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RESEARCH ABSTRACT FORM

TITLE: Relationships among Jumping Coordination Patterns, Distance, and Weight

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Stodden et al. (2008) have proposed the potential importance of acquiring early motor skill competence as one element in maintaining an active and fit lifestyle as described in their motor skill-fitness-physical activity-obesity model. It is critical that researchers employ the most valid and reliable assessment instruments as they examine measures of motor skill competence. My current study investigates the validity and reliability of hypothesized component developmental sequences for the standing long jump (Clark & Phillips, 1985) as measures of developmental coordination for assessing explosive leg power in elementary and middle school children. I used scores for a total of 267 children, ranging in age from 5 to 13 years ($n_f = 110$ females; $n_m = 157$ males) whose parents had provided informed consent. Each child performed three maximal effort trials of standing long jump while being videotaped from the side. The distance of each jump from toe takeoff point to first heel landing point was recorded. An additional measure of jumping skill, called mass-specific distance, was derived as the ratio between jump distance (in cm.) and total body mass (recorded in kg.). After establishing exact agreement objectivity exceeding $P > 0.80$, I reduced each jumping trial by viewing it in slowed- or stopped action and categorizing the arm and leg actions according to the component developmental sequences hypothesized by Clark and Phillips (1985). I then used Pearson product-moment correlations to examine the relationships among the distances jumped, the developmental levels of arm and leg action, the mass-specific distance jumped, standing height, and total body mass. A significant negative relationship was identified between body mass and mass-specific distance jumped ($r = -0.83$) and accounted for 69% of the variance between those two measures. Surprisingly, other correlations were much more moderate and accounted for very small amounts of variance (e.g., arm action vs. distance: $r = .44$; $r^2 = 19.5\%$ variance, leg action vs. distance: $r = .20$; $r^2 = 4\%$). Upon examining the scores for arm and leg coordination patterns, a distinct lack of variability was observed. Virtually all children (99.6%) used either a level 3 or level 4 leg actions (simultaneous heels up and knee extension; knee extension following heels up) and most children (90%) used either level 3 or level 4 arm actions (incomplete and complete biphasic arm swing). It appears that the Clark and Phillips (1985) developmental sequences for standing long jump, while appropriate for young children through age 6, do not adequately discriminate among older elementary and middle school children. A more detailed developmental sequence for jumping needs to be hypothesized and tested for elementary and middle school children.