In S. Serpa, J. Alves, V. Ferreira & A. Paula-Brito (Eds.), *Sport Psychology: an integrated approach. Proceedings of the 8th World Congress of Sport Psychology* (pp. 539-543). Lisbonne: I.S.S.P.

SELF-APPRAISAL OF PHYSICAL FITNESS

D. Delignières*, A. Marcellini*, P. Legros** & J. Briswalter*
*Institut National du Sport et de l'Education Physique, Paris, France
**Université Paris-Sud, Orsay, France

Key-words: perceived fitness, physical self-worth, anxiety, self-esteem, masculinity.

INTRODUCTION.

Beyond an improvement of physical capacities and health, the aim of fitness programs is an enhancement of psychological well-being (Rejeski & Kenney, 1987). The psychological benefits of physical practise have been evidenced by many authors: in particular, participation in aerobic exercise programs results in a significant decrease of anxiety (Fasting et Gronningsaeter, 1986; Hayden, Allen et Camaione, 1986; McGlynn *et al.*, 1983). Recent researches have shown that the physiological adaptation has no direct influence on psychological functioning. (Fasting et Gronningsaeter, 1986; Hayden, Allen et Camaione, 1986). These results led several authors to consider that psychological benefits of such programs are more related to the perception of fitness improvement rather than to an objective improvement (Abadie, 1988a, 1988b; Heaps, 1978; Leonardson, 1977). This hypothesis could have important consequences in the development of physical exercise programs. For example it could be proposed to focus exercises on the more salient dimensions of perceived fitness, in the aim to optimize the psychological benefits of practise (Balogun, 1986). Such a proposition requires a better understanding of the process of fitness perception.

Abadie (1988a) showed that self-perceived fitness is a multidimensional construct, which can be represented by a four-factors structure: cardio-vascular endurance, muscular flexibility, muscular strength, and body composition. Nevertheless his work do not allow to specify the weight of each dimension in the perception of fitness. Moreover the hypothesis can be advanced that this factorial structure is dependent on subjects' age and sex. Then the aim of the first experiment was to specify the respective importance of the four dimensions isolated by Abadie, considering age and sex.

EXPERIMENT 1

Method and Procedure

Subject. 247 subjects were involved in the experiment. They were divided, according to their age (< or > 50 years) and sex, into four groups which were labelled middle-aged males group (N= 56, mean age: 36.4, s.d.: 5.3), old males group (N= 46, mean age: 58.5, s.d.: 6.0), middle-aged females group (N= 78, mean age: 39.0, s.d.: 6.2), old females group (N=67, mean age: 59.3, s.d.: 5.6),

Method. Each subject completed a self-appraisal questionnaire, adapted from Borg, Skinner et Bar-Or (1972). This questionnaire was composed of 5 scales, related to endurance, strength, flexibility, body composition and fitness. Each dimension was rated according to a 13-grades category scale, every second grade anchored with verbal expressions, denoting how much above or below the mean the grade was. For example, for the physical fitness scale: 1: "I am completely out of form", 3: "I have a poor fitness, with regard to my age", 5: "My fitness is slightly below the average of those of my age", 7: "My fitness is quite normal, with regard to my age", 9: "My fitness is slightly above the average of those of my age", 11: "I have a very good fitness, with regard to my age", 13: "I am exceptionally fit". Subjects are requested to rate their physical capacities with regard to their sex and age.

Data analysis. The relationships between the 5 scales were studied with Pearson product-moment correlations and factor analysis. Then, the scales were compared according to Student paired-test procedure.

Results.

The Pearson correlation coefficients between the 5 scales are reported in Table 1. All correlations were highly significant, denoting a high collinearity within the data. A factor analysis showed that the first factor, before rotation, accounted for 58.8% of the total variance. This first factor accounted for 78% of the variance for perceived fitness, 70.4% for endurance, 52.9% for strength, 52.3% for body composition, and 40.6% for flexibility. This multicollinearity did not allowed to use multiple regression to specify the respective weight of each subscale in the perception of fitness.

TABLE 1: Pearson Correlation Coefficient between the Five Scales.

	Endurance	Strength	Flexibility	Body comp.
Endurance	1.000			
Strength	0.536	1.000		
Flexibility	0.396	0.334	1.000	
Body comp.	0.464	0.390	0.348	1.000
Phys. fitness	0.738	0.528	0.463	0.576

All correlations were significant (p<.001).

Considering all subjects, endurance presented the highest correlation with perceived fitness. The correlations of the three other scales were slightly lower. The analysis of correlations by group did not show a notable evolution of this structure (Table 2): nevertheless, it could be noted that there was no significant correlation between perceived flexibility and perceived fitness, for the old males group.

TABLE 2: Pearson Coefficients between Perceived Fitness and Subscales, by Group.

	Endurance	Strength	Flexibility	Body composition
Middle-aged males	0.695***	0.447***	0.527***	0.570***
Old males	0.721***	0.547***	0.239	0.667***
Middle-aged females	0.766***	0.533***	0.555***	0.577***
Old females	0.741***	0.551***	0.581***	0.476***

*(***: p<.001).*

The isomorphism of the scales allowed us to compare the obtained means. We could suppose that the more salient dimensions in the perception of fitness have been rated at the same level than perceived fitness. Table 3 indicate the *t* values computed by comparison of perceived fitness with the other variables (Student test for paired samples). For all groups, perceived endurance did not differ significantly from perceived fitness. Strength did not differ from perceived fitness for the middle-aged subjects, but was significantly lower for the older one. Perceived flexibility was lower than perceived fitness for males, but not for females. Finally body composition was lower than perceived fitness for the old subjects, but not for the middle-aged subjects.

Discussion.

These results show that perceived endurance is on the whole the main determinant of perceived fitness. For the middle-aged subjects, strength and body composition appear to be important factors. These two variables seem less taken into account by the older subjects. Finally muscular flexibility seems important for females, but is less considered by males. The self-appraisal of physical fitness seems based on the subjectively more favorable dimensions. It is commonly assumed that males are less flexible than females, and that with age, one tends to loss strength and to get weight, even if some works have challenged these assumptions (Parkatti, 1990;

Thornton *et al.*, 1987). Our subjects seem to agree with these common representations, and do not consider the subjectively lowest dimensions in the self-appraisal of physical fitness.

TABLE 3: Paired t-Test between Perceived Fitness and Subscales.

	Endurance	Strength	Flexibility	Body composition
All	-0.139	1.952	-3.437***	-5.949***
Middle-aged males	1.661	0.662	-2.987***	-1.686
Old males	0.200	-2.211*	-3.621***	-4.154***
Middle-aged females	-1.392	-0.661	0.930	-1.699
Old females	-0.785	-2.345*	-1.923	-5.386***

Negative values indicate that the mean of the column variable is below the mean of perceived fitness (:p<.05; ***: p<.001).*

The factor analysis revealed a global overlap between the five scales. This suggests that all these self-appraisals are overdetermined by a more global dimension of personality. This is consistent with the model proposed by Fox and Corbin (1989), which suppose that self-appraisals of physical capacities are overdetermined by a more general self-concept, labelled *physical self-worth*. We could assume that our first main factor corresponds to physical self-worth.

This model could provide some hypotheses concerning the antecedents of perceived fitness, and also concerning the psychological benefits of exercise. Fox and Corbin (1989) consider physical self-worth as a specification of global self-esteem, in the physical domain. Conversely, several authors suppose that the improvement of perceived fitness induces an enhancement of self-esteem, and a reduction of anxiety (Abadie, 1988b; Heaps, 1978; Leonardson, 1977). An analysis of the relationships between perceived fitness, physical self-worth, anxiety-trait and self-esteem seems necessary to verify these assumptions.

An other interesting variable could be sex-role identity. The relation between perceived physical fitness and gender-role have not been yet studied. Nevertheless, it had been shown that self-esteem is highly correlated with masculinity and self-efficacy, but not with feminity (Allgood-Merten and Stockard, 1991), and several studies have shown that anxiety was related to sex-role and self-efficacy (Wittig *et al.*, 1987). Then gender-role endorsement could represent an important variable in the problem in question.

The aim of the following experiment was to analyze the relationships between self-perceived fitness, physical self-worth, self-esteem, anxiety and gender-role.

EXPERIMENT 2

Method and Procedure.

Subjects. 91 subjects, 46 males and 45 females (mean age: 40.1, s.d. 8.2) were involved in the experiment.

Method. The subjects completed the questionnaire of self-appraisal of physical capacities previously presented. Then they completed the State-Trait Anxiety Inventory (Spielgerber, Gorsuch & Lushene, 1970), the Self-Esteem Inventory (Coopersmith, 1984) and the Bem Sex-Roles Inventory (Bem, 1974).

Data analysis. Scores of physical self-worth were computed by a factor analysis of the 5 self-appraisal scales. The relationships between the variables were analysed by Pearson correlation, and partial correlation procedures, controlling for physical self-worth. Then, physical self-worth and its related psychological variables were submitted to a factor analysis, with a varimax orthogonal rotation.

Results.

The Pearson correlation coefficients between the 5 scales of the first questionnaire and the scores obtained with the others inventories are reported in Table 4. Anxiety, general and professional self-esteem and masculinity were significantly correlated with physical self-worth, perceived fitness, perceived endurance, and perceived strength. The correlation with body composition seemed slightly lower, and perceived flexibility appeared to be independent on psychological variables. On the other hand, no significant correlation was evidenced with social or familial self-esteem, or feminity, except between social self-esteem and perceived strength, and between familial self-esteem and perceived endurance.

TABLE 4: Pearson Correlation Coefficients between the Scales of Self-Appraisal of Physical Capacities, and the Psychological Variables.

	Endurance	Strength	Flexibility	Body comp.	Phys. fitness	Phys. s.-worth
Phys. s. worth	0.852***	0.739***	0.507***	0.803***	0.897***	1.000
Anxiety-trait	-0.422***	-0.340***	-0.032	-0.257*	-0.485***	-0.432***
Gen. self-est.	0.364***	0.368***	0.055	0.214*	0.424***	0.390***
Soc. self-est.	0.083	0.333***	-0.056	0.196	0.124	0.187
Fam. self-est.	0.232*	0.132	0.040	-0.026	0.146	0.143
Prof. self-est.	0.342***	0.378***	0.046	0.325**	0.324**	0.385***
Masculinity	0.414***	0.427***	-0.043	0.297**	0.333***	0.398***
Feminity	0.145	-0.016	-0.004	0.188	0.075	0.110

(: p<.05; **: p<.01; ***: p<.001).*

Table 5 indicates the partial correlation coefficients between the five self-appraisal scales, and anxiety, general and professional self-esteem and masculinity, controlling for the influence of perceived self-worth. The partial correlation procedure extinguished the significance of most coefficients. The only significant coefficients were between anxiety and self-perceived fitness, and surprisingly between masculinity and self-perceived flexibility.

Physical self-worth, anxiety, masculinity, general and professional self-esteem were submitted to a factor analysis using a varimax orthogonal rotation. This analysis produced a two-factors model accounting for 71.4% of the total variance. (Table 6). The first factor accounted for masculinity and professional self-esteem, and the second for anxiety and general self-esteem. Physical self-worth seemed to be more determined by masculinity rather than by general self-esteem and anxiety.

TABLE 5: Partial Correlation Coefficients, Controlling for Physical Self-Worth.

	Endurance	Strength	Flexibility	Body comp.	Phys. fitness
Anxiety-trait	-0.157	-0.035	0.240*	0.165	-0.245*
Gen. self-est.	0.066	0.128	-0.179	-0.181	0.182
Prof. self-est.	0.029	0.216	-0.187	0.030	-0.052
Masculinity	0.066	0.128	-0.309**	-0.041	-0.057

(: p<.05; **: p<.01; ***: p<.001).*

TABLE 6: Factor Structure Obtained after Varimax Orthogonal Rotation.

	factor 1	factor 2
Masculinity	**0.851**	0.143
Prof. self-esteem	**0.755**	0.293
Anxiety	-0.193	**-0.919**
Gen. self esteem	0.377	**0.818**
Physical self-worth	0.587	0.364
% variance explained	36.4%	35.0%

DISCUSSION AND CONCLUSIONS

This experiment shows that the self-appraisal of physical capacities is mainly determined by a general attitude toward the physical self. We consider this attitude as equivalent to the Fox and Corbin' (1989) physical self-worth. This overdetermination could explain the moderated correlations reported in the literature between self-appraisal of physical capacities and the correspondent objective measurements (Abadie, 1988a; Borg, Bar-Or & Skinner, 1972; Delignières *et al.*, 1993; Thornton *et al.*, 1987).

Consistent with previous results (Fox & Corbin, 1989; Ryckman *et al.,* 1982), physical self-worth seems to be highly related to general self-esteem and anxiety. Nevertheless, this experiment shows that gender-role, and especially masculinity could have a prior influence on physical self-worth. This result could enlarge the Fox and Corbin' model.

Moreover the correlation analysis shows that the self-appraisal variables are not located at the same level. Perceived fitness, endurance, strength and body composition seem highly correlated with physical self-worth, self-esteem, anxiety and masculinity. Perceived flexibility appears to be more independent. We suppose that strength and endurance are considered as *active* dimensions, which involve the responsibility of the individual. This could be also true, at a lower level, for body composition: we have seen that the correlations between body composition and the psychological variables were slightly lower. On the contrary flexibility may be considered as a more passive, genetically determined dimension.

In summary, self-perceived fitness seems to integrate a wide number of factors, including self-concepts, personality traits, and self-appraisals of physical capacities. We suppose that it could conversely influence each of them. In particular, the close relationships between anxiety, self-esteem and perceived fitness could explain on the one hand the interindividual differences classically observed in perceived fitness, according to sex or age (Thornton *et al.*, 1987), and on the other hand the psychological benefits of exercise participation.

REFERENCES

Abadie, B.R. (1988a). Construction and validation of a perceived physical fitness scale. *Perceptual and Motor Skills*, 67, 887-892.

Abadie, B.R. (1988b). Relating trait anxiety to perceived physical fitness. *Perceptual and Motor Skills*, 67, 539-543.

Allgood-Merten, B., & Stockard, J. (1991). Sex role identity and self-esteem: a comparison of children and adolescents. *Sex Roles*, 25, 129-139.

Balogun, J.A. (1986). Muscular strength as a predictor of personality in adult females. *Journal of Sports Medicine*, 26, 377-383.

Bem, S. (1974). The measurement of psychological androgyny. *Journal of Consulting and Clinical Psychology*, 42, 155-162.

Borg, G., Skinner, J.S., & Bar-Or, O. (1972). *Self-appraisal of physical performance capacity*. Reports from the Institute of Applied Psychology, the University of Stockholm, n°32.

Coopersmith, S. (1984). *Manuel de l'inventaire d'estime de soi*, Paris, E.A.P.

Delignières, D., Marcellini, A., Legros, P. & Brisswalter, J. (1993). *L'auto-évaluation des capacités physiques*. Paper presented to the International Colloque "Les techniques psychologiques d'évaluation des personnes", Paris, May, 25-27th.

Fasting, K., & Gronningsaeter, H. (1986). Unemployement, trait anxiety and physical exercise. *Scandinavian Journal of Sports Science*, 8, 99-103.

Fox, K.H. & Corbin, C.B. (1989). The Physical Self-Perception Profile: Developpement and preliminary validation. *Journal of Sports & Exercise Psychology,* 11, 408-430.

Hayden, R.A., Allen, G.J., & Camaione, D.N. (1986). Some psychologiocal benefits resulting from involvement in an aerobic fitness program from the perspective of participants and knowledgeable informants. *Journal of Sports Medicine*, 26, 67-76.

Heaps, R.A. (1978). Relating physical and psychological fitness: a psychological point of view. *Journal of Sports Medicine*, 18, 399-408.

Leonardson, G.R. (1977). Relationship between self-concept and perceived physical fitness. *Perceptual and Motor Skills*, 44, 62.

McGlynn, G.H., Franklin, B., Lauro, G., & McGlynn, I. (1983). The effects of aerobic condotionning and induced stress on state-trait anxiety, blood pressure, and muscle tension. *Journal of Sports Medicine and Physical Fitness*, 23, 341-350.

Parkatti, T. (1990). *Self-rated and clinically measured fuctional capacityamong women and men in two age groups in metal industry*. Studies in Sport, Physical Education, and Health, University of Jyväskylä, n°25.

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 Psqychology*, 42, 891-900.

Rejeski, W.J., & Kenney, E.A. (1987). *Fitness Motivation: Preventing Participant Dropout*, Champaign, Ill., Life Enhancement Publications.

Spielberger, C.D., Gorsuch, R.L. & Lushene, R.E. (1970). *Manual for the State Trait Anxiety Invetory*, Palo Alto, CA, Consulting Psychologists Press.

Thornton, B., Ryckman, R.M., Robbins, M.A., Donolli, J., & Biser, G. (1987). Relationship between perceived physical ability and indices of actual physical fitness. *Journal of Sport Psychology*, 9, 295-300.

Wittig, A.F., Duncan, S.L., & Schurr, K.T. (1987). The relationship of gender, gender-role endorsement and perceived physical self-efficacy to sport competition anxiety. *Journal of Sport Behavior*, 10, 192-199.