FREQUENCY OF USE OF A FITNESS CLUB IN TOKYO

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Introduction

Only a few studies have ever tried to examine frequency in use for a fitness clubs. Niina (1997) showed that there was a relationship approximated by an exponential curve between frequency in use and relative frequency of users for fitness clubs. What seems lacking in his study, however, is that it did not deal with longitudinal data. Therefore, little is known about the stability of the exponential relationship.

The purpose of this study was to explore the behaviour of members of a fitness club in terms of frequency of use throughout a year, and to examine the characteristics of the distribution of the frequency.

Method

We selected a fitness club close to a major train terminal in metropolitan Tokyo. Data were daily usage (clock-in time, clock-out time and membership number) and a membership list dated April 2003 to March 2004, including membership number, home address, type of membership, gender, and date of birth. The number of club members was about 8,000, and annual cumulative number of users about 0.5million. Monthly frequency of use was calculated for each member, in 16 groups. The relationship between number of users and monthly frequency of use was analyzed statistically. Linear and nonlinear functions were applied to determine which function would best predict the relationship, and the exponential function had greatest explanation. So, we used the following formula to analyse the relationship.

$y=a_0*e^{-a}1^x$ where

y = number of users to be predicted

x = frequency in use per month, used as a predictor of y

a_0, a_1: parameters

The above formula was transformed into naturalized logarithm as $lny=lna_0 - a_1x$

Furthermore, this formula was transformed into linear expression as $b - a_1x$,

Where $Lny = \mathbf{Y}$ $lna_0 = b$

The linear expression was used as simple linear regression analysis.

Results

The main results were as follows:

1. Much the same relationship approximated by the exponential function was observed between frequency of usage and number of users for any month.
2. The extremely high coefficient of determination indicated that the frequency of use and the number of users were highly correlated, and
3. The linear expression model was statistically useful for predicting the number of users.

Details will be discussed further at the conference. The linear expression and correlation are summarized in Table 1.

Table 1: Tokyo fitness club membership and use: Results of linear regression

Month	a_1: *slope*	*b: Y-intercept*	*Determination Coefficient*	*Significance of Regression Expression*
Apr-2003	0.30	7.99	0.99	**
May-2003	0.29	7.93	0.99	**
Jun-2003	0.29	7.95	0.99	**
Jul-2003	0.28	7.88	0.99	**
Aug-2003	0.30	7.96	0.99	**
Sep-2003	0.30	7.99	0.99	**
Oct-2003	0.28	7.87	0.99	**
Nov-2003	0.30	7.91	0.99	**
Dec-2003	0.30	7.85	0.98	**
Jan-2004	0.31	7.97	0.99	**
Feb-2004	0.30	7.92	0.99	**
Mar-2004	0.27	7.75	0.99	**

Significant at $^{**}p<0.01$

Reference

Niina, K (1997) Analysis on frequency of use of a fitness club: Characteristics of frequency distribution using exponential curvilinear regression model pp8-9 in *Proceedings of 20th Japanese Society of Management for PE & Sports Congress*

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