University of Oregon Gym Attendance: An Analysis of Student Behavior and Decision Making

Hunter Wright

2025-05-21

Introduction

The health and fitness industry has seen substantial growth since COVID-19 pandemic restrictions lifted. According to the 2024 Health and Fitness Association Global Report, key developed markets around the world are seeing record high rates of gym memberships among their adult population. The United States leads with 23.7% of surveyed adults saying they belonged to a gym or health club. On top of this, markets with historically lower participation are seeing record growth as health and fitness enters the forefront of the public consciousness. However, having a gym membership and actually going to the gym are two different things. For many, going to the gym consistently is a challenge. It can be expensive and time-consuming, and finding motivation to go often is difficult. College students have a wide variety of responsibilities and commitments soaking up large amounts of time during the week that exacerbate this difficulty. Despite its growing popularity, going to the gym remains a privilege to those that posses excess time to spend there.

The field of behavioral economics primarily focuses on how individuals make risky decisions with monetary payoffs. Should someone spend their paycheck or invest it? Why does it feel so good to find $20 on the ground? What does someone expect to gain from buying a lottery ticket? Capital is a scarce resource that agents must take into account when making decisions that affect their future. In this thesis, I look to explore how agents make decisions with another scarce resource: time. While there is a wide disparity in wealth, where decisions involving money are more important to some than others, everyone has the same 24 hours in a day, and must make risky decisions based on that constant. One of the main purposes of taking classes at a university is to develop a student's education, skills, general knowledge, health and life experience. In economics, these are considered useful personal attributes and are known as *human capital*. College students look to develop their human capital by taking classes, joining clubs, doing internships, and exercising, among many other things. All of these activities take time, and a rational student must make important decisions on how to spend that time. On any given day of the week, a college student might have class, work, homework, and other responsibilities that take up most of their day, and coupled with basic tasks like eating and traveling, many students find their only free time on the weekends. According to the University of Oregon's Student Recreation Center (SRC) website, "The Student Recreation Center is consistently busy Monday–Thursday during the term... Friday–Sunday, the Rec has much less traffic." Most students have busy schedules during the week, and much more time on the weekend, so why does SRC traffic decrease when students have more time to go? In this thesis, I analyze short and long-term trends in SRC attendance to discuss how students display behaviors consistent with the behavioral economics concepts of mental accounting, present bias, and loss aversion when choosing whether or not to go to the gym.

After regressing gym attendance on variables like day of the week, season, and term, controlling for variables like previous day's attendance and membership type, I find strong, statistically significant drops in attendance in short term (week by week) time periods. Across longer time periods, most attendance fluctuations are negligible or insignificant. These results reinforce the ideas that students at the University of Oregon are spending their time irrationally, showing patterns of present bias and loss aversion in their intertemporal decision-making with respect to gym attendance.

Literature Review

The primary literature relating to this thesis is Prospect Theory: An Analysis of Decision Under Risk, by Kahneman and Tversky (1979). This paper serves as a critique of expected utility theory by providing evidence that humans do not act completely rationally when presented with decisions that involve risk. While Kahneman and Tversky were focused mainly on monetary decisions under risk, I focus on the scarcity of time as another form of currency, where students risk the development of their human capital based on how they utilize limited time. The concept of mental accounting was first developed by Richard Thaler in his 1985 paper "Mental Accounting and Consumer Choice." Thaler introduces a theory that explains how individuals make irrational decisions when spending money because they don't treat money as fungible. Present bias was formally introduced in "Doing It Now or Later" by O'Donoghue and Rabin (1999). The authors described "the human tendency to grab immediate rewards and to avoid immediate costs in a way that our 'long-run selves' do not appreciate." They called this tendency **present-biased preferences**, and partially attributed it to impatience. The concept of loss aversion was first introduced in Kahneman and Tversky's "Prospect Theory," but further refined in "Loss Aversion in Riskless Choice: A Reference-Dependent Model" by Tversky et. al (1991). Other similar literature related to gym attendance focus mainly on individuals' tendency to overestimate their future attendance. DellaVigna and Malmendier (2006) found that people who bought monthly memberships tended to go infrequently and indirectly pay more per visit than if they had bought a 10 day pass. They also found that monthly membership customers were more likely than yearly members to continue their membership for longer than a year, despite paying premiums for the option to cancel month by month. Acland and Levy (2015) reported that subjects in their experiment exhibited "evidence of partial naiveté with respect to present bias" when making projections about their future gym attendance. The subjects similarly overestimated their future attendance.

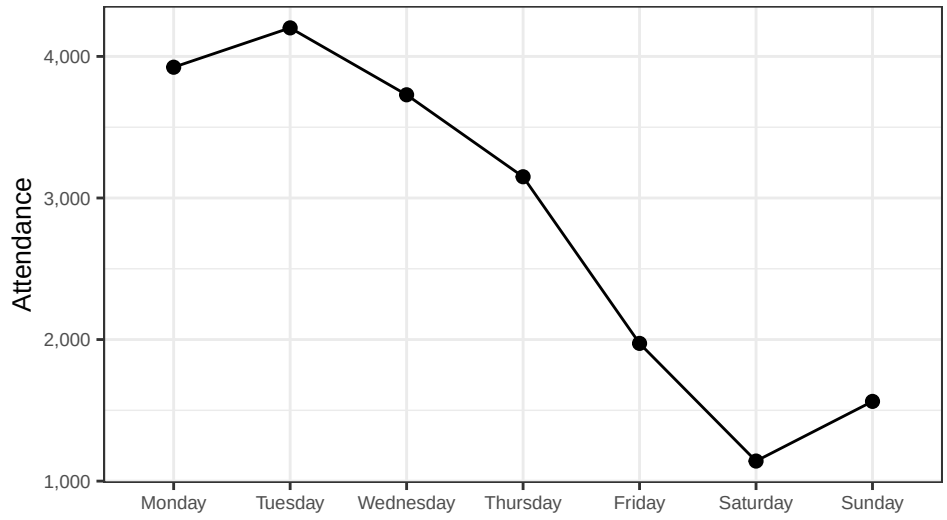
Concepts in Behavioral Economics Theory

Behavioral economics is the study of how people in the real world approach decisions in an irrational manner. Contrary to what standard model economics believes, people don't disregard emotion, habit, and other feelings when making decisions. Though behavioral economics primarily focuses on how individuals make decisions with limited money, this thesis shows that individuals may treat limited time in a similar manner.

The Standard Economic Model

The standard economic model predicts that all individuals are rational agents that maximize their utility subject to a constraint. In this case, the agent's constraint is the number of hours in a day, and with so few hours of free time in a weekday, we would not expect a rational agent to prioritize going to the gym. In other words, if this model reflected reality, we would observe a decrease in gym attendance during the week where the opportunity cost of an hour is higher, and increase in gym attendance on the weekend where the opportunity cost of an hour is cheaper. However, as Figure 1 shows, this tends not to be the case.

Figure 1: Average SRC Daily Student Attendance, Fall 2024



Mental Accounting

At the beginning of his paper outlining mental accounting, Thaler describes a hypothetical situation where two couples receive a sum of $300 from an airline after the airline lost some of their luggage. The couples then spend $225 on dinner, which they've never done before. Thaler claims that the couples have violated the monetary principle of fungibility by treating this money as "special." He argues that if the $300 had instead been received from salary raises, they would not have spent so much on a dinner, even though they would be earning more in the long run. The couples have essentially treated this money as "special" because it was received from the airline when they should have treated it like any other increase in wealth. In this thesis, I look to expand this definition to how students view time. Much like money, time is a scarce resource, especially for busy college students. Students show behavior consistent with mental accounting when it comes to spending that time, by budgeting time during the week for difficult activities like going to to the gym, studying, and going to class, while saving weekends for relaxation and other recreation.

Present Bias

Individuals experiencing a dilemma with ramifications that unfold over time (known as intertemporal choice) may engage in temporal discounting, where they place disproportionately less value on future rewards, even if they are greater than present rewards. This is known as *present bias*. For example, someone may choose to use their disposable income to consume goods (like buying a car), instead of putting it in a savings account, even though investing will ultimately net them more utility in the long run. In this thesis, I aim to interpret present bias in how individuals utilize their time. For many people, going to the gym is hard and its payoffs take time. If someone only has two days a week to relax, they might skip the gym on the weekend and spend their time relaxing, because the immediate gratification of relaxing is worth more to them than the future benefit of a consistent gym routine. This is a significant departure from the standard economic model's prediction, which interprets this behavior as irrational.

Loss Aversion

Loss aversion stems from an agent's perceived utility from losses and gains measured relative to a reference point, where a reference point is a baseline or standard of comparison. In their 1991 paper, Tversky et. al state, "the function is steeper in the negative than in the positive domain; losses loom larger than corresponding gain." The function in question represents the utility of an action relative to a reference point.

In other words, an agent will suffer a larger utility loss from losing \$5 than they will gain from receiving \$10. In the context of this thesis, suppose a student spends their Saturdays relaxing, as it's their only free day of the week. The concept of this time being set aside for relaxation becomes the student's reference point, and the utility of anything they have to do that deviates from relaxation will be compared to the lost utility of relaxing. This concept is represented by the following formula:

$$v(x) = \begin{cases} x, & x \geq 0, \\ -\lambda\,(-x), & x < 0. \end{cases}$$

Here, x represents the gain ($x > 0$) or loss ($x < 0$) of utility relative to the reference point. λ represents the loss aversion coefficient, which acts as a multiplier for negative utility. For a student relaxing on the weekend, x represents the utility difference between relaxing and going to the gym (or doing anything else that represents hard work). If $\lambda > 1$ then the student is loss averse and decides to relax instead of going to the gym. I find the opposite situation to be true during the week, where the reference point is classes, homework, and other responsibilities. During the week, relaxing becomes the loss and hard work like studying and the gym provide more utility.

Data

The University of Oregon's Student Recreation Center is the primary facility on campus for students to engage in physical activities like weightlifting, swimming, basketball, and other indoor sports. Students, faculty, staff, and community members alike enjoy more than 36,000 square feet of strength training space, a 12-lane swimming pool, and nearly two dozen courts and gymnasiums, among many other amenities. During normal hours, the SRC is open from 6am - 11pm on weekdays and 9am-9pm on weekends. Almost every person that enters the SRC must scan their ID through one of the turnstiles. These machines record the time and date of every person who walks through. Table 1 shows the summary statistics for daily entries between January 2015 and December 2024 for days where the SRC is open. This accounts for about 82% of the days in the data, which includes a period between March 18th, 2020 and September 17th, 2020 where the SRC closed due to COVID-19. A day was marked as 'closed' if no students entered the gym on a particular day.

Table 1: Student Attendance Summary Statistics

Mean	Median	SD	Min	Max
2160.308	1756	1609.478	1	6796

Table 2 shows the average daily proportion of members. Students make up the vast majority of the SRC's daily entrants. It should be noted that "Off-Term Students" are simply students who are not regarded as full-time students because they are taking less than 12 credits of classes. This number is skewed by the heavy increase in this membership type that occurs every summer when students continue to use the SRC while on summer break.

Table 2: Average Daily Entrances by Member

Membership Type	Average Daily Share
Student	87.7%
Off-Term Student	3.6%
Faculty/Staff	2.4%
Community Member	2.2%
Alumni	2.0%

Nonmember	0.9%
PE Staff	0.8%
Other	0.6%

Two data sets were collected and used for this analysis. The first displayed simple daily totals grouped by time of day, while the other displayed these totals grouped by membership type. There is a discrepancy in daily total entrances between the data sets, where the membership data set tends to under count daily entrances, averaging about 277 fewer entrances a day. The reason for this is unknown, but it can be reasonably assumed that this discrepancy has a negligible effect on attendance trends and behavior patterns. The membership data is the only data used in this analysis, as student behavior is the only behavior being analyzed. Observations where the SRC is closed for any reason are removed from the analysis.

Methods

To analyze both short and long-run attendance dynamics, I regress daily student attendance on lagged attendance, weekday, week-of-term, month, quarter, post-closure status, and finals/dead-week indicators.

$$\hat{\text{students}}_t = \beta_0 + \beta_1 \,\text{students}_{t-1} \;+\; \sum_{d=1}^{6} \gamma_d \,\text{Day}_{d,t} \;+\; \beta_2 \,\text{Week}_t \;+\; \sum_{q=2}^{4} \theta_q \,\text{Quarter}_{q,t} \;+\; \beta_3 \,\text{DayAfterClosed}_t$$
$$+\; \beta_4 \,\text{FinalsWeek}_t \;+\; \beta_5 \,\text{DeadWeek}_t \;+\; \varepsilon_t$$

Because I'm working with time series data, I conducted several tests to ensure unbiased estimates. The daily attendance counts displayed both conditional heteroskedasticity (Breusch-Pagan $\chi^2 = 889.97$, $p<0.01$) and positive serial correlation (Durbin-Watson = 1.69, $p<0.01$). To maintain sound standard error measures, I report Newey–West heteroskedasticity and autocorrelation-consistent (HAC) standard errors with a seven day bandwidth. Additionally, an autocorrelation function (ACF) test revealed strong AR(1) persistence, necessitating the addition of a lagged dependent variable.

Results

Both tables represent two sets of predictors from the same model. The first one reports week fixed effects with and without a one day lagged variable, representing short term trends in attendance. The second table reports week of the term and quarter fixed effects, controlling for finals week and the week before finals week, with and without a one day lagged variable. This represents attendance trends over a longer term, as each quarter of the academic year at the University of Oregon is 11 weeks, or 12 in the summer.

	Dependent variable:	
	Student Attendance	
	No Lag	With Lag
	(1)	(2)
Intercept	4,043.501***	2,404.912***
	(118.447)	(99.041)
Tuesday	−83.227**	−1,236.959***
	(34.938)	(73.545)
Wednesday	−215.539***	−1,426.438***
	(39.033)	(69.257)
Thursday	−453.528***	−1,600.034***
	(36.333)	(67.524)
Friday	−1,215.749***	−2,155.918***
	(47.822)	(78.315)
Saturday	−2,044.620***	−2,411.433***
	(64.318)	(71.794)
Sunday	−1,908.588***	−1,722.174***
	(61.326)	(59.252)
Lagged Student Attendance (t-1)		0.724***
		(0.027)
Observations	2,983	2,982
Adjusted R^2	0.704	0.867
Residual Std. Error	875.876 (df = 2968)	586.723 (df = 2966)
F Statistic	507.225*** (df = 14; 2968)	1,294.063*** (df = 15; 2966)
Note:		*p<0.1; **p<0.05; ***p<0.01

The lagless model shows a strong statistically significant negative drop in attendance as the week progresses, culminating in a more than 2,000 student difference in attendance between Monday and Saturday. Using the lag to account for strong AR(1) persistence, the second model finds even steeper results. The intercept, representing a Monday in fall term, not during finals/dead week, and not after a closure, expects 2,404 students on average, that declines to an intraweek low on Saturday. The lagged attendance variable predicts that about 72% of the previous day's "surprise", if any, carries on to the next day. For example, if there are 1,000 more entrants on Monday than usual, we expect ~724 more than usual on Tuesday. Controlling for this "habit" raises Adj. R^2 from 0.7 to 0.87, indicating that yesterday's turnout is a strong predictor for today's but isn't able to carry the prediction alone. These coefficients reinforce the idea that college students are not acting as rational agents when deciding how to spend their time. With a consistently decreasing attendance as the week progresses, students are going when their time is the most valuable (the beginning of the week), and going less as their time becomes less valuable (the weekend).

	Dependent variable:	
	Total Attendance	
	No Lag	With Lag
	(1)	(2)
Intercept	4,043.501***	2,404.912***
	(118.447)	(99.041)
Week of the Term	−75.437***	−27.398***
	(14.876)	(5.513)
Break	−1,530.622***	−585.571***
	(119.387)	(62.487)
Winter	28.118	46.161
	(148.358)	(46.359)
Spring	−2,596.728***	−641.711***
	(146.601)	(110.831)
Summer	356.826***	132.256***
	(127.221)	(39.110)
Finals Week	76.810	59.014*
	(111.249)	(33.220)
Week Before Finals	−2,362.714***	−591.278***
	(81.253)	(77.769)
Lagged Student Attendance (t-1)		0.724***
		(0.027)
Observations	2,983	2,982
Adjusted R^2	0.704	0.867
Residual Std. Error	875.876 (df = 2968)	586.723 (df = 2966)
F Statistic	507.225*** (df = 14; 2968)	1,294.063*** (df = 15; 2966)
Note:		*p<0.1; **p<0.05; ***p<0.01

Long term trends, while still mostly significant, are much weaker in comparison to day by day changes. Controlling for AR(1) persistence, there are sizable coefficients on break, spring, and week before finals variables. Break understandably sees a sizable drop in attendance as many students go home. Spring quarter in Eugene is notorious for students missing classes, going outside, and enjoying the sun, which explains the negative relationship. The week before finals estimate of -591 is consistent with the concept of loss aversion. The opportunity cost of all hours during the week before finals is much higher as students grind in preparation for finals. Weakly significant but negligible estimates constitute the rest of the table.

Conclusion

Citations

Acland, D., & Levy, M. R. (2015). Naiveté, projection bias, and habit formation in gym attendance. Management Science, 61(1), 146–160.

DellaVigna, Stefano and Ulrike Malmendier. (2006). "Paying Not to Go to the Gym." American Economic Review, 96 (3): 694–719.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. Econometrica, 47(2), 263-291.

O'Donoghue, Ted, and Matthew Rabin. (1999). "Doing It Now or Later." American Economic Review 89 (1): 103–124.

Thaler, Richard. (1985). Mental Accounting and Consumer Choice. Marketing Science, 4(3), 199–214.

Tversky, Amos, & Daniel Kahneman. (1991). Loss Aversion in Riskless Choice: A Reference-Dependent Model. The Quarterly Journal of Economics, 106(4), 1039–1061.