

MEASURING SOCIO-COGNITIVE FACTORS IN EXERCISE PARTICIPATION: INITIAL STEPS IN DEVELOPING AND VALIDATING THE Sp- AMSQEP.

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ABSTRACT

The impact of socio-cognitive factors in sport participation has become a popular topic in exercise and sport psychology. Although the components of self-efficacy, attitudes and motivation attract the attention of numerous studies yet there are no instruments measuring these three dimensions within the same instrument. This paper describes two studies conducted in order to develop and to obtain initial evidence regarding the reliability and validity of the Spanish Attitudes, Motivation and Self-efficacy Questionnaire of Exercise Participation (Sp- AMSQEP) – an instrument designed to measure the three constructs within the same questionnaire. Content as well as face validity helped us to refine the questionnaire by adding new items or by modifying others. During the phase 1, and through a pilot study a test/retest method was employed obtaining excellent indications of the repeatability of the research tool. In the preliminary application of phase 2 (N = 142) the internal consistency method was used obtaining satisfactory scores on the motivation and self-efficacy subscales, nevertheless the attitudes subscale presented some doubtful points. Finally an extended item analysis facilitated the detection of some points that by modifying them an increase in the internal consistency and the reliability of the instrument could be expected.

Key Words: exercise participation, attitudes, motivation, self-efficacy.

RESUMEN

La influencia que ejercen los factores socio-cognitivos y en especial la autoeficacia, las actitudes y la motivación en la participación deportiva es uno de los temas más estudiados en el ámbito de la psicología del ejercicio físico. No obstante, hay una escasez de instrumentos que midan estos tres constructos bajo el formato de un mismo instrumento. Este artículo describe dos estudios llevados a cabo con el fin de desarrollar y obtener unos resultados preliminares acerca de la fiabilidad y la validez del inventario de actitudes, motivación y autoeficacia hacia la práctica de la actividad física (Sp-AMSQEP). Durante la primera etapa de la investigación un estudio piloto se llevó a cabo aplicando el método test-retest obteniendo excelentes índices en relación con la repetibilidad del instrumento. En la aplicación preliminar (N = 142), llevada a cabo en la segunda etapa del estudio, se realizó un análisis de consistencia interna obteniendo unos resultados satisfactorios en las subescalas de motivación y autoeficacia. Finalmente, un análisis detallado de los ítems ha permitido sugerir unas modificaciones y cambios que podrían mejorar aún más la consistencia interna y la fiabilidad del instrumento.

Palabras clave: participación, actitudes, motivación, autoeficacia.

INTRODUCTION

During the last years there have been a growing number of people in Spain who engage in physical activities offered by private exercise clubs. The findings of a research conducted by the Madrid Chamber of Commerce shows a significant increase in the number of private gyms over the last years. The Municipality of Madrid, for instance, owns a number of clubs which have an average of 12 years' service, while 30% of them have been built over the last six years. Besides, a total

average sum of 37.800.000 euros is being earned by nine hundred private exercise clubs (Madrilenian Association of Industrialists of Sport Services, 2001). Such a big number of clubs suggest a logical assumption that growth in this field is a result of an increase in the number of clients involved. Nonetheless, this developing boom contradicts findings derived from relevant research indicating that more than half of the people who start a physical activity programme will apparently drop out within the first six months (Dishman, 1995; Rampf, 1998).

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) observed that up to 1985 more than two hundred studies related to the determinants of physical activity had been carried out. Nevertheless, the results of these studies are far from arriving in a common point. Thus, many models of research and theories have been suggested, mostly recruited from the field of social and psychological science with emphasis on the influence that factors such as attitudes, motivation and self efficacy have in the maintenance or abandonment of physical activity. All of these three factors play an important role on the cognitive, motivational, affective and selection processes, that according to the social-cognitive theory, affect the possibility of maintaining a certain patron of behaviour (Bandura, 1986). The present study forms part of a larger work in which the basic objective is to enhance knowledge concerning the influence these three socio-cognitive factors have in exercise adherence. Many researchers assess these variables by applying questionnaires that measure each variable separately. Taking this fact into consideration, the development of the present study aims at offering an instrument that will include these three psychological dimensions within the same instrument.

Another aspect also considered in this research is the degree of significance that language and cultural background prove to have when using a single questionnaire among different countries. López (2002) argued that the majority of sport psychology studies in Spanish-speaking countries have employed as a common guideline scales and questionnaires that have been developed and validated in other languages. Kim, Williams and Gill (2003) also reported that in the majority of the research conducted so far on participation motivation the main samples were constituted of participants coming from English-speaking countries, primarily from United States, England and Australia. Yet what should be carefully considered is the fact that participating in physical activities is a social phenomenon manifested in different forms depending on the diverse conditions prevailing in each country. Recently Jowett and Ntoumanis (2003) stated that culture at a theoretical and empirical level is an important determinant in cross-cultural sport psychology research and stressed the need that the instruments be psychometrically sound. Even

though Spanish is a widespread language, it would seem that throughout the review of the literature no studies have been found that specifically apply the social-cognitive models to the exercise adherence problem in a non competition sample. The complexity of the phenomenon of exercise adherence suggests the development of specific and validated questionnaires, otherwise, the use of questionnaires that have been translated directly from other languages, as well as their application in different cultural backgrounds might affect the reliability and the validity of the results obtained to a large extent. As it can be therefore deduced, this study aims to carry out a first step in the development of an instrument that will include the factors of attitudes, motivation and self-efficacy in the format of the same questionnaire, contributing in the exercise psychology literature by offering a psychometrically sound, Spanish language instrument.

PHASE 1

This phase refers to the preparatory processes, including the development stage, the expert's panel and the pilot test of the instrument. These initial studies were conducted so as to provide some first hand evidence of the validity and reliability of the instrument before joining it into the main application presented in phase 2.

Developing the instrument

A review based on already existing measures was conducted in order to detect existing scales which would provide us with items suitable to represent the dimensions of attitudes, motivation and self - efficacy. An attempt was made to find instruments properly constructed to assess exclusively each of these three factors mentioned above; the second criterion was related with the fiability of the instruments, therefore, instruments should have a satisfactory rate of reliability. The final criterion was that instruments should have been, previously adapted in Spanish since several researchers have stressed the belief that culture and language can exert significant influence and should be a marked variable when psychological concepts are examined (Rust y Golombok,1992 and Isogai, Brewer, Cornelius, Etnier & Tokunaga; 2003).

Following the above criteria, three psychometrically sound instruments were selected after thorough bibliographical research to be used as the basis to construct the inventory.

The instrument that was selected to represent the self-efficacy variable was the physical self-efficacy scale (Ryckman, Robbins, Thornton & Cantrell; 1982). Concretely, the items used came from the Spanish version of the scale elaborated Sánchez-Barrera, Muela, Sánchez-Huete, & Godoy (1992). The fiability of the scale

(measured by test-retest) was 0.85 in the alpha rate (Rycman, Robbins, Thornton, y Cantrell, 1982). For the dimension of motivation the spanish-language version of Brière et al. 1995 was considered. The adaptation of this scale in Spanish was made by López (2000) obtaining a high fiability rate (0.84). As far as the attitudes factor concerns, the “Opapaeq” questionnaire was used (Terry, Biddle, Chatzisarantis & Bell; 1997). This questionnaire has been adapted in Spanish by the first author of the present article, (Pappous et al., 2006) obtaining a high internal consistency score (0.83).

Afterwards, items from the Spanish version of these instruments were extracted in order to represent the dimensions of attitudes, motivation and self-efficacy as mentioned above. The primary criterion in order to incorporate an item was according to their discrimination rate in the various subscales of each of the three questionnaires. As Nunnally & Bernstein (1994) indicated, items with high values r item - total have more variance in relation to what they have in common and they add more reliability to the test than items with a low score in the discrimination rate. In order to assure a relative balance in the representation of the three dimensions within the questionnaire the same number of items (i.e.: 8) were extracted from the three questionnaires. As for the self-efficacy subscale it was not necessary to select any items, since the total number of the items was eight, i.e. all of them were included. Additionally, the format of all of the selected items was adapted so as to obtain a certain homogeneity in the formulation of the items within the same instrument.

Once the first version of the inventory had been produced it was subjected to a three step evaluation in order to obtain preliminary evidence regarding the reliability and the validity of the instrument. In the first place, the questionnaire was presented to a panel of seven experts who examined the content validity; secondly a pilot study was conducted in order to obtain some first hand evidence of its reliability and finally a main application was carried out using a different sample.

Panel Experts (content validity)

An examination of the content validity of the first version of the instrument was made on the item content of the three subscales. For this purpose, a panel of seven experts in sport psychology research was set up. According to Rust and Golombok (1992), content validity has to be judged qualitatively rather than on the extent of any deviation, as validity is usually more important than the degree. The experts were asked to express their opinion in relation to the extent to which statements represented the issue they were supposed to measure. They were found to agree on the adequacy of the items intended to measure the attitude and self-efficacy

dimension, but they indicated that, given the target sample of the research - individuals enrolled in exercise clubs - an item was missing: that of expressing a motive towards the practice of physical activity induced by the desire to lose weight; therefore for this purpose item 14 was added to this first version of the instrument.

Pilot study

The objective of this pilot study was to obtain primary evidence regarding the reliability of the inventory. This phase involved taking a thirty five respondent convenience sample and administering the instrument twice, within the period of two weeks, and under the same conditions. For the evaluation of the pilot study intraclass correlation rate was employed.

The statistical analysis, evaluating the reliability within the same data, showed an excellent rate on the interclass correlation coefficient: attitudes: $r = 0.92$, motivation: $r = 0.90$, self-efficacy: $r = 0.95$. Further evidence of the reliability of the instrument was collected in the main study later on in the second phase.

PHASE 2

Main Study

Participants

One hundred and forty-two participants, who were engaged in the sport activities offered by the University of Granada, constituted the sample of the main study. Their average age was 23, sixty-eight men and seventy-one were women. The particular activities in which the participants were involved were the following: aerobic, fitness, contemporary dance and badminton.

Measures

The first version of the 25-item inventory, which was constructed through the first part of the present study, served as a model to measure the components of Attitudes, Motivation and Self-efficacy. Specifically, 8 of the items were hypothesized to measure Attitudes, 9 items were hypothesized to measure Motivation, and 8 items were hypothesized to measure Self-Efficacy. Responses were rated on a five-point Likert scale ranging from 1 (“totally disagree”) to 5, (“totally agree”). Items with the opposite direction (3, 5, 11, 19, and 21) were inverted so that the higher the average, the more positive the content of the items. In order to assess the face validity, of this preliminary version, a section was added at the end of the questionnaire so that the respondents were free to add any observations they wanted.

Procedure

The Sports Service of the University of Granada was contacted so as to explain the characteristics of the study and to request collaboration. Then, participants were supplied with general instructions on the way the questionnaire should be filled in. Finally, they were fully informed of the fact that the inventory they were supposed to respond to was a preliminary version of a psychological instrument designed to measure the aspects of attitudes, motivation and self-efficacy in sport participation; therefore participants were kindly requested to note down any possible observation in case they considered any item as inappropriate or irrelevant.

Data analysis

The items that made up the preliminary version of the instrument were subjected to descriptive and frequency analyses with the employment of SPSS statistical program for Windows, version 10.0.06 (Statistical Package for Social Science). The quality of the data was examined in terms of frequency distribution and item discrimination. The items were evaluated according to their loadings on each factor and subsequently, with the employment of reliability analysis, the contribution of each item to the internal consistency of its respective factor was examined. It is worth mentioning that the factors in this main study were considered a priori according to the provenience of each item from one of the three questionnaires that served as a basis in the developing phase of the instrument - the task of evaluating the construct validity was also undertaken and it will be the subject of a different publication.

The internal consistencies of the subscales were assessed via the alpha coefficient (Cronbach, 1951). Face validity refers to the evaluation of the suitability of the instrument. An instrument should be considered as suitable not only by the experts but by the participants as well. This manner of evaluating an instrument is known as face validity and is used to complete the content validation that had taken place with the aid of the panel of experts.

RESULTS

Item analysis

An examination of the data of the attitudes subscale, (Table 1) shows that the majority of the responses fell at the midpoint of the “undecided” category, resulting in a relatively “peaked” distribution. However, the alpha coefficient of the attitudes subscale fell below acceptable levels ($\alpha = .663$; Nunnally and Bernstein, 1994). The item analysis on the whole, allowed refinements in the scale by the detection of

doubtful items like item 3: “vigorous exercise is not necessary to maintain one’s overall health”. The formulation of this item, however, had an opposite direction which caused confusion as many participants (18) abstained from answering this item.

Furthermore, the examination of the item-total correlations indicated a low correlation rate between item 3 and the rest of the items ($r = .125$). Moreover, as can be seen from the last column of Table 1 in the event of eliminating item number 3 an increase of the alpha rate is to be expected. Consequently, this finding suggests that item 3 should be modified in further applications of the instrument.

TABLE 1
Item analysis of the subscale of Attitudes

Item	M	SD	Item- Total	Alpha if item deleted
1. Physical exercise, undertaken with common sense and good judgement, is essential to good health	4.91	.39	.552	.674
3. Vigorous exercise is not necessary to maintain one’s overall health	3.20	.99	.125	.719
4. Associating with others in some physical activity is fun	4.70	.74	.371	.681
15. Regular physical activiyy makes one feel better	4.73	.74	.430	.671
17. I do not feel in control when I do an activity that requires physical dexterity	4.82	.66	.537	.658
20. Regular vigorous exercise is necessary for good health	4.78	.59	.630	.643
22. Developing one's physical skills leads to mental relaxation and relief from tension	3.89	1.28	.372	.668
24. Physical activity releases the tension of the individual participant	4.73	.69	.437	.670

Alpha = .663

Cronbach’s alpha for the motivation subscale was equal to .714 as shown in Table 2. From the same data, the only item towards the position of “totally disagree” is item number 12 for the statement: “I do sport so that the people I know will approve of me”. The analysis of the items also revealed that the internal consistency of the subscale would improve if item number 14 was excluded, (Item14: “I practice physical activity because I want to lose weight”); this item was the only one not originally in one of the three questionnaires that served as a basis during the developing phase of the instrument but it had been included following the instructions of the panel of experts. Items number 10 and 12 obtained a low

discrimination rate as well, but a possible elimination of these items would not necessarily contribute to a better internal consistency of the motivation subscale. The rest of the items, as implied from Table 2, fitted relatively well within this subscale.

TABLE 2
Item analysis of the subscale of Motivation

Item	M	SD	Item- Total	Alpha if item deleted
2. I practice physical activity because I need to do sport to feel well with myself	4.49	.86	.356	.648
6. I do sport for the pleasure of increasing my knowledge about different training methods	2.81	1.25	.463	.620
7. I practice physical activity because I like to feel involved in the activity	3.80	1.07	.456	.626
9. I do sport because it is one of the best ways of meeting people	2.68	1.28	.478	.621
10. I do physical activity because I feel great personal satisfaction when I master certain difficult training techniques	3.28	1.32	.399	.615
12. I do sport because the people I know will approve of me	1.73	1.13	.336	.687
14. I practice physical activity because I want to lose weight	2.88	1.44	.266	.741
16. I carry out sport because it is important for me to discover new movements and skills	3.45	1.26	.439	.600
18. I do physical activity because it is one of the best means of developing other aspects of my personality	3.64	1.19	.489	.626

Alpha=.714

Table 3 shows the analysis of the self-efficacy subscale; items number 5, 8, 11, 19, 21 were negative, thus the analysis were preceded by an inversion of the scores of the particular items. The results of items number 13 (“My speed has helped me out of some tight spots”) and 25 (“Because of my agility, I have been able to do things which many others could not do”) proved that they were falsely adjusted within the self-efficacy subscale. As can be observed in Table III, item number 13 presented a low discrimination rate ($r = .136$).

On the other hand, the results of item number 25 suggest that the elimination of this item should be considered in future applications of the inventory. Concretely, by eliminating item number 25 the reliability of the self -efficacy subscale would increase from .753 to .782.

TABLE 3
Item analysis of the subscale of Self-Efficacy

Item	M	SD	Item- Total	Alpha if item deleted
5. I am not agile and graceful	3.75	.129	.547	.702
8. I have poor muscle tone	3.65	1.18	.420	.737
11. I can't run fast	3.49	1.38	.520	.711
13. My speed has helped me out of some tight spots	3.11	1.18	.136	.770
19. I do not feel in control when I do an activity that requires physical dexterity	4.08	1.15	.532	.708
21. I take little pride in my ability in sports	3.72	1.01	.432	.733
23. I have excellent reflexes	4.40	1.28	.574	.700
25. Because of my agility, I have been able to do things which many others could not do	3.43	.69	.366	.782

Alpha=.753

Finally, the participant's observations were closely scrutinized so that instrument's face validity could be examined; several respondents indicated that item number 5 did not appear to measure any of the dimensions of attitudes, motivation and self-efficacy. This item had been recruited by the Spanish version (Sánchez-Barrera, 1992) of the self - efficacy scale of Rychman et al. (1982), where the English word "graceful" was translated into the Spanish « garboso ». Taking into consideration the doubtful face validity of item 5 we decided to carry out a bi-directional translation in order to approximate the most exact translation of the item; this post-result analysis was carried out by a professional language translator and a bilingual scholar. During the bi-directional translation process item number 5 was translated from English to Spanish and then back to English. This back-translation method suggested the replacement of the word "garboso" by "desenvuelto". Therefore in future use of the questionnaire it is strongly recommended the use of the term "desenvuelto".

DISCUSSION

The results of these two initial phases offer preliminar evidence regarding the efficiency of Sp- AMSQEP. Nevertheless, during the different steps of the development and the validation of the questionnaire the results facilitated the

detection of problematical points that by modifying them, an increase in the internal consistency and the reliability of the instrument could be expected.

Reliability

To establish the reliability of the research tool two different methods were employed: the test/retest and the internal consistency methods. The test/retest was conducted in the pilot study of phase 1; during this phase the questionnaire was administered once and then a second time to the same sample within a period of two weeks. Through this method we obtained excellent indications of the repeatability of the instrument.

During the preliminar application of phase 2, the internal consistency method was used. The motivation and self -efficacy subscales obtained satisfactory scores on the Cronbach statistical scale but the attitudes subscale fell below acceptable levels (Nunnaly & Bernstein, 1994). Consequently, an item analysis was conducted in order to detect any problematical points that propably influenced negtively the reliability of the instrument. Concretely, the evidence gathered through item analysis suggested the elimination of items 3 and 25 as well as a change in the wording of item 5 which presented a slight ambiguity and produced a certain confusion. Therefore, the above mentioned changes should me made and tested in a future application of the questionnaire.

Validity

In phases 1 and 2, two different forms of validity were assessed: The content and face validity. For the content validity a panel of experts was consulted in order to express their opinion as to the extent to which the statements of the questionnaire adequately represented the dimensions of attitudes, motivation and self -efficacy. Following the experts' instructions, one item was included on the motive of exercising to lose weight. Regarding face validity, special attention was paid to the observations of the participants. Thus, content as well as face validity helped us to refine the questionnaire by adding new items or by modifying others. In a future study the examination of the psychometric properties of the instrument should be further analised by assessing its construct validity; by this way it would be possible to examine whether this first "a priori" factor classification of the items coincides absolutely with the initial setting of the items among the three instruments used in the developing phase of the Sp- AMSQEP. Adittionaly, future studies could attempt to examine the criterion validity in order to examine whether the instrument correlates positively with other valid scales that measure separately each of the three subscales that make up the instrument.

The next step in the process of the psychometric evaluation of this instrument will consist of the accomplishment of a new application with the purpose of testing the suggested 22 -item version of the questionnaire. In such a study all the changes in the format and wording, which are mentioned in this article, should be included so as to examine if these modifications can produce a positive effect regarding the fiability and reliability of the instrument. As it has already been mentioned, the present article had a preliminary character therefore the next phase of this study, which has already been initiated, it will consist of passing this instrument to the final target sample - people participating in private health clubs participants.

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