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A prediction model of retention in a Spanish fitness centre

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Studies on customer loyalty commonly use future behavioural intentions, even though these do not always correspond to actual behaviour. This study aimed to create a model for predicting dropouts at a sport centre based solely on actual customer behaviour. Monthly data corresponding to the actual behaviour of 1977 members at a sport centre in Spain were recorded over the course of one year; these data represented the historical behaviour of the participants. The variables selected to develop the model have been used by other authors to study behavioural loyalty, although in this study users were not surveyed. A dropout prediction model was created by means of logistic regression based on real and common records in the management of users at sports centres. The predictive model was formed by: age of the subjects, number of attendances to the sport centre and their duration, their link to the centre (length of membership and ex-members) and economic aspects. The model's goodness of fit was considerably high showing more than 70% of effectiveness. These results suggest that the recording of historical behaviour from sport centres costumers can be a useful tool to predict the chance of dropping out.

Keywords: Loyalty, current behaviour, prediction, drop out, fitness centres

INTRODUCTION

Sports are being practised at all ages, in a diversity of places and for different purposes, as described in a variety of studies (European Commission, 2014; García Ferrando & Llopis, 2011; IHRSA, 2014; Ministerio de Educación, 2015). Due to this growth, the number of private and public sports facilities and centres has also increased. In this connection, Europe Active (2015) reports in its study that fitness and wellness centres in European countries had 50.1 million members and a membership penetration rate of 7.4% in 2014.

Even so, one of the main problems that sports facilities face today is the high number of customers dropouts, regardless of the model and type of management (Hillsdon, 2001; IHRSA, 2012; MacIntosh & Law, 2015; McCarthy, 2007). According to different studies, between 50% and 60% of people who join a club continue to be members after more than one year (Bedford, 2009; Hillsdon, 2001; IRHSA, 2012; MacIntosh & Law, 2015).

The literature clearly identifies customer loyalty as an effective tool to prevent dropouts. However, most of previous studies are cross-sectional studies which do not

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include the annual behaviour and that have used behavioural intentions as loyalty indicator (Brady & Robertson, 2001; Caruana, 2002; Clemes, Gan, & Ren, 2011; Zeithaml, Bitner, & Gremler, 2009). To our knowledge the usefulness of participants' records to predict the dropouts of sports centres has not been previously analysed. This could be an interesting approach since these variables are objectively obtained continually throughout a year. This aim of this study was to create predictive model of dropouts based on behavioural variables. However, we have studied only one sport centre; so the results cannot be generalized. This analysis is required in more sports centres.

LITERATURE REVIEW

Loyalty

The results of improving customer loyalty include, most notably, an increase in purchases, resistance to counter-persuasion, and positive referrals to other potential customers (Dick & Basu, 1994). The average value of customers increases from 25% to 100% if the use of retention strategies is increased by 5% (Reichheld, 1996). Therefore, building customer loyalty can have many economic and non-economic benefits. Thus, the implementation and continuous improvement of loyalty-building programmes is becoming a strategy to maximize the performance of companies (Chen & Quester, 2006).

However, there is no consensus in literature regarding the measurement and definition of the loyalty construct. One of the most accepted definitions is: "A deep held commitment to re-purchase a preferred product/service consistently in the future, thereby causing repetitive same-brand or same-brand-set purchasing, despite situational influences and marketing efforts having the potential to cause switching behaviour" (Oliver, 1999). To study this in more depth, customer loyalty can be defined from different perspectives (Dimitriades, 2006; Söderlund, 2006).

Attitudinal approach

Loyalty can be defined as a sense of union or affection for the product or services of a company. Thus, different sensations create individual attachment to the service, product or organization, so a positive attitude towards them is necessary (Dick & Basu, 1994; Setó, 2003). The attitudinal loyalty indicators used in most studies are behavioural intentions, which has been conceptualized as indicators that show what customers are going to do in the future: recommend, remain or defect from the company (Delgado, 2004; Dick & Basu, 1994; Lutz, 1991; Oliver, 1999; Zeithaml, Berry, & Parasuraman, 1996). Behavioural intentions have been widely used to represent loyalty in sports and recreation (Alexandris, Zahariadis, Tsorbatzoudis, & Grouios, 2004; Clemes, Brush, & Collins, 2011; Hightower, Brady, & Baker, 2002; Howat & Assaker, 2013; 2016).

Zeithaml et al. (1996) developed a 13-item scale to measure behavioural intentions and Setó (2003) carried out an empirical research and found out that this scale was appropriate for the services sector. The "behavioural intentions" scale describeb by Zeithaml et al. (1996) include two subscales widely used to represent loyalty, repurchase intention and service recommendations (Brady & Robertson, 2001; Caruana, 2002; Clemes, Brush, et al., 2011; Zeithaml et al., 2009; Zeithaml et al., 1996). Several studies have used this subscales in sport and recreation, suggesting their validity to measure behavioural intentions in this area (Bodet, 2012; Ferrand, Robinson, & Valette-Florence, 2010; Wei, Hung, Yang, & Jui, 2010).

However, loyalty understood in this way does not guarantee the purchase of the product or service (Assael, 1999). Furthermore, future intentions to repurchase or

recommend their services do not necessarily have to always correspond with the behaviours (Alexandris, Dimitriadis, & Kasiara, 2001; Bodet, 2012). Sheeran (2002) states in his study that intentions account for only 28% of the variance in behaviour. This makes it difficult to predict whether a user will leave the sports centre, since cancellation is usually measured with future behavioural intentions and not with respect to current perceptions (Watts, 2012).

Behavioural approach

The behaviour perspective of loyalty refers to repeated purchase of a particular brand. Thus, repetition, frequency and quantity of buying are used as indicators (Chen, Lin, & Stotlar, 2006; Dick & Basu, 1994; Ferrand et al., 2010; Hallowell, 1996; Zins, 2001). Loyalty is understood only according to actual behaviour or conduct, without taking into consideration the customer's declared intentions regarding future purchases (Cunningham, 1956; Martín, 2005). From this perspective, consumer preferences and emotions are ignored when making purchases (Delgado, 2004; Ishida & Keith, 2006; Odin, Odin, & Valette-Florence, 2001). This approach uses objective loyalty indicators, which do not exploit the psychological meaning of loyalty.

Consequently, it only shows the behaviour of loyalty which does not allow us to identify true loyalty (Dick & Basu, 1994; Ortega & Recio, 1997; Setó, 2003; Watts, 2012). Thus, a customer can repeat a purchase but not to feel commitment to the product of the company providing the service. Hence, it mixes customers who positively value the company or service with customers who remain customers for reasons such as inertia, market structure or situational factors.

Thus, both the behavioural and attitudinal approaches are postulated in a one-dimensional consideration of the term. However, measuring a phenomenon as complex and multi-dimensional as loyalty using a one-dimensional measurement is insufficient (Keller & Lehmann, 2006).

Factors linked with loyalty

In order to improve loyalty, numerous studies have analysed its direct and indirect relationship with concepts such as service quality and perceived value, brand image, price or satisfaction (Alexandris et al., 2004; Bernal, 2013; Bernhardt, Donthu, & Kennett, 2000; Bodet, 2012; Costa, 2011; Costa-Ferreira, 2012; Ferrand et al., 2010; Ganesh, Arnold, & Reynolds, 2000; Howat & Assaker, 2013; 2016; Javadein, Khanlari, & Estiri, 2008; Patterson & Spreng, 1997; Trail, Anderson, & Fink, 2005; Valle, Silva, Mendes, & Guerreiro, 2006). However, several studies have found no evidence of a clear relationship between loyalty and concepts such as quality, monthly income or satisfaction (Fay, 1994; Lin, 2004; MacIntosh & Law, 2015).

According to Alcaide (2010) and Kotler (2003), customers who are satisfied with the products, services and relationship with the organization do not guarantee their loyalty, they simply accept what is given to them in the relationship with the business. Moreover, some studies conclude that satisfaction is insufficient to prevent customers from leaving (Bowen & Chen, 2001; Ferrand et al., 2010; Neal, 1999). In this respect, Bodet (2008) states that neither satisfaction nor the attitudinal component of loyalty influence the action to renew a membership fee. So study of these variables may not help us prevent the customer drop out.

Retention

Consequently, there is a consensus on the importance of customer loyalty and on defining it as a complex construct formed by attitudinal and behavioural components (Bernal, 2013; Chaudhuri & Holbrook, 2001; Delgado, 2004; Garbarino & Johnson, 1999;

Keller & Lehmann, 2006; Setó, 2003). There is no consensus, however, regarding its measurement in future behavioural intentions, nor in relation to other concepts such as quality or satisfaction. This study will therefore focus on customer retention, which is a simpler concept (Hallowell, 1996; Segarra, 2007; Watts, 2012). Retention as a construct in itself has rarely been studied (Hennig-Thurau & Klee, 1997), exceptions being the studies by Crosby and Stephens (1987), Reichheld and Sasser (1990) and Rust and Zahorik (1993).

Retention is understood as the maintenance of repeat purchases, namely the renewal of the fee to continue as members of the sports club (Bodet, 2012; Hallowell, 1996; Oliver, 1999; Watts, 2012). Retention is different to loyalty; in the short-term, retained customers do not have to be loyal (Blattberg, Getz, & Thomas, 2001). Iwasaki and Havitz (2004), Oliver (1999) and Olsen (2007) claimed that retention can be seen as a manifestation of loyalty, but not as an equivalent. Thus, retention is generally measured as a dependent binary variable, for example continue or cancel (Bolton, Kannan, & Bramlett, 2000), retention or abandonment (East, Gendall, Hammond, & Lomax, 2005). Consequently, retention only shows behaviour of loyalty.

On the other hand, Martinez, de Borja, and Carvajal (1999) highlighted that customers' behaviours towards a company can be followed up through databases and purchase histories. In this respect, Zins (1998; 2001) defines historical loyalty as the construct of real behaviour based on information from companies' databases.

Dick and Basu (1994) established that repeat purchasing is dependent on previous purchases. 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 behaviour can reveal very effectively the stability of any customer behaviour. A customer with a history acquires a commitment with the company and tends not to look to other providers of the same service (Oliver, 1999).

Dropout prediction

In order to prevent customers from leaving, it is necessary to act before this behaviour occurs. As reported by Alcaide (2010), it is easier to retain a customer in the abandonment phase than to recover a lost customer. Thus, it is important to act when customers show the first signs that they are considering leaving. According to McDonald et al. (2014), the most obvious way to predict future behaviour is to review past behaviour.

In this regard, logistic regression is a statistical technique that can be used for this purpose. This technique is commonly used in clinical and epidemiological research to predict the effect of risk factors in specific diseases (Leon & Linares, 2014; Rincón, Valero, & Eslava-Schmalbach, 2008). It has also been used to develop models to predict school performance and dropout rates (Fernández & Rodríguez, 2008; García, Alvarado, & Jiménez, 2000), or performance analysis in sports games (Casal, Losada, & Ardá, 2015; Tenga, Ronglan, & Bahr, 2010). However, McDonald et al. (2014) used it to predict season ticket holder renewal, examining patterns of behaviour in the current season.

Nevertheless, to our knowledge no previous study has used this technique based on historical behaviour at sports centres. To this end, this paper aimed to determine the likelihood of abandonment of each customer by creating a predictive model based on these data. Identifying predictors of abandonment could reduce the dropout rate at sports centres and therefore the likely abandonment of the practice of physical activity. In this way, specific loyalty programmes could be planned for users with a high risk of abandonment before they actually drop out.

The theoretical model

It was studied that the predictive capacity of several behavioural variables was recorded throughout a year regarding customer drop out. Since the dependent variable was dichotomous, it was used a logistic regression technique. Table 1 shows a brief description of the independent variables that were initially considered.

METHOD

The private fitness centre analysed is located in a Spanish city called Zaragoza. The centre had 2000 square meters divided into two floors. The services were provided in a large fitness room and three multi-purpose rooms, where activities were carried out in groups. It had changing rooms and a small urban spa with sauna, Turkish bath, contrast showers and jacuzzi. Almost all services were included in a single fee, with the exception of specific group classes. During the year analysed, no specific loyalty campaign was carried out. The sample involved 1977 people from all the fitness centre's customers who had been members for at least one month in 2014. The sample comprised 47% men and 53% women and the average age was 35.6 ± 15.18 years. Fifty six per cent of the participants in the sample dropped out during the year analysed.

Variables

Eleven variables were selected. Table 1 provides the definitions of these variables. These variables were associated with certain common measurements of the behavioural approach of loyalty used by a variety of authors. The variables took into account socio-demographic values (age and gender), the ratio of participants per sports centre (age, fee changes, maintenance fee and ex-member), the use of the centre (access and duration of stays) and economic aspects (renewal periods, return of receipts and money spent).

It must be highlighted that these variables are normally recorded in the management of sports centres of this type and no psychological variable was selected. Thus, the data were accessed without any interaction with the customers.

Instrumentation

Most studies examining these behavioural variables have carried it out through surveys. According to Bryman (2015), this could lead to certain methodological limitations both in self-administered surveys and in those conducted by an interviewer. Additionally, the analysis of this historical data recorded throughout a year allows us to make a better analysis in seasonal businesses such as sports services, since it is common for customers to leave at certain times of the year and return in others.

To avoid these limitations, the variables used in this study were obtained from the real historical behaviour of users, namely without surveys. The monthly data registered using the management software Deporwin (T-Innova, Barcelona, Spain) represented the historic behaviour of the sample and all data were considered when carrying out the analysis.

The aforementioned software enables the administrative control and supervision of each member of the centre (registration fees, dropouts, changes in type of membership, payment control or receipt management). It also integrates the information from the turnstile at the entrance, which tracks accesses per user and records the exact day and time of very access. The information was extracted from the software and the average and total monthly data relating to the length of membership of each subject was calculated. Finally, users were assigned a code depending on whether or not they had dropped out in 2014 and the total length of membership up to that date was calculated.

Table 1. Definition of the variables and his association with variables selected by other authors

Variables	Definition	Loyalty (behavioural focus)	Authors
Age	Age of the subject in the moment of starting their behaviour registry. (Years)	Age	Triadó and Aparicio (2004), Hillsdon (2001), Baena, García, Bernal, and Lara (2013), Blázquez Manzano and Feu Molina (2012), Bodet (2012) and García, Fernández, and Bernal (2014)
Gender	It indicates the gender of the subject (0 = Male, 1 = Female)	Gender	Triadó and Aparicio (2004), Hillsdon (2001), Baena et al. (2013), Blázquez Manzano and Feu Molina (2012), Bodet (2012) and Chen et al. (2006)
Total changes	It shows the total changes in membership typology made by the subject during the analysed year. (Number)	Membership type; Consisting of choosing this service	Triadó and Aparicio (2004), Dick and Basu (1994), Hillsdon (2001), Baena et al. (2013), Bodet (2012) and Chen et al. (2006)
Maintenance fee	It registers whether the subject has paid a maintenance fee throughout 2014. This kind of fee is chosen in summer periods or periods of long absence. (0 = No; 1 = Yes)		
Exmember	It indicates whether the subject quitted from the sports centre before being a new member, during or before the analysed year. (0 = No; 1 = Yes)		
Access average	It tracks the average accesses per month of every subject throughout the year. (Number)	Access	Triadó and Aparicio (2004), Baena et al. (2013), Blázquez Manzano and Feu Molina (2012), Bodet (2012), Chen et al. (2006), Daryanto, De Ruyter, Wetzels, and Patterson (2010) and Ferrand et al. (2010)
Duration of the stay	The average duration of stay (in minutes) of every access. (Minutes)		

(*Continued*)

Table 1. Continued

Variables	Definition	Loyalty (behavioural focus)	Authors
Average renewal period	Days on average included in the advanced payment of every joining fee paid throughout the year. (Days)	Payment frequency; Average number of purchases per year; Purchase repetition rate; Purchase repetition probability and frequency	Hillsdon (2001), Hurley (2004), Triadó and Aparicio (2004), Dick and Basu (1994), Colmenares and Saavedra (2007), Hallowell (1996), Reichheld (1996) and Chen et al. (2006)
Average invested per month	It shows the average invested per month throughout the analysed year. (Euros)		
Returned receipts	It indicates the returned payment receipts per member throughout the analysed year. (Number)		
Length of membership	It quantifies how long a customer has been a member of the sports centre since they pay their joining fee up to the moment they drop out. (Days)	Length of membership	Triadó and Aparicio (2004), Hillsdon (2001), Blázquez Manzano and Feu Molina (2012), Bodet (2012) and García et al. (2014)

Statistical analysis

Statistical analysis was Performed using SPSS 21 (IBM, Armonk, NY, USA) for Macintosh. Firstly, descriptive values are presented as mean $\pm$ standard deviation, frequency and 25, 50 and 75 percentiles. Secondly, a univariate analysis was carried out to establish the association between each (predictive) independent and dependent variable (sports centre dropout). Then, two methods were used for logistic regression modelling: the forward stepwise method; and a manual process (Confidence Interval (CI) for exponentials of coefficients ($\exp(\beta)$) = 95%). The aim was to obtain a simple model with a reduced number of variables that could be applied to other samples and which would be useful for managers to perform their tasks (Hosmer & Lemeshow, 2004).

In the manual construction of the regression model, all the selected variables were initially introduced. Afterwards a variable was eliminated if the regression coefficient showed a statistically non-significant test of likelihood ratio. In this step, the odds ratio (OR) of the remaining variables was considered to determine whether they underwent important changes.

The goodness of fit was evaluated after obtaining the logistic equation. For this purpose, the prediction obtained with the model (dropout yes or no) was compared with the real results. Finally, the effectiveness and discriminatory power of the model were evaluated by means of the ROC curve.

RESULTS

Descriptive statistics

As shown in Table 2, members visited the centre on average 5.6 $\pm$ 5.0 times per month and stayed for 50.6 $\pm$ 33.5 minutes. They changed their type of membership an average of 1.1 $\pm$ 1.7 times, 16.5% of the members became ex-members (they were

Table 2. Statistical sample values

Variables	Value	%	Mean	Std	Percentile 25	Percentile 50	Percentile 75
Drop out	Yes	56					
	No	44					
Gender	Male	47					
	Female	53					
Maintenance fee	Yes	9.3					
	No	90.7					
Exmember	Yes	16.5					
	No	83.5					
Age (years)			35.66	15.18	23	33	46
Access average (number)			5.63	5.07	1.75	4.50	8
Duration Of The Stay (minutes)			50.67	33.52	26.50	50.70	71.83
Average renewal period (days)			41.39	32.60	30	30	30
Total changes (number)			1.11	1.70	0	0	2
Average invested (euros/month)			44.80	23.78	35.37	45	54
Length of membership (days)			293.47	236.41	114	214	441
Av. returned receipts (number/member)			0.44	1.26	0	0	0

members, they dropped out and then they re-registered as members) and only 184 people decided to join paying the maintenance fee. The average renewal period was 41.4 $\pm$ 32.6 days. They invested an average of 44.8 $\pm$ 23.8 euros per month and returned 0.44 $\pm$ 1.3 payment receipts (i.e. the customer rejects the payment and instructs the bank to "return" the debit order to the company). Lastly, their average length of membership was 293 days (9.7 months) $\pm$ 236.4.

Univariate analysis

Although all the quantitative variables reflected a monotonic trend, the decision was taken to turn them into dummy variables so that the resulting OR would allow comparisons to be made between big groups instead of studying the unitary change of the variable (Green & Salkind, 2010). Frequencies, means and modes and the recommendations of Hosmer and Lemeshow (2004) were reviewed in order to establish relevant cut-off points. The variables age, length of membership, accesses, duration of stay and money invested (euros) were classified according to the value of their quartiles. The variables average renewal time, total changes in type of membership and total returned payment receipts were classified in just two categories. The results of the univariate analysis are given in Table 3.

Logistic regression

Once the univariate analysis had been carried out, the predictive model was prepared by means of logistic regression using the automatic forward stepwise methodology. The model presents 23 parameters, corresponding to the number of variables and their categories. With this objective in mind, the model was constructed manually precisely to reduce the number of parameters. The aim was to select the subset of independent variables that provided most information about dropout probability. To do so, all the variables were entered into the logistic regression and decisions were

Table 3. Univariate logistic regression outcomes

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Age (base) (<23 years)			65.489	3	0.000	
Age 23.01–33 years	−0.388	0.130	8.919	1	0.003	0.679
Age 33.01–46 years	−0.506	0.133	14.496	1	0.000	0.603
Age >46.01 years	−1.046	0.131	63.631	1	0.000	0.351
Length of membership (base) (<114 days)			209.098	3	0.000	
Length of membership 114.01–214 days	1.161	0.142	67.138	1	0.000	3.194
Length of membership 214.01–441 days	0.356	0.128	7.692	1	0.006	1.428
Length of membership >441.01 days	−0.909	0.132	47.517	1	0.000	0.403
Access (base) (<1.75)			152.154	3	0.000	
|Access 1.76–4.50	−0.640	1.370	21.681	1	0.000	0.527
Access 4.51–8	−1.066	1.380	59.557	1	0.000	0.344
Access >8.01	−1.657	0.140	140.852	1	0.000	0.191
Duration of the stay (base) (<26.5 minutes)			99.549	3	0.000	
Duration of the stay 26.51–50.70 minutes	−0.724	0.136	28.299	1	0.000	0.485
Duration of the stay 50.71–71.83 minutes	−0.916	0.136	45.582	1	0.000	0.400
Duration of the stay >71.84 minutes	−1.341	0.136	96.554	1	0.000	0.262
Invested per month (base) (<35.37 euros)			96.642	3	0.000	
Invested per month 35.38–45 euros	−0.472	0.133	12.622	1	0.000	0.624
Invested per month 45.01–54 euros	−1.085	0.132	67.034	1	0.000	0.338
Invested per month >54.01 euros	−1.157	0.141	67.650	1	0.000	0.314
Average of renewal period (0 = <30days;1 = >30days)	−0.792	0.132	35.784	1	0.000	0.453
Total change of membership type (0 = No;1 = changes)	−0.626	0.092	46.335	1	0.000	0.535
Returned receipts (0 = No; 1 = Returned receipts)	0.981	0.133	54.754	1	0.000	2.667
Gender (0 = Male; 1 = Female)	−0.048	0.091	0.279	1	0.598	0.953
Maintenance fee (0 = No; 1 = Yes)	−0.170	0.155	1.199	1	0.273	0.844
Exmember (0 = No; 1 = Yes)	0.944	0.135	48.577	1	0.000	2.570

taken according to the significance of the OR obtained.

The variables gender, renewal period, maintenance fee and changes in membership type were eliminated. The number of cut-off points of the variables age, duration of the stay and amount invested monthly in euros were also reduced. As for the variable "access", it is important to highlight its importance in the management of a fitness centre. It is generally used by managers as an indicator of the possible deregistration of a customer and is therefore a reference in loyalty programmes. Therefore, it was established that the unit change of the variable "access" was relevant, and it was therefore introduced in the model as a quantitative variable, all in accordance with the methodological guidelines in terms of the statistic significance and OR variation presented by the remaining variables (Hosmer & Lemeshow, 2004).

The OR outcomes per variable of the manually-built model are shown in Table 4. Thus, age, monthly accesses (number and duration), length of membership and ex-member, as well as economic aspects (money invested per month and returned payment receipts) proved to be statistically significant predictive indicators of customer dropouts. Regarding the goodness of fit, it was confirmed that the models presented a good fit since the Chi-Square was significant

Table 4. Manual methodology model outcomes

	B	S.E.	Wald	df	Sig.	Exp(B)
Age (0 = <33 years; 1 = >33 years)	−.362	.109	10.964	1	.001	.696
Exmember (0 = N; 1 = Y)	1.161	.151	58.794	1	.000	3.193
Returned receipts (0 = N; 1 = Y)	.858	.153	31.578	1	.000	2.357
Invested (0 = <45 euros;1 = >45 euros)	−.713	.108	43.808	1	.000	.490
Length of memb. (base) (<114 days)			155.754	3	.000	
Length of memb. (114.01–214 days)	1.203	.154	61.317	1	.000	3.330
Length of memb. (214.01–441 days)	.401	.144	7.769	1	.005	1.493
Length of memb. (more than 441 days)	−.742	.149	24.778	1	.000	.476
Access	−.089	.013	49.408	1	.000	.915
Duration of the stay (base) (<34.49 min)			11.313	2	.003	
Duration of the stay (34.50–64.48 min)	−.366	.138	7.017	1	.008	.693
Duration of the stay (more than 64.48 min)	−.480	.148	10.504	1	.001	.619
Constant	1.049	.138	58.105	1	.000	2.855

($p < .05$). Additionally, the model showed low values of the -2LL statistic (2167.521) and Cox and Snell's R^2 (0.241) and Nagelkerke's R^2 (0.323) even closer to 1. The Hosmer–Lemeshow test was used to verify the goodness of fit ($p > .05$).

It was considered that participants with an OR of less than 0.5 would drop out. Table 5 shows the specificity and sensitivity values of the models. The manual model obtained specificity and sensitivity values of 64.1% and 79.6%, respectively. Both models increased the percentage of correct forecasts, from 56% to 70%, which is considered to be an optimum percentage (Steyerberg et al., 2001). The ROC curves of both models are presented in Figure 1, which shows very

Table 5. Specificity and sensitivity for both models

Forward stepwise

		Predicted			
		Drop out		% Correct	
Observed		No	Yes		
Drop out	No	570	299	65.6	Specificity
	Yes	221	884	80.0	Sensitivity
Overall %				73.7	Discrimination

Manual model

		Predicted			
		Drop out		% Correct	
Observed		No	Yes		
DROP OUT	No	558	312	64.1	Specificity
	Yes	226	881	79.6	Sensitivity
Overall %				72.8	Discrimination

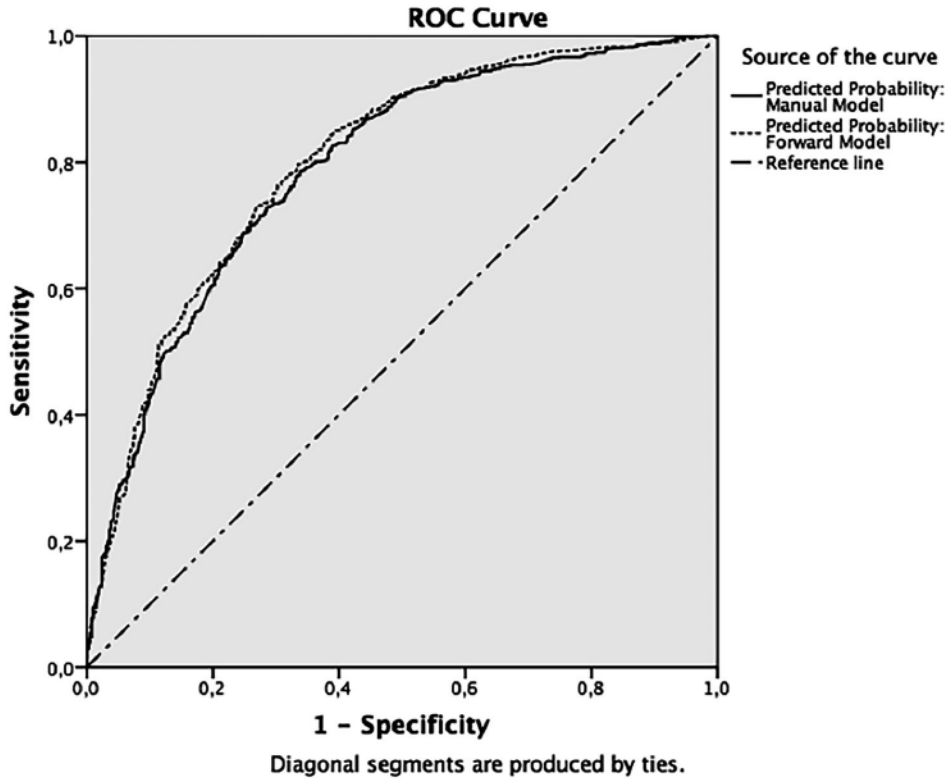


Fig. 1. ROC curve for both models.

similar results (resulting area under the curve of 0.791 in the manual model and 0.801 in the automatic model). The outcomes of both models were significant, with a discriminatory power rate of around 80%, classifying subjects from the centre into dropouts and non-dropouts. Thus, it can be concluded that the logistic regression model in this fitness centre allowed us to determine dropout probability using the equation $(e^z/1+e^z)$, where:

Z = −0.36*1 (if they were >33 years old; otherwise 0) + 1.16*1 (if they were an ex-member; otherwise 0) + 0.86*1 (if they returned receipts; otherwise 0) – 0.71*1 (if they spent more than 45€ per month; otherwise 0) + 1.20*1 (if their length of membership was between 114.01 and 214 days; otherwise 0) + 0.40*1 (if their length of membership was between 214.01 and 441 days; otherwise 0) – 0.74*1 (if their length of membership was more than 441.01 days; otherwise 0) – 0.09* (average number of accesses per month) – 0.37*1 (if the duration of stay per access lasted between 34.5 and 64.48 minutes; otherwise 0) – 0.48*1 (if the duration of stay per access was on average longer than 64.48 minutes; otherwise 0) + 1.05.

DISCUSSION

To our knowledge, this is the first study to create a predictive model from actual behavioural variables without the use of questionnaires. This will allow managers to obtain predictive data on an on-going basis, without interacting with the members of the fitness centre, and to classify them according to their dropout probability.

The analysis of a full year allows the behaviour of users in this type of seasonal business to be studied with greater precision. It is common for the members of sports centres to disenrol during the summer and then register again afterwards. The sample also included members of different ages at the fitness centre, thus incorporating possible differences between experienced members and newcomers. Watts (2012) reported differences between old and new members, and was able to predict the abandonment of the former but not the latter. Avourdiadou and Theodorakis (2014) also found differences in the influence of the perceptions of quality and satisfaction on loyalty between experts and novices at a fitness centre. The sample also failed to differentiate between their motivations for going to the fitness centre, despite the proven importance of not abandoning physical exercise (Luna-Arocas & Li-Ping Tang, 2005). In our opinion, these and other psychological variables would influence the behaviour of the subject, which was the ultimate aim of our analysis.

The results of the univariate analysis showed that the higher the age and the longer the length of membership, the lower the dropout probability, coinciding with the results reported previously by other authors (Bedford, 2009; Ferrand et al., 2010; Garcia, 2012; IHRSA, 2012; Liu, 2008; Teva, 2012; Triadó & Aparicio, 2004). According to the study by the Fitness Industry Association, persons aged over 35 reached a length of membership 1.5 times higher than those under that age (Hillsdon, 2001). In line with other studies, gender was not significant in predicting member dropout (Bedford, 2009; Bernal, 2013; Garcia, 2012; Triadó & Aparicio, 2004). Various studies have found no significant differences in repurchase intention by gender or age (Casper, 2007; McDonald et al., 2014). In this respect, Park (1996) also claimed that demographic variables (age, gender and occupation) were not significant in the search for behavioural loyalty predictors.

Members who access more often and register longer stays at clubs show a lower probability of drop out as described in other previous studies (Bedford, 2009; Bodet, 2012; Costa-Ferreira, 2012; Ferrand et al., 2010; Hurley, 2006; McCarthy, 2004; 2007). The study by the Fitness Industry Association described a positive relationship between frequency of use during the first three months and annual retention. Thus, higher frequency of use was associated with a lower likelihood of abandonment (Hillsdon, 2001). On the other hand, no studies in the bibliography addressed length of stay based on access. The longer the stay, the lower the dropout probability. Managers of fitness centres should offer a variety of services and/or services with durations of more than one hour. Therefore, the objective would be for customers to access and have a comfortable stay in order to minimize any likelihood of abandonment.

Our results also showed that dropout probability decreased among members who invested more money. This finding was also reported by other authors (Bedford, 2009; Hillsdon, 2001; Liu, 2008; McCarthy, 2004; 2007). This analysis also demonstrated that members who return payment receipts are much more likely to drop out than members who do not, as reported in the study by Chen et al. (2006). Obviously, this result suggests that members return receipts repeatedly until the manager of the sports centre processes the cancellation. Members with renewal periods longer than 30 days are less likely to drop out. This is in line with the results obtained in other studies affirming that users who pay 12 months of membership in advance are more loyal (Bedford, 2009; Garcia, 2012; Hillsdon, 2001). Thus, loyalty-building strategies that reward advance payment of fees and cross-selling seem to be effective.

Continuing with the analysis of membership type, it was found that dropout probability was lower in subjects who changed their type of membership. Joining the sports centre paying the maintenance fee did not seem a significant indicator with regard to predicting dropout probability. Offering customers the type of membership that best meets their needs and making it easy for them to change to another type of membership can be considered a good retention strategy (Triadó & Aparicio, 2004).

To our knowledge no previous studies have analysed the relationship between an ex-member and dropout probability at a sports centre. Our results of this study showed that members who dropped out previously are more likely to drop out again. Therefore, traditional marketing actions need to perform a more in-depth analysis of former members since retaining these kinds of customers seems difficult.

Creating a predictive model with these variables enables more effective segmentation of customers based on their dropout probability than with the univariate analysis. In terms of the methodology used to develop the model, the automatic forward stepwise method resulted in 23 parameters. This model would therefore be difficult to apply in smaller samples and would be of little use to the managers of such facilities. The manual methodology establishes a parsimonious and well-fitted model with significant values in terms of age (older or younger than 33 years), ex-member (yes or no), returned payment receipts (yes or no), money invested (more or less than 45 Euros), length of membership, number of accesses per month and duration of stay. It can be interpreted that the model obtained in this study coincides with the model described in other studies in terms of the predictive value of the variables accesses, length of membership, age and returned receipts, but not with respect to the variables ex-member, money spent and duration of stay (Chen et al., 2006; Triadó & Aparicio, 2004).

The resulting dropout prediction model correctly predicted 64.1% of the members who did not drop out and 79.6% of those who did. These results contrast with the data reported by Chen et al. (2006), who described effectiveness rates of 86.6% and 62.5%, respectively. More than 70% of the participants were correctly classified in the dropout or non-dropout groups. This result is similar to that obtained by McDonald et al. (2014) when predicting the renewal of season ticket holders. The area under the ROC curve showed a discriminatory power of 80%. This allows us to conclude that it is a well-fitted model with suitable discriminatory capacity (Chen et al., 2006; Harrell, Lee, Califf, Pryor, & Rosati, 1984; Steyerberg et al., 2001; Tenga et al., 2010).

THEORETICAL AND PRACTICAL IMPLICATIONS

The results of the present study provided support for the behaviour perspective of loyalty. Thus, analysis of participants' record, which are common in the management of sports centres, can be used to predict the probability of drop out. These type of data allow the continuous record of annual behaviour and also avoid certain limitations of surveys. Customer management in sports centres does not allow questionnaires to be used as often as necessary since, as shown in the bibliography, a high percentage of monthly dropouts should be avoided, making it difficult to continue with the questionnaires.

Previous customer behaviour can be used by managers to reduce dropouts, without the need to carry out surveys for evaluating behavioural intentions. According to their relevance in the model, variables age, ex-member, returned payment receipts, money invested, length of membership, number of accesses per month and duration of stay should be considered for the design of

loyalty programmes. Therefore, managers can perform specific campaigns on these behavioural variables to enhance customer retention without making questionnaires for their analysis.

Customers segmentation based on the probability of leaving could be useful to the design and implementation of loyalty programmes. Determining dropout probability can be particularly useful for sports centre managers since it will allow them to divided all the members into segments. This would undoubtedly be helpful for retaining members.

CONCLUSIONS, LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

Our study showed that databases can be used by managers to obtain variables an on-going basis, without disturbing members. Furthermore, methodological limitations would be avoided in the application of the questionnaire, as well as possible errors in loyalty and the validity of same. As shown in this study, this set of behavioural variables comprised predictors of member dropout (or indicators of low levels of loyalty) that confirm the majority of outcomes described in the bibliography with the use of questionnaires.

The development of a predictive model will enable more effective identification of participants who are more likely to abandon the fitness centre. However, it was found that few studies developed a predictive model. The construction of such a model using a manual approach resulted in 70% greater efficiency with only seven variables. Thus, the predictive model was formed with the following variables: the age of the subjects and their usage of the sports centre (accesses and duration), their link to the centre (length of membership and ex-members) and economic aspects (money spent per month and returned receipts). The resulting predictive model establishes that member dropout probability could be determined without taking into account psychological variables. The historical behaviour of the subject will give an indication of what he or she will probably do in the future, drop out or not. Consequently, it would not be necessary to ask users about their future behavioural intentions.

However, this is a case study; so the main limitation lies in the lack of generalization. This analysis is required in more sports centres with different management and different cities. Another limitation of this study is the data collection process, not only in terms of the management software, which can involve computer errors as it is a real-time registry of certain variables (accesses, day, time, duration of stay), but also of the users managed by administrative staff (membership type, fees, returned receipts), which could lead to mistakes in the registration of the selected variables.

Further studies are warranted to verify the effectiveness of the model in subsequent years for the same centre. It would also be interesting to determine whether the model can be replicated in other centres or if, conversely, each centre needs its own predictive model. This allows us to study in-depth the idea that you can predict the future behaviour of members of a sports centre based on its historical data, regardless of the psychological variables.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

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