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THE EXERCISE MOTIVATIONS INVENTORY: PRELIMINARY DEVELOPMENT AND VALIDITY OF A MEASURE OF INDIVIDUALS' REASONS FOR PARTICIPATION IN REGULAR PHYSICAL EXERCISE

DAVID MARKLAND* and LEW HARDY
Sport, Health and Physical Education, University College North Wales, Bangor, Gwynedd LL57 2EN, Wales

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Summary—This paper describes the development of the Exercise Motivations Inventory (EMI), a 44-item, multidimensional instrument designed to test theoretically derived predictions concerning the influences of personal exercise goals on exercise participation. Items were generated from responses to an open-ended questionnaire and from an examination of the literature on exercise adherence. A 71-item version of the EMI was completed by 249 regular exercisers. Principal components analysis with equamax rotation yielded 12 factors with eigenvalues greater than 1.0, accounting for 69.4% of the total variance. The factors were labelled Stress Management, Weight Management, Re-creation, Social Recognition, Enjoyment, Appearance, Personal Development, Affiliation, Ill-Health Avoidance, Competition, Fitness, and Health Pressures. The internal consistency of the 12 subscales was generally acceptable with Cronbach's alpha reliability coefficients ranging from 0.63 to 0.90. Test-retest reliability coefficients over a 4 to 5 week period ranged from 0.59 to 0.88. None of the subscales appear to suffer from a social desirability response bias, as evidenced by weak, non-significant correlations with the short form of the Marlowe-Crowne Social Desirability Scale. Preliminary evidence for the discriminative and construct validity of the EMI is presented.

A common theme emerging from the application of several theoretical approaches to the problem of exercise adherence concerns the role of individuals' exercise goals or objectives in determining long term participation in health-related exercise. According to Deci and Ryan's (1985) cognitive evaluation theory, intrapersonal events, which include the individual's goals or internal standards, may be informational or controlling in nature. Deci and Ryan suggest that to regulate oneself in a controlling fashion leads to tension and pressure to perform and undermines intrinsic motivation for the activity, thereby providing less than ideal conditions for the maintenance of the behaviour over a prolonged period of time. On the other hand, to regulate oneself in an informational fashion allows freedom from pressure and the experience of choice, thereby enhancing intrinsic motivation. With respect to exercise behaviour, this position implies that the sorts of reasons individuals have for exercising, or the goals that they adopt, will influence intrinsic motivation and subsequent adherence. Goals which pressure people to exercise will create anxiety and tension and have an adverse effect on intrinsic motivation for exercise, whilst goals which lead to feelings of competence and self-determination will have the opposite effects. In addition, as McAuley, Wraith and Duncan (1991) point out, exercise may be adopted initially for external reasons such as health and appearance improvement; but, as physical conditioning and skills improve, intrinsic reasons may become more salient. Thus exercise motivations may change over time as a response to being involved in physical activity.

Maehr and Braskamp's (1986) theory of personal investment also highlights the motivational importance of the types of goals that individuals adopt. Their theory proposes that the subjective meaning of a situation determines the person's level of investment of resources. Meaning is held to comprise three interrelated facets: personal incentives, sense of self, and perceived options. *Perceived options* refer to the behavioural alternatives available in a given situation, whilst *sense of self* includes perceptions of competence, self-reliance, and goal-directedness. Of more immediate relevance to the present discussion, *personal incentives* are the motivational focus of behaviour, or

*To whom correspondence should be addressed.

the goals that are adopted. From the perspective of personal investment theory, as Duda (1989) points out, an understanding of individuals' exercise goals, together with self-perceptions and situational influences, can provide insight into choice of activities and persistence within the domain of sport and exercise.

Both these theoretical positions, then, suggest that a consideration of individuals' reasons for exercising may be profitable. Research is required which explores the relationships between participants' exercise goals and exercise adherence; how exercise goals influence choice of activities; how affective responses to the experience of exercising may be influenced by exercise goals; how goals may interact with other factors (personal or situational) to determine adherence; and how involvement in physical activity may have a reciprocal influence on individuals' goals.

Clearly, if these questions are to be addressed, we need some means of measuring exercise goals. Duda and Tappe (1987, 1989a) have developed such an instrument, the Personal Incentives for Exercise Questionnaire (PIEQ). The PIEQ is a 48-item questionnaire comprising 10 subscales labelled: Appearance, Competition, Mental Benefits, Affiliation, Flexibility/Agility, Social Recognition, Health Benefits, Weight Management, Mastery and Strength. Unfortunately the PIEQ appears to suffer from a number of problems which may influence its suitability for addressing the research questions outlined above.

One problem concerns the role of enjoyment of physical activity as an exercise goal. According to Wankel (1988), surveys consistently show enjoyment to be an important reason for participation. Perrin (1979) reported that long-term participants rated enjoyment as one of the primary reasons for their continued involvement, whilst Boothby, Tungatt and Townsend (1981), and Wankel (1985) found lack of enjoyment to be an important factor in withdrawal from activity.

In the original version of the PIEQ (Duda & Tappe, 1987) a factor emerged which was labelled 'Involvement' comprising items that clearly related to enjoyment of the experience of exercising, such as 'because it is fun' and 'I enjoy being active'. However, this factor was found to be inconsistent and was dropped from subsequent versions of the instrument. None of the subscales in the current form of the PIEQ refer to exercising purely for enjoyment of the experience of exercising. Whilst a number of items do refer to enjoyment and fun, these are with respect to other aspects of exercise incentives such as Competition ('I find exercise fun, especially when competition is involved') or Affiliation ('I find exercise is more fun when there are others to do it with').

A further problem with the PIEQ is that a number of the items could be read as not necessarily reflecting incentives to exercise, but as general beliefs about exercise or oneself. For example one item states: 'Winning at physical activities is important to me'. Whilst this might be the case for a particular individual, it is not necessarily a reason why they exercise. Similarly, the item: 'I try to exercise with others whenever I can' is simply a statement about *how* the person exercises and not *why*. Further examples can be found in the Mastery scale which comprises only two items: 'Doing my best in an exercise activity is important to me' and 'When exercising I like to do as well as I can'. Neither of these statements are necessarily exercise incentives.

Given these problems it was felt worthwhile to develop a new instrument for measuring individuals' motives for exercising. This paper describes the development of the Exercise Motivations Inventory (EMI), a psychometrically derived multidimensional instrument which measures a wide range of possible reasons for exercising.

DEVELOPMENT OF THE EMI

Item generation

In order to generate an initial item pool and to determine whether individuals do indeed perceive enjoyment of activity as an important exercise goal, an open-ended questionnaire was designed which asked respondents to state the three main reasons why they chose to exercise. Questionnaires were administered to 100 individuals who were all involved in some form of regular physical activity. Seventy-six completed questionnaires were returned (52 females, 24 males; mean age = 37.88, SD = 13.70).

The responses were classified into 9 categories of related reasons for exercising on the basis of belonging either to one of the factors identified in the PIEQ, or because they reflected enjoyment-

related reasons. Exercising for fitness improvement or maintenance were the most frequently cited reasons with 56.57% of *S*s giving responses which fell into this category. These were closely followed by responses relating to enjoyment of physical activity (51.31%), giving preliminary evidence that enjoyment is indeed an important reason for exercising for many individuals.

The next most frequently cited category (35.53%) concerned exercising for social and affiliation needs, followed by health-related reasons (30.26%), exercising for stress management and relaxation (28.95%), weight management (22.37%) and then by statements relating to the development of personal skills (17.11%). Finally a small number of *S*s (9.21%) stated that they exercised to improve sporting performance or for competitive reasons (7.89%). The low frequency of responses in the last two categories reflected the composition of the sample with few *S*s being involved in competitive sporting activities.

The responses to this questionnaire were used to form an initial pool of 45 items. Further items were generated with reference to the literature on exercise participation, and by borrowing from the PIEQ, producing a total initial pool of 76 items. The item pool was scrutinized by a panel of 5 judges who were all familiar with contemporary developments in exercise psychology, motivational psychology, and test construction. The judges rated the items according to whether they actually reflected reasons for exercising, were unambiguous, and were easily understood. This procedure led to a final pool of 71 items for the first form of the EMI.

The items were incorporated into an inventory in such a way that each followed the root: 'Personally, I exercise . . .'. Responses were scored on a 6-point Likert-type scale ranging from 0- 'Not at all true for me', to 5- 'Very true for me'. The instructional set supplied with the inventory emphasized that respondents should answer in terms of whether each item was true for them personally, rather than whether each item was a good reason for *anybody* to exercise.

Subjects

The initial version of the EMI was administered to 400 individuals from a variety of backgrounds and age groups, who were all involved in some form of regular physical activity. Two hundred and forty nine (62.25%) *S*s returned completed inventories (mean age = 28.37, range 16 to 75 years, SD = 12.77); 63% were female. The total sample comprised three fairly distinct subsamples. The first included 115 female participants in aerobics or keep-fit classes (mean age = 35.60, range 16 to 75 years, SD = 14.84). The second subsample comprised 91 undergraduate students (mean age = 21.21, range 18 to 34 years, SD = 3.65), 64.83% were male and 35.17% female. The third subsample comprised 43 members of local sport clubs (mean age 25.39, range 16 to 58 years, SD = 11.38), 81.4% were male and 18.6% female. All *S*s reported participating in exercise or sport at least once a week for at least 1 h per week.

Exploratory factor analyses

The factor structure of the EMI was explored initially by principal components analysis with varimax rotation. Fifteen factors emerged with eigenvalues >1.00, accounting for 68.60% of the variance. Examination of the factor structure revealed 11 clearly distinct sets of items reflecting exercising for stress management, weight management, social recognition/comparison, enjoyment of the experience of exercising, feeling refreshed or invigorated by exercise, development of personal skills, fitness-related reasons, competitive reasons, avoidance of ill-health, friendship/affiliation needs, and exercising for some particular health-related reason. However, the remaining factors were indeterminate in nature and there were a number of ambiguously loading items.

The number of items was reduced to eliminate those which had low factor loadings (<0.50) or loaded very ambiguously (the difference between the highest loading and loadings on any other factor being <0.15). Fifty-six items remained following this procedure. These items were once more subjected to principal components analysis. An equamax rotation provided the most parsimonious reduction of the data. Twelve factors emerged with eigenvalues >1.00, accounting for 69.40% of the variance. The principal components factor loadings are shown in Table 1.

Eleven of these factors were similar to those described above. The 12th factor reflected exercising to improve one's appearance. The factors were labelled Stress Management, Weight Management, Re-creation (hyphenated to emphasize the original meaning of the word), Social Recognition, Enjoyment, Appearance, Personal Development, Affiliation, Ill-health Avoidance, Competition,

Table 1. Principal components factor loadings for the EMI

Scale	Item	Factor 1	2	3	4	5	6	7	8	9	10	11	12
1	38	0.77											
	41	0.77											
	43	0.76											
	67	0.73											
	15	0.69											
	16	0.68											
	59	0.61											
	11	0.58											
	6	0.52										0.42	
	9	0.51											
2	14		0.88										
	40		0.87										
	69		0.84										
	51		0.83										
	3		0.78										
	44		0.49				0.42						
3	62			0.79									
	8			0.78									
	34			0.63									
	54			0.53									
4	58				0.84								
	65				0.74								
	47				0.71								
	33				0.63								
	68				0.58								
5	37					0.68							
	36					0.59							
	45				0.47	0.57							
	13					0.53		0.40					
	10					0.52							
6	39						0.71						
	63						0.67						
	22						0.66						
	42						0.55						
	55		0.40				0.49						
	12						0.45					0.42	
7	27							0.64					
	57							0.62					
	35							0.60					
8	24								0.90				
	48								0.86				
	30								0.58				
9	64									0.84			
	56									0.79			
	50									0.70			
10	71										0.80		
	66										0.79		
	29							0.46			0.60		
11	7											0.85	
	53											0.67	
	4											0.56	
12	60												0.85
	32												0.72
	52												0.60

Factor loadings <0.4 not shown.

Fitness, and Health Pressures. Separate analyses for males and females revealed similar factor structures.

Internal consistency

Further item reduction led to the removal of 6 ambiguous or low-loading items, leaving a total of 50. The internal consistency of the EMI subscales was then examined using Cronbach's alpha. Following removal of a further 6 redundant items, alpha reliability coefficients ranged from 0.63 to 0.92 (see Table 2). The internal consistency of 10 of the scales was at least adequate; however, alpha for the Fitness scale was only marginally acceptable and that for Health Pressures was relatively poor. These procedures resulted in a final 44-item version of the EMI with the 12 subscales comprising 2 to 6 items each. Subscale means and standard deviations for the entire sample are also shown in Table 2.

Table 2. EMI subscale means (SD), Cronbach's alpha coefficients, and test–retest Pearson correlation coefficients

Scale	Mean (SD) ($n = 249$)	Cronbach's alpha ($n = 249$)	Test–retest reliability ($n = 57$)
Stress Management	2.24 (1.34)	0.90	0.72
Weight Management	2.56 (1.62)	0.92	0.88
Re-creation	4.01 (1.00)	0.85	0.66
Social Recognition	0.98 (1.04)	0.85	0.82
Enjoyment	3.24 (1.21)	0.75	0.59
Appearance	2.01 (1.30)	0.79	0.64
Personal Development	2.67 (1.38)	0.79	0.76
Affiliation	2.60 (1.41)	0.85	0.71
Ill-Health Avoidance	2.38 (1.50)	0.85	0.87
Competition	2.44 (1.60)	0.82	0.80
Fitness	3.76 (0.97)	0.70	0.64
Health Pressures	0.52 (0.84)	0.63	0.83

Test–retest reliability

In order to determine the stability of the EMI subscale scores over time a subset of 100 *S*s from the original sample were re-administered the EMI 4 to 5 weeks after the first administration. Fifty-seven completed inventories were returned. Correlations between the EMI subscale scores on the two testing occasions ranged from 0.59 to 0.88, indicating the EMI scores are relatively stable over a 4 to 5 week period (see Table 2). These correlations are particularly promising given that they were derived from administrations of the original 71-item scale. A similar study using the final, reduced version of the EMI would seem likely to produce even stronger relationships.

DISCUSSION 1

The EMI was developed to measure the full range of motivations for participation in exercise as reflected in the responses of exercisers to the open-ended questionnaire described earlier and in the literature on exercise participation. On the whole, this goal seems to have been realized.

Examination of mean scores on the 12 scales shows Re-creation to be the most salient exercise incentive within this sample, followed closely by Fitness Improvement and then Enjoyment. Health Pressures and Social Recognition were endorsed least. The low scores on Social Recognition suggested that this scale may be subject to a social desirability response bias. Low scores on the Health Pressures scale are probably a function of the sample representing a healthy population.

When compared with the PIEQ, 8 factors were replicated in this study: Mental Benefits (Stress Management), Affiliation, Social Recognition, Mastery (Personal Development), Competition, Health Benefits (Ill-health Avoidance), Appearance, and Weight Management. Given the high scores which were obtained on the Enjoyment and Re-creation scales it seems surprising that the Involvement factor, which emerged in the first version of the PIEQ (Duda & Tappe, 1987), was lost in subsequent analyses. The present results suggest that enjoyment and feeling good are important reasons for exercising, providing support for the decision to develop a new instrument for measuring exercise motivations.

With the exception of Health Pressures, the internal consistency of the scales was at least acceptable. However the alpha coefficient for the Fitness scale was also relatively weak. In the PIEQ, fitness-related items split into 2 factors: Flexibility/Agility and Strength. In the EMI 2 of the 3 Fitness items referred to agility/flexibility whilst the third referred to improving physical fitness generally. Items in the original pool concerning strength and endurance improvement did not load strongly on any factors. Given more fitness-related items reflecting speed, endurance, strength and cardio-vascular fitness, and their administration to a more varied sample, it seems likely that further fitness factors might emerge.

The low internal consistency of the Health Pressures scale reflects the fact that the items are not necessarily homogeneous. The scale comprised 3 items referring to exercising because of a doctor's advice, to help prevent an illness that runs in the family and to help recover from an illness. A given individual might well be exercising for rehabilitation reasons and because of a doctor's advice,

but not in order to prevent an illness that runs in the family, or vice versa. Adjustments and additions to this scale may result in improvements in its internal consistency.

In conclusion, the analyses showed that the 44-item 12 factor version of the EMI had a conceptually meaningful factor structure. Although improvements could be made with the addition of further items, it was felt that the current version provided an acceptable means of assessing individuals' motivations to exercise, subject to the demonstration of satisfactory validity.

CONSTRUCT VALIDITY

Gender differences in exercise motivations

Maehr and Braskamp (1986) have proposed that personal incentives vary with respect to gender. Research within the exercise domain supports this contention. It is generally found that women tend to endorse affiliation needs more than men, whilst men place more importance on competitive incentives (Biddle & Bailey, 1985; Duda & Tappe 1989b; Finkenberg, 1991; Mathes & Battista, 1985). Consistent age-related differences in personal incentives have also been identified. Prior research indicates that with increasing age, incentives such as competition and social recognition become less salient whilst task mastery and affiliation become more important (Wigfield & Braskamp, 1985). In exercise contexts, it has also been found that older adults tend to endorse health and fitness related reasons for exercising more than younger adults (Beran, 1986; Duda & Tappe, 1989b; Heitmann, 1986; Sidney & Shepherd, 1976).

As a first step in exploring the construct validity of the EMI, an examination of gender differences was conducted to determine whether the EMI could discriminate between young men and women with respect to their exercise motivations, using the data collected for the development of the instrument. In order not to confound the results with age differences, the analysis was restricted to *S*s aged between 18 and 25 years of age. On the basis of previous findings in the literature, it was hypothesized that young males would place more emphasis on Competition, whilst the young women would exercise more for Affiliation reasons. Given the pervasiveness of societal pressures for slimness amongst women, it was also hypothesized that females would endorse Weight Management as an exercise incentive more than males.

One hundred and thirty one *S*s fell within the required age range, 74 women (mean age = 21.22, SD = 2.28) and 57 men (mean age = 20.35, SD = 2.07). A MANOVA indicated that the two groups differed significantly with respect to their exercise motivations [Wilk's lambda = 0.53, $F(12,118) = 8.75$, $P < 0.001$]. Follow-up discriminant function analysis also revealed a statistically significant separation (canonical $r = 0.69$). The classification matrix revealed an overall accuracy of 83.9% with 85.1% of the males and 82.5% of the females correctly classified. In order to determine which variables contributed maximally to the discrimination between the two groups, structure coefficients were calculated. Structure coefficients represent the correlations between each dependent variable and the discriminant scores. According to Pedhazur (1982), values >0.30 can be regarded as meaningful. The results showed that the males exercised more for Competition and Social Recognition and less for Weight Management than the females. There was no difference between males and females in terms of the Affiliation motive. Table 3 shows mean scores on each EMI subscale for the two groups and the results of the analyses.

Social desirability

Low scores were found on the Social Recognition subscale in the sample used to develop the EMI and in the analysis of gender differences, suggesting that it may be subject to a social desirability response bias. It was also possible that some or all of the other EMI scales might suffer from such a bias. In order to examine this possibility a group of 25 karate players attending a summer training camp completed the final version of the EMI along with the short form of the Marlowe–Crowne Social Desirability Scale (Reynolds, 1982). There were 19 males and 6 females with a mean age of 25.80 years (SD = 9.54). The correlation between the Social Recognition subscale and the Social Desirability Scale was -0.05 ($P = 0.402$). Correlations between the other EMI subscales and the Social Desirability Scale ranged from -0.01 to 0.23. None of the

Table 3. Scale means, SDs and multivariate analyses, males and females (18–25 year olds)

Scale	Mean (SD) Males ($n = 57$)	Females ($n = 74$)	Structure coefficient
Weight Management	1.68 (1.47)	3.10 (1.54)	0.50
Competition	3.39 (1.43)	2.25 (1.40)	−0.43
Social Recognition	1.52 (1.18)	0.93 (0.91)	−0.30
Fitness	3.37 (1.09)	3.83 (0.87)	0.25
Re-creation	3.64 (1.14)	4.01 (0.83)	0.20
Personal Development	3.31 (1.20)	2.90 (1.21)	−0.18
Affiliation	2.37 (1.48)	2.75 (1.30)	0.14
Enjoyment	3.09 (1.26)	3.40 (1.09)	0.14
Appearance	1.93 (1.42)	2.26 (1.24)	0.13
Stress Management	2.36 (1.35)	2.65 (1.28)	0.12
Health Pressures	0.39 (0.67)	0.57 (0.94)	0.11
Ill-Health Avoidance	1.89 (1.42)	2.19 (1.50)	0.11
Wilk's lambda = 0.53		% Correctly classified	
$F(12, 118) = 8.75$, $P < 0.001$		Males	82.5
Canonical $r = 0.69$		Females	85.1
		Overall	83.9

correlations were statistically significant at the 0.05 level indicating that, at least with this sample, socially-desirable responding does not appear to be a problem with the EMI.

Concurrent validity

One hundred and ninety six *S*s from the original sample had also completed a version of the Intrinsic Motivation Inventory (IMI; Ryan, 1982; McAuley, Duncan & Tammen, 1989; McAuley *et al.*, 1991). The IMI determines levels of intrinsic motivation for a task as an additive function of the four underlying dimensions of Interest/Enjoyment, Perceived Competence, Effort/Importance and Pressure/Tension. According to McAuley *et al.* (1989), the wording of the IMI can easily be modified to reflect any particular activity; the version used here was worded to reflect intrinsic motivation for exercising in general.

Correlational analyses were conducted to examine the concurrent validity of the Enjoyment and Re-creation scales with respect to the Interest/Enjoyment subscale of the IMI. As expected the Enjoyment and Re-creation scales showed the strongest correlations with Interest/Enjoyment ($r = 0.55$ and 0.50, respectively, $P < 0.001$). Unexpectedly, the Affiliation scale also correlated moderately with Interest/Enjoyment ($r = 0.45$, $P < 0.001$). The remaining EMI scales showed only small correlations ranging from −0.02 to 0.24.

DISCUSSION 2

These analyses offer preliminary support for the validity and reliability of the EMI as a measure of individuals' exercise motivations. As anticipated, young adult men endorsed Competition more and Weight Management less than their female counterparts. Young females did not, however, report exercising for Affiliation reasons more than the males as had been hypothesized. The results with respect to Social Recognition amongst young adults are at odds with those of Duda and Tappe (1989b) who found young adult females to rate this incentive higher than their male counterparts. This finding may reflect cultural differences between the British sample used here and the American sample used by Duda and Tappe. It may be that young British males are actually more likely to exercise for social recognition than young British females. On the other hand, it could be that British males are simply more prepared than their female counterparts to *report* Social Recognition as an exercise incentive. However, the very low correlation between the Social Recognition subscale and the Social Desirability Scale, using a sample comprised primarily of young adult males, does not lend support to the latter interpretation. Nevertheless, it may be informative to further examine the possibility of gender differences in this relationship.

In addition to evidence for the discriminative capabilities of the EMI with respect to gender, the Enjoyment and Re-creation subscales showed appropriate correlations with a conceptually-related scale and none of the subscales showed evidence of being prone to a social desirability response bias. The preliminary evidence suggests that the EMI offers advantages over the PIEQ in that

enjoyment-related reasons for exercising clearly emerged and the instrument may prove useful in addressing the research questions outlined in the Introduction. Further developments will include the possibility of improving or extending the Fitness scale through the inclusion of additional items, clarification and improvement of the Health Pressures scale, further exploration of the discriminative validity of the EMI subscales, examination of their concurrent validity with respect to conceptually related scales, and analyses of the predictive validity of the instrument with respect to exercise adherence.

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