

Validity, reliability and exploratory factor analysis of the dropout scale in sport centres

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ABSTRACT

Nuviala A, Teva-Villén MR, Grao-Cruces A, Pérez-Ordás R, García-Fernández J, Nuviala R. Validity, reliability and exploratory factor analysis of the dropout scale in sport centres. *J. Hum. Sport Exerc.* Vol. 7, No. 1, pp. 275-286, 2012. Sport dropout is a complex problem, in which multiple reasons influence. One lacks an instrument of easy application for the sport centres, which there contributes relevant information about dropout motives, at the time that it expires with the properties that any measurement's instrument must assemble. The aims of this work were to design, to validate and to verify the reliability of a useful instrument as way of evaluation of the motives of the dropout of the organized physical activity that provide the different sport centres. So, an inventory was made, a statistical analysis of the items was also made, so as an exploratory factor analysis and his validation and his reliability were analyzed. In conclusion, it can be stated that we have a valid and reliable tool to study the phenomenon of dropout in sport centres, which depends on five factors: leisure, enjoyment, satisfaction, practice and economic. The tool has 22 items in total, which makes its application easy. **Key words:** SPORT SERVICES, SPORT ORGANIZATIONS, DROPOUT MOTIVES, ABANDONMENT, QUESTIONNAIRE.

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Submitted for publication February 2012

Accepted for publication March 2012

JOURNAL OF HUMAN SPORT & EXERCISE ISSN 1988-5202

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doi:10.4100/jhse.2012.71.06

INTRODUCTION

Nowadays, the increase of physical inactivity has turned in one of major public health concerns in industrialized countries (Guthold et al., 2008). This problem has derived in a progressive deterioration of the population's health in recent years (Huang et al., 2007). Years in which have continued to proliferate evidences of the relationship between the insufficient physical activity (PA) and different health risks. Cardiovascular diseases (Lavie & Milani, 2011), metabolic syndrome, diabetes type 2 and some types of cancers (Church, 2011) have recently been linked with the lack of PA.

Large sums of money have been invested in health policy to promote citizens' PA (Limstrand & Rehrer, 2008). Variety of programs have been designed and implemented with this goal. However, the high dropout of these exercise programs indicates that promotion plans are not having success (Haase & Kinnafick, 2007). Dropout is the main concern of the physical and sports practice (Gonçalves et al., 2007). This problem has been approached, mainly, from the application of the motivation's theoretical models to the field of the PA and sport (Almagro et al., 2010; Cervelló et al., 2007).

Motivational orientation does not only has relationship with the onset of PA practice but affects the adherence and the dropout of PA (Deci & Ryan, 2000). Self-determination theory (Deci & Ryan, 1985, 2000) argues that individuals' perceptions of behaviours are associated with different types of motivation, influenced by social environmental factors. Based on this theory, recent studies have shown that intrinsic motivation (which refers to engaging in an activity for the pleasure of the process) is a key factor to maintain exercise behaviour (Haase & Kinnafick, 2007; Jöesaar & Hein, 2011a; Jöesaar et al., 2011b) and predict the intention to be physically active in the future (Almagro et al., 2010). Intrinsically motivated behaviour has the highest self-determination, however, perceptions of not meeting the psychological needs for autonomy, competence and relatedness will facilitate non self-determined forms of motivation and amotivation which, in turn, may lead to dropping out of PA and sport (Jöesaar & Hein, 2011a).

Narrowly tied to self-determination theory is the achievement goal theory (Jöesaar et al., 2011b; Nicholls, 1989). Achievement goal theory postulates that individuals in achievement settings may interpret their success with respect to two orientations, learning or task orientation and performance or ego orientation. Individuals exhibiting a predominant task orientation tend to focus on improving performance relative to their own past performance rather than comparison with another. Individuals with a predominant ego orientation tend to judge their ability by using social comparison as a reference, so that the person feels successful when he shows more skills than others. The literature has pointed that task-oriented individuals tend to be more persistent under failure and intrinsically motivated. In contrast, an ego orientation has proved an indicator of sport dropout (Cervelló et al., 2007; Jöesaar et al., 2011b).

Other psychological theories, such as self-efficacy theory (Bandura, 1997), have also made contributions to explain the dropout phenomenon (Haase & Kinnafick, 2007) and design interventions to reduce the early dropout of organized PA's programs (Annesi & Unruh, 2007). However, a review by Biddle & Mutrie (2008) concluded that the predictive power of all these explanation theories is still modest. In fact, sport dropout is a complex problem, in which multiple reasons influence (Bara & Guillén, 2008; Ruiz et al., 2007). Diverse studies have focused on deciphering which are the main motives that has as a consequence the dropout of physical and sport practice (Gómez-López et al., 2011; Ruiz et al., 2007).

The barrier that supposes for the PA and sport practice the lack of time has been the dropout's motive most argued in the previous studies. Motive invoked by more than the half of Havana's citizens older than 15 years who had dropped out the practice in the study of Ruiz et al. (2007). Main reason for dropout in sport college (Gómez-López et al., 2011) and high school students (Macarro et al., 2010). Lack of time that shares importance with study when the motives of dropout are analyzed between the students of minor age (Bara & Guillén, 2008; Palou et al., 2005). Another of the main motives of dropout is the preference of other leisure activities, not physical-sports (Bara & Guillén, 2008; Macarro et al., 2010; Palou et al., 2005; Ruiz et al., 2007). Laziness and unwillingness have also been identified as some of the most pervasive motives of dropout in the physical-sports practice (Macarro et al., 2010; Ruiz et al., 2007).

Close to these main motives, there are others of diverse nature, as for example the health reasons (Macarro et al., 2007; Ruiz et al., 2007), that increase with individual's age (Ruiz et al., 2007). Motives related to dissatisfaction with the practice's development, with the different resources that surround the practice (Evans, 2008; Macarro et al., 2010; Ruiz et al., 2007) or aspects linked with the economic cost of the physical-sports practice (Ruiz et al., 2007), together with the absence of enjoyment (Evans, 2008; Macarro et al., 2010; Palou et al., 2005) and the influence of relatives, friends or pair (Macarro et al., 2010; Ruiz et al., 2007) are reasons that have to be had into account.

The knowledge of the motives that lead to the dropout is fundamental to be able to improve the management of a complex problem as the loyalty of the user in a sport centre (Martínez & Martínez, 2009). The knowledge of the origin or cause of the users' experiences is essential in implementing any kind of service that seeks to improve the efficiency and effectiveness of its management and gain the loyalty of users (Martínez & Martínez, 2008). Users are increasingly more demanding (Martin & O'Neill, 2010), and as such their loyalty has become one of the most important achievements for any organisation (Tsitskari et al., 2006). So it is surprising that studies in the last years have appeared interested in knowing the motivation of the sport centres' user (Martínez & Martínez, 2009; Muyor et al., 2009).

Nevertheless, the dropout studies are scanty in the specific field of the sport centres. Most of the results of dropout work are difficult to generalize (Cervelló et al., 2007). The majority of these studies have centred on studying the dropout of the competitive PA (Almagro et al., 2010; Jõesaar & Hein, 2011a). And the greatest part of the dropout's works has attended exclusively to adolescence (Cervelló et al., 2007; Jõesaar et al., 2011b). For what it turns out necessary to continue investigating on the dropout's motives, with a view to adopt measures in order to reduce this problem (Macarro et al., 2010).

Following a review of the instruments contemplated in the bibliography to assess the dropout's motives, it is observed that the questionnaires that attend to this end are few, of which we do not know any exclusively designed to evaluate the dropout motives, unless they are open items (Bara & Guillén, 2008). The major part of the questionnaires related the foresaid purpose forms part of questionnaires of major extension (Gómez-López et al., 2011; Macarro et al., 2010), which includes in most cases together with items on the physical-sport practice's reasons and of never having practised it (Gómez-López et al., 2011; Palou et al., 2005; Ruiz et al., 2007). In any case, there are unknown psychometric properties of the item or items designed to assess the dropout's motives, which in most studies have consisted of dichotomous questions (Gómez-López et al., 2011; Ruiz et al., 2007).

One lacks therefore an instrument of easy application for the sport centres, which there contributes relevant information about dropout motives, at the time that it expires with the properties that any measurement's instrument must assemble. Base to it, the aims of this work were to design, to validate and to verify the reliability of a useful instrument as way of evaluation of the motives of the dropout of the organized PA that provide the different sport centres.

MATERIAL AND METHODS

Participants

The sample consisted of 547 subjects aged between 15 and 70 ($M= 30.62$; $SD= 9.98$), who had quit training in a sport centre in the *Comunidad Autónoma de Andalucía* (Spain). Around 56% were men and 44% were women, and there were no significant statistical differences derived from age ($p= 0.588$). The most common training frequency per week for people who had quit, was 2-3 times per week (59.2%), the average time of training was between 60 and 90 minutes for 45% of people sampled. Finally, average resident time in the centre had been 13.03 months ($SD=16.51$)

Measures

In order to make the dropout rating scale in sport centres, it was necessary to decide what dimensions should be included or what dimensions were relevant to know the reasons of dropout from sport centres. Three different stages were followed:

1. Bibliographic research about dropout in sport practice.
2. Establishment of a discussion group composed of sport business professionals and experts in the development of research tools.
3. Making of a pilot research with 50 customers of sport centers who had quit sport training.

The resulting rating scale was composed of 7 factors and 51 items that could lead to dropout in sport training: (1) Enjoyment, with 6 items referred to the joy obtained from carrying out a physical activity; (2) Physical Appearance, composed of 5 items related to the physical look and its perception; (3) Social, 5 items that research into social relationships; (4) Leisure time, integrated by 10 items related to spending spare time by means of sport practice; (5) Fitness, composed of 6 items that deal with health and well-being; (6) Quality perception and satisfaction, integrated by 15 items related to material and human resources of the organization; (7) Economic, 4 items referred to economical questions that affect sport practice in the organization. Answers ranged between 1 (totally disagree) and 5 (totally agree).

An statistical research was made about the items on the questionnaire of dropout in sport centers (mean, standard deviation, asymmetric, kurtosis, and adjusted correlation coefficient item-total), leading to a first selection of items in accordance with the following criteria: 1) those items with a mean value located outside the area defined by the scale mean value plus/minus a standard deviation would be eliminated, 2) those items with a reduced standard deviation ($SD < 0.50$) would be eliminated, 3) those items with an asymmetry and kurtosis over ± 1.96 would be eliminated and 4) those items with a correlation coefficient item-total under 0.35 would be eliminated.

Procedures

The fieldwork was carried out using a questionnaire managed by a group of survey takers who were previously trained. Participants were asked for their collaboration and they were also encouraged to ask any question they may had related to the items. Time taken in making the survey was around 10 minutes. Before proceeding to the data collection, managers of the organization where the survey was taken were asked for permission. In the same way, all survey takers agreed to participate voluntary in the research.

Analysis

The analysis of psychometrics properties of the scale was made using the software SPSS.20. First, the analysis of the items was made, and to do so they following tests were carried out: mean standard deviation, asymmetry, kurtosis and adjusted correlation coefficient item-total. Next, an exploratory factor analysis was made, as well as some different reliability tests. Later, the divergent validity was obtained by a calculation of correlations between the factors resulted from the exploratory factor analysis.

RESULTS

Statistical analysis of the items

Table 1 shows metric values of the selected items, keep in mind that the scale was initially composed of 51 items in order to make the remaining tests. As it can be checked, the 22 items fulfil the necessary criteria to proceed with the analysis, guaranteeing the capacity to show the differences between the individuals, and maximizing the test variance at the same time. The reliability of the dropout scale of sport centers was evaluated with Conbrach's alpha resulting a value of 0.941.

Table 1. Mean (M), standard deviation (SD), Asymmetry, Kurtosis, correlation item-total (R IT-c) and alpha if case any item is eliminated (α without item).

	M	SD	Asymmetry	Kurtosis	R IT-c	α without item
It's not fun	1.6284	0.90270	1.536	1.893	0.600	0.940
I don't like attending a sport centre	1.7612	1.10149	1.571	1.701	0.520	0.940
I don't enjoy attending a sport centre	1.7255	1.05037	1.557	1.751	0.622	0.939
I don't find stimulating attending a sport centre	1.8219	1.14172	1.393	1.013	0.576	0.939
I haven't met interesting people	1.6955	0.97387	1.373	1.167	0.609	0.939
I think I have to spend my time doing some other things	2.1477	1.28302	0.829	-0.458	0.333	0.941
I have some other leisure options more interesting	1.8333	1.07196	1.328	1.129	0.469	0.940
I have to spend more time with my family	1.8320	1.14473	1.395	1.101	0.302	0.941
It takes too long to go and to come back from the gym	2.5949	1.55171	0.421	-1.325	0.376	0.941
I'm not satisfied with the training staff	1.8194	1.24093	1.431	0.878	0.606	0.939
The training staff doesn't pay due attention to users	1.9145	1.31897	1.314	0.434	0.592	0.939
I'm not being well attended in classes and/or fitness rooms	1.7209	1.17503	1.714	1.811	0.602	0.939

Table 1.	M	SD	Asymmetry	Kurtosis	R IT-c	α without item
I'm not satisfied with reception/commercial staff	2.0783	1.43409	1.060	-0.338	0.400	0.941
Temperature is not adequate	1.8032	1.16174	1.391	0.906	0.512	0.940
There are not enough sport equipment	1.9683	1.32848	1.200	0.159	0.549	0.940
The strength and cardio equipment are not enough	1.8680	1.26561	1.357	0.630	0.597	0.939
I think price is too high	2.7358	1.51808	0.295	-1.373	0.402	0.941
I found a more economical gym	2.0812	1.41958	1.030	-.369	0.429	0.940
I think membership fees are very expensive	2.7456	1.56299	0.286	-1.426	0.393	0.941
I can't do the activity I like	2.0973	1.42461	1.042	-.355	0.457	0.940
It's very crowded	2.5525	1.47829	0.451	-1.208	0.535	0.940
I'm not satisfied with the service	2.1615	1.42492	1.008	-0.382	0.524	0.940

Internal structure analysis

In order to know the factorial structure of the dropout scale of sport centres, an exploratory factor analysis was made about the 22 items resulted from the statistical analysis of the items, using the method of extraction of main components and subsequent Varimax rotation. Before making the analysis, the mean of sampling adequacy of Kaiser-Meyer-Olkin (KMO) and Bartlett's sphericity test were calculated. The index KMO showed a value of 0.874 and Bartlett's test was statistically significant ($\chi^2_{2231}=5961.7560$; $p<0.001$), what lead to the conclusion that the use of factorial analysis was appropriate. The resulting dimensional structure was composed of five factors (satisfaction, enjoyment, practice, economic and leisure and social relationships) that together explain 65.55% of the variance (Table 2).

Table 2. Factor structure rotated, communality, eigenvalues, Cronbach's alpha and percentage of variance explained by each factor.

	Satisfaction	Enjoyment	Practice	Economic	Leisure	Extraction
I'm not satisfied with training staff	0.857					0.853
Training staff doesn't pay due attention to users	0.863					0.860
I'm not being well attended in classes and/or fitness rooms	0.802					0.764
I'm not satisfied with reception/commercial staff	0.622					0.497
I'm not satisfied with the service	0.658					0.670
It's not fun		0.626				0.571
I don't like attending a sport centre		0.810				0.723
I don't enjoy attending a sport centre		0.860				0.824
I don't find stimulant attending a sport centre		0.840				0.793

Table 2.

	Satisfaction	Enjoyment	Practice	Economic	Leisure	Extraction
It takes too long to go and to come back from gym		0.463				0.453
I cannot do the activity that I like			0.636			0.468
It is very crowded			0.661			0.602
Temperature is not adequate			0.516			0.412
There are not enough sport equipment			0.779			0.755
Strength and cardio equipment are not enough			0.766			0.733
Price is to high				0.891		0.844
I found a more economical gym				0.750		0.640
Membership fee is very expensive				0.912		0.873
I haven't met interesting people					0.515	0.545
I should spend my time doing some other things					0.736	0.578
I have more interesting leisure options					0.557	0.470
I have to spend more time with my family					0.689	0.496
% Variance explained	34.604	10.782	8.892	6.157	5.120	65.555
Eigenvalue	7.613	2.372	1.956	1.355	1.126	
Cronbach's alpha	0.893	0.812	0.807	0.878	0.732	0.898

Reliability

The reliability of the resulting tool was measured with Cronbach's alpha obtaining a value of 0.898. As a complement to this index of internal consistence other two indicators derived from the factorial analysis were obtained: Carmine's theta (Θ) (Carmine & Zeller, 1979) and Heise & Bohrnstedt's Omega (ω) (1970). For the data we have been working with, Θ reaches a value of 0.90 and ω 0.96 (Table 3).

Table 3. Calculation made to obtain Carmine's Theta (Θ) and Omega (ω).

$$\theta = \frac{n}{n - 1} \left(1 - \frac{1}{\Delta} \right) = \frac{22}{21} \left(1 - \frac{1}{7.613} \right) = 0.90$$

$$\omega = 1 - \frac{n - \sum h^2}{n + (2 \sum r)} = 1 - \frac{22 - 14.424}{22 + (136.814)} = 0.95$$

Divergent validity

In order to study the divergent validity a study of correlation between the five factors of the dropout scale in sport centers was made using the Pearson's coefficient. The correlations between the factors that compose the rating scale have obtained positives and significant correlations between 0.640 and 0.202 (Table 4).

Table 4. Correlation between factors and internal consistence (diagonal).

	M	SD	Leisure	Enjoyment	Satisfaction	Practise	Economic
Leisure	1.8668	0.77159	(0.732)	0.505**	0.276**	0.324**	0.202**
Enjoyment	1.8840	0.86846		(0.812)	0.401**	0.417**	0.295**
Satisfaction	1.9049	1.08481			(0.893)	0.640**	0.357**
Practise	2.0193	0.98475				(0.807)	0.359**
Economic	2.4930	1.33922					(0.878)

Note. **. The correlation is significant at level 0.01 (bilateral).

DISCUSSION AND CONCLUSION

This problem has been approached, mainly, from the application of the motivation's theoretical models to the field of the PA and sport (Almagro et al., 2010; Cervelló et al., 2007). Motivational orientation does not only has relationship with the onset of PA practice but affects the adherence and the dropout of PA (Deci & Ryan, 2000). However, a review by Biddle & Mutrie (2008) concluded that the predictive power of all these explanation theories is still modest. In fact, sport dropout is a complex problem, in which multiple reasons influence (Bara & Guillén, 2008; Ruiz et al., 2007). One lacks an instrument of easy application for the sport centres, which there contributes relevant information about dropout motives, at the time that it expires with the properties that any measurement's instrument must assemble. Base to it, the aims of this work were to design, to validate and to verify the reliability of a useful instrument as way of evaluation of the motives of the dropout of the organized PA that provide the different sport centres.

After the qualitative design of the items was carried out, in accordance with the procedure described by Carretero-Dios & Pérez (2005), that had three different moments: checking of the literature, making of the group of experts for the design of the questionnaire and the pilot study, quantitative analysis of resulting items. This procedure's aim is to guarantee that it has the capacity to show the differences existing between individuals. That is the reason why, the aim is to achieve a group of items that can maximize the variance of the test, selecting those with a high level of discrimination, high standard deviation and with average answering scores around the middle value of the rating scale (Bollen & Lon, 1993; Carretero-Dios & Pérez, 2005; Nunnally & Bernstein, 1995).

Items average score was around the middle value of the rating scale (not existing values too high neither too low) and standard deviation was over 1, except in two items, which demonstrates the regularity of the results according to Carretero-Dios & Pérez (2005). In addition, asymmetry and kurtosis values were below 2, which indicates a univariate normal distribution of the data (Bollen & Long, 1993). In order to calculate items discrimination, we use the adjusted correlation coefficient between the score in the item and the total score. This procedure intended to increase the internal consistence of the rating scale. Values over and equal to 0.25-0.35 were considered adequate (Nunnally & Bernstein, 1995). The intention was to eliminate those items that generated answers too much unanimous and not enough discriminatory (Streiner & Norman, 1995).

Once the selected items passed through initial filters, the next aim was to verify if these items were empirically put into groups, as theoretically had been predicted in the design of the questionnaire. At this moment, the target is exploring the internal structure of the rating scale, its dimensionality or the way items are put into groups (Elosua, 2003). The initial rating scale was made considering seven factors that could lead to the dropout in sport centres: enjoyment, appearance, social, leisure, fitness/health, quality perceived, satisfaction and economic. In order to verify the group, an exploratory factor analysis was used. That analysis provided us with the grouping of the variables that compose the questionnaire depending on mathematical criteria based on the correspondence between them, in order to be interpreted later. The exploratory factor analysis only group similar correlations, but this grouping may be due to more elements than those purely conceptual. There are several kinds of exploratory factor analysis that can be used, as several rotations too. With a number of items over 20, it is recommended the use of principal components analysis (PCA) (Cortina, 1993). The rotation procedure used was Varimax, despite of being recommended for studies where factors are not related. This procedure was chosen due to the theoretical interest of separating, if possible, the resulting factors, in spite of establishing the factors relation (Carretero-Dios & Pérez, 2007).

Before a correct application of exploratory factor analysis, it is necessary to verify that items must be found related between them, which means that the correlation matrix must allow finding relevant groups between variables. Therefore it is necessary, before the application of the analysis, to calculate some estimators that can ensure the adequate correlation matrix (Cortina, 1993), being the election tests those of Bartlett's sphericity and KMO. The result of this test demonstrated the right choice of the process as its value was elevated.

The result of the statistical analysis of the items and the exploratory factor analysis, was the existence of five factors that explain the 65.55% of the variance, around which the following items were grouped: leisure, enjoyment, satisfaction, practice and economic. It attracted our attention the disappearance from the initial proposal of the questionnaire of two factors that a priori could be taken as dropout reasons in sport centers; these are the appearance and fitness/health. The items that composed these factors did not pass through initial filters, either because the asymmetry and kurtosis were very high, or because the correlation item-total was very low. It is possible that in addition to the low "quality" of the items, it might be necessary to mention the positive association of the adherence to physical practice for the reason of enjoyment and social, and negative for reasons of practice related to the appearance or health (Frederick-Recascino & Shuster-Schmidt, 2003; Ryan et al., 1997), results that strengthen those obtained in this work when not taking into account the reasons related to health and appearance, and maintain the factors enjoyment and social as factors that cause the dropout in sport centres.

It must be noticed the grouping made in the exploratory factor analysis of social and occupation of spare time reasons in only one factor, leisure. This result can be considered normal, given that the social relations and the occupation of that temporal gap occur in the same period of time: spare time. It is impossible to establish and/or maintain new social relationships if the place and the activity where we spend our leisure time does not satisfy users wishes.

The factor quality perceived and satisfaction has been dissociated after the factorial confirmatory analysis. Current studies of these concepts treat them separately, understanding quality as a lasting attitude, opposite to satisfaction as a temporary judgement of a specific service (Varela et al., 2003). But their relationship is direct, being quality perceived considered a precedent of satisfaction, and both together with

value perceived, precedents of users fidelity in sport centers (Brady et al., 2005), opposite phenomenon to the one we try to provide with a researching tool.

The two other factors, enjoyment and economic, established in the qualitative design of the items, have been maintained after the two statistical analysis carried out which demonstrates the appropriateness of them in the research and the incidence they have in the phenomenon of dropout in sport centres.

The internal consistence of the rating scale was measured by Cronbach's alpha obtaining a value of 0.898. As a complement to this index of internal consistence two other indicators derived from factorial analysis were calculated: Carmines' theta (θ) (Carmines & Zeller, 1979) and Heise & Bohrnstedt's Omega (Ω) (1970), being both estimated coefficients higher than Cronbach's alpha. Results obtained confirm the statement $\alpha < \theta < \Omega$, what demonstrates a good reliability of the tool.

Next, the study of discriminated validity was made, and it was obtained by the correlations between the five factors of the rating scale by means of the Pearson's coefficient. The correlations between them are positive, moderates and are significantly related, which demonstrates this kind of validity, given that results tell us they are similar but conceptually different (Bearden & Teel, 1983; McEvily & Zaheer, 1999). In the same way and following Luque's criteria (2000), which states that none of the correlations is higher than 0.9; this corroborates the existence of this kind of validity. In conclusion, it can be stated that we have a valid and reliable tool to study the phenomenon of dropout in sport centres, which depends on five factors: leisure, enjoyment, satisfaction, practice and economic. The tool has 22 items in total, which makes its application easy.

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