# STADIUM ATTENDANCE FOR BASEBALL: A CASE STUDY 

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#### Abstract

We examine stadium attendance for the Mallards baseball team, a nonprofessional, summer collegiate baseball team in the Northwoods League in Madison, Wisconsin. Not only can this analysis be used in a principles course as a case study to explain demand shifts in a perfectly elastic supply situation, it also highlights this team's unique experience of having game attendance at a rate far exceeding any other team in their league, even surpassing that of some major league baseball teams.


## INTRODUCTION

Teaching a principles of economics course leads inevitably to an exposition of Supply and Demand curves and their elasticities. Many of us struggle to find real world examples of the polar cases (perfectly elastic demand or supply) to present to our students. In this paper, we have developed a model using perfectly elastic supply in stadium attendance for a local non-professional baseball team. The team under consideration here is the Madison Mallards, which played for the first time in 2001. Since that time, it has never raised seating prices and does not sell out games, leading to a situation of perfectly elastic supply (see Figure 1)

This example becomes one in which we examine Demand shifts to determine the increases in attendance. Among the demand factors that could be pushing demand, the traditional factors of area population, area income, alternative choices, and 'tastes' need to be considered. As the prices of alternative entertainment choices did not vary in any significant way in this area during the time period in question (we looked at movie ticket prices, etc), that option was discarded. When we look at 'tastes' for entertainment, a class discussion regarding why a person (or family) might choose an amateur league baseball outing over other

[^0]choices can be quite illustrative. For example, choosing an outdoor entertainment choice over, say, going to a museum or library, the weather could play a role. Sports economics would suggest that the team's performance record should matter, as most people prefer to witness a 'win' by the home team rather than otherwise, so team stats should have some explanatory power here. Though if that were the only factor pulling fans, one would expect that higher levels of play in the Major leagues would draw substantially larger crowds. Our analysis of their attendance explores not only the traditionally accepted explanatory variables of performance outcome and environmental concerns common in Sports Economics (see Rasher, 1999 among others) but also the various types of promotions used by the Mallards' ownership to attract patrons. It is this last set of variables that prove to be highly instrumental in explaining attendance - providing a lesson perhaps for other teams.


We examine the attendance record of this team since its inception in 2001 and covering the subsequent 153 home games. We note that this team's experience is unique in that it attracts fans far in excess of what would be expected given the league in which it plays. Indeed, Figure 2 shows the Mallards attendance figures compared to the league average.

Figure 2: Madison Mallards vs. League Average Attendance, by year


Source: Northwoods League, Media Guide, Johnson Printing, 2006.

It is clear that there is something unusual about the Mallards as a team and their ability to draw fans. Therefore, this paper examines the Mallards Stadium attendance not only as a stand-alone example of Supply and Demand, but through the precepts of Sports Economics, a fast-growing sub-discipline of economics that has set precedent for studies of this type.

The Mallards play in the Northwoods League of non-professional Spring season baseball using college level players seeking to gain league experience without losing their collegiate eligibility. This team plays in its own stadium near the community of Madison, WI, a community far from bereft of entertainment possibilities. Indeed, there are even two local farm teams (the Beloit Snappers and the Wisconsin Timber Rattlers) that play within a reasonable driving distance of the Mallards, as well as the Milwaukee Brewers major league team. In 2001, the Northwoods League consisted of seven teams besides the Mallards. Since then, the league has expanded twice, for a total of twelve teams. Within this league, the

Mallards are something of an attendance phenomenon. During their first year in the league, they had their smallest total attendance, placing them at the midway point in the entire league. By their second season they were the top drawing team, and continue to rank with the highest overall attendance in their league (Figure 1, above). Compared to professional teams, the Mallards' attendance is not insignificant either. For example, out of the more than 175 affiliated farm teams that played in 2005, the average attendance of the Mallards was higher than that at all but the top 35 teams, putting them in the top $20 \%$ of those teams. Further, the Montreal Expos' (National League, professional team) average attendance was 9,356 , while the Mallards actually had a few games with higher attendance. Indeed, there were several games played by the Montreal Expos with lower attendance than the Mallards in $2004 .{ }^{1}$

## LITERATURE

We investigate the demand for home games using attendance figures for a team that has, by all measures, defied the standard wisdom that would predict low fan turnout, as its win/loss record is hardly anything unusual. Indeed, the team we are studying regularly has stadium attendance that has occasionally topped that of Major League Baseball Teams. How they manage to achieve such a feat, is the goal of this paper beyond just estimating just another stadium attendance model. We follow the existing literature for such models before widening our approach to the inclusion of other variables.

Current work in the field of Sports Economics includes primarily econometric studies that examine the 'usual suspects' to explain fan turnout: age of stadium, quality of play, price of ticket, and so on tend to be the factors in question. For instance, Rascher (1999) shows such a model using winning percentages as well as environmental components (day of the week, temperature, area economic data, etc.) and finds that he is able to explain between $60 \%$ and $75 \%$ of attendance for Major League baseball during a single season (1996). This study, being leaguewide, means that regional variances in fan tastes had to be taken into consideration, done mainly by Rascher using racial composition of the various localities. This is somewhat troublesome as there can be wide differences in fan loyalty in any particular location due to other effects than race. Indeed, in our study we find that game attendance rises from an average of just over 1,500 fans per game in 2001 to over 5,700 fans per game in 2005 with essentially no change in racial composition of the area.

Butler (2002) estimates baseball demand using more definitive environmental data than Rascher. We follow Butler's precedent using precipitation as well as temperature and day of the week rather than just 'weekend' or 'night' game dummy variables.

Clapp and Hakes (2005) concentrate their analysis on stadium amenities, age in particular to explain fan demand. They find, using data over more than a half century, that new stadium effect wane quickly, on average diminishing to nearly zero in as little as two years. Our data demonstrates such dramatic increases in attendance, in a continuing upward direction over the entire sample period, that we feel fairly confident in omitting stadium age from our model as Clapp and Hakes suggest that any affect from stadium age would be long gone by the time our sample concludes.

Coates and Harrison (2005) examine the effects of an outcome based quality assessment on the part of fans for baseball stadium seat demand. They find that team success is a large factor in attendance, regardless of such extraneous negative influences (such as the strike in Major League Ball) or stadium age.

For some time, authors have sought to explain game attendance with the 'star' factor or with the potential for a closely played game by looking at probability of winning a given game or stats on a particular player or on the game starters. For instance, Scully (1989) finds that games that have a high probability of either team winning even when the home team was likely to win had lower attendance than those games that were thought to be more closely contested, prompting leagues to institute rules that had the outcomes of 'leveling the playing field' as it were. Several authors, studying the demand for sports attendance, use team quality in one way or another for analyses of this sort. We follow many of these by looking at quality with an outcomes based assessment method such as that used by Scully (1989) or Coates and Harrison (2005).

Leventhal (2000), attempts an overview of generalized factors of fan loyalty. For instance, the quality of play comes into question when the winning percentage or existence of 'stars' in such studies as Butler (2002) and Zimbalist (2003). Other studies look at ticket pricing such as those by Noll (1974) and Salant (1992), though in our study ticket pricing did not vary over the period and, given rather low levels of inflation, alternative entertainment pricing also didn't vary enough to warrant inclusion in our model. Research in the field has a long standing tradition of assuming some unmeasurable motivation behind fan loyalty determined by locality or tradition that makes comparisons across teams less empirically satisfying than theory might suggest (see particularly Porter (1992) and Owen

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(2003)). Because of that, we feel that our case study approach is justified rather than attempting to examine the disparities across teams within the relatively small league within which the Mallards play.

From our initial perspective, we realized that many of the standard explanations of fan turnout would not prove particularly satisfactory with the team we are studying. The Mallards are a member of the Northwoods League that uses only college players: In order to maintain NCAA (college) eligibility, these players cannot receive pay of any kind. Hence, the level of play is not the same as one would expect out of a professional league. Indeed, there are few if any with name recognition of any sort (they recruit players nationwide, rarely relying on local teams for players so that the fans are not previously acquainted with 'stars' or even 'personalities' of the players). They play at Warner Park, a stadium that is neither new nor luxurious by any standard.

Furthermore, the entire roster changes from year to year so that there is little 'carry-over' due to any particular player or line-up. Ticket prices for the Mallards are very near to those charged by any other team of similar caliber and exceed those of local college or high school teams that would provide 'home town heroes.' Indeed, we have ascertained that the Mallards do very little direct advertising other than having a web presence and hosting local radio personalities in order to gain word of mouth excitement. Therefore, we realize that several of the standard measures of player or team quality are likely to even be recognized much less act as impetus for attendance.

So, what is different about the Mallards? Why do they so far exceed the attendance figures of every other team in their league and of teams in leagues far and away superior to them? We decided to investigate all of the standard variables so often at the center of studies of this type, but also to add in several other environmental factors.

## DATA

Our data comes from the all home games of this team, since its inception in 2001 through 2005 (about half of all games played by this team). Game attendance, box scores, and other game data were provided to us directly from the head office of the Madison Mallards. Table I shows the area data on population and median income, along with game day average for weather.

After speaking at length with the management of the team, we came to believe that the Mallards offered something rather special, perhaps even unique, in
baseball. One of the most eye-popping examples of this difference was demonstrated by a picture found on their website. In this picture, the game was in progress (a game they ultimately lost by the way) and the aerial photograph showed an area of the 'picnic' lawn (an area where fans can lounge in the grass) full of fans - but the area has absolutely NO view of the ongoing game. Given that there is free admission to nearby community parks, why would these people pay to sit on the grass in a baseball stadium where they can't even view the game? The Mallards have made a mission of providing family oriented entertainment at reasonable prices. They make a practice of offering different promotions (give-aways or other attractions like autograph signing by visiting celebrities, fireworks etc.) at every game, quite unlike the standard practice of occasional promotions practiced by their competition.

The management is extremely sensitive of the family environment of their stadium and offers several areas for families to enjoy their time during the game. They even offer a family special area with a one price admission to a play area. The owner suggests:

Here you come in, have a playground, (free) bounce house, speed pitch, chase foul balls and get a free hot dog, sit on the hill to talk and run - not to watch baseball. So your 4 year old has something to do. So why go here instead of a park? Take an inning off or so? Yes, especially for the standing room only nights. Watch for a while and then run around on the hill. 50-100 kids chasing foul balls behind $1^{\text {st }}$ base, so it is a social thing, more than at a park. Have a tail gate area -2 tents behind first base with up to 1,500 people, reserved seats, pregame food and some groups never left the tent - stayed and talked rather than go to seats - - can hear the game/announcer who is funny. Just people watching is fantastic - coeds to families, to little kids to retired people... my wife loves to watch people. No better place to do it than right here.

Clearly, this team offers something special, something other than ordinary baseball viewing. We delved into this difference during a series of interviews with the owner and other head office personnel. Even during the first such interview, it became clear that the Mallard's approach to team promotion was different from other teams. Though there was, and is, emphasis placed on winning games and the division, management is highly cognizant of their fan base. They have a very strong belief that many of their fans come out to the park for family entertainment, all inclusive of the game as well as all entertainment during, before, and after the players take the field. To quote:

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Baseball is number one, family atmosphere, affordable tickets, giveaways...one not more important than anything else. If it was just baseball, we would only have 1,000 a night, but we do other things while keeping baseball important.

Indeed, management has a very clear idea of which promotions are most successful. They believe that the family oriented promotions, such as fireworks, give-aways exclusively for children (such as bats, hats, or dolls, for instance) draw more fans than those more adult oriented promotions. When asked about the most popular forms of non-baseball entertainment, the immediate response was

Fireworks... everyone else says so too and they are right. First show in June for Fireworks, looking at Friday and Saturday (first fireworks) had twice as many as Friday when usually we do better than Friday...

The more adult oriented promotions include some of the standard adult fan oriented give-aways (such as calendars, schedules, beer steins, etc.) as well some very creative schemes that may well have been unique to the Mallards. One such promotion was the giveaway of one free nose job, though management was quick to assure the authors that this particular give-away was actually quite well received, there were other promotions that did not work as well. According to the owner, the worst promotion was "Singles night. Sell seats to opposite sexes every other seat. Didn't work..." In that particular scheme, all of the single seat sales for that game were doled out on the basis of the gender of the purchaser (not only a logistical nightmare, there were too few women buying individual seats, making many male purchasers end up with less desirable seats). Perhaps because of these opinions, the team has been offering more family oriented promotions in recent years. Our model tests whether this bias toward family promotions does indeed draw more fans than the more adult oriented promotions.

Management also provided information on the cost of promotions, the most expensive single 'item' being fireworks at approximately $\$ 2,000$ for one event. Fireworks, as well as other promotions that act as localized 'public goods' (such as musical acts), were valued simply as their total cost. Individual give-aways were valued individually, with the number of items given, to determine the total cost. For instance Bobble-head dolls being the priciest per item (at approximately $\$ 4$ each), but they were only awarded to the first 250 fans, making the total cost of the give-away for that game $\$ 1,000$. Several of the give-aways were free to the team, as they were provided by sponsoring entities, those too were valued at the price to the sponsor rather than to the team. Our study includes both the type of promotion offered at each game (family oriented or not) and the value of these promotions. Season summaries of these variables can be found in Table II.

| Table I: Environmental Data - by Season, 2001 to 2005 |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Season | Median Income | CMSA <br> Population | Weather <br> (Rainfall, <br> gameday <br> average) | Temp <br> (gameday, <br> average) |
| 2001 | 50,776 | 212,099 | .19 | 68.5 |
| 2002 | 51,230 | 215,414 | .03 | 71.4 |
| 2003 | 52,216 | 217,815 | .11 | 68.7 |
| 2004 | 52,918 | 220,332 | .10 | 67 |
| 2005 | 53,582 | 223,131 | .03 | 70.4 |

Source: Weather and Temperature from National Weather Service Forecast Office, www.crh.noaa.gov/mkx/climate.
Population and Income data from the US Census Bureau, County QuickFacts, www.quickfacts.census.gov/qfd/states

| Table II: Promotion Characteristics by Season - 2001-2005 |  |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Promotion Characteristic | 2001 | 2002 | 2003 | 2004 | 2005 |
| Average Promotion Cost | 215.59 | 384.39 | 1172.48 | 1906.47 | 1372.06 |
| \% Family Centered Promotion (KID <br> PROMOTION) | .41 | .48 | .57 | .4 | .53 |
| Source: Madison Mallards home office. |  |  |  |  |  |

## METHODOLOGY

Following past research in this field, we first look at a model of attendance very like those done previously: One assuming the demand for a particular game has the form

$$
\mathrm{ATT}=\mathrm{aT}_{\mathrm{h}}+\mathrm{bT}_{\mathrm{a}}+\text { other }
$$

Where ATT is the attendance of home games, T is a vector of talent variables, h being the home team and a being the away (or visiting) team. We expect that $\mathrm{a}>\mathrm{b}$ as fans are more likely to both be more aware of the home team's talent and be more likely to attend based on the quality of the home team than the visitor, all else being equal. Rather than using a sort of 'past predicts the present' sort of talent analysis, we employ an outcomes based fan analysis. For instance, rather than looking at a composite variable of earned errors over the
past several games, we look at the string of wins over the most recent games and the current game outcomes. In that way, we are presuming that fans are capable of gathering and assimilating information in a more accurate way than impressing, say, a Koyck distributed lag on the data. We also look at the square of the difference between the talent variables across teams, as is also common in the literature. The other variables included in our work include those common in the literature, such as game and environment characteristics such as day of the week, temperature (deviation from expected norm), precipitation, area population and area median income. This leads to Model 1.

## Model 1:

$$
\begin{aligned}
& \text { ATT }=\text { CONSTANT }+a \mathrm{AB}_{\mathrm{h}}+\mathrm{b} \mathrm{R}_{\mathrm{h}}+\mathrm{c} \mathrm{H}_{\mathrm{h}}+\mathrm{dBI}_{\mathrm{h}}+\mathrm{eE}_{\mathrm{h}}+\mathrm{fIP}_{\mathrm{h}}+\mathrm{gER}_{\mathrm{h}} \\
& +\mathrm{hAB} \mathrm{a}_{\mathrm{a}}+\mathrm{iR} \mathrm{R}_{\mathrm{a}}+\mathrm{jH} \mathrm{H}_{\mathrm{a}}+\mathrm{kBI}+1 \mathrm{E}_{\mathrm{a}}+\mathrm{mIP}_{\mathrm{a}}+\mathrm{nER} \mathrm{E}_{\mathrm{a}}+\mathrm{o}\left(\mathrm{AB}_{\mathrm{h}}-\mathrm{AB}_{\mathrm{a}}\right)^{2}+\mathrm{p} \\
& \left(\mathrm{R}_{\mathrm{h}}-\mathrm{R}_{\mathrm{a}}\right)^{2}+\mathrm{q}\left(\mathrm{H}_{\mathrm{h}}-\mathrm{H}_{\mathrm{a}}\right)^{2}+\mathrm{r}\left(\mathrm{BI}_{\mathrm{h}}-\mathrm{BI}_{\mathrm{a}}\right)^{2}+\mathrm{s}\left(\mathrm{E}_{\mathrm{h}}-\mathrm{E}_{\mathrm{a}}\right)^{2}+\mathrm{t}\left(\mathrm{ER}_{\mathrm{h}}-\mathrm{ER}_{\mathrm{a}}\right)^{2}+\mathrm{u}\left(\mathrm{IP}_{\mathrm{h}}-\right. \\
& \left.\mathrm{IP}_{\mathrm{a}}\right)^{2}+\mathrm{v} \text { WINSTRING }+\mathrm{w} \text { WIN }+\mathrm{x} \text { WTR }+\mathrm{y} \text { DEPARTURE }+\mathrm{z} \\
& \text { AVERAGE + aa POPULATION + ab INCOME + (error) }
\end{aligned}
$$

Where lower case letters are coefficients, subscripts refer to either the Mallard (h) or visiting team (a). Table III summarizes the variables.

| Table III: Variables |  |  |  |
| :---: | :--- | :--- | :--- |
| Variable Name | Definition | Variable Name | Definition |
| ATT | Stadium Attendance | CONSTANT | Constant term |
| AB | At bats | WINSTRING | Length of winning string <br> do date (if last game lost, <br> $=0$ ) |
| R | Runs | hits | WIN |
| H if Mallards win |  |  |  |
| BI | Runs batted in | Weather: Precipitation <br> amount |  |
| E | Errors | DEPARTURE | Departure from expected <br> temp |
| IP | Innings Pitched | POPULATION | Area population |
| ER | Earned runs | INCOME | Area income |
| KidPromo | $=1$ if promotion family <br> oriented | DBL | $=1$ if game double header |
| Day | $=1$ if Monday, $=2$ if <br> Tuesday, etc. | NETSCORE | =Mallard Runs - Visitor <br> Runs |
| WINLASTGAME | $=1$ if last game won |  |  |

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In our second model, we include variables that further define the game environment - in particular those identified by management as being important to attendance (as specified during the interview process). Far from being such variables as those already identified in the literature, such as 'star power' of various players, or team history, management highlighted game promotions. These promotions are broken down into those oriented specifically for family/child entertainment versus adult oriented promotions. Family or child oriented promotions were such things as bats for kids under 14, bobble-head dolls for kids under 14, or fireworks shows at the game's conclusion. Adult oriented entertainment, included such events as live music performed in the stadium, or 'singles night' (where seats were sold to opposite sexes in alternating order), or even 'nose job night' (winner gets all expense paid nose job). Furthermore, we identified the approximate cost of each promotion, from the point of view of the fan. ${ }^{2}$ Hence, we come to model 2.

## Model 2:

$$
\begin{aligned}
& \text { ATT }=\text { CONSTANT }+a \mathrm{AB}_{\mathrm{h}}+\mathrm{b} \mathrm{R}_{\mathrm{h}}+\mathrm{c} \mathrm{H}_{\mathrm{h}}+\mathrm{dBI}_{\mathrm{h}}+\mathrm{e} \mathrm{E}_{\mathrm{h}}+\mathrm{fIP}_{\mathrm{h}}+\mathrm{g} \\
& E R_{h}+h A_{a}+i R_{a}+j H_{a}+k B I_{a}+1 E_{a}+m \operatorname{IP}_{\mathrm{a}}+n E R_{a}+o\left(\mathrm{AB}_{\mathrm{h}}-\right. \\
& \left.\mathrm{AB}_{\mathrm{a}}\right)^{2}+\mathrm{p}\left(\mathrm{R}_{\mathrm{h}}-\mathrm{R}_{\mathrm{a}}\right)^{2}+\mathrm{q}\left(\mathrm{H}_{\mathrm{h}}-\mathrm{H}_{\mathrm{a}}\right)^{2}+\mathrm{r}\left(\mathrm{BI}_{\mathrm{h}}-\mathrm{BI}_{\mathrm{a}}\right)^{2}+\mathrm{s}\left(\mathrm{E}_{\mathrm{h}}-\mathrm{E}_{\mathrm{a}}\right)^{2}+\mathrm{t} \\
& \left(\mathrm{ER}_{\mathrm{h}}-\mathrm{ER}_{\mathrm{a}}\right)^{2}+\mathrm{u}\left(\mathrm{IP}_{\mathrm{h}}-\mathrm{IP}_{\mathrm{a}}\right)^{2}+\mathrm{v} \text { WINSTRING }+\mathrm{w} \text { WIN }+\mathrm{x} \text { WTR }+ \\
& \text { y DEPARTURE }+\mathrm{z} \text { AVERAGE }+ \text { aa POPULATION }+\mathrm{ab} \\
& \text { INCOME + ac KIDPROMO + ad PROMOCOST + ae DBL+ a f } \\
& \text { DAY + (error) }
\end{aligned}
$$

Where variables are as described in Table III.
To determine just how important the stadium specific promotions are, we develop Model 3. It is designed around the casual fan who may know little about baseball and is only looking for an outing. Hence, we limit the explanatory variables to those that might be easily discovered to a non- aficionado, removing all of the talent variables but including the environmental and promotional variables as well as the 'winning string' (based on the concept that even casual fans love a winner). This brings us to Model 3.

## Model 3:

$$
\begin{aligned}
& \text { ATT }=\text { CONSTANT + a WINSTRING }+\mathrm{b} \text { WIN }+\mathrm{c} \text { WTR }+\mathrm{d} \\
& \text { DEPARTURE }+\mathrm{e} \text { AVERAGE }+\mathrm{fPOPULATION} \mathrm{+} \mathrm{~g} \text { INCOME }+ \\
& \mathrm{h} \text { KIDPROMO }+\mathrm{i} \text { PROMOCOST }+\mathrm{j} \text { DBL }+\mathrm{k} \text { DAY }+1 \\
& \text { NETSCORE }+\mathrm{m} \text { WINLASTGAME }+(\text { error })
\end{aligned}
$$

Where variables are as described in Table III.

## RESULTS

Our three models' results are shown in Table IV. Of particular interest is the fact that Model 3, without any talent variables at all, can show significance stunningly close either of the other two models, bearing out the Mallard's own perceptions of the importance of the environmental variables in determining fan attendance. Model 1 , using the traditional variables dealing with team performance meets the explanatory power suggested by Rasher (1999) of $60-75 \%$, and the inclusion of data on team promotions pushed the explanatory power significantly higher to nearly $80 \%$ in Model 2. A brief look a the F statistic of these models suggests that eliminating the vast preponderance of the performance variables does little damage to the resulting explanatory power of the regression, flying the face of traditional Sports Economics analysis but fully supporting the team's management perspective of the importance of promotions to attendance.

| Table IV: Empirical Results <br> Dependent = ATTENDANCE |  |  |  |
| :---: | :---: | :---: | :---: |
|  | Model 1 | Model 2 | Model 3 |
|  | -87741 | -82056 | -81710 |
|  | $(\mathrm{t}=12.1)$ | $(\mathrm{t}=12.31)$ | $(\mathrm{t}=-12.84)^{* *}$ |
| $\mathrm{AB}_{\mathrm{h}}$ | -56.38 | -60.04 |  |
|  | $(\mathrm{t}=.11)$ | $(\mathrm{t}=1.14)$ |  |
| $\mathrm{R}_{\mathrm{h}}$ | 276.18 | 197.89 |  |
|  | $(\mathrm{t}=1.69)$ | $(\mathrm{t}=1.34)$ |  |
| $\mathrm{H}_{\mathrm{h}}$ | -48.09 | -32.61 |  |
|  | $(\mathrm{t}=.78)$ | $(\mathrm{t}=.582)$ |  |


| Table IV: Empirical Results Dependent = ATTENDANCE |  |  |  |
| :---: | :---: | :---: | :---: |
| Variable | Model 1 | Model 2 | Model 3 |
| $\mathrm{BI}_{\mathrm{h}}$ | $\begin{gathered} 26.14 \\ (\mathrm{t}=.14) \end{gathered}$ | $\begin{gathered} 81.07 \\ (\mathrm{t}=.47) \end{gathered}$ |  |
| $\mathrm{E}_{\mathrm{h}}$ | $\begin{aligned} & -95.59 \\ & (\mathrm{t}=.97) \end{aligned}$ | $\begin{gathered} \hline-90.10 \\ (\mathrm{t}=.941) \end{gathered}$ |  |
| $\mathrm{IP}_{\mathrm{h}}$ | $\begin{gathered} 697.11 \\ (\mathrm{t}=2.19)^{* *} \end{gathered}$ | $\begin{gathered} 665.88 \\ (\mathrm{t}=2.34)^{* *} \end{gathered}$ |  |
| $E R_{\text {h }}$ | $\begin{gathered} .712 \\ (\mathrm{t}=.006) \end{gathered}$ | $\begin{gathered} 7.70 \\ (\mathrm{t}=.072) \end{gathered}$ |  |
| ABa | $\begin{aligned} & \hline-19.13 \\ & (\mathrm{t}=.325) \end{aligned}$ | $\begin{gathered} -3.16 \\ (\mathrm{t}=.060) \end{gathered}$ |  |
| $\mathrm{R}_{\mathrm{a}}$ | $\begin{gathered} \hline-64.06 \\ (\mathrm{t}=.423) \end{gathered}$ | $\begin{aligned} & -50.11 \\ & (\mathrm{t}=.37) \end{aligned}$ |  |
| $\mathrm{Ha}_{\text {a }}$ | $\begin{gathered} 75.52 \\ (\mathrm{t}=1.11) \end{gathered}$ | $\begin{gathered} 56.05 \\ (\mathrm{t}=.91) \end{gathered}$ |  |
| $\mathrm{BI}_{\text {a }}$ | $\begin{gathered} 15.37 \\ (\mathrm{t}=.098) \end{gathered}$ | $\begin{gathered} 38.84 \\ (\mathrm{t}=.28) \end{gathered}$ |  |
| $\mathrm{E}_{\text {a }}$ | $\begin{gathered} \hline-10.11 \\ (\mathrm{t}=.098) \end{gathered}$ | $\begin{gathered} \hline-19.18 \\ (\mathrm{t}=.206) \end{gathered}$ |  |
| $\mathrm{IP}_{\mathrm{a}}$ | $\begin{gathered} -342.25 \\ (\mathrm{t}=1.097) \end{gathered}$ | $\begin{aligned} & \hline-306.73 \\ & (\mathrm{t}=1.27) \end{aligned}$ |  |
| $\mathrm{ER}_{\mathrm{a}}$ | $\begin{gathered} -188.90 \\ (\mathrm{t}=1.377) \end{gathered}$ | $\begin{aligned} & \hline-186.19 \\ & (\mathrm{t}=1.51) \end{aligned}$ |  |
| $\left(\mathrm{AB}_{\mathrm{h}}-\mathrm{AB}_{\mathrm{a}}\right)^{2}$ | $\begin{gathered} -1.14 \\ (\mathrm{t}=.22) \end{gathered}$ | $\begin{gathered} \hline-3.39 \\ (\mathrm{t}=.723) \end{gathered}$ |  |
| $\left(\mathrm{R}_{\mathrm{h}}-\mathrm{R}_{\mathrm{a}}\right)^{2}$ | $\begin{gathered} \hline 23.75 \\ (\mathrm{t}=1.86) \end{gathered}$ | $\begin{gathered} \hline 21.47 \\ (\mathrm{t}=1.87) \end{gathered}$ |  |
| $\left(\mathrm{H}_{\mathrm{h}}-\mathrm{H}_{\mathrm{a}}\right)^{2}$ | $\begin{gathered} \hline-4.30 \\ (\mathrm{t}=.681) \end{gathered}$ | $\begin{gathered} -3.95 \\ (\mathrm{t}=.684) \end{gathered}$ |  |
| $\left(\mathrm{BI}_{\mathrm{h}}-\mathrm{BI}_{\mathrm{a}}\right)^{2}$ | $\begin{gathered} \hline-18.22 \\ (\mathrm{t}=1.22) \\ \hline \end{gathered}$ | $\begin{gathered} -15.05 \\ (\mathrm{t}=1.14) \end{gathered}$ |  |

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| Table IV: Empirical Results Dependent $=$ ATTENDANCE |  |  |  |
| :---: | :---: | :---: | :---: |
| Variable | Model 1 | Model 2 | Model 3 |
| $\left(\mathrm{E}_{\mathrm{h}}-\mathrm{E}_{\mathrm{a}}\right)^{2}$ | $\begin{gathered} 17.438 \\ (\mathrm{t}=.586) \end{gathered}$ | $\begin{gathered} 31.89 \\ (\mathrm{t}=1.19) \end{gathered}$ |  |
| $\left(\mathrm{ER}_{\mathrm{h}}-\mathrm{ER}_{\mathrm{a}}\right)^{2}$ | $\begin{gathered} -3.864 \\ (\mathrm{t}=.368) \end{gathered}$ | $\begin{gathered} -.221 \\ (\mathrm{t}=.023) \end{gathered}$ |  |
| $\left(\mathrm{IP}_{\mathrm{h}}-\mathrm{IP}_{\mathrm{a}}\right)^{2}$ | $\begin{gathered} 102.05 \\ (\mathrm{t}=2.09)^{* *} \end{gathered}$ | $\begin{gathered} 95.424 \\ (\mathrm{t}=2.18)^{* *} \end{gathered}$ |  |
| WinLastGame |  |  | $\begin{gathered} 55.06 \\ (\mathrm{t}=.313) \end{gathered}$ |
| WIN | $\begin{gathered} -715.62 \\ (t=1.566) \end{gathered}$ | $\begin{gathered} \hline-574.21 \\ (t=1.402) \end{gathered}$ | $\begin{aligned} & 76.41 \\ & (\mathrm{t}=.281) \end{aligned}$ |
| NetScore |  |  | $\begin{aligned} & 23.01 \\ & (\mathrm{t}=.69) \end{aligned}$ |
| Population | $\begin{gathered} -.249 \\ (\mathrm{t}=1.332) \end{gathered}$ | $\begin{gathered} -.262 \\ (\mathrm{t}=1.56) \end{gathered}$ | $\begin{gathered} -.160 \\ (\mathrm{t}=1.01) \end{gathered}$ |
| Income | $\begin{gathered} 2.582 \\ (\mathrm{t}=3.55)^{* *} \end{gathered}$ | $\begin{gathered} 2.53 \\ (\mathrm{t}=3.87)^{* *} \end{gathered}$ | $\begin{gathered} 2.10 \\ (\mathrm{t}=3.47)^{* *} \end{gathered}$ |
| KidPromotion |  | $\begin{aligned} & -279.33 \\ & (\mathrm{t}=1.54) \end{aligned}$ | $\begin{aligned} & -298.94 \\ & (\mathrm{t}=1.79) \end{aligned}$ |
| PromoCost |  | $\begin{gathered} .298 \\ (\mathrm{t}=5.35)^{* *} \end{gathered}$ | $\begin{gathered} .293 \\ (\mathrm{t}=5.53)^{* *} \end{gathered}$ |
| DBL |  | $\begin{gathered} -138.442 \\ (\mathrm{t}=.417) \end{gathered}$ | $\begin{gathered} -245.49 \\ (\mathrm{t}=.74) \end{gathered}$ |
| Day |  | $\begin{gathered} 51.27 \\ (\mathrm{t}=.974) \end{gathered}$ | $\begin{gathered} 73.8 \\ (\mathrm{t}=1.57) \end{gathered}$ |
| AVG | $\begin{gathered} 144.74 \\ (\mathrm{t}=3.85)^{* *} \end{gathered}$ | $\begin{gathered} 141.81 \\ (\mathrm{t}=4.196)^{* *} \end{gathered}$ | $\begin{gathered} 143.62 \\ (\mathrm{t}=4.44)^{* *} \end{gathered}$ |
| DEP | $\begin{gathered} -187.88 \\ (\mathrm{t}=4.69)^{* *} \end{gathered}$ | $\begin{gathered} -169.72 \\ (\mathrm{t}=4.72)^{* *} \end{gathered}$ | $\begin{gathered} \hline-171.11 \\ (\mathrm{t}=5.1)^{* *} \end{gathered}$ |
| WTR | $\begin{aligned} & -167.96 \\ & (\mathrm{t}=.669) \end{aligned}$ | $\begin{aligned} & -131.55 \\ & (\mathrm{t}=.587) \end{aligned}$ | $\begin{aligned} & -175.52 \\ & (\mathrm{t}=.805) \end{aligned}$ |


| Table IV: Empirical Results <br> Dependent = ATTENDANCE |  |  |  |
| :---: | :---: | :---: | :---: |
| Variable | Model 1 | Model 2 | Model 3 |
| WinString | -39.91 <br> $(\mathrm{t}=.592)$ | -70.78 <br> $(\mathrm{t}=1.17)$ | -40.78 <br> $(\mathrm{t}=-.705)$ |
| Adj R ${ }^{2}$ | .746 | .799 | .793 |
| F | $16.851^{* *}$ | $19.786^{* *}$ | $45.833^{* *}$ |
| Absolute value of T score of unstandardized coefficients reported <br> $* *$ implies significance at $95 \%$. |  |  |  |

Closer inspection of model results clearly shows that the only performance variable that mattered here was IP (innings pitched) - with longer games showing more attendance. We can infer that fans were able to riddle out which games would be close even before the game was played so that they would attend those longer, more closely contested games (just as Scully, 1989 predicted). Not even winning the game or the most recent winning streak was significant.

What was significant in all three models was the average expected temperature at game time, with higher temperatures bringing in more fans (this may indicate that baseball attendance is simply higher in July when temperatures are likely to be higher than during other months). The departure from average (DEP) on specific game days was also significant, meaning that especially hot or especially cold temperatures (as a departure from expected average) did drive attendance, suggesting the conclusion that when temperatures were over-warm attendance lagged (as there is a positive coefficient on DEP). Oddly, the advent of rain did little to deter fans from attending games.

Just as management suggested, the cost of the promotions mattered with higher cost events brining in more fans. Contrary to what management thought, however, our research suggests that "kid" promotions were no better received than those aimed at adults. In sum, Model 3, using only the barest of the performance data (winning streak, score, and wining the most recent game) but including promotion data actually outperformed Model 1 (the traditional model using the largest array of performance data but no data on promotions). It is clear that for this team, the value of the entertainment provided by attending a game is not limited to the level of skill of the baseball players or even how the team fares against other teams. Fans appear to value this experience for what it can bring to them as an entertainment package.

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The final lesson this could bring home to students in an introductory course is that demand for this type of entertainment is driven by such traditional factors like area income but also that elusive 'taste' variable. In this particular case, warm weather games (that were not hotter than expected) and the closely contested games (more innings pitched) were more likely to be those attended by fans along with those games with the best promotions (fireworks being the most expensive, so the biggest draw).

## ENDNOTES

1 From mtlexpos.tripod.com/attendance.htm, the official home web site for the Montreal Expos.
${ }^{2}$ Data was gathered as to whether promotions were sponsored by corporations or not, but this did not affect fan response.

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