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Editorial

Epidemiology

The purpose of this study was to validate individual information (II)-centered methods for handling missing data, using data samples of 118 middle-aged adults and 91 older adults equipped with Yamax SW-200 pedometers and Actigraph accelerometers for 7 days. We used a semisimulation approach to create six data sets: three physical activity outcome measurements (i.e., step counts, activity counts, and minutes of moderate to vigorous physical activity) for both groups (i.e., middle-aged adults and older adults). After analyzing each data set separately, we replaced missing values with two II-centered and two group information (GI)-centered methods. Root mean square difference (RMSD), mean signed difference, paired t tests, and Pearson correlations were used to determine the effectiveness of the various recovery methods. Overall, the II-centered methods showed smaller RMSDs than the GI-centered methods for each data set in both groups. We found no significant mean differences between the known values and the replacement values in all conditions. The II-centered methods produced better results than GI-centered methods. We determined substituting missing data points using the average of days remaining to be an accurate missing data recovery method for middle-aged adults' and older adults' pedometer and accelerometer data.

We investigated the effects of regular exercise on the plasma lipid levels that contribute to coronary heart disease (CHD), of 20 sedentary men who participated in an exercise program over 20 consecutive years. The men, whose initial ages ranged from 30–51 years, participated in the University of Nevada-based exercise program for an average of 45 min/day, 3.5 days/week. The study examined plasma levels of low-density lipoprotein (LDL) cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), total cholesterol (TC), triglycerides (TG), and TC to HDL-C (TC/HDL-C) ratios. All lipid values improved significantly during the study ($p < .05$). The largest changes occurred during the first year of participation and slow, gradual improvements continued in the subsequent years. We concluded that regular exercise has positive effects on plasma lipid levels, which results in reducing the risk of CHD in middle-aged and older adults.

Measurement and Evaluation

Ten adolescent judokas performed circuit training consisting of six 40-s periods of judo exercises separated by 40 s (CT1:1), 120 s (CT1:3), or 200 s (CT1:5) of rest. Heart rate, blood lactate concentration, and the number of repetitions were recorded. Heart rate reached ~180 beats·min^{-1} at the end of work periods, with slightly lower values for CT1:5. Blood lactate concentration increased until the 6th and 5th work periods for CT1:1 and CT1:3, respectively, whereas the peak value was lower and achieved earlier for CT1:5. Conversely, the number of repetitions was greater during CT1:5. These results suggest that circuit training composed of judo exercises substantially affects aerobic and anaerobic metabolisms, with relative contributions depending on the rest duration.

Convergent validity of accelerometer and electronic diary physical activity data was assessed in children with asthma. Sixty-two participants, ages 9–18 years, wore an accelerometer and reported their physical activity level in quarter-hour segments every 2 hr using the Ambulatory Diary Assessment (ADA). Moderate validity was found between physical activity data from accelerometers and ADA (average individual participant Spearman $r = .48$, $SD = 0.13$). Within-participant accelerometer estimates for ADA sleep, rest, and light activity were different from each other and from higher activity (mixed model $p < .0001$), but moderate did not differ from strenuous activity ($p = .70$). Moderate validity between accelerometer and electronic diary data supports the use of ADA with short-term recall to capture gross changes in daily activity.

Expected Values for Pedometer-Determined Physical Activity in Youth (pp. 164–174)
Catrine Tudor-Locke, James J. McClain, Teresa L. Hart, Susan B. Sisson, and Tracy L. Washington

This review assembles pedometry literature focused on youth, with particular attention to expected values for habitual, school day, physical education class, recess, lunch break, out-of-school, weekend, and vacation activity. From 31 studies published since 1999, we constructed a youth habitual activity step-curve that indicates: (a) from ages 6 to 18 years, boys typically take more steps per day than girls; (b) for both sexes the youngest age groups appear to take fewer steps per day than those immediately older; and (c) from a young age, boys decline more in steps per day to become more consistent with girls at older ages. Additional studies revealed that boys take approximately 42–49% of daily steps during the school day; girls take 41–47%. Steps taken during physical education class contribute to total steps per day by 8.7–23.7% in boys and 11.4–17.2% in girls. Recess represents 8–11% and lunch break represents 15–16% of total steps per day. After-school activity contributes approximately 47–56% of total steps per day for boys and 47–59% for girls. Weekdays range from approximately 12,000 to 16,000 steps per day in boys and 10,000 to 14,000 steps per day in girls. The corresponding values for weekend days are 12,000–13,000 steps per day in boys and 10,000–12,000 steps per day in girls.

Pedometry Methods for Assessing Free-Living Youth (pp. 175–184)
Catrine Tudor-Locke, James J. McClain, Teresa L. Hart, Susan B. Sisson, and Tracy L. Washington

The purpose of this review is to integrate and summarize specific measurement topics (instrument and metric choice, validity, reliability, how many and what types of days, reactivity, and data treatment) appropriate to the study of youth physical activity. Research quality pedometers are necessary to aid interpretation of steps per day collected in a range of young populations under a variety of circumstances. Steps per day is the most appropriate metric choice, but steps per minute can be used to interpret time-in-intensity in specifically delimited time periods (e.g., physical education class). Reported intraclass correlations (ICC) have ranged from .65 over 2 days (although higher values also have been reported for 2 days) to .87 over 8 days (although higher values have been reported for fewer days). Reported ICCs are lower on weekend days (.59) versus weekdays (.75) and lower over vacation days (.69) versus school days (.74). There is no objective evidence of reactivity at this time. Data treatment includes (a) identifying and addressing missing values, (b) identifying outliers and reducing data appropriately if necessary, and (c) transforming the data as required in preparation for inferential analysis. As more pedometry studies in young populations are published, these preliminary methodological recommendations should be modified and refined.

Motor Control and Learning

The Effect of Biological Movement Variability on the Performance of the Golf Swing in High- and Low-Handicapped Players (pp. 185–196)
Elizabeth J. Bradshaw, Justin W. L. Keogh, Patria A. Hume, Peter S. Maulder, Jacques Nortje, and Michel Marnewick

The purpose of this study was to examine the role of neuromotor noise on golf swing performance in high- and low-handicap players. Selected two-dimensional kinematic measures of 20 male golfers ($n = 10$ per high- or low-handicap group) performing 10 golf swings with a 5-iron club was obtained through video analysis. Neuromotor noise was calculated by deducting the standard error of the measurement from the coefficient of variation obtained from intra-individual analysis. Statistical methods included linear regression analysis and one-way analysis of variance using

SPSS. Absolute invariance in the key technical positions (e.g., at the top of the backswing) of the golf swing appears to be a more favorable technique for skilled performance.

The Amount of Practice Really Matters: Specificity of Practice May Be Valid Only After Sufficient Practice (pp. 197–204)
Olav E. Krigolson and Luc Tremblay
Studies investigating the specificity hypothesis have not always demonstrated that reliance on a specific source of feedback increases with practice. The goal of the present study was to address this inconsistency by having participants practice a throwing task with or without vision at incremental levels (10, 50, 100, or 200 acquisition trials). Following acquisition, all participants in the present experiment performed 10 trials in a no-vision transfer condition. Our results demonstrated that, given a sufficient number of acquisition trials, feedback reliance increased as a function of time engaged in practice. Our results also suggest that increased reliance on a specific source of feedback occurs only after the control strategy for a task is optimized.

Factors Influencing Children's Performances of a Steady-State Bimanual Coordination Task (pp. 205–212)
Dawn A. Lantero and Shannon D. Ringenbach

Children ages 4, 6, and 8 years and adults performed self-selected, continuous, unimanual and bimanual coordination tasks for 30 s. The length of time performing the task was investigated as a potential control parameter. As hypothesized, all groups spent less time in antiphase than in in-phase coordination as the trial continued. These results were interpreted as evidence that the length of time performing a task is a control parameter embedded in any task. The importance of studying control parameters in various developing systems is discussed.

Throwing Pattern: Changes in Timing of Joint Lag According to Age Between and Within Skill Level (pp. 213–222)
Dan Southard

Accomplished throwers conserve angular momentum when distal joints of the throwing arm reach peak velocity at a later time than their proximal neighbors. The result is an increase in velocity of the most distal segment—the hand. Past research indicates that skill level varies by the number of joints experiencing distal timing lag (time to peak velocity of a distal joint minus the time to peak velocity of its proximal neighboring joint) and that the amount of lag may vary within skill level across individual performers (Southard, 2002). The purpose of this study was to determine if the amount and variance of joint timing lag differ between and within skill level and age of performer. Eighty participants were divided into four groups according to their age and skill level. Participants were required to throw a ball at 50% maximum velocity. Differences in the timing of three-dimensional joint lag were determined using a 2 x 4 (Age x Level) multivariate analysis of variance (MANOVA). Significant MANOVA was followed by discriminant function analysis, univariate analysis of variance (ANOVA), and analysis of covariance. Coefficient of variance in joint lag was analyzed using separate 2 x 4 ANOVAs. MANOVA results indicated a significant two-way interaction. Discriminant analysis showed that wrist lag was the best discriminating variable for age. Wrist and elbow lag were best for throwing level. ANOVA for wrist lag indicated a decrease in distal timing lag for older and higher level throwers. Elbow lag increased with age and skill level. Coefficient of variance results indicated that joint lag for younger and lower level performers was most variable. It was concluded that such differences in lag should be considered when defining throwing performance.

Motor Development
The Association Between Motor Skill Competence and Physical Fitness in Young Adults (pp. 223–229)
David Stodden, Stephen Langendorfer, and Mary Ann Roberton

We examined the relationship between competence in three fundamental motor skills (throwing, kicking, and jumping) and six measures of health-related physical fitness in young adults (ages 18–25). We assessed motor skill competence using product scores of maximum kicking and throwing speed and maximum jumping distance. A factor analysis indicated the 12-min run/walk, percent body fat, curl-ups, grip strength, and maximum leg press strength all loaded on one factor defining the construct of "overall fitness." Multiple regression analyses indicated that the product scores for jumping (74%), kicking (58%), and throwing (59%) predicted 79% of the variance in overall fitness. Gender was not a

significant predictor of fitness. Results suggest that developing motor skill competence may be fundamental in developing and maintaining adequate physical fitness into adulthood. These data represent the strongest to date on the relationship between motor skill competence and physical fitness.

Pedagogy

Navigating Two Cultures: An Investigation of Cultures of a Responsibility-Based Physical Activity Program and School (pp. 230–240)
Okseon Lee and Tom Martinek

We investigated the culture of a responsibility-based physical activity program called Project Effort as well as the school culture of its participants. Five children who had at least one full semester of participation in the program participated in the study. We collected data from participants' individual interviews and observations of their involvement at school and in Project Effort. Findings revealed a distinct incongruence between the participants' perceptions of the atmosphere of the after-school program and school. Although explicitly similar values were emphasized between Project Effort and school, participants suggested these values were distorted between the two settings. For example, the empowerment values in Project Effort (e.g., respect, responsibility) were perceived as a discipline approach in the school setting. Participants' perceptions of cultural differences functioned as a barrier to the transfer of program values to the school context.

Physiology

Desaturation Patterns Detected by Oximetry in a Large Population of Athletes (pp. 241–248)
Raul P. Garrido-Chamorro, Marta González-Lorenzo, Jose Sirvent-Belando, Cristina Blasco-Lafarga, and Enrique Roche

Optimal exercise performance in well trained athletes can be affected by arterial oxygen saturation failure. Noninvasive detection of this phenomenon when performing a routine ergometric test can be a valuable tool for subsequent planning of the athlete's training, recovery, and nutrition. Oximetry has been used to this end. The authors studied 339 athletes performing a similar exercise trial under well controlled environmental conditions. Maximum speed, oxygen uptake, and heart rate levels were simultaneously measured. From the obtained data, six patterns were found: (a) athletes in whom oxygen saturation is constant (95%) during test execution; (b) athletes displaying a progressive desaturation with incremental exercise intensities; (c) athletes presenting a transient desaturation in the anaerobic threshold region; (d) athletes starting with a mild-to-moderate desaturation at the beginning of the test, but reaching normal saturation values at the end; (e) athletes displaying mild-to-moderate desaturation levels throughout the whole test; and (f) athletes displaying a transient desaturation in the anaerobic threshold region and a new desaturation at the end of the test. In conclusion, it is believed that establishment of desaturation patterns by validated oximetry could be a first approach to evaluate the adaptation of the cardiorespiratory system to exercise intensity, helping to improve results.

Estimating Energy Expenditure With the RT3 Triaxial Accelerometer (pp. 249–256)
Ralph Maddison, Yannan Jiang, Stephen Vander Hoorn, Cliona Ni Mhurchu, Carlene M. M. Lawes, Anthony Rodgers, and Elaine Rush

The RT3 is a relatively new triaxial accelerometer that has replaced the TriTrac. The aim of this study was to validate the RT3 against doubly labeled water (DLW) in a free-living, mixed weight sample of adults. Total energy expenditure (TEE) was measured over a 15-day period using DLW. Activity-related energy expenditure (AEE) was estimated by subtracting resting energy expenditure and thermic effect of feeding from TEE. The RT3 triaxial accelerometer was worn over 14 consecutive days. TEE and AEE were estimated using the RT3 proprietary equation. Thirty-six adults ages 18–56 years (56% women) with an average weight of 75.9 kg (SD = 14.8) completed all measurements. Compared to DLW, the RT3 underestimated TEE by 539 kJ (4%) and AEE by 485 kJ (15%) on average. The RT3 provided a relatively accurate assessment of free-living activity-related energy expenditure at the group level and generally underestimated total and activity-related energy expenditure compared to DLW.

A Single 30-s Stretch Is Sufficient to Inhibit Maximal Voluntary Strength (pp. 257–261)
Jason B. Winchester, Arnold G. Nelson, and Joke Kokkonen

While it has been well established that an acute stretching program can inhibit maximal muscle performance, the amount of stretching needed to produce the deleterious response is unknown. Therefore this study examined the dose-response relationship between acute stretching and strength inhibition. Eighteen college students performed a one repetition maximum (1-RM) test of knee-flexion following 0, 1, 2, 3, 4, 5, or 6 30-s bouts of hamstring stretching held at the limit of toleration. All seven dose variations were done by each subject, with each variation done on a separate day. One week separated each test, and the order of the stretch variations was balanced across the seven testing days. Stretching significantly ($p < .05$) reduced 1-RM after one 30-s stretch (5.4%), and continued to decrease 1-RM up to and including six 30-s stretches (12.4%). A single 30-s stretch, if held at the limit of toleration, is sufficient to cause an inhibition in a person's 1-RM. Additional bouts of stretching will further decrease the 1-RM, suggesting that multiple mechanisms may be involved in stretch-induced strength inhibition.

Body Mass and Circumference of Upper Arm Are Associated With Race Performance in Ultraendurance Runners in a Multistage Race—The Isarrun 2006 (pp. 262–268)
Beat Knechtle, Brida Duff, Ulrich Welzel, and Götz Kohler

In the present study, we investigated the association of anthropometric parameters with race performance in ultraendurance runners in a multistage ultraendurance run, in which athletes had to run 338 km within 5 consecutive days. In 17 male successful finishers, calculations of body mass, body height, skinfold thicknesses, extremity circumference, skeletal muscle mass (SM), and percentage body fat (%BF) were performed before the race to correlate anthropometric parameters with race performance. A positive association was shown between total running time and both body mass ($r^2 = .29$, $p < .05$) and upper arm circumference ($r^2 = .23$, $p < .05$). In contrast, body height, skinfold thicknesses, extremity circumference, SM, and %BF showed no association with race performance ($p > .05$). We concluded that in a multistage ultraendurance run, body mass and upper arm circumference were negatively associated with race performance in well experienced ultraendurance runners. In contrast, body height, skinfold thicknesses, circumferences of the other extremities, SM, and %BF showed no association with race performance.

Psychology

Older Adults' Perceived Changes in Physical Self-Worth Associated With Resistance Training (pp. 269–280)
Rylee A. Dionigi and Jack Cannon

Using Sonstroem, Harlow, and Josephs' (1994) expanded version of the Exercise and Self-Esteem Model (EXSEM; Sonstroem & Morgan, 1989), we explored how 9 older adults (6 women and 3 men, aged 65–72 years) involved in a resistance training program experienced and perceived changes in physical self-worth (i.e., improved strength, functional competency, physical condition, and body satisfaction). We conducted three in-depth interviews with each participant over the course of the program. In individual log books, participants recorded the weight lifted and the number of repetitions for each exercise. Our findings showed the course of changes in physical self-perceptions in these older adults and how actual individual changes in strength performance related to perceived changes in important psychological outcomes.

Intrateam Communication and Performance in Doubles Tennis (pp. 281–290)
Domagoj Lausic, Gershon Tennebaum, David Eccles, Allan Jeong, and Tristan Johnson

Verbal and nonverbal communication is a critical mediator of performance in team sports and yet there is little extant research in sports that involves direct measures of communication. Our study explored communication within NCAA Division I female tennis doubles teams. Video and audio recordings of players during doubles tennis matches captured the communications that took place between and during points. These recordings were coded and sequential analysis computed using the Discussion Analysis Tool software (Jeong, 2003). Results indicated that most communications were emotional (i.e., > 50%) or action statements (i.e., > 25%). Winning teams exhibited significantly different communication sequences than losing teams. In particular, winning teams had a more homogeneous model of communication, which perhaps makes message interpretation more reliable. Finally, winning teams exchanged twice as many messages as losing teams.

Crossing the Line: Rites of Passage, Team Aspects, and Ambiguity of Hazing (pp. 291–302)
Jennifer J. Waldron and Christopher L. Kowalski

Framed within the psychosocial context of the sport ethic and social-approval goal orientation, 10 female and 11 male current collegiate or former high school athletes participated in individual interviews about their hazing experiences. Data analysis resulted in seven lower order themes and two higher order themes. The higher order theme of the general aspects of hazing included types of, factors influencing, reasons for, and the effects of hazing. The higher order theme of hazing as deviant overconformity included rites of passage, hazing and the team, and the ambiguity of hazing. Results indicated that athletes reported engaging in risky, hazing behaviors and that both the values of sport as well as the desire to be accepted by teammates encouraged hazing.

Sport Ability Beliefs, 2 x 2 Achievement Goals, and Intrinsic Motivation: The Moderating Role of Perceived Competence in Sport and Exercise (pp. 303–312)
C. K. John Wang, Woon Chia Liu, Marc R. Lochbaum, and Sarah J. Stevenson

We examined whether perceived competence moderated the relationships between implicit theories, 2 x 2 achievement goals, and intrinsic motivation for sports and physical activity. We placed 309 university students into high and moderate perceived competence groups. When perceived competence was high, entity beliefs did not predict the performance-avoidance goal; yet when perceived competence was moderately low, entity beliefs did predict this goal. The mastery-avoidance goal had no relationship with intrinsic motivation when perceived competence was high, but had a significant negative relationship when perceived competence was moderately low. Our findings highlight the importance of reexamining the role of perceived competence when studying implicit beliefs and the 2 x 2 achievement goals.

A Cross-Cultural Validation of Perceived Locus of Causality Scale in Physical Education Context (pp. 313–325)
C. K. John Wang, Martin Hagger, and Woon Chia Liu

We examined the validity of the factor structure and invariance of the Perceived Locus of Causality (PLOC) scale instrument scores across two nations endorsing collectivist (Singapore) and individualist (Great Britain) cultural values. Results indicated that confirmatory factor analytic models of the PLOC exhibited adequate fit according to multiple criteria within each sample and across samples. There was invariance in the item-intercepts across the two cultures. In addition, the simplex-like pattern of relations among the PLOC constructs was confirmed within cultures and in invariance analyses. Finally, latent factor means analysis revealed that the British participants tended to rate less self-determined forms of motivation lower than and more self-determined forms of motivation higher than the Singaporean participants.

Sociology and Cultural Anthropology
Examining the Relationships Among Coaching Staff Diversity, Perceptions of Diversity, Value Congruence, and Life Satisfaction (pp. 326–335)
George B. Cunningham

The purpose of this study was to examine relationships among coaching staff diversity, perceptions of diversity, value congruence, and life satisfaction. Data were collected from 71 coaching staffs (N = 196 coaches). Observed path analysis was used to examine the study predictions. Results indicate that actual staff diversity was positively related to perceptions of such heterogeneity, which were negatively related to value congruence among the coaches. Finally, value congruence was positively associated with life satisfaction of members of the coaching staff. Results are discussed in terms of research and practical implications.

The Relative Age Effect in Elite Sport: The French Case (pp. 336–344)
Nicolas Delorme, Julie Boiché, and Michel Raspaud

The relative age effect (RAE) is considered a common phenomenon in elite sport. However, it has not been examined systematically in previous research, and the mechanisms likely to generate or to limit such an effect are little understood. This paper investigates the prevalence of the RAE in French professional championship-level players, taking into account the potential influence of gender. Among all investigated sports, no statistically significant RAE was found, except for male ice hockey. For male handball and rugby union a trend was detected, but the RAE did not

appear statistically significant. In line with previous studies, no significant RAEs were found in female elite sports. The results are discussed with regard to the potential mechanisms underlying RAE.

Complicating the "Soccer Mom:" The Cultural Politics of Forming Class-Based Identity, Distinction, and Necessity (pp. 345–354)
Lisa Swanson

Using Pierre Bourdieu's theories of social class differentiation and class reproduction, this paper provides an analysis of class-based identity politics in contemporary suburban America. Through a critical ethnography of the emergent, American, upper-middle-class "soccer mom" phenomenon, this study contributes to a growing body of research that interrogates class-based, cultural practices of status differentiation. As part of a larger, longitudinal ethnographic study, this paper specifically focuses on the ways in which women, who are driven by upper-middle-class habitus, contest and construct their identity as mothers of young, soccer-playing children.

Research Notes

Assessment of Differing Definitions of Accelerometer Nonwear Time (pp. 355–362)
Kelly R. Evenson and James W. Terry, Jr.

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Predicting Changes in Athletes' Well Being From Changes in Need Satisfaction Over the Course of a Competitive Season (pp. 386–392)
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Physical Activity as a Moderator of the Relationship Between Aging and Inductive Reasoning (pp. 393–397)
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