

Computing and Evaluating Relationships Between Equal and Differential Factor Weighting for Fundamental Movement Skills and Physical Activity with Guided Active Play During Childhood

This study evaluated and compared the relationships between equal- and differential-weighted locomotor (LOC) and object-control/manipulative (OC) skill scores from the Test of Gross Motor Development 2 (TGMD-2) with two physical activity (PA) outcomes during guided active play and three predictor fitness components across childhood. Eighty-two children, 5 to 10 years old, from a community center program participated in the study. From the TGMD-2 test, equal-weighted skill scores and factor weights were used to estimate the differential-weighted skill scores. The researchers estimated both energy expenditure and time spent at moderate-to-vigorous intensity PA (MVPA) using activity counts from a hip-worn accelerometer following guided active play sessions. Fitness components included aerobic fitness, lower-body (leg) power from a vertical jump test, and hand grip strength. They used multiple linear regression analysis, two, five (+ fitness) and eight (+ fitness, sex, BMI and age stages) predictors, as well as chi-square analysis to observe relationships.

They found that equal-and differential-weighted skills showed similar relationships with PA outputs and the covariates. A reciprocal relationship was found between equal- and differential weighted OC skill and MVPA, a unidirectional relationship of leg power and strength with energy expenditure. Although similar relationships were observed with differential- and equal-weighted LOC and OC scores, there were varied contributions from individual movement skills. The relationship among skills, PA and fitness remained when children were categorized into high and low performing groups using relevant cut-off thresholds. Children in the high OC skill category were more likely to fall into both the high PA intensity group. Overall, TGMD-2 outputs with equal- and differential-weighted scores are adequate for clinical/educational use, which show similar relationships with PA and fitness variables. Differential-weighted TGMD-2 scores comprise different contributions of movement skills and may hold promise for intervention studies focused on varied or target tasks and movement abilities.