

ORIGINAL ARTICLE

Prediction of abandonment in Spanish fitness centres

IVÁN CLAVEL SAN EMETERIO ¹, JORGE GARCÍA-UNANUE²,
ELISEO IGLESIAS-SOLER ¹, JOSE LUIS FELIPE², & LEONOR GALLARDO³

¹Department of Physical Education and Sport Science, Faculty of Sport Sciences and Physical Education, University of A Coruña, A Coruña, Spain; ²School of Sports Science, Universidad Europea de Madrid, Madrid, Spain & ³Department of Physical Activity and Sport Science, Faculty of Sport Sciences of Toledo, University of Castilla La Mancha, Toledo, Spain

Abstract

Research question: The increase of physical exercise in fitness centres has turned these facilities in important active lifestyle promoters. However, only between 30% and 60% of subscribers still linked to the sports centre after a year. The aim of this study is to design a model to predict the drop out in fitness centres. Research methods: Monthly data corresponding to the actual behaviour of 14,522 members of three sport centres in Spain were recorded over the course of one year. In order to calculate the likelihood of drop out, logistic regressions were used to create predictive models for each centre. Results and findings: It was possible to predict abandonment of users of sport centres from their historical behaviour, although the predictive models obtained for each centre were not completely coincident. The effectiveness of the models was around 70%. Implications: The analysis of users' behaviour in a fitness centre can allow to avoid the drop out and therefore the abandonment of physical activity. Segmenting the customers based on the likelihood of drop out may be useful for improving the effectiveness of the strategies of loyalty and for optimizing the organization of human and material resources.

Keywords: Exercise, prediction, abandonment, sport management, current behaviour

Highlights

- It is possible to predict abandonment of users of sport centers from their behavior.
- The users correctly classified in the models generated (abandonment yes or not), are in values close to 70%.
- The predictive models for each center were not completely coincident.

1. Introduction

The benefits of physical activity are widely known. Many of those who exercise do it in informal places (like running or walking in the park) or they go to fitness centres. Currently, the latter has become one of the easiest ways to practice physical exercise among the population (Sperandei, Vieira, & Reis, 2016). In the case of Spain, the *Europe Active* association (2016) concludes in their market report that the fitness business holds around 5.06 million members.

Within this field, however, different studies have proven that only between 30% and 60% of the members continue to be registered at the centre for more than one year (Bedford, 2008; International Health Racquet & Sportsclub Association, 2012; MacIntosh & Law, 2015).

Therefore, dropping out is a major business problem, which could be converted into a global problem from a physical inactivity point of view, since sport centres are the main drivers of physical activity (Gallardo, Rodríguez-Cañamero, Hernández-Barrio, & Peñas, 2016).

Adherence to physical activity is a complex interaction of cognitive, behavioural and social conditions (McAuley, Jerome, Elavsky, Marquez, & Ramsey, 2003; Surakka, Alanen, Aunola, Karppi, & Lehto, 2004). Studies on population groups that perform supervised/structured exercise programmes, created only for research purposes are frequent (Arikawa, O'Dougherty, & Schmitz, 2011; Miller et al., 2014). However, these programmes are not usually practised by the majority of the population and the conditions created are often expensive in time and money to

Correspondence: Iván Clavel San Emeterio, Department of Physical Education and Sport Science, Faculty of Sport Sciences and Physical Education, University of A Coruña, Avenida Che Guevara 121, Bastiagueiro, Oleiros 15179, A Coruña, Spain. E-mail: ivan.clavel@udc.es

apply them extensively (Linke, Gallo, & Norman, 2011). The lack of control over characteristics and types of activities performed by a fitness centre member could affect adherence and make it difficult to identify the determinants of fitness (Masuki et al., 2015).

In the literature, customer loyalty is clearly identified as an effective tool to prevent drop outs. The improvement in the loyalty of the client translates as an increase in its value. The average value of the clients increases from 25% to 100% if the use of retention strategies is increased by 5% (Reichheld, 1996). The implementation and continuous improvement of loyalty-building programmes are becoming a strategy to maximize the performance of companies. However, there is no consensus in the literature regarding the measurement and definition of the loyalty construct. To study this in more depth, customer loyalty can be defined from different perspectives (Dimitriadis, 2006), attitudinal, behavioural and mixed approach.

However, fidelity implies that there are favourable attitudes and overt commitments on half of the consumer, which may not correspond to the final abandonment behaviour (Alexandris, Dimitriadis, & Kasiara, 2001; Bodet, 2012). This makes it difficult to predict whether a user will leave the sports centre, as cancellation of membership is usually measured with future behavioural intentions without taking into account current perceptions (Watts, 2012).

This study focuses on the behavioural perspective, which refers to the repeated purchase of a particular brand. Thus, repetition, frequency and quantity of purchasing are used as indicators (Dick & Basu, 1994; Ferrand, Robinson, & Valette-Florence, 2010). Loyalty is understood only according to current behaviour, without taking into consideration the customer's declared intentions regarding future purchases (Martín, 2005). From this perspective, consumer preferences and emotions are ignored when making purchases (Ishida & Keith, 2006; Odin, Odin, & Valette-Florence, 2001). This approach uses objective loyalty indicators, which do not exploit the psychological meaning of loyalty.

The software currently used for managing large sports centres allows the registration of a large number of variables. The information provided in these databases allows the analysis of behaviour and type of consumption by members (Martinez, de Borja, & Carvajal, 1999). According to Ferrand et al. (2010), the relationship between previous and subsequent purchasing behaviour is obvious. McDonald, Karg, and Leckie (2014) state that the review of previous behaviours can very effectively reveal the stability of any customer behaviour. Thus, recent studies have delved into these records to create

prediction models to be applied to other fitness users (McDonald et al., 2014; Sperandei et al., 2016).

Therefore, this study aims to obtain a predictive model based on the variables of use and behaviour, thus establishing the probability of abandonment of users of sports centres. In addition, the resulting models will be compared in three sports centres of different cities and with different management modalities, under the same methodological procedure. This will allow to conclude if there is a unique predictive model and will even confirm the predictive value of each of the variables included in the models. These analyses will help the directors of centres guide the design of loyalty programmes towards people who are more likely to leave. Likewise, the design of these programmes will be more effective because they will be able to focus on the variables that show a greater influence in the behaviour of abandonment of the practice of physical activity in each sports centre.

2. Method

2.1. Sample and study context

This study has been developed in three sports centres, one of private ownership and two of public ownership and private management (subcontracted public sports service). The centres were located in Zaragoza and Tudela (Spain). The centres offer pool services (except the private centre), spa, fitness activities and resistance training and cardio rooms. Customers paid a standard price set for access to all services. The sample consisted of all those who were members of the sports club at some point in 2014 during a minimum duration of one month (minimum duration in the type of fees offered). Data, protocols and analysis were performed under a licence obtained from the management company. The methods and procedures conformed to the Declaration of Helsinki and Personal Data Protection Law, and were checked and approved by the Research Committee of the University of A Coruña.

The total sample of the study was 14,522 customers of sports centres distributed in three different facilities. The sample of sports centre one, privately owned and run (SC1) consisted of a total of 1977 people with a mean age of 35.6 ± 15.18 years, 47% of whom were men and 53% were women. Throughout the year, 56% of them dropped out. A total of 6836 were members of sports centre two for at least one month during 2014, which is publicly owned but privately managed (SC2) (51% women and

Table I. Definition of the variables

Variable	Definition
AGE	Variable that indicates in years the age of the subject at the moment the behaviour was registered (categorized by dummy)
SEX	Indicates the gender of the individual. Values: 0 = Man, 1 = Woman.
TOTAL CHANGES	Reflects the total number of subscription fee changes made by the subject during the year analysed. Values = 1, 2, 3, 4 ... (categorized by 0=No changes; 1=changes)
TOTAL SUSPENSION	It registers if the subject has contracted this type of fee throughout 2014. It is the only fee that reflects a reduction in the use of the sports centre. Values 0 = No; 1 = Yes.
EX MEMBER	Indicates whether the individual has previously dropped out from the centre prior to a new registration. Values 0 = No; 1 = Yes.
ENTRANCE AVERAGE	It registers the average number of accesses over a month of each individual during the year registered. Values = 1, 2, 3, 4 ... (categorized by dummy)
AVERAGE STAY	Calculates in minutes the average time of stay per entrance to the centre made during the year. (categorized by dummy)
AVERAGE RENEWAL PERIOD	This is the average in days of the renewal period of the fees contracted throughout the year. Values: 30, 60, 90, 120, ... (categorized by 0 = <30 days; 1 = >30 days)
AVERAGE MONTHLY EXPENDITURE	Reflects in euros the average amount spent monthly during the year of analysis. (categorized by dummy)
NUMBER OF RECEIPTS RETURNED	Indicates the number of receipts that have been returned to the centre and not paid by the customer throughout the year. It implies that the company has not been able to charge the fee to that client for several reasons. Insufficient balance, nonconforming amount or customer indications are a few of them. Values: 1, 2, 3, 4, ... (categorized by 0 = No returned; 1 = receipts returned)
MEMBERSHIP TIME	It quantifies the time in days that a member has been registered at the centre until they drop out. (categorized by dummy)

49% men, with a mean age of 37.19 ± 16.89 years). A total of 48.8% of these members left the centre during that same year. On the other hand, centre three (SC3), also publicly owned and privately run, registered 5709 people who were a member of the centre for a minimum of one month (mean age 34.38 ± 18.60 years). Of the total, 47.3% of them dropped out at some point during the year.

2.2. Measures

All the monthly values recorded during 2014 were taken into account in the Deporwin management software which was used by all the centres (T-Innova, Barcelona, Spain). This software includes the historical behaviour and consumption habits of all customers of the centre. The selection of the variables was made based on the software's catalogue and literature that determines these variables as predictors of behaviours, as we can see in Table I.

These variables have traditionally been used as indicators of the behavioural approach to loyalty (Chen, Lin, & Stotlar, 2006; Daryanto, De Ruyter, Wetzels, & Patterson, 2010; Ferrand et al., 2010; Hurley, 2004; Triadó & Aparicio, 2004). For the analysis, the monthly and total values recorded during 2014 of the selected variables were taken into account for each of the subjects, as well as the period of time that they were members. Finally, users were coded based on whether they had dropped out of the centre that year or not.

2.3. Data analysis

The purpose of the analysis is to determine more clearly those variables that affect the prediction of abandonment of sports centres. For this, the definition of a simple model with a reduced number of variables was used, making it applicable to other samples and useful for managers (Hosmer & Lemeshow, 2004). Moreover, given the size of the sample and for a better interpretation of the results, the scale variables were transformed into exclusive categories, thus creating dummy variables. The procedure for creating such categorical variables was to divide the initial variables into four categories differentiated by quartiles. In this way, the comparison of odds between large groups is allowed instead of studying unitary changes, which loses usefulness if the scales are too broad (Green & Salkind, 2010).

With all this, we have chosen to use a logistic regression of manual input, introducing all the variables initially selected and eliminating one by one (the complete variable or the corresponding category) in their possible combinations to create the best fit. The elimination criterion was the selection of regression coefficients that present a likelihood ratio test with no statistical significance (Sanchez-Villegas & Martínez-González, 2006).

In all estimates, the logistic regression coefficient (β) is presented, as well as the exponential of β . The latter is identified as the odds ratio (OR), defined as the ratio of the odds of an event occurring in a

Table II. Resultant model according to the Manual methodology of SC1

	B	E.T.	Wald	gl	Sig.	OR	95% I.C. for OR	
							Inferior	Superior
Membership time (base) (<114 days)			137.955	3	.000			
Membership time (114.01–214 days)	1.362	.159	73.115	1	.000	3.903	2.856	5.332
Membership time (214.01–441 days)	.701	.163	18.614	1	.000	2.017	1.466	2.774
Membership time (more than 441 days)	-.397	.180	4.876	1	.027	.672	.472	.956
Entrances (base) (<1.75 entrances)			85.437	3	.000			
Entrances (1.76–4.50 entrances)	-.617	.152	16.399	1	.000	.540	.400	.727
Entrances (4.51–8 entrances)	-1.023	.156	42.805	1	.000	.359	.264	.488
Entrances (more than 8 entrances)	-1.398	.158	77.944	1	.000	.247	.181	.337
Expenditure (base) (<35.37 euros)			63.035	3	.000			
Expenditure (35.38–45 euros)	-.523	.153	11.673	1	.001	.593	.439	.800
Expenditure (45.01–54 euros)	-1.079	.155	48.320	1	.000	.340	.251	.461
Expenditure (>54 euros)	-1.068	.163	43.200	1	.000	.344	.250	.473
Changes in fees	-.368	.133	7.654	1	.006	.692	.534	.898
Receipts returned	.911	.153	35.323	1	.000	2.488	1.842	3.360
Ex-member	1.177	.153	59.272	1	.000	3.243	2.404	4.376
Age (33 años)	-.378	.111	11.710	1	.001	.685	.552	.851
Constant	1.308	.158	68.863	1	.000	3.698		

group to the odds of it occurring in the reference group. This value complements the value of β since it allows identifying the direction of the association but also its relative magnitude.

3. Results

The estimation of the SC1 centre model, created using manual input methodology, is shown in Table II ($\chi^2 = 559.70$, $p < .001$). After decision making and the evaluation of different possible combinations of variables, a total of seven variables were taken as reference. Users with the highest number of entrances, higher spending, more fee changes and greater age are significantly less likely to unsubscribe from their membership (approximately 50% less chances). Specifically, entrances to the centre of more than 8 times a month is the parameter that most reduces the odds (OR 0.247, $p < .001$). On the other hand, customers with a greater number of returned receipts and the condition of being an ex-member, more than double the chances of becoming a drop out from the sports facility. Membership time presents more complex results, as belonging to the centre between 114 and 214 days and between 214 and 441 days increases the probability of dropping out compared to those that have been there less than 114 days (OR 3.903, $p < .001$ and OR 2.017, $p < .001$, respectively), while those who remained more than 441 days were less likely to leave (OR 0.672; $p = .027$).

The model presents an R^2 of Cox and Snell of 0.247 and R^2 of Nagelkerke of 0.331. In order to classify the subjects in drop out and stay, it was considered that those participants with a probability of

abandonment superior to 0.5 would leave the centre. According to this classification, the obtained model reaches a 66.1% of specificity and 80.2% of sensitivity. Thus, the model is able to classify 73% of cases correctly.

Table III shows the results of the SC2 model ($\chi^2 = 1466.91$; $p < .001$). In this case, the model consists of eight variables. Thus, a greater number of entrances, more monthly expenses, sex (being a woman), a greater age and more average stay per day, decrease the chances of leaving the centre, between 13% and 82% depending on the variable. Membership time has a clearer interpretation than in the SC1 model. On the other hand, as in the previous model, the parameter that reflects those with more membership time within the centre is the one with the lowest ORs (OR 0.180; $p < .001$). On the contrary, members with the most returned receipts and former members are more likely to unsubscribe at the centre, as with the SC1 model (OR 2.500, $p < .001$ and OR 2.234; $p < .001$), respectively.

The SC2 model has a Cox R^2 and Snell of 0.195 and Nagelkerke R^2 of 0.260. Following the same classification criteria as the previous case, the model obtained a 68.6% specificity and a sensitivity of 69.7%. The model is able to predict 69.1% of cases correctly.

Table IV shows the estimates of the last centre model, SC3 ($\chi^2 = 2006.24$; $p < .001$). In this case, it was composed of seven variables. Greater age, greater number of entrances at the centre and longer stay at the centre, decrease the probability of leaving the centre. In this case, membership time again has a clear implication, where more membership time at the centre the lower

Table III. Resultant model according to the Manual Methodology of SC2

	B	E.T.	Wald	gl	Sig.	OR	95% I.C. for OR	
							Inferior	Superior
Ex-member	.804	.067	144.333	1	.000	2.234	1.960	2.547
Entrances (base) (<1.33 entrances)			48.283	3	.000			
Entrances (1.34–4.25 entrances)	-.397	.094	17.845	1	.000	.672	.559	.808
Entrances (4.26–8 entrances)	-.567	.107	27.961	1	.000	.567	.460	.700
Entrances (more than 8 entrances)	-.780	.113	47.667	1	.000	.458	.367	.572
Expenditure (base) (<23.55 euros)			80.480	3	.000			
Expenditure (23.56–31.08 euros)	-.189	.079	5.650	1	.017	.828	.709	.967
Expenditure (31.09–42 euros)	-.340	.079	18.530	1	.000	.712	.610	.831
Expenditure (más de 42 euros)	-.694	.080	75.934	1	.000	.500	.427	.584
Returned receipts	.916	.091	102.359	1	.000	2.500	2.093	2.986
Sex	-.141	.055	6.623	1	.010	.868	.780	.967
Membership time (base) (<168 days)			561.193	2	.000			
Membership time (168.01–637 days)	-.476	.066	51.685	1	.000	.621	.546	.707
Membership time (more than 637 days)	-1.714	.074	534.918	1	.000	.180	.156	.208
Stay (base)(<48 minutes)			13.022	2				
Stay (48.01–81 minutes)	-.211	.089	5.561	1	.018	.810	.680	.965
Stay (more than 81 minutes)	-.347	.097	12.889	1	.000	.707	.585	.854
Age (35 years)	-.503	.056	81.839	1	.000	.605	.542	.674
Constant	1.619	.093	304.051	1	.000	5.050		

Table IV. Resultant model according to the Manual methodology in SC3

	B	E.T.	Wald	gl	Sig.	OR	95% I.C. for OR	
							Inferior	Superior
Ex-member	1.233	.070	311.881	1	.000	3.432	2.993	3.936
Renovation period (30 days)	1.052	.287	13.466	1	.000	2.863	1.632	5.021
Membership time (base) (<149 days)			1037.376	3	.000			
Membership time (149.01–302 days)	-1.002	.091	122.077	1	.000	.367	.307	.438
Membership time (302.01–546 days)	-2.096	.094	492.971	1	.000	.123	.102	.148
Membership time (>546 days)	-3.430	.114	901.606	1	.000	.032	.026	.041
Returned receipts	.591	.184	10.311	1	.001	1.807	1.259	2.592
Entrances (base) (<1.91 entrances)			48.068	2	.000			
Entrances (1.92–5.64 entrances)	-.357	.103	12.154	1	.000	.699	.572	.855
Entrances (>5.64 entrances)	-.782	.117	44.644	1	.000	.457	.364	.575
Stay (base)(<46.81 minutes)			21.224	2	.000			
Stay (46.82–83.19 minutes)	-.208	.101	4.219	1	.040	.812	.666	.991
Stay (>83.19 minutes)	-.505	.115	19.137	1	.000	.604	.481	.757
Expenditure (base)(<19.87 euros)			130.255	2	.000			
Expenditure (19.88–34 euros)	.886	.083	114.017	1	.000	2.424	2.061	2.852
Expenditure (>34 euros)	.178	.804	4.428	1	.035	1.194	1.012	1.409
Constant	1.181	.098	144.569	1	.000	3.259		

the probability of leaving, with 564 days membership time being the variable with the lowest OR (OR 0.032; $p < .001$). The condition of ex-member increases most the chances of leaving the centre (OR 3.432, $p < .001$). However, there is a new variable that positively affects the probability of dropping out being the renewal period (OR 2.863, $p < .001$). Finally, expenditure shows a behaviour contrary to the two previous models, as those members with greater spending are more likely to unsubscribe from the sports facility.

The model presents an R^2 of Cox and Snell of 0.297 and R^2 of Nagelkerke of 0.397. Again, considering those participants with a probability of unsubscribing higher than 0.5, the model reaches 74.5% of specificity and 73.8% of sensitivity and therefore is able to predict 74.1% of the cases correctly.

Analysing the models, there are differences in the variables included in the model and the positive or negative influence on the abandonment of some of them, which indicates that the behaviour of users in

each centre is different, and therefore its relationship with fidelity. The variables ex-member, membership time, entrances, monthly expenditure and received receipts are included in all the models, indicating that they have a clear relation with fidelity of the user and that they must be taken into account in the loyalty programmes. Also, the maintenance fee variable is not included in any model, so the usual loyalty strategies based on this quota should be reviewed. This variable is not relevant in any of the centres as behaviour associated with loyalty (neither positive nor negatively).

4. Discussion

The results of this study show similarities with previous investigations such as those of Chen et al. (2006) or Triadó and Aparicio (2004), as they suggest that entrances, membership time and the existence of returned receipts are clear indicators of abandonment of sports centres. These variables appear among those included in the three centres evaluated. However, while the existence of returned receipts and the average number of entrances per month have a clear influence, in membership time, we find a complex behaviour in one of the centres, without being able to draw conclusive results. Watts (2012) suggested that it is simpler to predict behaviours among clients with less membership time at the centre than those that have been at the centre for longer, but that clients with longer membership time generally show less indication of leaving the sports centre. These results support those of this study, because despite finding some disparity, a greater membership time decreases the probability of leaving the centre. Independently, membership time is one of the parameters with more implications for managing the sports centre. Avourdiadou and Theodorakis (2014) indicate that the perception of the different quality attributes and their relationship with satisfaction varies among newer and older clients. Therefore, more studies are needed to analyse behavioural variations in different phases of the life cycle of a client at a sports centre.

The number of entrances at the centre and being an ex-member of the centre are two of the variables with the most robust results found in the models. Thus, a higher average number of entrances per month would initially be related to greater adherence and predisposition to sports practice. It has been proven that greater assistance to the centre on behalf of the client is achieved through individualized treatment of the client, with professional-supervised exercise programmes that include a high variety of activities and equipment (Bottorff et al., 2015).

Similarly, group activities suggest greater adherence (Kováčová, Stejskal, Neuls, & Elfmark, 2011), as well as low-intensity exercises or higher frequency activities (Surakka et al., 2004). In addition, it should not be forgotten that adherence is highly affected by economic (more better off), psychological (less depression) and physical (greater autonomy of movement) factors (Picorelli, Souza, Sirineu, Felício, & Sherrington, 2014).

The average monthly expenditure has a similar interpretation as membership time. Two of the models show a negative relationship with the probability of leaving the centre while the model of the third centre shows a positive influence. Literature suggests that the probability of quitting is lower among clients who spend more money (Bedford, 2009; Liu, 2008) but in this study, this cannot be generalized as a variable with a clear influence. However, Anokye, Pokhrel, Buxton, and Fox-Rushby (2012) argue that a 25% reduction in gym fees in the United Kingdom would significantly increase the number of members, although a 100% fee decrease would be needed to achieve the recommended number of participants in sports activities according to the UK government.

The third variable with more solid results is the return of receipts. The group of clients with more receipts returned due to non-payment increases the likelihood of leaving, as found in the study by Chen et al. (2006). This result reveals the common practice of some clients, who do not perform the administrative procedures to unsubscribe, but cancel the payment in a systematic way until the centre has to generate the cancellation of the subscription due to a breach of the regulations. This has been one of the major barriers to continue sport practice as highlighted by Bethancourt, Rosenberg, Beatty, and Arterburn (2014).

On the other hand, age appears as a significantly influential variable in the probability of dropping out in two of the models. The older age groups (over 33 years old or over 35 according to the model) are less likely to leave the centre. These results coincide with those obtained by Sperandei et al. (2016), who differentiate two profiles of consumers according to their probability of staying at the sports centres. The worst prognosis group, are younger than 25 years old on average and the best prognosis group are over 35 years old on average. However, the probability of dropping out is still excessively high, as the best prognosis group has only a 30% chance of remaining in a sports centre for more than six months according to that study.

Renewal period and fee changes only presented significant results in one of the three models respectively. Although, it has been concluded in previous

studies, that members with annual fees are the ones who remain the longest at sports centres (Bedford, 2009). No studies have been found that analyse the influence of different types of contracted fees. However, previous investigations (Bethancourt et al., 2014) to structural and organizational factors, as main limiters for the adherence to sport practice.

Finally, gender has significant differences in only one centre, coinciding with those shown for adherence and practice of physical activity (Masuki et al., 2015; Surakka et al., 2004). However, again, these studies were based on supervised and structured programmes specifically for such research, when this fact does not occur in daily sports practice of those attending fitness centres (Sperandei et al., 2016). Therefore, this fact may affect how different variables may influence on adherence. The results cannot be considered as conclusive in some of the analysed variables, which means it is necessary to do more research in this direction.

The models obtained for predicting abandonment have good specificity and sensitivity, data similar to that obtained by Chen et al. (2006), in terms of effectiveness in predicting those who will drop out and those who will not. The users correctly classified in the models generated are in values close to 70%, a result similar to that obtained by McDonald et al. (2014), resulting with models with a correct discrimination capacity (Tenga, Ronglan, & Bahr, 2010).

Finally, the estimates made in the three centres show some discrepancies between the variables finally included, indicating the need to adapt the model to each sports facility to achieve maximum precision. The creation of predictive models in three different sports centres based on the variables used confirms that certain behaviours are associated with fidelity in bibliography (membership time, uses, monthly expenditure, ...) which help to predict abandonment. In this way, we can confirm the relationship of these variables with fidelity (understood as the maintenance or not of their status as a member), reinforcing the behavioural perspective of the same. However, the model is not well adjusted, thus other variables (perhaps psychological) help explain this fidelity. Therefore, it seems that fidelity is a complex construct that needs both perspectives to be measured and analysed.

This study has not registered the reasons for abandonment, proving a clear limitation of this study. Its analysis would allow an insight into the causes of abandonment, even if it is related to their behaviour and/or clearly indicates the points to improve in the loyalty strategies. Therefore, future studies should analyse additional parameters that may influence the probability of dropping out and that can be incorporated into the entrance register software, to

increase the potential of these systems as a method of prediction and control of client drop out.

5. Conclusions

The predictive models generated in the three sports centres, using the manual methodology, were parsimonious models with good discriminant capacity. The variables used in this study are records of real behaviours, without the use of surveys. This allows managers to obtain continuous data, without interacting with members of the sports centre, and establish the probability of abandonment of each member before it actually occurs. Therefore, managers can improve the loyalty strategies to the specific characteristics of each member.

Disclosure statement

No potential conflict of interest was reported by the authors.

ORCID

Iván Clavel San Emeterio  <http://orcid.org/0000-0002-0718-2009>

Eliseo Iglesias-Soler  <http://orcid.org/0000-0002-1212-4188>

References

- Alexandris, K., Dimitriadis, N., & Kasiara, A. (2001). The behavioural consequences of perceived service quality: An exploratory study in the context of private fitness clubs in Greece. *European Sport Management Quarterly*, 1(4), 280–299.
- Anokye, N. K., Pokhrel, S., Buxton, M., & Fox-Rushby, J. (2012). The demand for sports and exercise: Results from an illustrative survey. *The European Journal of Health Economics*, 13(3), 277–287.
- Arikawa, A. Y., O'Dougherty, M., & Schmitz, K. H. (2011). Adherence to a strength training intervention in adult women. *Journal of Physical Activity and Health*, 8(1), 111–118.
- Avourdiadou, S., & Theodorakis, N. D. (2014). The development of loyalty among novice and experienced customers of sport and fitness centres. *Sport Management Review*, 17(4), 419–431.
- Bedford, P. (2008). *A randomised controlled trial to test the effect of two differing induction processes in a YMCA over a twelve month period*. London: London Sports Institute, Middlesex University.
- Bedford, P. (2009). *Retain & gain: Keeping your members engaged*. Paper presented at the A Global Perspective: Challenges & Opportunities for Membership Growth & Retention, San Francisco.
- Bethancourt, H. J., Rosenberg, D. E., Beatty, T., & Arterburn, D. E. (2014). Barriers to and facilitators of physical activity program use among older adults. *Clinical Medicine & Research*, 12(1–2), 10–20.
- Bodet, G. (2012). Loyalty in sport participation services: An examination of the mediating role of psychological commitment. *Journal of Sport Management*, 26(1), 30–42.

- Bottoff, J. L., Seaton, C. L., Johnson, S. T., Caperchione, C. M., Oliffe, J. L., More, K., ... & Tillotson, S. M. (2015). An updated review of interventions that include promotion of physical activity for adult men. *Sports Medicine*, 45(6), 775–800.
- Chen, C. Y., Lin, Y. H., & Stotlar, D. K. (2006). Marketing information system in fitness clubs. *International Journal of Eastern Sports & PE*, 4(1), 1–6.
- Daryanto, A., De Ruyter, K., Wetzels, M., & Patterson, P. G. (2010). Service firms and customer loyalty programs: A regulatory fit perspective of reward preferences in a health club setting. *Journal of the Academy of Marketing Science*, 38, 604–616.
- Dick, A., & Basu, K. (1994). Customer loyalty: Toward an integrated conceptual framework. *Journal of the Academy of Marketing Science*, 22(2), 99–113. doi:10.1177/0092070394222001
- Dimitriades, Z. (2006). Customer satisfaction, loyalty and commitment in service organizations. *Management Research News*, 29, 782–800.
- Europe Active. (2016). *European Health & Fitness Market Report 2015*. Bruselas: European Health and Fitness Association. Retrieved from <http://www.europeactive.eu/why-ereps>.
- Ferrand, A., Robinson, L., & Valette-Florence, P. (2010). The intention-to-repurchase paradox: A case of the health and fitness industry. *Journal of Sport Management*, 24(1), 83–105.
- Gallardo, L., Rodríguez-Cañamero, S., Hernando-Barrio, E., & Peñas, L. (2016). Impacto del comportamiento de los ex-clientes de centros deportivos por tipo de cuota. *Revista de Psicología Del Deporte*, 25(1), 43–46.
- Green, S. B., & Salkind, N. J. (2010). *Using SPSS for Windows and Macintosh: Analyzing and understanding data*. Upper Saddle River, NJ: Prentice Hall Press.
- Hosmer, D. W., & Lemeshow, S. (2004). *Applied logistic regression*. New Jersey: John Wiley & Sons.
- Hurley, T. (2004). Managing customer retention in the health and fitness industry: A case of neglect. *Irish Marketing Review*, 17(1/2), 23.
- International Health Racquet & Sportsclub Association. (2012). *The IHRSA Global Report 2012*. Boston, MA: Club Business International.
- Ishida, C., & Keith, J. (2006). Social exchange perspective on consumer loyalty. *Marketing, theory and applications*, 17, 15–16.
- Kováčová, L., Stejskal, P., Neuls, F., & Elfmark, M. (2011). Adherence to the aerobics exercise program in women aged 40 TO 65. *Acta Gymnica*, 41(2), 55–63.
- Linke, S. E., Gallo, L. C., & Norman, G. J. (2011). Attrition and adherence rates of sustained vs. intermittent exercise interventions. *Annals of Behavioral Medicine*, 42, 197–209.
- Liu, Y. C. (2008). *An analysis service quality, customer satisfaction and customer loyalty of commercial swim clubs in Taiwan*. Daphne, Alabama: Faculty of the United States Sports Academy, United States Sports Academy.
- MacIntosh, E., & Law, B. (2015). Should I stay or should I go? Exploring the decision to join, maintain, or cancel a fitness membership. *Managing Sport and Leisure*, 20(3), 191–210.
- Martín, D. (2005). *Determinantes estratégicos de la fidelidad del turista en destinos maduros* (Tesis doctorales). Universidad de La Laguna, La Laguna.
- Martínez, J., de Borja, L., & Carvajal, P. (1999). *Fidelizando Clientes: detectar y mantener al cliente leal*. Gestión 2000.
- Masaki, S., Mori, M., Tabara, Y., Sajurái, A., Hashimoto, S., Morikawa, M., ... Nose, H. (2015). The factors affecting adherence to a long-term interval walking training program in middle-aged and older people. *Journal of Applied Physiology*, 118(5), 595–603.
- McAuley, E., Jerome, G. J., Elavsky, S., Marquez, D. X., & Ramsey, S. N. (2003). Predicting long-term maintenance of physical activity in older adults. *Preventive Medicine*, 37(2), 110–118. doi:10.1016/S0091-7435(03)00089-6
- McDonald, H., Karg, A. J., & Leckie, C. (2014). Predicting which season ticket holders will renew and which will not. *European Sport Management Quarterly*, 14(5), 503–520.
- Miller, F. L., O'Connor, D. P., Herring, M. P., Sailors, M. H., Jackson, A. S., Dishman, R. K., & Bray, M. S. (2014). Exercise dose, exercise adherence, and associated health outcomes in the TIGER study. *Medicine and Science in Sports and Exercise*, 46(1), 69–75.
- Odin, Y., Odin, N., & Valette-Florence, P. (2001). Conceptual and operational aspects of brand loyalty: An empirical investigation. *Journal of Business Research*, 53(2), 75–84.
- Picorelli, A. M. A., Souza, L., Sirineu, D., Felício, D., & Sherrington, C. (2014). Adherence to exercise programs for older people is influenced by program characteristics and personal factors: A systematic review. *Journal of Physiotherapy*, 60(3), 151–156.
- Reichheld, F. (1996). *The loyalty effect: The hidden forces behind growing profits and final worth*. Barcelona: Ariel.
- Sanchez-Villegas, A., & Martínez-González, M. A. (2006). Aspectos avanzados de regresión múltiple. In M. A. Martínez González (Ed.), *Bioestadística amigable* (pp. 753–775). Madrid: Díaz de Santos.
- Sperandei, S., Vieira, M. C., & Reis, A. C. (2016). Adherence to physical activity in an unsupervised setting: Explanatory variables for high attrition rates among fitness center members. *Journal of Science and Medicine in Sport*, 19(11), 916–920.
- Surakka, J., Alanen, E., Aunola, S., Karppi, S. L., & Lehto, P. (2004). Adherence to a power-type strength training programme in sedentary, middle-aged men and women. *Advances in Physiotherapy*, 6(3), 99–109.
- Tenga, A., Ronglan, L. T., & Bahr, R. (2010). Measuring the effectiveness of offensive match-play in professional soccer. *European Journal of Sport Science*, 10(4), 269–277.
- Triadó, X., & Aparicio, P. (2004). El tipo de cuota como variable de fidelización de usuarios en Entidades Deportivas: Un reto actual de consecuencias futuras. *Investigación y Marketing*, 83, 31–38.
- Watts, H. (2012). *A psychological approach to predicting membership retention in the fitness industry*. Worcester: University of Worcester.