#2) or slightly forward (#1) provide similar sensor output, and when also considering usability arguments, these are the preferred positions. Boerema et al. (2014)

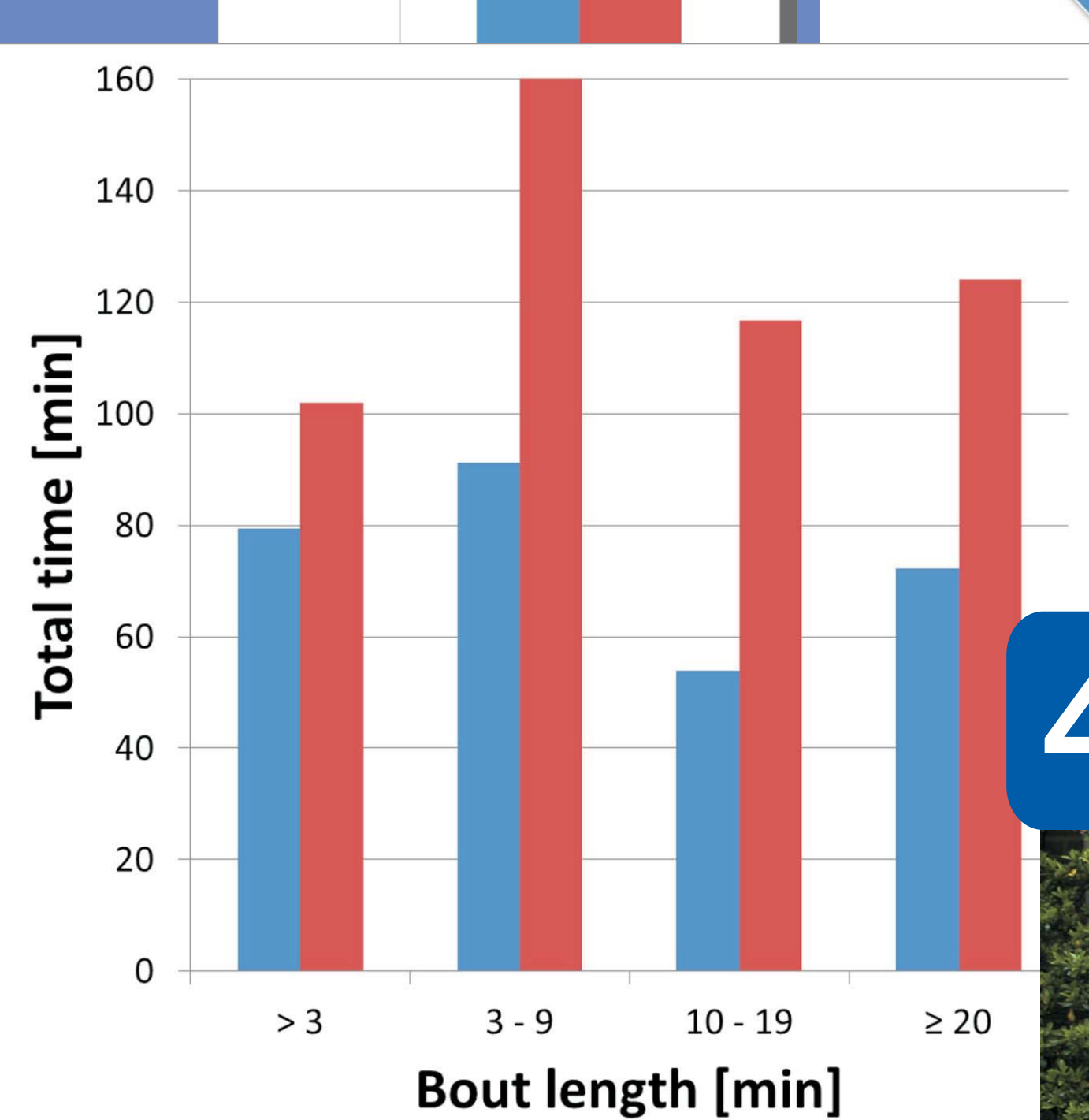


Activity intensity (left) and Time spent in bouts of activity and inactivity (right). Physical activity is measured using the ProMove 3D in two groups: A) 20 healthy office workers (age 28±5), and B) 4 community dwelling elderly (age 77±10). A) 100 monitoring days, on average 13.7 hours (7h47 – 22h11); B) 9 monitoring days, on average 11.5 hours (9h11 – 21h14). Classification of 1) activity, 2) inactivity and 3) a 'grey' area in between these, by using thresholds of 0.2 and 0.5 m/s² on 10 second IMA epochs.



Bout duration.

Average total time in Activity (left) and Inactivity (right), vs. the bout duration for both elderly (blue) and office workers (red).



4



Mobility assessment will be done by combining
1) Activity & inactivity patterns, 2) Self-perceived PA and SB, and
3) Perceived barriers and facilitators.



Simone T. Boerema
s.boerema@rrd.nl
+31 53 487 5777

