

SELF-PERCEPTION OF FITNESS AND PERSONALITY TRAITS

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Summary.- Our aim was to analyse how subjects perceive their own physical fitness. In experiment 1 the 247 subjects assessed their own fitness, endurance, strength, flexibility, and body composition according to specific category scales. Analyses showed that self-perceived physical fitness was mainly related to perceived cardiovascular endurance. According to sex and age, strength, flexibility, and body composition could have a significant influence. The scores obtained on the five scales were highly correlated, suggesting they were overdetermined by a more general factor assimilated to physical self-worth. In experiment 2 the 91 subjects completed the same five scales, the Spielberger State-Trait Anxiety Inventory, the Coopersmith Self-Esteem Inventory and the Bem Sex-Role Inventory. Results confirmed the hierarchical model of Fox and Corbin (1989) and showed that physical self-worth is related to self-esteem, anxiety, and masculinity.

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 reported by many authors: in particular, participation in aerobic exercise programs results in a significant decrease in anxiety (Fasting & Gronningsaeter, 1986; Hayden, Allen, & Camaione, 1986; McGlynn, Franklin, Lauro, & McGlynn, 1983). Recent research has shown that the physiological adaptation has no direct influence on psychological functioning (Fasting & Gronningsaeter, 1986; Hayden *et al.*, 1986). These results led several authors to consider that psychological benefits of such programs are related more to the perception of improved fitness 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 one could suggest focusing exercises on the more salient dimensions of perceived fitness to optimize the psychological benefits of practise (Balogun, 1986). Such a suggestion requires a better understanding of the process of perceived fitness.

Abadie (1988a) showed that self-perceived fitness is a multidimensional construct, which can be represented by a four-factor structure: cardiovascular endurance, muscular flexibility, muscular strength, and body composition. Nevertheless his work does not allow specification of 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. The aim then of the first experiment was to specify the respective importance of the four dimensions isolated by Abadie, in relation to age and sex.

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EXPERIMENT 1

METHOD

Subjects.- 247 participants were divided, according to their age (< 50 years) and sex, into four groups labelled middle-aged men ($N= 56$, mean age: 36.4 yr., $SD: 5.3$), old men ($N= 46$, mean age: 58.5 yr., $SD: 6.0$), middle-aged women ($N= 78$, mean age: 39.0 yr., $SD: 6.2$), old women ($N=67$, mean age: 59.3 yr., $SD: 5.6$).

Procedure.- Each subject completed a self-appraisal questionnaire, adapted from Borg, Skinner, and Bar-Or (1972). This questionnaire was composed of five scales related to endurance, strength, flexibility, body composition, and fitness. Each dimension was rated on a 13-points scale, every second point anchored with verbal expressions denoting how much above or below the mean the point was. Subjects were requested to rate their physical capacities with regard to their sex and age. We report here the definitions provided to the subjects for each scale, and the seven corresponding expressions.

Endurance: "This scale refers to your capacity to sustained prolonged effort (walking, running, cycling, skiing, or climbing stairs ...)". 1: "I have absolutely no endurance". 3: "I have poor endurance, with regard to my age". 5: "My endurance is slightly below the average for those of my age", 7: "My endurance is quite normal with regard to my age", 9: "My endurance is slightly above the average for those of my age", 11: "I have a very good endurance with regard to my age", 13: "I am exceptionally resilient."

Strength: "This scale refers to your capacity to perform intense muscular work of short duration (for example lifting, moving, carrying heavy objects,...)". 1: "I have absolutely no strength", 3: "I am very weak with regard to my age", 5: "My strength is slightly below the average for those of my age", 7: "My strength is quite normal with regard to my age", 9: "My strength is slightly above the average for those of my age", 11: "I am very strong with regard to my age", 13: "I have exceptional strength."

Flexibility: "This scale refers to your capacity to perform movements requiring high amplitude articular mobilization (clearing a fence, passing under a barrier)". 1: "I am definitely not flexible", 3: "I have poor flexibility with regard to my age", 5: "My flexibility is slightly below the average for those of my age", 7: "My flexibility is quite normal with regard to my age", 9: "My flexibility is slightly above the average for those of my age", 11: "I have very good flexibility with regard to my age", 13: "I have exceptional flexibility."

Body composition: "This scale refers to the relative amounts of fatness and muscle in your body". 1: "I am abnormally fat", 3: "I am too fat with regard to my age", 5: "I am a little too fat with regard to my age", 7: "My body composition is quite normal with regard to my age", 9: "I am quite athletic with regard to my age", 11: "I am very athletic with regard to my age", 13: "I am exceptionally athletic."

Fitness: "As the aim of the experiment is to specify the nature of fitness, it is impossible to give you an accurate definition. Base your assessment on your own representation of fitness". 1: "I am completely unfit", 3: "I have a poor fitness level with regard to my age", 5: "My fitness is slightly below the average for those of my age", 7: "My fitness is quite normal with regard to my age", 9: "My fitness is slightly above the average for those of my age", 11: "I have a very good fitness level with regard to my age", 13: "I am exceptionally fit."

Data analysis.- Statistical treatments were performed on P.C.S.M. software (Deltasoft). The relationships between the five scales were estimated by Pearson product-moment correlations. The five x five correlation matrix was submitted to a principal component factor analysis. We did not employ rotation as our goal with this factor analysis was primarily to assess the multicollinearity within the data. The isomorphism of the scales allowed us to compare the obtained means. Then, data were analyzed by a two (age) by two (sex) by five (scale) analysis of variance, with repeated

measurements on the scale factor. Post-hoc comparisons were performed by using Newman-Keuls procedure.

RESULTS

The Pearson correlation coefficients among the five scales are reported in Table 1. All values were significant, denoting high collinearity within the data. The factor analysis showed that the first factor, before rotation, accounted for 58.8% of the total variance. This 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 allow use of multiple regression to specify the respective weight of each subscale in the perception of fitness.

TABLE 1
PEARSON CORRELATION COEFFICIENTS BETWEEN THE FIVE SCALES

	1	2	3	4
1. Endurance				
2. Strength	0.536			
3. Flexibility	0.396	0.334		
4. Body composition.	0.464	0.390	0.348	
5. Physical fitness	0.738	0.528	0.463	0.576

Note.-All values are significant ($p < .001$).

Taking all subjects into account, 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, there was no significant correlation between perceived flexibility and perceived fitness for the group of old men.

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 analysis of variance revealed a significant interaction between sex and age ($F_{1,243}=5.90$, $p < .02$). In general, middle-aged men gave higher ratings than middle-aged women, but there was no differences between older subjects. No main between-subjects effect (sex or age) was significant.

The within-subjects effects were more interesting for our purpose. We could suppose that the more salient dimensions in the perception of fitness have been rated at the same level as perceived

fitness. The analysis showed significant interactions between scale and sex ($F_{4,972}=8.72$, $p<.001$) and between scale and age ($F_{4,972}=2.55$, $p<.05$). The third order interaction was not significant. Post-hoc comparisons indicated that 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 ones. Perceived flexibility was lower than perceived fitness for men, but not for women. 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 to be taken into account less by the older subjects. Finally, muscular flexibility seems important for women but is less considered by men. The self-appraisal of physical fitness seems based on the subjectively more favorable dimensions. It is commonly assumed that men are less flexible than women and that with age one tends to lose strength and to gain weight, even if some works have challenged these assumptions (Parkatti, 1990; Thornton, Ryckman, Robbins, Donolli, & Biser, 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.

The factor analysis yielded a global overlap among 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) who suggested 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 among perceived fitness, physical self-worth, trait anxiety 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 has not been yet studied. Nevertheless, it had been shown that self-esteem is highly correlated with masculinity and self-efficacy but not with femininity (Allgood-Merten & Stockard, 1991), and several studies have shown that anxiety was related to sex-role and self-efficacy (Wittig, Duncan, & Schurr, 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 among self-perceived fitness, physical self-worth, self-esteem, anxiety and gender-role.

EXPERIMENT 2

METHOD

Subjects.- 91 subjects, 46 men and 45 women (mean age: 40.1 yr., *SD*: 8.2) were involved in the experiment.

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

Data analysis.- Correlations among the five self-appraisal scales were submitted to a principal component factor analysis without rotation to compute scores of physical self-worth. The relationships between the variables were then analysed by Pearson correlation and partial correlation procedures controlling for physical self-worth. Finally, physical self-worth and its related psychological variables were submitted to factor analysis with a varimax orthogonal rotation.

RESULTS

The Pearson correlation coefficients among the five scales of the first questionnaire and the scores obtained with the other inventories are reported in Table 3. 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 of the psychological variables. On the other hand, no significant correlation was evidenced with social or familial self-esteem, or femininity, except between social self-esteem and perceived strength and between familial self-esteem and perceived endurance.

TABLE 3
PEARSON CORRELATION COEFFICIENTS BETWEEN SCALES OF SELF-APPRAISAL OF PHYSICAL CAPACITIES, AND THE PSYCHOLOGICAL VARIABLES

	Endurance	Strength	Flexibility	Body composition	Physical fitness	Physical self-worth
Physical self-worth	0.85 [‡]	0.74 [‡]	0.51 [‡]	0.80 [‡]	0.90 [‡]	1.00
Anxiety-trait	-0.42 [‡]	-0.34 [‡]	-0.03	-0.26*	-0.49 [‡]	-0.43 [‡]
General self-esteem.	0.36 [‡]	0.37 [‡]	0.06	0.21*	0.42 [‡]	0.39 [‡]
Social self-esteem.	0.08	0.33 [‡]	-0.06	0.20	0.12	0.19
Familial. self-esteem.	0.23*	0.13	0.04	-0.03	0.16	0.14
Professional self-esteem.	0.34 [‡]	0.38 [‡]	0.05	0.33 [‡]	0.32 [‡]	0.39 [‡]
Masculinity	0.41 [‡]	0.43 [‡]	-0.04	0.30 [‡]	0.33 [‡]	0.40 [‡]
Femininity	0.15	-0.02	-0.00	0.19	0.08	0.11

* $p < .05$. [†] $p < .01$. [‡] $p < .001$.

Table 4 indicates the partial correlation coefficients among the five self-appraisal scales, and anxiety, general and professional self-esteem, and masculinity, controlling for the influence of physical self-worth. The partial correlation procedure extinguished the significance of most coefficients. The only significant values were between anxiety and perceived fitness and surprisingly between masculinity and perceived flexibility.

Correlations among physical self-worth, anxiety, masculinity, general and professional self-esteem were submitted to a factor analysis using varimax orthogonal rotation. This analysis produced a two-factor model accounting for 71.4% of the total variance. (Table 5). 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 4
PARTIAL CORRELATION COEFFICIENTS, CONTROLLING FOR PHYSICAL SELF-WORTH

	Endurance	Strength	Flexibility	Body composition	Physical fitness
Anxiety-trait	-0.16	-0.04	0.24*	0.17	-0.25*
General self-esteem	0.07	0.13	-0.18	-0.18	0.18
Professional self-esteem	0.03	0.27	-0.19	0.03	-0.05
Masculinity	0.07	0.13	-0.31 [†]	-0.04	-0.06

* $p < .05$. [†] $p < .01$.

TABLE 5
FACTOR LOADINGS OBTAINED AFTER VARIMAX ORTHOGONAL ROTATION

Measure	Factor 1	Factor 2
Masculinity	0.85	0.14
Professional self-esteem	0.76	0.29
Anxiety	-0.19	-0.92
General self-esteem	0.38	0.82
Physical self-worth	0.59	0.36
% 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) construct of physical self-worth. This overdetermination could explain the moderate correlations reported in the literature between self-appraisal of physical capacities and the corresponding objective measurements (Abadie, 1988a; Borg, *et al.*, 1972; Delignières, Marcellini, Legros, & Brisswalter, in press; Thornton, *et al.*, 1987).

Consistent with previous results (Fox & Corbin, 1989; Ryckman, Robbins, Thornton, & Cantrell, 1982), physical self-worth seems to be highly related to general self-esteem and anxiety. Nevertheless, this experiment shows that masculine-role endorsement could have a major influence on physical self-worth. Wittig *et al.* (1987) showed similarly that perceived physical self-efficacy was related to masculinity, but not to femininity and suggested that the relationship between gender-role and competitive anxiety was mediated by differences in perceived physical self-efficacy. More generally, these findings are consistent with the *masculinity model* (Allgood & Stockard, 1991; Taylor & Hall, 1982; Whitley, 1983) which argues that masculinity, mainly defined by self-efficacy, represents a critical factor for self-esteem and psychological well being. It appears to be of main interest to enlarge the model of Fox and Corbin with gender-role endorsement.

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 these psychological variables were slightly lower. On the contrary, flexibility may be considered as a more passive, genetically determined dimension.

To summarize, self-perceived fitness seems to integrate a wide number of factors, including self-concepts, personality traits, and self-appraisals of physical capacities. We suppose 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 participation in exercise.

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