Progress in the Psychometrical Properties of an Instrument Aimed to Assess Attitudes, Motivation and Self-efficacy of People Practicing Physical Activity

Athanasios Pappous, Juan G. Godoy, Francisco Q. Cruz and Jeanette López

1. Introduction

Findings provided by the European Research Institute for Public Health and Nutrition (European Commission 1999, as cited in Kontogianni, 2001) demonstrated that 33% of Europeans do not undertake any physical activity during a typical weekly period while, even more alarming data based on Spanish population shows that 68% tend to adopt a sedentary behavior. Now, why people persevere or drop out is a phenomenon as complex as nature itself. Over the last three decades, there has been an increase in the research studying the factors that influence the participation in physical activities (Dishman, 1994). Despite this, the factors involved still remain far from clear. Thus, many models of research and theories have been suggested, mostly recruited from the field of social and behavioral science with emphasis on the influence that factors such as attitudes, motivation and self efficacy have in starting exercise, maintenance or drop out of physical activity. Doganis and Theodorakis (1995), in their revision, noted that the new trends on the field of exercise behavior use to adopt sound theoretical models derived from social-psychological paradigms. According to these authors, the research projects based on social-psychological paradigms are more promising in the comprehension of the complex interplay between actual exercise behavior and the variables associated with it (Doganis and Theodorakis, 1995). Among the different paradigms, the present study, aims to progressively focus on the influence of the motivational, attitudinal and self-efficacy variables. According to the creator of
the social-cognitive theory, Albert Bandura, “What a person thinks, believes and feels affects the way a person behaves” (Bandura, 1986, pp. 25).

The present study forms part of a larger work in which the basic objective is to study the exercise participation phenomenon by developing a short and practical to administrate, valid questionnaire that will include attitudinal, motivational and self-efficacy dimensions within the same instrument. During the construction phase of the questionnaire (Pappous, Cruz & Godoy, 2006) we followed the paradigm of Karlsson, Sjöström, Sullivan & Swedish (1995) who measured psychosocial factors and health by means of short-form questionnaires; in that method study which was carried out with the participation of Swedish obese subjects, Karlsson and his collaborators (1995) indicated that lengthy questionnaires should be shortened to enable better compliance in large-scale trials also ensuring adequate measurement precision. In fact, the administration of long questionnaires is fairly a problematical task especially in contexts like the one of the present study - private gyms - were people are most of the times in a hurry and often unwilling to complete multiple questionnaires comprised of numerous items. Taking this fact into consideration the development of the present study aims at obtaining further evidence regarding the psychometrical properties of the Spanish Attitudes, Motivation and Self-efficacy Questionnaire of Exercise Participation (Sp- AMSQEP) - an instrument designed to enhance knowledge concerning the influence these three factors (attitudes, motivation, self-efficacy) have in exercise adherence. Concretely the present study is the continuation of a recent preliminary study carried out by Pappous, Cruz & Godoy (2006). The advance of the present study, compared with the initial preliminar study, consists of four basic points: a) the questionnaire has been modified according to the suggestions emerged from the first study; b) the questionnaire was answered by a bigger number of respondents (N 242 in the present study – N 142 in the preliminary); c) the reliability of the instrument was retested in order to see if the modifications have produced any impact; d) in the preliminar study a factor analysis was not carried out, but in the present study this type of analysis was included in order to assess the construct validity of the instrument.

2. Method

2.1. Participants

This study is based on a convenience sample (Fowler, 1993) of members of private health clubs based in six areas of the city of Granada-Spain. The total number of the research participants was 242 (64% female and 36% male), with a mean age of 28; all of them were recruited from six private health clubs. In selecting the gyms special attention was paid to try to reflect diverse socio-economical levels; therefore the sample was recruited from gyms that represented a wide range of the city (three of the gyms were located in the urban area, two in the urban periphery and one in the rural area).

2.2. Measures

The instrument used in this study is a shortened 22-item version of the Sp- AMSQEP (Spanish Attitudes, Motivation and Self-efficacy Questionnaire of Exercise Participation). This questionnaire aimed to examine the attitudes, motivation and self-efficacy components of people who engage in exercise. During the developing phase of the instrument the reliability was assessed by test/retest and internal consistency methods while for the validity of the research tool content and face validity procedures were employed. Nevertheless Pappous, et al.; (2006) recommended that further psychometric analysis of the instrument should include a construct validity assessment; and this is a task that will be undertaken in the present study.

It should be noted that the first version of the inventory consisted of 25 items (Pappous, Cruz & Godoy, 2006). Nevertheless the evidence gathered in the preliminary tests of the 25-item version inventory suggested that three items could be removed and several modifications related to the wording of some items should be considered (Pappous, et al.; 2006). Therefore all the suggestions of the creators of the inventory have been taken into account before passing the resulting version of the questionnaire used in this study. Concretely, compared to the preliminary study, three items have been excluded in the present study (items: 13, 14, & 25 of the preliminary study). The changes regarding the wording of the items refer to the word “garboso” in item number 5 which was substituted by the term...
“desenvuelto” and item 3 which was reverted in order to be positively formulated. The responses of the participants were rated on a five-point Likert scale ranging from 1 (“totally disagree”) to 5, (“totally agree”).

3. Results

Primarily, a factor analysis was conducted in order to explore the interrelations between the items of the questionnaire, so that it is possible to identify the items that can be brought together to form a more ample construct known as a factor. In the present study three criteria were established for factor extraction; a) each factor should have an eigenvalue greater than 1.0 indicating that it can explain more variance than any single item individually; b) each factor should have a Cronbach (1951) alpha coefficient greater than .60 indicating an acceptable internal consistency; c) factor loadings of .40 and above for selecting items; and d) the items that would compose each factor should have a similar content, with a clear orientation, constituting a clear factor that is easy to interpret and identify. In conclusion, following the inventory development and item-trimming procedure, the 22 items of the questionnaire were loaded across three factors each one of which had a clear orientation and interpretation. In Table 1 the items are distributed into three factors in accordance with their highest loadings.

<table>
<thead>
<tr>
<th>Items</th>
<th>F.1</th>
<th>F.2</th>
<th>F.3</th>
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<tbody>
<tr>
<td>1. Physical exercise, undertaken with common sense and good judgment, is essential to good health</td>
<td>.69</td>
<td>.46</td>
<td></td>
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<tr>
<td>2. I practice physical activity because I need to exercise to feel well with myself</td>
<td>.75</td>
<td></td>
<td></td>
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<tr>
<td>3. Vigorous daily exercise is necessary to maintain one's general health</td>
<td>.57</td>
<td></td>
<td></td>
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<td>4. Associating with others in some physical activity is fun</td>
<td>.65</td>
<td></td>
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<td>5. I am not agile and graceful</td>
<td>.53</td>
<td></td>
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<tr>
<td>6. I do sport for the pleasure of increasing my knowledge about different training methods</td>
<td>.66</td>
<td></td>
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<tr>
<td>7. I practice physical activity because I like to feel involved in the activity</td>
<td>.71</td>
<td></td>
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<td>8. I have poor muscle tone</td>
<td>.68</td>
<td></td>
<td></td>
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<tr>
<td>9. I do sport because it is one of the best ways of meeting people</td>
<td>.67</td>
<td></td>
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<tr>
<td>10. I do physical activity because I feel great personal satisfaction when I master certain difficult training techniques</td>
<td>.77</td>
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<td>11. I can't run fast</td>
<td>.55</td>
<td></td>
<td></td>
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<td>12. I do exercise because the people I know will approve of me</td>
<td>.61</td>
<td></td>
<td></td>
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<td>13. Physical activity releases the tension of the individual participant</td>
<td>.75</td>
<td></td>
<td></td>
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<tr>
<td>14. I carry out sport because it is important for me to discover new movements and skills</td>
<td>.68</td>
<td></td>
<td></td>
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<td>15. Regular physical activity makes one feel better</td>
<td>.80</td>
<td></td>
<td></td>
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<td>16. I do exercise because it is one of the best means of developing other aspects of my personality</td>
<td>.66</td>
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<td>17. I do not feel in control when I do an activity that requires physical dexterity</td>
<td>.71</td>
<td></td>
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<td>18. Exercise helps to work off emotional tensions and anxieties</td>
<td>.66</td>
<td></td>
<td></td>
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<tr>
<td>19. I take little pride in my ability in sports</td>
<td>.76</td>
<td></td>
<td></td>
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<tr>
<td>20. Regular vigorous exercise is necessary for good health</td>
<td>.55</td>
<td></td>
<td></td>
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<tr>
<td>21. I have excellent reflexes</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>22. Developing one's physical skills leads to mental relaxation and relief from tension</td>
<td>.53</td>
<td></td>
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Factor 1. There were eight items (1, 3, 4, 13, 15, 18, 20, and 22) that recorded the highest loading on the first factor (F1); these items had loadings ranging from .57 to .86; were directly orientated with a vision of exercise as an activity that contains positive psychological effects (items:13, 15, 18, 22), that promotes the socialization of the participants (item 4) and as an activity that enhances health (items: 1, 3). Consequently, this first factor was called attitudes towards exercise. Factor 2. Six items (5, 8, 11, 17, 19 and 21) were grouped together to form the second factor (F2) ranging from .55 to .77. This factor consists of items that reflected the estimation of the participants regarding their own physical ability, thus these items were interpreted as representing the dimension of self-efficacy. Factor 3. Eight items (2, 6, 7, 9, 10, 12, 14 and 16) had loadings on factor 3 (F3) in the range from .46 to .68. This factor comprises items that refer to the different motives that made the participants engage in exercise (item 1: “I do exercise because...”); item 14: “I carry out exercise because...”; item 16: “I do exercise because...”, etc.) Thus, after examining the content of this third dimension, the factor was called motivation towards exercise.
Secondly, for examining the internal reliability of the modified version of the questionnaire the internal consistency method was used. Cronbach’s alpha statistics were estimated for the overall scale and for each subscale, as an indication of internal consistency. The overall scale obtained a satisfactory internal consistency score ($\alpha=.79$). Moreover, each of the three subscales revealed adequate internal consistency coefficients: attitudes $\alpha=.75$, motivation $\alpha=.71$ and self-efficacy $\alpha=.81$. Hence, findings supported the internal consistency reliability of the entire instrument and the three subscales.

Additionally, it is relevant to note that all of the items that make up the three factors of the final model concur with their original extraction. That means that the items which in the developing phase of the preliminary study (Pappous, et al., 2006) were extracted from the Spanish version of the motivation scale (Lopez, 2000), and were expected to reflect the motivation factor, were, in fact, grouped together in the present formulating the first factor. In the same way, the items that originally were part of the two questionnaires designed to measure the concepts of attitudes and self-efficacy were grouped respectively together in the present factor analysis.

4. Discussion

Factor Structure: The assessment of the factor’s analysis of the instrument support the a-priori three dimension structure of the Sp- AMSQEP. The items of the instrument obtained their highest values in one of the factors of attitudes, motivation or self-efficacy. It is noteworthy that the factor classification of the items coincides absolutely with their initial provenance from one of the three instruments that served as a basis in the developing phase of the inventory, as it was reported by Pappous, et al., (2006). The factor analysis offered preliminary evidence regarding the construct validity of the instrument since the measured variables used in the study represent the hypothesized constructs (Heppner, Kivlighan & Wampold, 1990).

Internal Reliability: If we compare this data with those of the preliminary application (table 2) we can observe that the internal consistency of two of the three subscales was increased significantly in the present study. Specifically, in the preliminary application (Pappous, et al., 2006), the reliability rate for the attitudes subscale obtained an alpha rate of $\alpha=.66$, falling, according to Nunnaly & Bernstein (1994), below acceptable levels. Nevertheless a considerable improvement it can be observed in the present study since the alpha coefficient of the attitudes subscale reached a level of $\alpha=.75$. This improvement is probably due to the fact that before the present application of the instrument the suggestions of the authors of the first study (Pappous, et al., 2006) were followed by modifying those items that had presented an inappropriate function. Another point indicating an increase in the reliability of the instrument is the higher score in the internal consistency rate of the self-efficacy subscale since the $\alpha=.75$ coefficient of the preliminary application increased to $\alpha=.81$ in the present study. Finally, the reliability rate of the motivation subscale was maintained at the same level ($\alpha=.71$). In view of these improved results, compared with those of the preliminary study (Pappous, et al., 2006), it can be concluded that the modifications made in the present study have produced a significant increase in the internal consistency of the instrument.

However is worth mentioning the fact that the Sp- AMSQEP is in the early stages of development and, thus, requires improvement. Certain shortcomings observed in the present studies could serve as incentive for further research in this area. A limitation of this study is the absence of a test-retest reliability procedure in order to examine the reproducibility of of the instrument. Moreover further research could attempt to examine the criterion validity in order to obtain evidence whether the instrument correlates positively with other valid scales that measure separately each of the three subscales that make up the instrument.

The research design and the convenience samples

<table>
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<th>Table 2 Internal consistency of Sp- AMSQEP at the preliminary and at the present application</th>
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<td>Preliminary study (Pappous, et al., (2006))</td>
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<td>Attitudes $\alpha=.66$</td>
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<tr>
<td>Self-efficacy $\alpha=.75$</td>
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<td>Motivation $\alpha=.71$</td>
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in the present studies were advantageous for the initial development of the instrument, but other samples or exercise contexts should be used in the future in order to test the applicability of the instrument. In addition, it would also be convenient to test the factorial model in larger samples, since according to Russell (2002) this is likely to contribute to more reliable estimates. Another line that this study certainly opens up is that of the future application of the instrument in different Spanish-speaking countries in order to examine its cross-national generality. In conclusion, the present study served as an exploratory attempt to provide initial evidence in support of the psychometric properties of the inventory.

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References

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His research fields cover the social and psychological aspects of physical activity health & sports, minorities, gender, race and nationalism in sports media coverage, active living and health promotion. Apart from his academic posts, Athanasios Pappous has worked as an expert for a National Parliamentarian Committee of Children, Youth and Sports Affairs, and has also been employed as Supervisor in the Organizing Committee of the 2004 Olympic and Paralympic Games in Greece.

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Main Works:

norme. 4ème Congres International de la Societe de Sociologie
du Sport de Langue Francaise: Du local au global : le sport
enjeu de culture et de developpement. Valence (48).
• Pappous A., Cruz F., De Leseleuc E., Marcellini A., Recours
R., & Schmidt J. (2006). Older Person’s Attitudes Toward
Physical Activity and Exercise and its association to
maintenance: An adaptation of Opapaeq in Spain. Studies in
Physical Culture and Tourism, Vol. XIII, No. 1
socio-cognitive factors in exercise participation: initial steps
in developing and validating the Sp-AMSQEP. Motricidad-
Femmes/Hommes : la mise en scene des differences dans la
couverture mediatique des Jeux Paralympiques, In Sciences de
l’homme et societes, 73, pp. 45-47.