C.M. Parsey, R. Srinivasan, M. Schmitter-Edgecombe, D. Cook. Monitoring activity with actigraph and motion-sensor data in a smart environment. *Gerontechnology 2010;9(2):321;* doi:10.4017/gt.2010.09.02.160.00. **Purpose** Integrative efforts of psychologists, computer scientists, and engineers have resulted in the development of smart environments that promote independent living for older adults. In-home monitoring systems offer non-invasive tracking of daily activity for people experiencing difficulty with activities of daily living. The ability to monitor physical activity, identify patterns of daily activity, and intervene when these patterns are disturbed (either in times of illness, distress or emergency) would extend the utility of in-home monitoring systems to include health-monitoring aspects. The purpose of this study was to compare the methodologies of motion-sensor and actigraph data to observe physical activity patterns of a resident in a smart environment. It was hypothesized that motion-sensor data would demonstrate similar levels of activity as that of the wrist actigraph worn by the resident in the home. **Method** Motion-sensor data was collected for 13 consecutive days using 28 individually-numbered sensors located on the ceiling of the various rooms of the home. The resident of the home wore a wrist-activity monitor (actigraph) on the non-dominant wrist and did not remove the actigraph during the data collection period. Data from the motion sensors were analyzed by calculating 24-hour intervals of the total number of times each sensor turned 'on' or 'off' as well as the total amount of time that each sensor was 'on' for each day. Actigraph data was analyzed by calculating mean activity levels for each 24-hour interval. **Results & Discussion** The activity-monitoring techniques of counting the number of times the motion sensors were activated as well as calculating the total time each sensor was 'on' were highly correlated ($r=0.992$, $p<0.01$), suggesting that both techniques measured similar levels of activity in the home. Analysis of the actigraph data revealed that increased levels of wrist activity correlated with higher numbers of motion-sensor activation counts ($r=0.781$, $p<0.01$), and greater time durations of motion-sensor activity ($r=0.792$, $p<0.01$), indicating that both methodologies measured in-home activity with relative consistency. Observation of the linear actigraph data also further facilitated the identification and understanding of individual activities of daily living carried out by the resident.

Keywords: smart environment, actigraphy, activity levels, activities of daily living

Address: Washington State University, USA; E: carolyn.parsey@email.wsu.edu