The MIT Movement Project

by

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ABSTRACT

We present an experimental study investigating trends in the Massachusetts Institute of Technology’s physical activity patterns and factors affecting activity levels. Physical activity was measured using steps taken per day and the study was conducted using historical and collected data of 20 subjects. Step data was measured and stored in the iPhone Health application and submitted through a custom MIT Movement Project iPhone application.

The results showed a correlation between steps taken and day of the week, with fewer steps being taken towards the middle of the class week. Additionally, steps variations occurred during major holidays and events. Temperature and rainfall also relate to steps taken with higher temperatures and less rain correlating with more steps taken. Furthermore, individual factors also affected an individual participant’s daily step count. Higher stress levels correlated with fewer steps taken and less activity overall while fewer hours of sleep led to increased number of steps per day, likely due to the larger number of awake hours.

To further increase physical activity levels on its campus, we recommend that MIT investigate the possibility of specific campaigns to target low-activity level time periods and look to expand its physical education programs for all members of its community.

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1. Introduction

1.1 Health and Fitness in the United States

Since 1980, the worldwide obesity rate has more than doubled and current fears surrounding an obesity epidemic in the US are high. Unhealthy eating habits, along with an increasingly sedentary lifestyle are likely the main contributors to obesity, commonly measured using one’s Body Mass Index (BMI). BMI compares a person’s height and weight and has been shown to be directly related to higher risks for non-communicable diseases such as diabetes, heart disease, osteoarthritis, etc. The movement to counter obesity has centered around healthy eating and active lifestyles. For example, the US White House’s “Let’s Move” campaign targets childhood obesity by suggesting 60 minutes of play per day along with a diet that is nutrient-rich, but lesser in calories.

Numerous studies have shown direct relationships between a person’s level of activity and his/her general health. However, on average, students experience decreased exercise and activity levels when transitioning from high school to college. In a study conducted on freshmen women upon entering college, average body weight increased after five months, even though caloric intake had decreased. The increase in BMI was attributed to significant decreases in total physical activity. In fact, only 41.7% of college students met the recommendations for exercise as recommended by the American College of Sports Medicine and the American Heart Association (moderate-intensity exercise for at least 30 minutes on five or more days/week or vigorous-intensity exercise for at least 20 minutes on three or more days/week).

Physical activity can be defined as any bodily movement produced by skeletal muscles that results in energy expenditure. Although physical activity can encompass household, occupational, sport, and other activities, many quantifications of activity levels center around steps taken per day. Pedometers have long been used as simple, inexpensive sensors to measure and motivate physical activity behaviors. Other sensor options, such as accelerometers and video-analysis are typically more expensive and require additional equipment and complex analysis to understand output data. With pedometer resurgence along with the introduction of wearable technology and “smart” fitness trackers, steps per day has become a simple, accessible, and primary metric for movement.

1.2 The Massachusetts Institute of Technology (MIT) Community

The Massachusetts Institute of Technology is a private research university based in Cambridge, Massachusetts. Founded in 1861, the overarching MIT network consists of students, faculty, staff, affiliates, parents, and alumni. For the purposes of the study, the MIT Community consists of students, faculty, and staff who spend a majority of their time at MIT’s campus in Cambridge, MA. In 2015, 11,331 undergraduate and graduate students and 12,110 staff and faculty members attended or were employed by MIT. Restricting participants to those who are based near Cambridge, MA allows for equivalent fitness tracking comparisons across potential external factors (e.g. weather, major location-based events, elevation, campus culture, etc.).
1.2.1 The MIT Community – Students

Because this study focuses on the movement patterns of MIT's community as a whole, the university's culture is important to understand. In 2015, 4,527 undergraduate students and 6,804 graduate students were enrolled at MIT. 94.9% of declared undergraduate students were studying math, science, or engineering. MIT's culture focuses heavily on academic activities. Students (undergraduate and graduate) spent an average of 51.6 hours per week attending scheduled classes and labs or studying or doing research outside of class. 8

Although approximately 20% of MIT undergraduates join a varsity athletic team during their time at MIT, athletic involvement on campus is relatively low when compared to academic involvements. From a school-wide student quality of life survey conducted in 2013, 67% of students agreed that they “try to regularly participate in physical activities or exercises.” 8 However, more than 50% of students reported that their level of participation was less than they would have liked for “exercising regularly or participating in club or intramural sports.” 8 In contrast, 78% of students rate their academic experience as “very good” or “excellent.” 8 Although a culture surrounding exercise and/or healthy living may exist on the campus, MIT’s academic experiences, not its athletic opportunities, are the main focuses of many students.

1.2.2 MIT Fitness Resources

MIT’s fitness resources include physical fitness facilities, wellness programs, and incentive challenges to promote health and wellness on its campus. Two main groups support these initiatives: MIT Medical and the Department of Athletics, Physical Education, and Recreation (DAPER).

Community wellness at MIT Medical focuses on a variety of topics including sexual health, sleep, stress reduction, and exercise and fitness. The main exercise promotion run through MIT Medical is getFit@mit. GetFit is an annual 12-week challenge that encourages members of the community to form teams of 5-8 friends, colleagues, affiliates, etc. When the team meets weekly exercise goals, they qualify for prize drawings.

DAPER also organizes many programs to encourage physical activity. DAPER oversees varsity, club, intramural, and recreational athletic programs for students, faculty, and affiliates. In addition, MIT requires undergraduate students to complete a physical education requirement and pass a swim test in order to graduate. DAPER maintains athletics facilities, notably the MIT Zesiger Center and its surrounding fields, as well as the Alumni Pool/Wang Fitness Center. Fitness centers include pools, fitness floors with cardiovascular and strength equipment, multipurpose activity courts, tennis courts, an ice rink, and outdoor fields. 9 Access to these facilities are free or at a reduced rate for all MIT community members. Facilities and resources relating to physical activity are available and highly accessible to all members of the community.
2. Methodology

2.1 Measuring Movement at MIT

By measuring movement patterns in the MIT community, factors affecting movement can be revealed and methods to increase physical activity can be implemented. Using steps as an indicator of movement is simple, accessible, and easily understood. To measure movement in the MIT community, community members were contacted through email and word of mouth and recruited to become subjects in the project. Step data was collected for individuals over an extended period of time, dependent on when the user began collecting the step data on his/her iPhone (usually correlating with the date that he/she bought the iPhone). Several environmental and individual factors were further explored in hopes of better understanding the influences on a community’s physical activity.

2.2 iPhone Fitness Tracking

Because this study focuses on gathering a large, diverse participant base to model the MIT community’s movement patterns, a motion-tracking device with widespread adoption was vital. Although other devices such as Fitbit, Jawbone, Microsoft Band, etc. were considered, all paled in comparison with the iPhone’s adoption rates. Only 21% of US online adults use a wearable device and the market is fairly segmented, with 36% of these adults using a Fitbit. In 2016, more than 197.4 MN Americans, or 79.3% of mobile phone owners, own smartphones. Specifically, iPhones are increasingly in popularity among smartphone owners. At the end of 2015, Apple held nearly 43% of the US smartphone market. 86% of owned iPhones are a Model 4s or newer, making the phone eligible for this study. The large population of iPhone owners, along with the benefits of using a phone instead of a separate accessory (e.g. automatic tracking when idle, battery life, Apple developer toolkits, ease of application creation, and familiarity) revealed the iPhone as the best tracking device for the study. Using the iPhone allowed the study to gain maximum study participation and high participant retention.

2.2.1 iPhone Health

The iPhone Health application became available in Fall of 2014 and was widely distributed with Apple’s newest iPhone (4s model or later) and iPod touch (5th generation or later) models. A variety of sensors allow Health to track health factors such as steps, walking and running distance, and flights climbed without use of an external pedometer. Other factors such as temperature, blood glucose, cycling distance, etc. can be tracked via automated data collection or user input. The sensors that each iPhone model uses to collect data vary. However, each model (iPhone 4s and newer) includes accelerometers, gyroscopes, compasses, and GPS. iPhone 6 and newer models also include a barometer that provides a more accurate step climbing count.

2.2.2 iPhone Health Accuracy
The accuracy of iPhone-based fitness tracking has been previously tested against other fitness wearable devices including those made by Fitbit, Nike, Jawbone, and Yamax. A study that tested step count recordings during treadmill walks found that the iPhone was as accurate as most other fitness-based trackers (if not more accurate). In fact, the study reported that data from smartphones was only slightly different than observed step counts, but wearable devices, such as Fitbit, Nike, and Jawbone differed more from the observed count. Overall, the iPhone’s step tracking is accurate enough to make conclusions regarding the trends in a user’s activity patterns when compared to the accuracy of other wearable devices.

2.2.3 MIT Movement Application

The iPhone Health application data for an individual can be downloaded by himself/herself through an export feature created by Apple Inc. Individuals can also give external, third-party applications access to their iPhone Health data by adjusting privacy settings. For the purposes of this study, a custom external application named the MIT Movement Project Application was created. By creating a separate application, participants could “push” their health data to researchers via their phone, thereby circumnavigating the need for each individual to download and submit his/her own data. In addition, a custom application allowed for easy data consolidation and the ability to anonymize participant information.

A subject pool of 20-50 participants was estimated at the beginning of the study. To accommodate this, the MIT Movement Project application was created via Crashlytics and Parse. Crashlytics is an application platform that hosted and facilitated user download of the application while the Parse server collected data and stored it in a secure, ISO 27001 and FISMA certified data center. The data was then organized, downloaded, and analyzed from Parse.

The MIT Movement Project application interface consisted of 3 main features. Firstly, participants had the ability to push their Health data to the researchers. On the participants first “push” of data, the information sent included all movement data starting from the first recorded data point (usually the first day that the participant bought and activated his/her phone). On subsequent “pushes,” the application sent all new data collected after the previous push. The application also sent a weekly notification to all phones to remind each participant to send in their most recent data set.

The second feature included in the application was a real-time leaderboard showing the number of times each user pushed his/her data and the number of steps that each user took during the week. The leaderboards were implemented to increase participant-interaction with the application, to encourage more frequent and consistent data submissions, and to encourage individual physical activity during the week.
Figure 2-1: (left) A screenshot of the MIT Movement Project homepage. A “push” leaderboard shows participants how many times the top users have “pushed” their data. In addition, a counter below the leaderboard shows how many times the given user has “pushed” his/her data. Underneath the “My Posts” count, users can click the “Send Data” button to send their data to the Parse server or log out. (right) A screenshot of the step count leaderboard. Steps are counted and reset weekly.

The third feature of the application used rotating questions to gain insight into potential changing factors that may affect participant activity. After pushing data, participants were prompted to answer one to two questions regarding their week. For example, participants were asked to rate their stress level on a scale from 1-5 (1 indicating not stressed and 5 indicating very stressed) or how much sleep they averaged per night during a given week.
Figure 2-2: (left) A screenshot of an automatically-prompted question. The auto-prompt question occurs as a pop-up after a user pushes the “Send Data” button. Questions were changed weekly and were generally related to potential individual factors that could affect activity patterns. (right) A list of separate, voluntary questions answered by the subject. The questions were accessible from the application home screen and covered a variety of individual factors that may affect activity patterns. In addition, old auto-prompt questions from previous weeks were asked in the voluntary question section in case a user forgot to push his/her data in a given week.

2.3 Subject Recruitment

Subjects were recruited via word of mouth and MIT (internal) email list distribution. The study required that participants be over the age of 18, be a member of the MIT community, and own an iPhone that was compatible with the iPhone Health application. Subjects registered for the experiment through an online form and were sent an email with details about how to download the MIT Movement Project application.
Figure 2-3: The initial online registration survey. Each participant filled out the survey and provided information needed to set-up the participant on the MIT Movement Project application platform. The survey also included user-specific questions. For example, questions such as diet, hours spent exercising per week, and current fitness-tracking methods were asked. Demographic and user-specific information was collected and used as potential factors affecting movement patterns in an individual and/or the MIT community. All questions, excluding Kerberos and preferred email, were voluntary.

Following application download, each subject was prompted to create an anonymous username and password and send their initial “push” of data.

To further encourage participants to sign-up for the study, a bi-weekly rewards program was implemented. In the first week of the program, all participants who pushed data were entered into a raffle for a $10 restaurant gift card. The second rewards raffle included all participants who pushed data in the given week and referred a friend to the study.

Subject recruitment continued throughout the study. Because historical data can be accessed through iPhone Health, the registration date of each participant did not affect the availability of individual data sets. However, participants who joined the study later may have missed...
submitting an answer for some or all of the prompted weekly questions. Communication with subjects during the study was maintained via email. Emails with further download instructions and frequently asked troubleshooting questions were sent with the hopes of solving any technical problems that may have prevented subjects from participating in the study.

2.4 Data Set Analysis

Data was collected through multiple avenues and assigned to a participant’s anonymous user ID. Firstly, data was collected from the initial registration survey. Metrics gathered are shown in Figure 2-3. Secondly, data was collected via each data “push” through the MIT Movement Project iPhone application. The time-stamped step data automatically collected through iPhone Health is organized in Parse and can be exported into friendly formats. From the formatted data, correlations can be compared across multiple users.

3. Collected Data and Results

3.1 General Movement Trends

Of the 69 registrants that filled out the initial survey, 20 participants completed the full download of the MIT Movement Application and successfully submitted their step data to the study. Students made up a large portion (95%) of the user pool. On first push, all historical data stored in a user’s iPhone was sent to the Parse server. The first date of available data correlated with the day that the participant purchased his/her iPhone. All participants owned their iPhone for at least 3 months and had available data for all months of 2016. More than 50% of users had step data dating back to mid-2015 and three users had data dating back to 2014.

On average, participants took 11,775 steps per day with a standard deviation of 2869 steps. Steps were generally higher on weekdays than weekends with a general decrease in steps towards the middle of the school week. Participants also showed a slight change in steps per day from month to month. MIT’s fall and spring academic semesters run from September-December and February-May. A small difference is also evident when comparing in-school and out-of-school dates. During months in which classes were in session, 12,610 steps were averaged whereas vacation months only averaged 11,370 steps.
Figure 3-1: Average steps per day for all participants versus day of the week. A decreasing number of steps were taken towards the middle of the week.

Figure 3-2: Average steps per day for all participants versus month of the year. Steps remained fairly consistent over the year, but showed a decrease in the winter months. A slight difference in steps per day is evident when comparing in-school and out-of-school dates.

Individual user data was collected and analyzed. However, trends in steps per day greatly varied from person-to-person. While some users were fairly consistent in taking the same number of steps from day to day, other users’ step counts fluctuated greatly. However, almost all users had outlier days. Outlier days can be classified as days in which steps taken were more than double or less than half of the individual’s mean number of steps. Outliers can be attributed to many reasons including: a day-outing involving more walking, a rigorous workout or long run during that day, forgetting or losing one’s iPhone that day, etc.
Figure 3-3: Average steps per day for User C in the 2015. User C averaged 11,911 steps per day during 2015. The majority of days fell between within a range of 7,500 to 15,000 steps, as indicated by the blue dashed lines. However, several large outliers (greater than 23,823 steps or less than 5,956 steps and marked in red) exist.

Figure 3-4: Steps per day for Users A and B from January 1, 2016 to March 23, 2016. Steps per day is measured as a percentage difference from each user’s average number of steps.

3.2 Factors Affecting Movement Patterns

Several factors were hypothesized to have high correlations with the MIT community’s activity patterns. The factors can be grouped into two main categories: environmental factors and individual factors.
3.2.1 Environmental Factors

Environmental factors encompass any external element (not controlled by an individual) that may change an individual’s activity patterns. In this study, factors explored related to weather (temperature and rainfall). Each participant’s daily step count was compared to his/her total average step count. If the step count for the given day was greater than 15% of the user’s average step count, the day was categorized in the high step category. For step days falling below 85% of a user’s average step count, the day was categorized as a low step day. All other days were categorized in the medium step category. For all given subjects and days, a step category classification was assigned.

Temperature was obtained using historical data obtained from that measured by The Weather Company. As generally expected, colder weather correlated with fewer steps taken while participants took more steps on warmer days.

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![Heat map of step category (by frequency) versus temperature.](image)

Figure 3-5: Heat map of step category (by frequency) versus temperature. A heat map percentage value was created in relation to all other step instances in a given step category. For example, high step days more frequently occurred on days with average temperatures between 70°F and 79°F. The percentage value assigned to those criteria was 21.39% and was calculated by comparing the total number of 70°F and 79°F days that occurred to the total number of high step category days. From the heat map, it is clear that the number of days in a given step category is directly related to higher temperatures.

Rainfall data was also obtained through historical weather data. However, weather data showed less of a clear correlation between rainfall and steps taken.
Figure 3-6: Heat map of step category (by frequency) versus rainfall. A heat map percentage value was created in relation to all other step instances in a given rainfall category. For example, 53.62% of 0.80” – 1.05” rainfall days were categorized in the low step category. When compared to other step categories, it is clear that more low step days occurred than medium or high step days for the given range of rainfall.

3.2.2 Individual Factors

Individual factors encompass internal choices that are selected by a given individual that may affect how much he/she moves in a given day. Individual factors were measured via user survey during days of the study. Survey questions were prompted through the MIT Movement Application and corresponded to a given day. The number of steps that the participant took during that given day was linked to his/her survey answers and analyzed.

In analyzing individual factors, it is important to note that each individual factor may be linked to other individual factors, or may be influenced by certain environmental factors. The individual factors studied – stress and sleep – are not necessarily isolated from other effects.

Stress levels were measured on a scale from 1-5, with 1 being not stressed at all and 5 being extremely stressed. Stress may be affected by various influences, including but not limited to, workload, health, successes, major events, etc. Participants tended to take fewer steps during higher stress days and more steps on lower stress days. In addition, only very rarely did participants ever rate their days as “extremely stressful” or a 5 on the stress level scale.
Figure 3-7: Steps per day versus stress level rating. The bar graph shows the average of all participants’ difference from his/her individual mean number of steps versus stress level rating. The difference from a user’s mean number of steps was calculated as a percentage by comparing a given day’s step count to his/her average step count. These values for a given day were averaged among all days that had a given stress level rating. Level 5 stress rating data is not provided due to insufficient participant response.

Data on a participant’s average amount of sleep was collected via survey question in a given week. When asked “What was your average sleep this week per day in hours?” participants were given five response options: <4, 5, 6, 7, and 8+ hours. The given sleep question was prompted during three separate weeks of the study. Steps during the given week were compared to each participant’s mean number of steps and matched to the participant’s sleep question response. Correlation between amount of sleep and physical activity was less than correlation between stress and physical activity. However, a larger number of steps were taken during weeks of little sleep (<4 hours).
Figure 3-8: Steps per day versus average hours of sleep per day for a given week. The difference from a participant’s mean number of steps is calculated by comparing the participant’s average number of steps in a given week to his/her total average number of steps. Participants generally took a larger number of steps during weeks with less sleep. The larger number of steps taken during lower sleep weeks may be due to the larger number of awake hours that a participant could be moving.

4. Conclusion

4.1 Discussion

The average number of steps per day for an individual at MIT was determined to be 11,775 with a standard deviation of 2,869 steps. This lies close to the commonly advertised goal of 10,000 steps per day. The 10,000 step value originated in Japan when pedometers became popular in 1965. Although new research suggests that 10,000 steps (or 5 miles) is not necessarily the optimum number, the popular benchmark has largely stuck among the general population. This may explain why the MIT average sits near the 10,000 step value. Additionally, the MIT average may be slightly higher due to the population and lifestyle at MIT. Younger populations are generally more active and a college campus in an urban setting indicates fewer automotive forms of transportation, likely requiring more walking.

From the collected data, it is clear that there exist factors that are strongly correlated to physical activity levels of the MIT community. Among individuals, date seems to affect activity level, particularly the specific day of the week. During in-class terms, students are often busier towards the middle of the week. This is because more homework and projects are assigned while existing work is also being completed, initiating a general increase in academic commitments. The decrease in activity level makes sense because students may be
focusing less on exercise and also may have less time to pursue leisure activities (e.g. walking, sightseeing, games, shopping, etc.). Other significant decreases in activity are revealed near popular holidays or events. As seen in Figure 3-3, lower step counts were observed during the middle of May and the end of December. The middle of May correlates with the final exam study period (May 14 – May 18) and examinations (May 18 – May 22) while holiday celebrations occur during the December break period. Holidays may call for untraditional activity patterns or varying special commitments.

In addition, environmental and individual factors correlate with how active the MIT community is. Days with higher temperatures correlated with a larger number of steps taken. This makes sense as outdoor workouts and using walking as a primary mode of transportation are often more enjoyable during spring, summer, and fall months with higher temperatures and lower rainfall. Warmer temperature also correlates to sunnier days, which may lead to greater overall happiness levels and/or increased exercise among participants. Interestingly, steps per day did not show any clear trends in relation to rainfall. This may be because rainfall is fairly consistent in the city of Boston. In fact, Boston ranked sixth amongst large cities in a comparison of annual precipitation. The MIT Community may have adapted to the consistent rainfall. Furthermore, temperature as related to precipitation (e.g. summer rain showers versus snowfall) may be a bigger factor than precipitation itself when analyzing effects on a person’s physical activity.

Individual factors such as stress levels and sleep relate to one’s energy level, the date/day of week, and other environmental factors. Participants in the study showed a decreased number of steps per day as stress levels increased. In fact, on days in which stress level was rated as a three or four (somewhat stressed or stressed), few users were likely to take more steps than his/her average number of steps. Correlations to environmental factors may also be a factor. For example, stress levels may be higher during the middle of week or during certain time periods during the year (i.e. final examinations). Higher stress levels and large work loads could also cause the MIT community, especially students, to sleep less. However, surprisingly, participants took more steps on average during weeks averaging less than four hours of sleep when compared to weeks with greater amounts of sleep. In fact, the trend of steps versus sleep may be invers to common intuition. This correlation may be due to increased workload or movement that is required during weeks of less sleep. In addition, the increased number of awake hours may give participants an increase in steps per day, purely because of the longer time period that a participant could be walking or moving.

4.2 Suggestions and Further Steps

To encourage increases in physical activity during specific time periods, MIT could further advertise or campaign to remind students to move and stay active. Existing campaigns involve flyers and emails sent out as well as stress-relaxation, yoga, and wellness classes near busy time periods. Campaigns currently organized through MIT Medical or MIT DAPER target stressful and busy time-periods. However, an even more targeted approach to specific dormitories, living groups, or communities with further incentives could be beneficial. For example, dorms could organize more inter or intra-dorm sports matches, group exercise activities or classes, or introduce exercise competitions amongst halls or floors. In addition,
incentives such as free meals or monetary/physical prizes could be provided to students who meet certain activity guidelines (similar to insurance rate deductibles for healthy individuals).

In addition, a stricter or more progressive physical education curriculum could benefit MIT students. Currently, only MIT undergraduates are required to complete the physical education requirement. Adding a requirement (or optional choices) for graduate students could educate the community in health and wellness topics. MIT undergraduates who choose to complete the physical education requirement through classes can select any four physical education classes. A more standard education requirement with a curriculum covering general physical activity methods, suggested exercise guidelines, and/or nutrition could provide more comprehensive understanding of health and wellness for all MIT students. Furthermore, extension of these classes to MIT faculty, staff, and affiliates could increase health standards amongst non-student members of the population and increase the general health (and decrease health insurance rates) of MIT community members.

The trends emerging from the data sets collected give reason to believe that a larger, more comprehensive study of movement patterns at MIT is necessary. A broader study could provide more insight into key issues that affect the health of the MIT community and could reveal and reaffirm specific causes and correlations that affect individuals’ physical activity levels. Furthermore, a large study could increase awareness on campus and could synergize well with other campus campaigns, such as getfit@MIT or MIT’s Student Quality of Life Surveys.

Emphasizing the importance of physical activity and health in the MIT community is of critical importance. The pursuit of academic excellence is highly sought after at MIT. Improvements to the MIT community’s physical health can further benefit emotional health and mental health, and push individuals to reach academic goals in a faster, more productive way.
5. References


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