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Relationship Between Perceived Physical Ability and Indices of Actual Physical Fitness

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Ryckman, Robbins, Thornton, and Cantrell (1982) recently reported on the construction of a generalized Physical Self-Efficacy (PSE) Scale consisting of two differentially meaningful components, perceived physical ability (PPA) and physical self-presentation confidence (PSPC). The PPA subscale appraises individuals' perceptions of their physical abilities (e.g., strength, endurance, and agility), while the PSPC subscale measures their confidence as reflected by their physical demeanor in the presence of evaluative others. Ryckman et al. (1982) reported that individuals' beliefs about their own physical competence, and their confidence in performing physical tasks in the presence of others, were related positively to feelings of self-esteem. Research in corroboration with the relation between a perceived abilities component and self-esteem has been provided by many sport psychologists utilizing populations that differ in age, gender, and educational level (e.g., Fox, Corbin, & Coudry, 1985; Heaps, 1978; Sonstroem, 1976, 1978; Young, 1985).

While both PPA and PSPC were related positively to self-esteem in the Ryckman et al. research, PPA and PSPC were found to have differential predictive power in situations involving sports and the use of physical skills. Specifically, PPA scores predicted not only subjects' expectancies for success but also their actual performance on tasks involving physical skills. The PSPC factor, by contrast, was unable to predict these physical task outcomes as well.

Ryckman et al. (1982) also provided evidence that the PPA scale was a more potent predictor than the PSPC scale of the amount and level of subjects' sports participation. High PPA individuals reported participating in more sports activities and at higher levels of involvement (e.g., varsity vs. intramural participation) than low PPA individuals. PSPC scores were unrelated to these sports participation indices. Subsequent research by Ryckman, Robbins, Thornton, and Kaczor (1983) indicated further that, for both men and women, PPA was related

positively to the frequency, duration, and intensity of participation in various aerobic and muscle strength and endurance activities. Again, PSPC scores were unrelated to exercise activity.

Pollock, Wilmore, and Fox (1978) have reviewed research findings which indicate that enhanced physical fitness (i.e., cardiorespiratory endurance, body composition, flexibility, and muscle strength and endurance) is a function of the frequency, duration, and intensity of a fitness training program. Although PPA may be correlated with these three facets of a physical fitness exercise regimen, it has yet to be demonstrated whether PPA may be of predictive utility where indices of actual physical fitness are concerned. Therefore the present research was conducted to assess the relationship between PPA and physical fitness evaluations, anticipating that individuals with greater PPA scores would be more physically fit than those with lesser PPA scores in each of the areas cited by Pollock et al. PSPC scores, by contrast, were expected to be unrelated to such physical fitness indices.

In addition, Pollock et al. (1978) noted general sex and age differences in physical ability such that males typically outperform females on physical fitness indices and that actual physical abilities generally decline with age. Evidence of both sex and age differences were expected in the present study for actual physical ability as well as perceived physical ability. Thus, males were expected to have higher PPA scores than females and, for both sexes, PPA was predicted to be negatively correlated with age. Males were also expected to have greater actual physical abilities than females.

Method

In all, 135 individuals (college employees, relatives of employees, and students) took part in a physical fitness evaluation program conducted by staff members of the Fitness Training Center at Gettysburg College. There were 67 Caucasian males ranging in age from 17 to 64 years ($M = 30.7$, $SD = 13.46$), and 68 Caucasian females ranging in age from 18 to 64 years ($M = 28.9$, $SD = 11.88$). At individual sessions, each subject completed a set of questionnaires and then participated in the evaluation of actual physical abilities.

Evaluations

Physical Activity Profile. This measure provided basic demographic information, as well as a general physical and medical history, about each participant.

RISKO. RISKO is a nonclinical heart hazard appraisal instrument that assesses an individual's level of risk for developing coronary problems within the next several years (American Heart Association, 1981). This measure takes into account the most important modifiable factors that contribute to the development of heart disease (e.g., weight, blood pressure, cholesterol level, smoking) and provides a composite assessment of coronary risk for one's sex and age group. Possible response range for this composite is 0 (lowest level of risk) to 27 (highest level of risk).

Physical Self-Efficacy Scale. This inventory assesses individuals' perceptions of their physical efficacy (Ryckman et al., 1982). It consists of a 10-item perceived physical ability subscale and a 12-item physical self-presentation con-

fidence subscale. All items are responded to along 6-point continua from strongly agree to strongly disagree, with higher scores reflecting stronger PPA and PSPC.

Cardiorespiratory Ability. Following completion of the questionnaires, a submaximal bicycle ergometer exercise tolerance test (Pollock et al., 1978) was used to estimate a subject's aerobic capacity, or maximum oxygen consumption (in ml of oxygen per kg of body weight per min).

Body Composition. Skinfold measurements (subscapular, suprailiac, bicep, and tricep) were used to estimate what proportion of a person's total body weight consisted of body fat, as opposed to lean body weight (Pollock et al., 1978).

Flexibility. Flexibility, or the degree of possible movement involving a joint and its associated ligaments, tendons, and muscles, was assessed as a specific component of fitness. Pollock et al. (1978) emphasized lower back flexibility, evaluated on the basis of forward trunk flexions (in inches reached) while in a sitting position.

Muscle Strength and Endurance. Two additional specific components of fitness included muscle strength and muscle endurance (Pollock et al., 1978). Muscle strength, or the maximum amount of force exerted by a particular muscle group, was evaluated with hand-grip and back dynamometers (calibrated in kg) with the person doing one repetition. Lower back strength measurements with the back dynamometer were available only for male participants. Muscle endurance, or the capacity for repeated muscle contractions without fatigue, was assessed by the number of bent-knee sit-ups a person could perform in 1 minute.

Results and Discussion

Initially, a multivariate analysis of variance was conducted to evaluate sex differences on the questionnaire and physical indices (multivariate $F = 75.50$, $p < .001$). Univariate analyses indicated that males and females did not differ significantly on either the PPA ($M = 41.99$ and 40.21 , $SD = 9.36$ and 9.03 , respectively) or PSPC ($M = 50.73$ and 50.15 , $SD = 6.25$ and 6.61 , respectively), $F < 2$, ns. The two subscales were unrelated to one another both for males ($r = .10$) and females ($r = -.03$).

Considering actual physical assessments, males had greater aerobic capacity than females ($M = 45.02$ and 40.38 , $SD = 13.08$ and 10.14 , respectively), $F(1, 133) = 5.24$, $p < .05$, and less percentage of their total body weight was composed of body fat ($M = .19$ and $.26$, $SD = .06$ and $.05$, respectively), $F(1, 133) = 53.62$, $p < .001$. In addition, males' grip strength ($M = 133.13$, $SD = 54.66$) was greater than that of females ($M = 91.60$, $SD = 94.89$), $F(1, 133) = 9.55$, $p < .05$, as was their muscle endurance ($M = 41.79$ and 32.98 , $SD = 12.75$ and 12.44 , respectively), $F(1, 133) = 16.31$, $p < .001$. No difference was noted between the flexibility of men ($M = 20.64$, $SD = 18.98$) and women ($M = 19.27$, $SD = 13.73$), $F < 1$. Despite their having generally greater physical abilities, males nevertheless had greater potential for coronary problems, as indicated by RISKO composites, than did women ($M = 12.90$ and 9.75 , $SD = 5.28$ and 3.67 , respectively), $F(1, 133) = 16.01$, $p < .001$.

Although the males in the present study generally were more physically proficient relative to the females (cf. Pollock et al., 1978), there was no apparent

sex difference in PPA as had been expected. A possible explanation for this unanticipated outcome may be found in the basis for comparison of one's physical abilities, that is, evaluating oneself in relation to others of the same sex. Thus, females' relative perceptions of physical ability may be comparable to males' because their reference group for such an evaluation, other females, has different limits on physical abilities than those for males. When comparisons are made with an inappropriate reference group (e.g., females to males or males to females), sex differences in PPA may result with males holding higher perceptions relative to females (e.g., Godin & Shephard, 1985; Ryckman et al., 1983). Further research is necessary to evaluate this possibility.

The relationships between age and physical fitness indices were examined using partial correlations that statistically controlled for individuals' sex. Certain physical abilities did show an age-related decline, including aerobic capacity ($r = -.24, p < .01$), muscle endurance ($r = -.72, p < .001$), and males' back strength ($r = -.18, p = .07$). However, flexibility and grip strength were unrelated to age ($r = .02$ and $-.08$, respectively). Along with the general decline in physical abilities with age, there was increased potential for experiencing coronary problems with advanced age as assessed with the RISK0 measure ($r = .68, p < .001$).

Not only were actual physical abilities found to vary as a function of age, but participants' perceptions of their physical abilities also covaried with age. As anticipated, there was an age-related decline in PPA for both men ($r = -.36, p < .001$) and women ($r = -.24, p < .05$). Age and PSPC were unrelated for both men ($r = .08$) and women ($r = .10$).

The finding of similar age-related declines in both actual physical abilities and in perceptions of physical abilities suggests that, as they age, individuals may be evaluating their physical ability relative to standards more appropriate to a younger age group, or perhaps relative to their own ability levels when younger. The comparison standards used by individuals for perceptions of physical abilities require further research.

Having noted specific sex and age differences for both perceived and actual physical abilities, we evaluated the relationship between PPA and the various physical fitness indices through partial correlation analyses in which subjects' age and sex were statistically controlled. Participants' PPA scores were positively associated with their aerobic capacity ($r = .24, p < .001$), flexibility ($r = .15, p < .05$), and muscle endurance ($r = .34, p < .001$). The correlation of males' back strength with PPA, controlling only for age, was significant also ($r = .22, p < .05$). Grip strength was unrelated to PPA, however ($r = -.01$). Finally, higher PPA scores were associated with less percentage body fat ($r = -.26, p < .001$) and less risk of coronary problems as indicated by RISK0 ($r = -.28, p < .001$). Similar partial correlations controlling for subjects' sex and age revealed that PSPC subscale scores were essentially unrelated to the various physical fitness indices ($rs < |.14|$), with one exception being a positive association with males' back strength ($r = .24, p < .05$).

Due to the correlational nature of the present research, there remains a question as to the causal relationship between perceived and actual physical ability. Nevertheless, the present findings do support the predictive utility of perceived physical ability where actual indices of physical fitness are concerned.

Individuals with higher PPA scores generally were more physically fit than their counterparts with lower PPA scores. This was true not only for specific indices such as flexibility and muscle endurance (and back strength for males), but also for the more generalized fitness assessments such as cardiorespiratory endurance and body composition. In addition, this research has provided further support for the differential meaningfulness of the PPA and PSPC dimensions of the Physical Self-Efficacy Scale. While PPA was consistently related to indices of physical fitness, PSPC scores generally proved unrelated in this regard, a finding consistent with previous research (Ryckman et al., 1982, 1983).

Finally, the development of the generalized Physical Self-Efficacy Scale evolved from an adaptation of Bandura's (1977) general definition of efficacy expectation as it relates to the specific set of situations that involve the exercise of physical skills. One limitation of the measure, however, is that the construct it reflects is not housed explicitly within any systematic theoretical framework. Nevertheless, the scale has solid psychometric properties and considerable heuristic value (Gayton, Matthews, & Burchstead, 1986; McAuley & Gill, 1983; Ryckman et al., 1982). Therefore, it may eventually generate outcomes that can be integrated into a new theory that will account for individual performances, not only in sport-specific settings (Sonstroem, 1976, 1978) but also in other situations involving the use of physical skills.

References

- American Heart Association. (1981). *RISKO: A heart hazard appraisal*. Dallas: Author.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, **84**, 199-215.
- Fox, K.R., Corbin, C.B., & Couldry, W.H. (1985). Female physical estimation and attraction to physical activity. *Journal of Sport Psychology*, **7**, 125-136.
- Gayton, W.F., Matthews, G.R., & Burchstead, G.N. (1986). An investigation of the validity of the physical self-efficacy scale in predicting marathon performance. *Perceptual and Motor Skills*, **63**, 752-754.
- Godin, G., & Shephard, R.J. (1985). Gender differences in perceived self-efficacy among older individuals. *Perceptual and Motor Skills*, **60**, 599-602.
- Heaps, R.A. (1978). Relating physical and psychological fitness: A psychological view. *Journal of Sports Medicine and Physical Fitness*, **18**, 399-408.
- McAuley, E., & Gill, D. (1983). Reliability and validity of the physical self-efficacy scale in a competitive sport setting. *Journal of Sport Psychology*, **5**, 410-418.
- Pollock, M.F., Wilmore, J.H., & Fox, S.M. (1978). *Health and fitness through physical activity*. New York: Wiley & Sons.
- Ryckman, R.M., Robbins, M.A., Thornton, B., & Cantrell, P. (1982). Development and validation of a physical self-efficacy scale. *Journal of Personality and Social Psychology*, **42**, 891-900.
- Ryckman, R.M., Robbins, M.A., Thornton, B., & Kaczor, L. (1983, March). *Physical self-efficacy, exercise routines, and sports participation in university men and women*. Paper presented at the meeting of the Southeastern Psychological Association, Atlanta.
- Sonstroem, R.J. (1976). The validity of self-perceptions regarding physical and athletic ability. *Medicine and Science in Sports*, **8**, 126-132.

- Sonstroem, R.J. (1978). Physical estimation and attraction scales: Rationale and research. *Medicine and Science in Sports*, 10, 97-102.
- Young, M.L. (1985). Estimation of fitness and physical ability, physical performance, and self-concept among adolescent females. *Journal of Sports Medicine and Physical Fitness*, 25, 144-150.

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