

### **Biomechanics**

*The Effects of Opposition and Gender on Knee Kinematics and Ground Reaction Force During Landing From Volleyball Block Jumps* (384–391)

Gerwyn Hughes, James Watkins, and Nick Owen

The aim of this study was to examine the effect of opposition and gender on knee kinematics and ground reaction force during landing from a volleyball block jump. Six female and six male university volleyball players performed two landing tasks: (a) an unopposed and (b) an opposed volleyball block jump and landing. A 12-camera motion analysis system (120 Hz) was used to record knee kinematics, and a force platform (600 Hz) was used to record ground reaction force during landing. The results showed a significant effect for level of opposition in peak normalized ground reaction force ( $p = .04$ ), knee flexion at ground contact ( $p = .003$ ), maximum knee flexion ( $p = .001$ ), and knee flexion range of motion ( $p = .003$ ). There was a significant effect for gender in maximum knee flexion ( $p = .01$ ), knee flexion range of motion ( $p = .001$ ), maximum knee valgus angle ( $p = .001$ ), and knee valgus range of motion ( $p = .001$ ). The changes in landing biomechanics as a result of opposition suggest future research on landing mechanics should examine opposed exercises, because opposition may significantly alter neuromuscular responses.

### **Epidemiology**

*Seasonal Variation in Physical Activity Among Preschool Children in a Northern Canadian City* (392–399)

Valerie Carson, John C. Spence, Nicoleta Cutumisu, Normand Boule, and Joy Edwards

Little research has examined seasonal differences in physical activity (PA) levels among children. Proxy reports of PA were completed by 1,715 parents on their children in Edmonton, Alberta, Canada. Total PA (TPA) minutes were calculated, and each participant was classified as active, somewhat active, or inactive. Logistic regression models were conducted to examine associations between PA status and seasons. Significant seasonal differences were observed for TPA, weekday PA, weekend PA, and active play. Children were significantly more likely to be physically active in the summer and spring and somewhat physically active in the summer and fall, relative to winter. Children living in cold climates are less likely to be physically active in the winter.

### **Measurement and Evaluation**

*A Primer-Test Centered Equating Method for Setting Cut-off Scores* (400–409)

Weimo Zhu, Sharon Ann Plowman, and Youngsik Park

This study evaluated the use of a new primary field test method based on test equating to address inconsistent classification among field tests. We analyzed students' information on the Progressive Aerobic Cardiovascular Endurance Run (PACER), mile run (MR), and  $VO_2$ max from three data sets (college:  $n = 94$ ; middle school:  $n = 39$ ; elementary school:  $n = 96$ ). Using the college and elementary school data, the equivalent relationship between PACER and MR scores was first established by the Kernel equating method. This yielded MR scores derived from PACER (mile run PACER equated [MR PEQ]), which were used to predict maximal oxygen uptake ( $VO_2$ max) and classify students according to the FITNESSGRAM<sup>®</sup> Healthy Fitness Zones<sup>™</sup>. We compared the results to the predictions and classifications based on measured  $VO_2$ max, MR, and PACER-predicted  $VO_2$ max and cross-validated the relationships using the middle school data. We found the test conversion to be accurate and that the MR PEQ scores functioned similarly to the original MR scores. Both performed better than the original PACER scores in predicting  $VO_2$ max and classifying students. The middle school data generally supported these results. The proposed method is accurate and effective in setting a new field test onto the same scale of a primary field test and determining its cut-off scores.

### **Motor Behavior**

*Visual Illusions and the Control of Ball Placement in Goal-Directed Hitting* (410–415)

Simone R. Caljouw, John Van der Kamp, and Geert J. P. Savelsbergh

When hitting, kicking, or throwing balls at targets, online control in the target area is impossible. We assumed this lack of late corrections in the target area would induce an effect of a single-winged Müller-Lyer illusion on ball placement. After extensive practice in hitting balls to different landing locations, participants ( $N = 9$ ) had to hit a ball to a distant target specified by the vertex of a single-winged Müller-Lyer configuration. Impact velocity was not significantly “tricked” by the pictorial illusion, suggesting that, even when late corrections in the target area are absent, some motor behaviors are not susceptible to the influence of the visual environment surrounding the target.

*The Influence of Audience and Monetary Reward on the Putting Kinematics of Expert and Novice Golfers* (416–424)

Yoshifumi Tanaka and Hiroshi Sekiya

We investigated changes in movement kinematics and attentional focus when expert and novice golfers performed a golf-putting task under pressure. Six male professional golfers and five male novice golfers performed 100 acquisition trials, followed by 10 trials in the pressure condition with a performance-contingent cash reward and small audience. After the 10 trials in the pressure condition, participants answered a questionnaire concerning attentional focus during both types of trial, including such aspects as conscious control of movements and the effects of distraction. A pressure manipulation check revealed a modest increase in physiological arousal, in that heart rate increased by about 10 bpm although state anxiety did not increase. A two-dimensional analysis of movement kinematics revealed that the amplitudes of arm and club movements decreased on the backswing in the pressure condition. Arm and club movement speed decreased on the foreswing in both experts and novices. Furthermore, neither experts nor novices changed their attentional focus in the pressure condition. Whereas previous studies of “choking under pressure” focused on attentional changes, the kinematic changes found in the present study were possibly caused by the influences of strategy modification and/or emotional response. Choking phenomena can be explained by attentional changes, along with the influences of strategy modification and/or emotional response under pressure.

*Normative Feedback Effects on Learning a Timing Task* (425–431)

Gabriele Wulf, Suzete Chiviacowsky, and Rebecca Lewthwaite

This study investigated the influence of normative feedback on learning a sequential timing task. In addition to feedback about their performance per trial, two groups of participants received bogus normative feedback about a peer group’s average block-to-block improvement after each block of 10 trials. Scores indicated either greater (better group) or less (worse group) than the average improvement, respectively. On the transfer test 1 day later, which required producing novel absolute movement times, the better group demonstrated more effective learning than the worse group. These findings add to the mounting evidence that motivational factors affect motor skill learning.

*Developmental Gender Differences for Overhand Throwing in Aboriginal Australian Children* (432–441)

Jerry R. Thomas, Jacqueline A. Alderson, Katherine T. Thomas, Amity C. Campbell, and Bruce C. Elliott

In a review of 46 meta-analyses of gender differences, overhand throwing had the largest gender difference favoring boys ( $ES > 3.0$ ). Expectations for gender-specific performances may be less pronounced in female Australian Aborigines, because historical accounts state they threw for defense and hunting. Overhand throwing velocities and kinematics were recorded in 30 female and male Aboriginal Australian children 6–10 years old. Results indicated the Aboriginal girls and boys were more similar in horizontal ball velocities than U.S. girls and boys. Throwing kinematics between girls and boys were also more similar in Australian Aborigines than U.S. children. Aboriginal girls threw with greater velocities than U.S., German, Japanese, and Thai girls, while the boys were similar across cultures.

## **Pedagogy**

### *Sport Education and Extracurricular Sport Participation: An Examination Using the Trans-Contextual Model of Motivation (442–455)*

Tristan L. Wallhead, Martin Hagger, and Derek T. Smith

In this study, we used the trans-contextual model of motivation (TCM) to examine the effect of Sport Education (SE) on students' participation in a voluntary lunch recess sport club. A total of 192 participants (ages 9–14 years) completed measures of the TCM constructs before and after a 12-week SE intervention period. Participants had the opportunity to participate in weekly, voluntary lunch recess sport club sessions during the intervention period. SE elicited a moderate increase in autonomous motives in physical education. The TCM accounted for a significant proportion of the explained variance in lunch recess sport club intention and participation. Autonomy-supportive curricular models, such as SE, may have the potential to facilitate transfer of motivation and participation in physical activity from a physical education to an extracurricular context.

### *How Can Perceived Autonomy Support Influence Enrollment in Elective Physical Education? A Prospective Study (456–465)*

Bo Shen

This prospective study was designed to investigate the influence of high students' perceived teacher autonomy support in mandatory physical education on their intention and actual enrollment in elective physical education. Participants included 545 ninth-grade students enrolled in three suburban high schools in a major midwestern metropolitan area. A series of hypothesized models related to autonomy support within the Theory of Planned Behavior were tested. Structural equation modeling results demonstrated that perceived autonomy support provided by teachers in mandatory physical education could predict elective physical education enrollment indirectly via the mediation of attitudes and intention in the Theory of Planned Behavior. Providing support for students' autonomy in physical education may hold potential promise for enhancing their future physical activity engagement.

## **Physiology**

### *Evaluating the Prediction of Maximal Heart Rate in Children and Adolescents (466–471)*

Anthony D. Mahon, Andrea D. Marjerrison, Jonah D. Lee, Megan E. Woodruff, and Lauren E. Hanna

In this study, we compared measured maximal heart rate (HR<sub>max</sub>) to two different HR<sub>max</sub> prediction equations [220 - age and 208 - 0.7(age)] in 52 children ages 7–17 years. We determined the relationship of chronological age, maturational age, and resting HR to measured HR<sub>max</sub> and assessed seated resting HR and HR<sub>max</sub> during a graded exercise test. Maturational age was calculated as the maturity offset in years from the estimated age at peak height velocity. Measured HR<sub>max</sub> was 201 ± 10 bpm, whereas predicted HR<sub>max</sub> ranged from 199 to 208 bpm. Measured HR<sub>max</sub> and the predicted value from the 208 - 0.7(age) prediction were similar but lower ( $p < .05$ ) than the 220 - age prediction. Absolute differences between measured and predicted HR<sub>max</sub> were 8 ± 5 and 10 ± 8 bpm for the 208 - 0.7 (age) and 220 - age equations, respectively, and were greater than zero ( $p < .05$ ). Regression equations using resting HR and maturity offset or chronological age significantly predicted HR<sub>max</sub>, although the  $R^2 < .30$  and the standard error of estimation (8.2–8.5) limits the accuracy. The 208 - 0.7(age) equation can closely predict mean HR<sub>max</sub> in children, but individual variation is still apparent.

### *Effect of a Prolonged Altitude Expedition on Glucose Tolerance and Abdominal Fatness (472–477)*

Mu-Tsung Chen, Wen-Chih Lee, Shih-Chang Chen, Chiu-Chou Chen, Chung-Yu Chen, Shin-Da Lee, Jørgen Jensen, and Chia-Hua Kuo

In the present study, we investigated the effect of a long-term mountain expedition on glucose tolerance and insulin action. Twelve registered mountaineers ages 31 years ( $SD = 1.1$ ) participated in a 25-day expedition at a 2,200–3,800-m altitude with an average duration of 8 hr per day. Arterial oxygen saturation (SaO<sub>2</sub>) was

substantially reduced during hiking. Glucose tolerance and insulin responses were measured prior to and twice during the expedition period. Maximal oxygen consumption increased from  $43.0 \pm 2.7$  to  $49.1 \pm 2.2$  mL/kg/min. Percentage of body fat decreased from  $19.4 \pm 6.8\%$  to  $16.9 \pm 5.9\%$ . The area under the curves for insulin and glucose during the oral glucose tolerance test were also reduced in Days 3 and 25. The present study demonstrated that altitude hiking activity is an effective lifestyle intervention to improve insulin action.

## **Psychology**

*Who Takes Risks in High-Risk Sports? A Typological Personality Approach* (478–484)

Carole Castanier, Christine Le Scanff, and Tim Woodman

We investigated the risk-taking behaviors of 302 men involved in high-risk sports (downhill skiing, mountaineering, rock climbing, paragliding, or skydiving). The sportsmen were classified using a typological approach to personality based on eight personality types, which were constructed from combinations of neuroticism, extraversion, and conscientiousness. Results showed that personality types with a configuration of low conscientiousness combined with high extraversion and/or high neuroticism (impulsive, hedonistic, insecure) were greater risk-takers. Conversely, personality types with a configuration of high conscientiousness combined with low extraversion and/or high extraversion (skeptical, brooder, entrepreneur) were lower risk-takers. Results are discussed in the context of typology and other approaches to understanding who takes risks in high-risk domains.

*A Measurement and Conceptual Investigation of Exercise Imagery Establishing Construct Validity* (485–493)

Peter R. Giacobbi, Jr., Daniel E. Tuccitto, Matthew P. Buman, and Krista Munroe-Chandler

We assessed the factor structure of a revised version of the Exercise Imagery Inventory (EII; Giacobbi, Hausenblas, & Penfield, 2005), second-order interrelationships for cognitive and motivational forms of mental imagery, and associations with exercise behavior and barriers self-efficacy. A convenience sample of 358 ( $M$  age = 20.55 years,  $SD = 3.88$ ) college students completed the EII-revised (EII-R), a measure of barriers self-efficacy and the Leisure-Time Exercise Questionnaire. The EII-R demonstrated reliability and factorial validity with good model fit statistics. We observed second-order relationships among scale scores and discriminant validity evidence that distinguished cognitive (e.g., exercise technique, exercise routines) and motivational (e.g., appearance/health, exercise self-efficacy, exercise feelings) factors. The second-order imagery factors were significantly and moderately associated with barriers self-efficacy and exercise behavior.

*A Cross-Cultural Perspective of Parental Influence on Female Adolescents' Achievement Beliefs and Behaviors in Sport and School Domains* (494–505)

Jennifer A. Bhalla and Maureen R. Weiss

Little is known about parental socialization processes for youth participants from different cultural backgrounds. The purpose of this study was to examine parental influence on self-perceptions, task values, and achievement behaviors among female adolescents from two cultures using Eccles' expectancy-value theory (Eccles et al., 1983). Twelve Anglo Canadian and nine East Indian female adolescents were interviewed about perceptions of parental influence on expectancy-value constructs for sport and academic domains. Inductive and deductive content analyses were performed to identify lower and higher order themes from interview responses. Similarities and differences in perceived parental influence emerged for girls of both cultural groups and in both domains. Our findings support links among expectancy-value constructs and highlight cultural variations in parental socialization of achievement cognitions and behaviors in multiple domains.

## **Sociocultural Foundations**

*Bearing the Burden of Doubt: Female Coaches' Experiences of Gender Relations* (506–517)

Leanne Norman

Based on interview research, this study examined how master female coaches based in the United Kingdom experienced relations with men within their profession. Using a feminist cultural studies approach to examine how sport promotes and maintains a gender order unfavorable to women, we found that female coaches felt the need to continually prove themselves and often experienced coaching as a hostile and intimidating culture. Participants reported a gradual reduction in such unwelcoming behavior from men, seemingly because they had proved to be no threat to the existing patriarchal structure. A critical exploration of coaching is needed to understand how masculine hegemony leads to women's relative powerlessness as coaches. Furthermore, the findings present a case for a greater emphasis on sociocultural education within the UK coaching curricula.

### **Research Notes**

*The Relationship Between Motor Skill Proficiency and Body Mass Index in Children With and Without Dyslexia:*

*A Pilot Study (518–523)*

S. Wood Logan and Nancy Getchell

*Signal-to-Noise Ratio in Physical Education Settings (524–528)*

Stu Ryan, Dan Grube, and Martin M. Mokgwathi