

The adiposity associations of reallocating physical activity, sedentary behaviour and sleep: A Compositional Data Analysis Approach

D. Dumuid¹, T. E. Stanford², J. A. Martin-Fernandez³, T. S. Olds¹, L. K. Lewis^{1,4}, P. T. Katzmarzyk⁵ and C. Maher¹

¹University of South Australia, Adelaide, Australia; dorothea.dumuid@mymail.unisa.edu.au

²The University of Adelaide, Adelaide, Australia

³Universitat de Girona, Girona, Spain

⁴Flinders University, Adelaide, Australia

⁵Population Science, Pennington Biomedical Research Center, Baton Rouge, USA

Abstract

Daily activity behaviours (time spent in physical activity, sedentary time and sleep) are compositional data. Some activity behaviour compositions may be associated with better health outcomes than other activity behaviour compositions. The estimated adiposity associations of reallocating fixed durations of time from one activity behaviour to another, while remaining behaviours were kept constant, were examined using multiple linear regression models on isometric logratio coordinates. Adiposity was positively associated with displacement of moderate-to-vigorous intensity physical activity by any other behaviour, and, to a lesser extent, negatively associated with displacement of any other behaviour by moderate-to-vigorous intensity physical activity. Linear models estimated (1) asymmetrical adiposity associations with an activity being displaced, or displacing another (2) non-linear adiposity associations with the amount of time displaced, and (3) different adiposity associations depending on the starting composition.