

Biomechanics

Segmental and Kinetic Contributions in Vertical Jumps Performed With and Without an Arm Swing (pp. 216–230)
Michael E. Feltner, Elijah J. Bishop, and Cassandra M. Perez

To determine the contributions of the motions of the body segments to the vertical ground reaction force (**FZ**), the joint torques produced by the leg muscles, and the time course of vertical velocity generation during a vertical jump, 15 men were videotaped performing countermovement vertical jumps from a force plate with and without an arm swing. Linear kinematic, **FZ**, and joint torque data were computed and compared using repeated measures analysis of variance. Maximum jump height was significantly larger in the arm swing jumps compared to the no arm swing jumps and was due to both a higher height of the center of mass (CM) at takeoff (54%) and a larger vertical velocity of the CM at takeoff (46%). The net vertical impulse created during the propulsive phase of the arm swing jumps was greater due to a trend of an increased duration (0.021 s) of the propulsive phase and not to larger average values of **FZ**. In the arm swing jumps, the arm motion resulted in the arms making a larger maximal contribution to **FZ** during the middle of the propulsive phase and decreased the negative contribution of the trunk-head and thigh to **FZ** late in the propulsive phase. Last, the arm swing decreased the extensor torques at the hip (13%), knee (10%), and ankle (10%) early in the propulsive phase but augmented these same extensor torques later in the propulsive phase.

Epidemiology

American Adults' Knowledge of Exercise Recommendations (pp. 231–237)
James R. Morrow, Jr., Jeanette A. Krzewinski-Malone, Allen W. Jackson, Timothy J. Bungum, and Shannon J. FitzGerald

Physical inactivity is a major risk factor for cardiovascular disease, stroke, hypertension, diabetes, obesity, osteoporosis, and some cancers. Approximately 950,000 Americans die annually from cardiovascular diseases. The purpose of this study was to determine whether American adults know which traditional and lifestyle physical activities affect health and how they should be physically active to achieve a health benefit. Secondary purposes were to determine whether this knowledge is a function of gender, ethnicity, education, or age and if those who are sufficiently active for a health benefit possess different knowledge levels than those not sufficiently active for a health benefit. Items based on the Centers for Disease Control and Prevention/American College of Sports Medicine principles included knowledge of exercise guidelines and traditional and lifestyle physical activities. This information was obtained from 20 questions that were part of a national random telephone survey of 2,002 American households in the 48 contiguous states and the District of Columbia. Respondents were most aware of traditional physical activities (M = 94%) that provide a health benefit and less aware of specific exercise guidelines (M = 68%) and lifestyle physical activities (M = 71%) that can result in a health benefit. Knowledge was not related to physical activity behavior sufficient for a health benefit and only slightly related to ethnicity, education, and age. These data suggest that physical activity knowledge alone is not sufficient to elicit a behavior; however, it provides educators with an understanding of the public's physical activity knowledge that could be helpful in developing health promotion and physical activity interventions.

Growth and Motor Development

Relationships Between Body Composition and Fundamental Movement Skills Among Children and Adolescents (pp. 238–247)
Anthony D. Okely, Michael L. Booth, and Tien Chey

The purpose of this study was to examine associations of fundamental movement skills (FMS) with measures of body composition among children and adolescents. Secondary analyses of cross-sectional data collected from 4,363 children and adolescents in Grades 4, 6, 8, and 10 as part of the 1997 New South Wales Schools Fitness and Physical Activity Survey were conducted. Six FMS (run, vertical jump, throw, catch, kick, and strike) were assessed by observation. Height and weight (used to calculate body mass index; BMI) and waist circumference were directly measured. Results indicated that the children's and adolescents' ability to perform FMS was significantly related to BMI and waist circumference. Specifically, BMI and waist circumference were significant predictors for FMS in six of the eight demographic groups. Adjusted odds ratios revealed that overweight boys and girls in all grades were less likely to possess high levels of FMS and more likely to possess low levels of FMS than those who weren't overweight. When FMS were partitioned into locomotor and object-control skills, nonoverweight boys and girls in each grade

were two to three times more likely to possess more advanced locomotor skills than overweight boys and girls. However, for object-control skills, the only demographic groups in which nonoverweight students possessed a greater number of advanced skills than overweight students were boys in Grades 6 and 10. There appear to be significant and important associations between performance of locomotor skills and weight status among children and adolescents. This would suggest that intervention strategies to prevent unhealthy weight gain among children and youth might usefully include increasing proficiency of locomotor skills as a key component.

Measurement and Evaluation

Comparison of Anthropometry to Dual Energy X-Ray Absorptiometry: A New Prediction Equation for Women (pp. 248–258)

Stephen Ball, Pamela D. Swan, and Rosemarie DeSimone

The purpose of this study was to assess the accuracy of three recommended anthropometric equations for women and then develop an updated prediction equation using dual energy x-ray absorptiometry (DXA). The percentage of body fat (%BF) by anthropometry was significantly correlated ($r = .896-.929$; $p < .01$) with DXA, but each equation underestimated %BF (3.2–5.6 %BF; $p < .01$). The following DXA criterion (DC) equation was created: $\%BF = -6.40665 + 0.41946(S3SF) - 0.00126(S3SF)^2 + 0.12515(\text{hip}) + 0.06473(\text{age})$; (S3SF = sum of triceps, suprailiac, thigh; hip = circumference in cm; age = years). The predicted residual sum of squares (PRESS) R^2 was high (0.86), and the PRESS standard error of estimate (SEE) was low (2.5 %BF) for our sample of 150 women. The DC equation was further crosschecked on a separate sample of women ($n = 25$) and again showed excellent agreement. The DC equation appears to be a more accurate estimation of %BF in women.

Factorial Validity and Invariance of a Self-Report Measure of Physical Activity Among Adolescent Girls (pp. 259–271)

Robert W. Motl, Rod K. Dishman, Marsha Dowda, and Russell R. Pate

We examined the factorial validity and factorial invariance of the 3-day physical activity recall (3DPAR) using confirmatory factor analysis. Adolescent girls from two cohorts ($N = 955$, $N = 1,797$) completed the 3DPAR in the eighth grade; participants in Cohort 2 ($N = 1,658$) completed the 3DPAR again 1 year later in the ninth grade. The 3DPAR was best represented by two uncorrelated factors in Cohort 1. The two-factor, uncorrelated measurement model exhibited evidence of cross-validity between Cohorts 1 and 2. This model also exhibited configural and partial metric invariance between race and across time. Hence, the 3DPAR consisted of two uncorrelated factors underlying three indicators of both moderate and vigorous physical activity in this sample of Black and White girls across a 1-year period. The 3DPAR can be used in cross-sectional, prospective cohort and intervention studies that examine mediators and moderators of physical activity among Black and White adolescent girls.

Pedagogy

High School Students' Physical Education Conceptual Knowledge (pp. 272–287)

Suzan F. Ayers

The value of conceptual physical education knowledge has long been acknowledged (American Alliance for Health, Physical Education, and Recreation, 1969; Kneer, 1981; NASPE, 1995) yet has not been formally measured or assessed. Seven multiple choice tests with established validity and reliability (Ayers, 2001b) were used to assess the concepts identified in Mohnsen's text (1998). Tests were administered to 3,263 high school students at the schools of 17 NASPE Teachers of the Year in 16 states. On all tests, girls outscored boys, and Caucasians outscored all other racial groups. Examinees' average performance on each test was: motor development (65%), exercise physiology (62%), social psychology (60%), biomechanics (57%), aesthetic experiences (56%), motor learning (53%), and historical perspectives (49%). Analyses of each area determined concepts students knew and did not know.

Self-Efficacy Theory and the Theory of Planned Behavior: Teaching Physically Active Physical Education Classes (pp. 288–297)

Jeffrey J. Martin and Pamela Hodges Kulinna

The purpose of our investigation was to examine determinants of teachers' intentions to teach physically active physical education classes (i.e., spend at least 50% of class time with the students engaged in moderate to vigorous physical activity). Based on the theory of planned behavior, a model was examined hypothesizing that teachers' intentions were determined by subjective norm, attitude, and perceived behavioral control. Grounded in self-efficacy theory, it was hypothesized that program goal importance and hierarchical and barrier self-efficacy would also predict

intention. Using a series of hierarchical regression analyses, the theory of planned behavior was supported by accounting for 59% of the variance in intention due to attitude, perceived behavioral control, and subjective norm. Self-efficacy theory based variables received minimal support.

Ice Can Look Like Glass: A Phenomenological Investigation of Movement Meaning in One Fifth-Grade Class During A Creative Dance Unit (pp. 298–314)

Lynda M. Nilges

The movement meanings of students ($n = 19$) in one fifth-grade class during a creative dance unit focusing on effort (force, time, space, flow) are investigated using a perspective grounded in transcendental phenomenology (Husserl, 1931). Data were collected via videotape, journal, and homework documents and semistructured interviews. Analytical induction (Patton, 2002) structured a four-step analysis process that reduced meaning to its essential essence. Movement meaning was found to be a multifaceted construct that varied among students within and across five dimensions. To enhance meaningful learning, educators are encouraged to consider reflexively (a) their philosophical orientation relative to knowledge making and curriculum values, (b) instructional techniques that help students' access meaning, and (c) the contribution of dance as a source of meaning.

Psychology

A Longitudinal Perspective of the Relationship Between Perceived Motivational Climate, Goal Orientations, and Strategy Use (pp. 315–325)

Lori A. Gano-Overway and Martha E. Ewing

Achievement goal theory suggests that goal orientations and the perceived motivational climate may influence one another and other motivational variables over time. Therefore, the purpose of this study was threefold: (a) to examine the relationship between perceived motivational climate and goal orientations over time (b) to investigate how goal orientations may fluctuate when the climate was in opposition to the initial goal orientation, (c) to determine how the climate may impact practice strategies. A set of inventories was administered to 162 college students at preselected times throughout several 16-week physical activity classes. Changes occurred in students' goal orientations, particularly when the perceived motivational climate was in opposition to their goal orientation. Aspects of the task-involving climate positively predicted practice strategies.

Individual Differences of Action Orientation for Risk Taking in Sports (pp. 326–336)

Markus Raab and Joseph G. Johnson

The goal of this article is to explain empirical risk-taking behavior in sports from an individual cognitive modeling perspective. A basketball task was used in which participants viewed four video options that varied in the degree of associated risk. The participants were independently classified by scores on the Questionnaire for Assessing Prospective Action Orientation and State Orientation in Success, Failure, and Planning Situations as action-oriented or state-oriented decision makers. The results of the experiment show that action-oriented players shoot faster and more often to the basket and that state-oriented players prefer to pass to a playmaker more often. Four versions of a computational model of decision making, Decision Field Theory, were compared to evaluate whether behavioral differences depend on the focus of attention, the initial preferences, threshold values, or an approach-avoidance interpretation of the task. Different starting preferences explained individual choices and decision times most accurately. Risk taking in basketball shooting behavior can be best explained by different preferences for starting values for risky and safe options caused by different levels of action orientation.

Research Note

Cross-Validation of the YMCA Submaximal Cycle Ergometer Test to Predict VO_{2max} (pp. 337–342)

Matthew D. Beekley, William F. Brechue, Diego V. deHoyos, Linda Garzarella, Galila Werber-Zion, and Michael L. Pollock