People Who Walk a High Amount of Steps a Day Have a Daily Increase in Positive Emotions

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Abstract:

This experiment's purpose is to observe if there is a positive correlation between a group of subjects' mood and the amount of steps they walked that day. It's known that exercise obtains many health benefits but what is its effect on mental health? My hypothesis is that there will be a positive correlation between the subjects mood and their steps walked that day. First, I let the subjects use a step tracker through a fitness tracker phone app or smart watch to track their steps that day. Then at 11pm, I will send out a survey with the question, "how did you feel today on a scale from 1-10?", and a place to submit their recorded steps that day. The dependent variable being measured will be the subjects mood on a scale from 1 to 10 and the independent variable being measured will be the steps each subject walked that day. After collecting the data from the surveys, I will use R-studio to make a scatterplot with steps walked that day as the x-axis and mood on a scale from 1 to 10 as the y-axis. I will transfer the data to the scatterplot and note if the graph presents a positive correlation by performing a correlation test with the function cor.test(x,y). If the correlation is a negative number, the correlation is negative and if the correlation is a positive number, the correlation is positive. I predict the correlation will be a positive number, therefore resulting in a positive correlation presented on the scatterplot. The findings reveal the influence exercise has on mood. Subjects who walked a high amount of steps that day were found to also have a high mood. Those who walked a low amount of steps that day were found to have a low mood. According to the scatterplot, reaching about 10000 steps a day will ensure an increased mood. It is important for those with depression or other mental illnesses that cause high dissatisfaction to get a high amount of steps in a day to reduce the symptom of negative emotions.

Introduction:

Desire to experience satisfaction and contentment is human nature. It is why people indulge in drugs, good food or music, however, does exercise play a significant role in an individual's emotional state? When humans experience something pleasurable they tend to want to do it over and over again. A question to reflect on while reviewing this experiment is could a healthy addiction to exercise increase our daily mood? In this report, we will ask the research question: what does the influence of daily steps have on our overall mood and how this might encourage stability in an individual's mental health.

My hypothesis is that daily steps and mood have a positive correlation, and a high amount of steps walked a day will discourage negative emotion in an individual's daily life. Endorphins are an integral part in understanding how and why exercise might cause an increased mood. According to the article, "Endorphins and Exercise," "elevated serum β-endorphin concentrations induced by exercise have been linked to several psychological and physiological changes, including mood state changes and "exercise-induced euphoria"" (Harber & Sutton, 2012). Exercise-induced euphoria might explain why daily exercise could increase mood. Our body and brains are designed to keep us in shape, this is why we get a hit of endorphins when we do physical activity.

Daily walking has many benefits including "weight control", extended life-span, heart attack prevention, "treatment of hypertension" and reduced ability to develop diseases (Morris &

Hardman 2012). All of these benefits improve the quality of life, in turn, increasing a person's mood on average. The sedentary experience a lot of depression in their life due to their inactivity and walking is a gentle start-up to improve their mental well-being through exercise.

There are many factors and stimulates that can affect a person's average daily mood. For instance, music, social feedback, solitary and imagery (Martin, 1990). This article's information reveals the mechanics of emotion and how it is possible for outside stimuli to affect mood. If the stimulates listed in the article can cause such a change in emotion, exercise as a stimulant could too.

Methods:

In this experiment, 30 University of Texas at Austin students, age range:18-22 with an average age 19, will be tracked by mood and steps for 17 hours from 6am to 11pm. Participants were reached out through email and asked to assist in this study. Those who replied were chosen at random to be a part of the experiment. Each participant will receive 20 dollars for their participation. Participants will either use their own fitness tracker watch or the StepsApp Pedometer step counter app to track their steps throughout the day. Then at 11pm participants will be emailed a questionnaire with a place to upload their step results and a question that asks "How did you feel today on a scale from 1 - 10?". 1 being very negative and 10 being very positive. After receiving the questionnaire results, a R-studio scatter plot graph is used to display the data.The dependent variable being measured will be the participants' mood on a scale from 1 to 10 and the independent variable being measured will be the steps each participant walked that day. Utilizing a scatter plot graph will help us view if there is a negative or positive correlation between mood and steps walked that day.

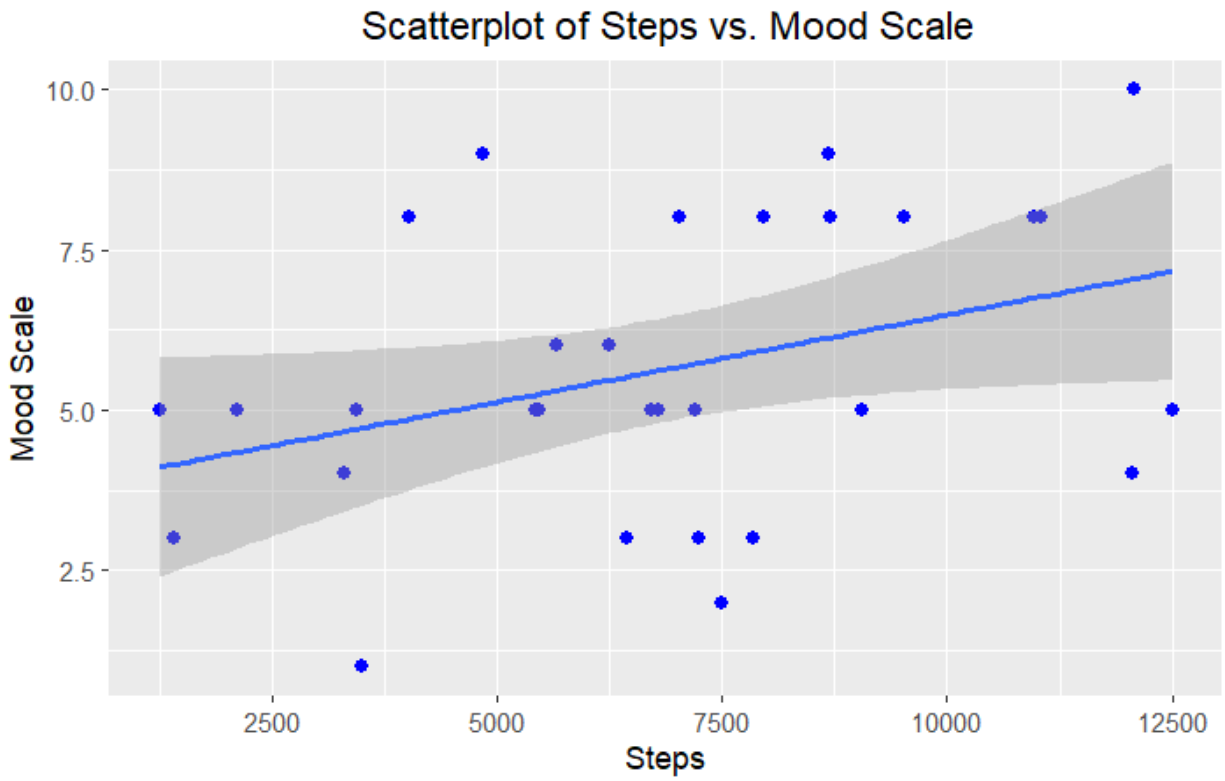

Figure 1: Scatterplot of Steps and mood showing a positive correlation.

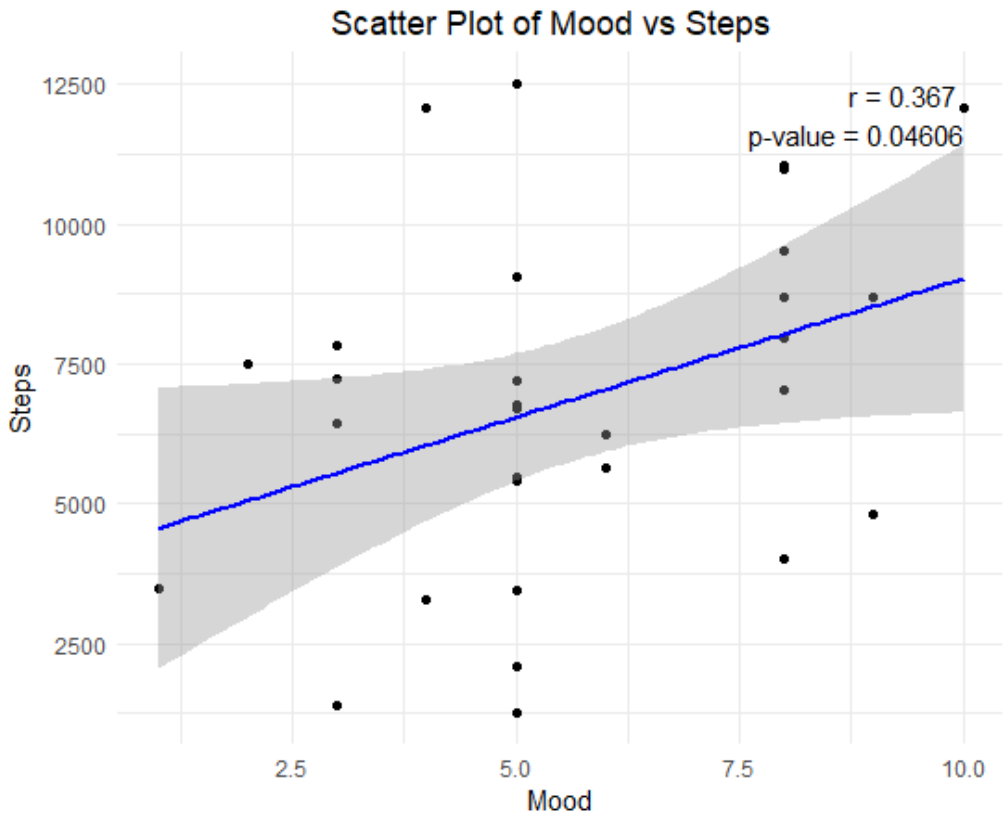

Figure 2: Scatterplot of steps and mood with p-value and correlation coefficient

Results:

As predicted in the hypothesis, the participants' mood and their steps walked that day resulted in a positive correlation. Figure 1 displays the data collected in a scatterplot with a positive trend. In order to highlight this trend, geom_smooth with the lm(linear model) method was applied. While conducting a correlation test with the cor() function 0.3669732 was returned. This is a positive integer which conveys a positive relationship between mood and steps. I then found the Pearson correlation p-value with cor.test() and 0.04606474 was returned. This p-value is just below the 0.05 threshold which suggests the observed correlation is unlikely to be due to random chance.

```
> # Display the results
> cat("Mean of Mood:", mean_mood, "\n")
Mean of Mood: 5.633333
> cat("Standard Deviation of Mood:", sd_mood, "\n")
Standard Deviation of Mood: 2.296674
> cat("Mean of Steps:", mean_steps, "\n")
Mean of Steps: 6862.533
> cat("Standard Deviation of Steps:", sd_steps, "\n")
Standard Deviation of Steps: 3106.65
```

Figure 3: Mean and Standard deviation of Mood and Steps.

Figure 3 presents the mean of mood as 5.63 for all participants which indicates a higher than average positive mood among participants. The standard deviation of 2.30 indicates mood varies somewhat around the mean. There is some variability. The average number of steps is 6862.533 which gives us an idea of the physicality level of the participants. Without knowing the health background of the participants we can't determine if this average is low or high activity. The standard deviation of steps at 3106.65 suggests a considerable amount of variability. There is a wide range of physical activity levels among the participants.

Discussion:

This experiment reveals the high likelihood of an increased mood if one walks at least around 6000 steps a day, however, it fails to observe other factors that may disrupt mood. Individuals tested could have a predisposition to negative emotions meaning their average mood could be lower than the average person. To portray a more accurate graph participants could write down their initial mood at the start of the day before submitting their end mood. This will provide a more accurate observation of if steps increase mood. A similar study was done on "84 highly fit students", "22-25 years old," after completing a physical activity course. The study resulted in a "positive change of mood for the participants". "Mood changes in individuals who participate in physical activity" so it is very possible that increased steps is the cause for increased mood in the observed data (Mryna-Bekas et.al, 2012). Overall, the study reveals a positive correlation between daily steps and mood but without further research we are unsure if it is the steps that improve the mood or the mood that improves the steps. We do know that those who walk a higher amount of steps a day tend to be happier on average.

References:

Harber, V. J., Sutton, J. R. (1984). Endorphins and Exercise. *Sports Medicine,* 1, 154–171. https://doi.org/10.2165/00007256-198401020-00004

Martin, M. (1990). On the induction of mood. *Clinical Psychology Review,* 10(6), 669-697. https://doi.org/10.1016/0272-7358(90)90075-L

Morris, J. N., & Hardman, A. E. (1997). Walking to health. *Sports Medicine,* 23, 306–332. https://doi.org/10.2165/00007256-199723050-00004

Myrna-Bekas, R., Kałwa, M., Stefaniak, T., & Kulmatycki, L. (2018, June 14). *Mood changes in individuals who regularly participate in various forms of physical activity*. Human Movement. https://www.termedia.pl/Mood-changes-in-individuals-who-regularly-participate-in-various-forms-of-physical-activity,129,33104,0,1.html