

Articles

Growth and Motor Development

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Predicting Children's Overarm Throw Ball Velocities From Their Developmental Levels in Throwing
Mary Ann Robertson and Jürgen Konczak

This study examined the movement process-product relationship from a developmental perspective. The authors used multiple regression to investigate the changing relationship between qualitative movement descriptions of the overarm throw and the throwing outcome, horizontal ball velocity. Seventeen girls and 22 boys were filmed longitudinally at ages 6, 7, 8, and 13 years. Their movements were assessed using Robertson's (Robertson & Halverson, 1984) developmental sequences for action of the humerus, forearm, trunk, stepping, and stride length. The sequences accounted for 69-85% (adjusted) of the total velocity variance each year. The components that best predicted ball velocity changed over time, although humerus or forearm action always accounted for considerable variance. Gender was a good predictor of ball velocity, but if the developmental descriptions were entered first in a stepwise regression, gender then explained no more than 2% additional variance.

Measurement and Evaluation

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Rasch Calibration and Optimal Categorization of an Instrument Measuring Women's Exercise Perseverance and Barriers
Weimo Zhu, Gail Timm, and Barbara Ainsworth

The purposes of this study were: (a) to determine the optimal categorization of an instrument measuring women's exercise perseverance and barriers using the Rasch analysis and (b) to examine urban women's exercise perseverance and barriers. A 23-item barrier instrument with five response categories was administered to 479 women from a metropolitan area. The data analysis started from collapsing the original five adjacent categories into three and four categories and 11 sets of original and collapsed data were analyzed using the Rasch rating scale model. The model-data fit, category and separation statistics, and parameter estimates provided by Rasch analyses were used to determine the optimal categorization of the instrument. Instead of the original five-category construct, which had a disordered internal construct, a collapsed three-category construct (i.e., Very Often/Often, Sometimes/Rarely, and Never) was found to have the optimal categorization. The time barrier domain was found to be the most severe barrier domain, but the barrier "lack of self-discipline" was the most severe individual barrier. Rasch calibration provides a new way to construct an instrument with optimal categorization, to describe the nature of barrier items and the respondents' attribute being measured, and to develop a practical and informative scoring sheet.

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Psychometric Properties of Child- and Teacher-Reported Curl-Up Scores in Children Ages 10-12 Years
Patricia Patterson, Jennifer Bennington, and Tina De La Rosa

The purpose of this study was to examine the psychometric properties of child- and teacher-reported curl-up (CU) scores in children ages 10-12 years in both a norm-referenced (NR) and criterion-referenced (CR) framework. Eighty-four children, 36 boys and 48 girls, performed the FITNESSGRAM (Cooper Institute for Aerobics Research, 1992) CU test on 2 days separated by 48-72 hr. Two video cameras were used to record students' CU performances. Two students performed the CU at the same time, with each child's performance recorded by one camera. The test was terminated when the child stopped due to fatigue or after two form errors occurred. Teacher-reported scores were the average of two independent ratings of each video performance, while child-reported scores came from data collected and recorded by the children. Single trial norm-referenced reliability was $R = .75$ for girls and $R = .80$ for boys for teacher-reported CU and $R = .69$ and $R = .70$ for child-reported CU for girls and boys, respectively. CR reliability was examined using P , proportion of students who consistently passed or failed the test across 2 days, and km , defined as reliability with chance removed. For teacher-reported scores, $P = .89$ and $km = .78$ for boys and $P = .81$ and $km = .62$ for girls. For child-reported scores, $P = .86$ and $km = .72$ for boys, while $P = .79$ and $km = .58$

for girls. For teacher-reported data, 39% of boys passed and 50% failed the test on both days, while for girls the percentages were 27% pass and 54% fail. For child-reported data, 64% of boys passed and 22% failed on both days, while 54% of girls passed and 25% failed. NR validity was examined by correlating teacher and child-reported scores. The resultant coefficient was $r = .42$ (95% CI = .11-.66) for boys and $r = .67$ (95% CI = .58-.74) for girls. Additionally, child-reported scores were significantly higher than teacher-reported scores. CR validity was examined with a contingency coefficient, and results indicated $C = .55$ with 44% false master errors for boys and $C = .65$ with 29% false master errors for girls. The findings of this study suggest that while NR reliability estimates were moderate for teacher-reported scores, single trial estimates suggest that child-reported CU should be viewed with caution. In regard to CR reliability, both teacher-reported and child-reported reliability were moderate. However, there were marked differences between teacher- and child-reported scores, with children reporting higher percentages of students passing and lower percentage of student failing the test when compared with scores reported by teachers. Validity was rather moderate when viewed in either a NR and CR framework. It is suggested that problems with child-reported scores may be due to the need for additional practice or simplification of the testing protocol.

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The Most Important Points in Grand Slam Singles Tennis

Peter G. O'Donoghue

A computerized data management system was used to enter details of points played in 252 tennis matches from the men's and women's singles events of all four Grand Slam tournaments over a 2-year period. A supplementary data analysis system was developed to determine the proportion of points won by each player on serve at each game score from love all to deuce as well as the proportion of games the player went on to win from each score. Analysis of the 43 matches in which both players served at each score from love all to deuce revealed that the proportion of points won by the server was not significantly influenced by score, $F(15, 495) = 0.8$, $p > .05$. A further analysis of the 175 matches consisting of at least 100 points revealed that the proportion of points won by the superior player was not significantly influenced by gender, $F(1, 165) = 0.1$, $p > .05$, or surface, $F(3, 165) = 0.1$, $p > .05$. However, the proportion of points won when serving was significantly greater in men's singles than women's singles, $F(1, 165) = 69.7$, $p < .001$, $R^2 = .30$. Surface also had a significant influence on the proportion of points won when serving, $F(3, 165) = 8.1$, $p < .001$, $R^2 = .13$, with a significantly greater proportion of points won when serving by both winning and losing players at Wimbledon than at the Australian and French Opens, $p < .05$. This suggests that gender and surface should be accounted for when determining the importance of points in Grand Slam tennis.

Motor Control and Learning

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Learning a Coordination Skill: Interactive Effects of Instruction and Feedback

Nicola J. Hodges and Ian M. Franks

Information prior to and during the acquisition of a continuous bimanual task was manipulated. Participants practiced a difficult coordination pattern, which produced circular shapes on the computer, when they moved their arms correctly. Four groups were examined, which differed in the type and amount of information provided. Either limb or circle feedback was provided in the presence or absence of instructions detailing how to move the limbs. Circle feedback facilitated learning relative to the limb feedback in which the explicit displacements of the limbs was displayed. Under circle feedback conditions, instructions hindered acquisition. Little instructional effects were observed under limb feedback conditions, despite the prediction that instructions would benefit learning when the feedback was more compatible. Findings are discussed in relation to the complexity of the feedback and processing demands.

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On the Tactical Significance of Game Situations in Anticipating Ball Trajectories in Tennis

Yves-André Féry and Lionel Crognier

It is hypothesized that live playing situations preceding an opponent's strokes in tennis have sufficient significance to provide expert players with anticipative cues to estimate accurately the spatiotemporal characteristics of oncoming ball trajectories. Seven participants (all expert tennis players) had to watch two players opposed in high, moderate, and low tactical significance situations terminated by a stroke delivered by one of the two players in the direction of the participants. The participants' vision was occluded 100 ms after the stroke, and they had to indicate the zone

reached by the ball at the moment of its rebound. Results showed that the essential anticipative information is contained in the view of the opponent's stroke movements, whatever the tactical significance of the situation.

Pedagogy

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Situational Interest in Physical Education: A Function of Learning Task Design
Ang Chen and Paul W. Darst

Situational interest is the appealing effect of unique characteristics students recognize in a learning task during interaction with the task. It occurs when a learning task gives the learner a sense of novelty and challenge, demands high attention and exploration intention, and generates instant enjoyment during the person-task interaction. In this study, a repeated measure research design was used to examine the effects of task design on situational interest and the extent to which the effects were mediated by gender, grade, personal interest, and skill levels. Middle school students (N = 242) evaluated situational interest of four learning tasks with different cognitive and physical demands after having experienced the tasks in their physical education classes. Analyzed data showed that cognitive demand of a learning task played a critical role in generating situational interest. Grade levels, gender, and personal interest mediated the effects of task design on situational interest. But these mediation effects seemed rather limited. Physical skill levels had little influence on the effects of task design on situational interest. The findings seem to suggest that to enhance interestingness of a physical activity task, an option for physical educators may be to increase cognitive demand rather than reduce physical demand.

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Students' Perceptions of the Motivational Climate, Achievement Beliefs, and Satisfaction in Physical Education
Darren C. Treasure and Glyn C. Roberts

The present study examined the relationship between students' perceptions of the motivational climate and beliefs about the causes of success, preference for challenging tasks, and satisfaction in physical education. Responses of 50 female and 46 male students (M age = 12.08 years; SD = .72) showed that perceptions of a mastery-oriented motivational climate were related to the belief that motivation or effort caused success and satisfaction. In contrast, perceptions of a performance climate were related to the belief that deception caused success and related negatively to the students' preference for challenging tasks. Results of hierarchical regression analyses revealed that perceptions of the motivational climate explained a significant amount of unique variance in the students' responses after controlling for dispositional goal orientations. The results suggest that the teacher can influence the salience of a mastery-oriented climate and, in so doing, optimize a child's motivation in physical education.

Research Notes

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Energy Expenditure Relative to Perceived Exertion: Stationary Cycling Versus Treadmill Walking
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Perceived Physical Ability as a Function of Race and Racial Comparison
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