

Title of Paper

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Abstract

Most of the research into sports attendance uses cognitive and hedonic models as the theoretical foundation. While these models are useful at *explaining* attendance variance, they are not good *predictors* of attendance. For frequently purchased consumer goods in stable markets, the study of past behaviour (habit) and the use of the negative binomial distribution (NBD) have been particularly effective in predicting penetration rates and frequency of buyers of a brand or category. This study compares sports attendance at football games with the attendance predicted by the NBD, and finds that attendance at professional football games follows the NBD when season ticket holders are removed from the sample.

Introduction

Sports teams around the world seem to garner uncommonly high levels of both behavioural loyalty in the form of repeat attendance, and attitudinal loyalty in the form of a psychological commitment to the team. While winning is important in sports, and important to fans of their teams, why then do fans of Major League Baseball's Chicago Cubs not simply switch to the Chicago White Sox when they are performing better? Cubs' fans exhibit strong brand loyalty *despite* the brand performing poorly. For most other consumer goods and services, consumers would switch when their brand is performing poorly (Parker & Stuart, 1997). Indeed East (1997 p. 18) writes that "People do not continue to buy a brand that persistently disappoints; instead they break their habit and try something else".

A number of reasons exist for attending professional sports games other than winning. Fan behaviour can be explained by motivational models (Funk *et al.*, 2001) or by consumption models that use attendance and/or media behaviour (Madrigal, 2006; Pritchard & Funk, 2006). Such models focus on the cognitive and affected processes associated with behaviour. Although they are useful in explaining fan attendance at sports games, they have rarely been used to predict future attendance.

What then might be a good predictor of sports attendance? For frequently purchased consumer goods in stable markets, the study of habit formation (past behaviour) has been effective in predicting future purchase rates and frequency (Ehrenberg, Goodhardt, & Barwick, 1990) at an aggregate level. Similar analyses are performed in this study on sports attendance. Examining the past attendance of spectators may lead to insights that would help strengthen habitual attendance.

Behaviour and Habit

The principal research methods used to investigate customer satisfaction, loyalty and motivation are based on intentions or self-reported behaviour. However, the validity of introspection on cognitive or affective processes, or behavioural intentions is widely questioned and consumers may be unable to report accurately about them (Nisbett & Wilson, 1977). Also, merely by measuring purchase intentions, researchers increase the likelihood of re-purchase, and decrease the time until the first repeat purchase takes place (Chandon,

Morwitz & Reinartz, 2004). Behavioural research that empirically tests past behaviour as opposed to cognitive processes or intentions has demonstrated that past behaviour accounts for a significant variation in subsequent behaviour (Bentler & Speckart, 1979). However, since the mid-1950's the cognitive approach to intentions through information processing has been more widely used than the behavioural habits (Abelson, 1994; Allport, 1985; Smith, 1994).

Habit in the consumer behaviour context is viewed as behavioural tendencies to repeat responses given a stable supporting context (Ouellette & Wood, 1998), and has been used interchangeably with the frequency of past behaviour (Knight, 1999). These habitual responses are said to have an element of automaticity, in that the response takes place with less focal attention than would normally be required for non-habitual behaviour (Triandis, 1980). Researchers have included habit with intention as joint predictors of future behaviour (Ouellette & Wood, 1998; Triandis, 1977, 1980).

Negative Binomial Distribution

Ehrenburg (1990; 1988) and others contend that for frequently purchased consumer goods in stable markets, the study of past behaviour and the use of the NBD has been particularly effective in predicting penetration rates and frequency of buyers of a brand or category. Negative Binomial Distribution Theory uses market penetration, purchase frequency and time-period data to predict repeat purchase and brand choice patterns (Ehrenberg, 1988). The NBD is a behaviourally based model that does not require attitudinal or other marketing variables to calculate predicted repeat purchase rates, or the pattern of amount consumed. The managerial implications of the NBD are powerful. With only market penetration and purchase frequency in a time period, managers can predict future buying patterns (Frisbie, 1980) and therefore a measure of behavioural loyalty for a population (Bennett, 2004).

Requisite conditions for best use of the NBD (Robert East, 1997; Morrison & Schmittlein, 1988; Wagner & Taudes, 1987) are: a) The market is stable and mature, b) Average repurchase frequency is greater than once per year, and c) Repeat purchase rates are Poisson distributed. The Dirichlet model (Goodhardt, Ehrenberg & Chatfield, 1984), based on the NBD, applies where consumers purchase multiple brands from the chosen set. Sports team fanaticism generally prevents this consumption of multiple brands except in situations where consumers are motivated by enjoyment of the sport rather than a particular team, or incidental purchase due to a favourite team having to play another team to provide the core sport service. The NBD and the Dirichlet models have been applied, with varying levels of success, to fast food outlets (Bennett, 2004), grocery stores (Frisbie, 1980), subscription markets (Sharp, Wright and Goodhardt, 2002), retail shopping (Brewis-Levie & Harris, 2000; Robert East *et al.*, 1995) online gambling (Jolley, Mizerski & Olaru, 2006), lotteries (Mizerski *et al.*, 2004), financial markets, petrol stations and dry cleaning stores, but not with sporting attendance.

In one of the few studies segmenting sports fans based on behaviour, Clowes and Tapp (2003) collected data from 667 fans at an English Premier League football game. Their results suggested that the attendance patterns of fans exhibited an "hourglass" shape, with high percentages of heavy and light attendees, and a low percentage of medium attendees. This hourglass distribution represents season ticket holders, who comprise the majority of heavy attendees, and casual fans who only attend one or two games per year. Researchers continue to debate whether this hourglass shape is desirable (Clowes & Tapp, 2003; Mullin, Hardy & Sutton, 2000). For example, if each game is sold out, is it better to have higher proportions of

heavy attendees (meaning fewer unique spectators at subsequent games), or higher proportions of light users, thereby a wider fan base with more individuals getting in to games?

Hypotheses

This research examines whether attendance at sporting events follows the habitual pattern offered by the NBD. Specifically, can the inclusion of past behaviour add to the explanatory or predictive powers of cognitive or hedonic models such as motivation or identification? East et al. (2005) found that separating the behavioural and attitudinal dimensions of loyalty provided better predictions for the outcomes of loyalty. For example, instead of trying to measure an overall loyalty construct, researchers should choose behavioural loyalty, and measure its strength by examining customer retention. Perhaps the same may be true for sports fan loyalty. There may be an attitudinal dimension (already measured in existing scales), and a behavioural dimension (not yet measured).

Tapp (2004) theorises that older supporters, leading more stable lives, may settle into a form of auto-repurchase of sporting tickets and thus mimic the NBD. However, one of the conditions of using the NBD (ticket purchase being Poisson distributed) is not satisfied in some professional sporting arenas that sell season tickets. Each ticket purchased for an individual game is not independent of each other purchase if members buy a season ticket for all games. Season ticket holders can comprise up to 80% of some home game attendances in the Australian Football League (AFL) (Georgiu, Neale & Purchase, 2003), so distinguishing between season ticket holders and game-by-game attendees is important. For AFL games with a high percentage of season ticket holders, attendance should not follow the NBD. When analysing just non-season ticket holders at AFL games, attendance patterns should follow the NBD as all conditions are met. Therefore, the following hypotheses are tendered:

H1: Overall attendance at AFL games will not follow the negative binomial distribution.

H2: Non-season ticket holder attendance at AFL games will follow the negative binomial distribution.

Research Method

The two hypotheses were tested from data collected at a Fremantle Dockers home game at Subiaco Oval in 2004. Eight research assistants were stationed inside gates 8, 10, 19 and 26 from one hour before bounce-down until the three-quarter time break. The gates were roughly equidistant from each other in an attempt to gather data from both members and non-members of the Fremantle Football Club. The research assistants handed out 820 self-completed paper questionnaires to patrons as they entered the stadium.

To randomise the sample, the assistants were instructed to approach every fourth individual or group, with further instructions not to give the questionnaire to more than one person in any group. The respondents could either complete the questionnaire on the spot, or return the questionnaire to the same location before the end of the three-quarter time break. A total of 651 completed questionnaires were returned for a response rate of 79%. This response, from a game day attendance of 35,037 corresponds to 1.8% of the overall crowd. Of the 651 responses, 233 are non-season ticket holders. A small incentive (e.g., hat or cap in team colours) was given to respondents as they returned their completed questionnaire to the research assistant. The number of refusals was low.

The sample was 55% male, with an average age of 38.1 years. The gender split of the sample compares favourably with the overall gender split of AFL games in Perth of 57.6% (Megalogenis, 2004). The mean number of games attended was 6.52 out of a possible total of 10 home games to that point in the season. Approximately 65% were members of the Fremantle Football Club, and of those members, 94% purchased season tickets. The Fremantle Football Club reported that during most home games in 2004, 68% of the attendees were Fremantle members. These figures indicate that the sample is representative of the attendee population.

Analysis

Attendance data were first analysed with NBD predictions to test the hypotheses, and then the overall attendance data and non-season ticket holder data were compared using Mean Absolute Percent Error. The mean number of games attended from the overall sample was 6.52, and 3.38 for the non-season ticket holder sub-sample. Entering this into NBDNORMS (Wright, 1999) with a penetration rate of 99.5% (does not allow for 100% penetration) provides a comparison of actual and predicted attendance. Figure 1 compares the observed and predicted attendance for the overall sample. Visually there appears to be a difference and further analysis was required.

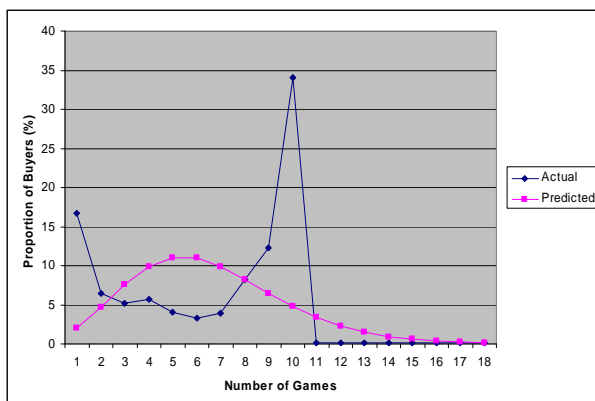


Figure 1:

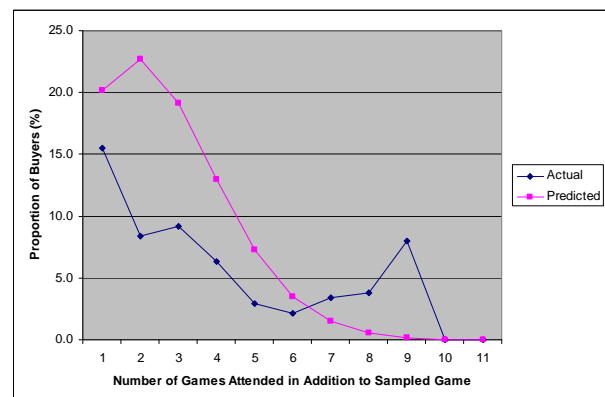


Figure 2

Figure 1: NBD Prediction Compared with Overall Attendance;

Figure 2: Prediction Compared with Non-Season Ticket Holder Attendance

The correlation coefficient is low ($r = 0.257$) and not significant at $p > .05$. This indicates a weak correlation between the actual and predicted values. Therefore, H1 was supported in that overall attendance at AFL games does not follow the negative binomial distribution. Figure 2 compares the reported and predicted attendance among non-season ticket holders at AFL games. The correlation coefficient is high ($r = 0.766$) and significant at $p < .01$. This indicates a strong correlation between the actual and predicted values, and therefore, H2 was supported in that non-season ticket holder attendance at AFL games followed the negative binomial distribution.

A further test to compare how well the data fits the NBD predictions is to use Mean Absolute Percent Error (MAPE). MAPE is calculated by dividing the sum of the absolute error (actual minus forecast) by the sum of the actual number. Forecast accuracy is then determined by the formula $(1 - \text{error})$. Forecast accuracy for overall attendance is 0% while for the non-season ticket holder data it is 21%.

Discussion and Future Research

The findings indicate that studying past behaviour (habit), and using the NBD are useful for predicting attendance at AFL games. The high proportion of season ticket holders at AFL invalidates one of the conditions of the NBD, but when season ticket holders are removed from the sample, NBD predictions and reported attendance are highly correlated. Theoretically, this study provides initial support for applying empirical generalisations like the NBD to contexts other than consumer goods, such as professional sports.

Managerially, sports team managers can use the NBD to predict future attendance. This is especially useful for non-professional sports team managers where season tickets are not offered and ticket purchases are independent of each other. By using the penetration rate among the target population and the average number of games attended with the NBD, managers will better understand the fluctuations in game attendance among non-season ticket holders. Future researchers should apply the NBD to other sporting events, festivals and entertainment products to see if it holds. Behaviourally based models can be used alongside cognitive and hedonic models to provide a clearer understanding of consumer behaviour. For example, a comparison of NBD with motivation-based measures and intentions would be instructive.

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