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The Relationship Between Physical Exercise and Job Performance: The Mediating Effects of Subjective Health and Good Mood

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Abstract

This study gives an insight into to the relationship between physical exercise and job performance as well as mediating effects of the physical exercise-job performance relationship such as increased subjective health and good mood. At the present time, health care costs for companies are drastically increasing. Complications arise with individuals not being physically active. Obesity has now become the fourth largest cause of death in the world. In order for companies to think about ways to reduce costs, perhaps management can look to exercise as a way to improve employee performance, mood and subjective health. For the purpose of this study, physical exercise is defined as planned, structured, and repetitive activities aimed at improving physical fitness and health. Job performance is defined as employee behaviors that contribute to organizational goals. Mood is defined as particular feeling or state of mind experienced by the participant. Subjective health is defined as the perception of their own health. The questionnaire was conducted among 413 respondents working in Baltimore County, Maryland, United States. The participants received a structured questionnaire to assess demographic information as well as variables such as physical exercise, job performance, good mood and subjective health. The results of the data analysis supports the researcher's hypotheses and mediational model whereby physical exercise had a significant relationship with job performance, and the mediating effects of good mood and subjective health were statistically significant to the physical exercise and job performance relationship.

Keywords: Physical exercise; Job performance; Subjective health; Good mood

Introduction

The researcher is going to tackle the problem of the mediation effects of the physical exercise and job performance relationship such as subjective health and good mood. The health and fitness trend is exploding across the United States and globally around the world. According to IBIS World: the nation's largest publisher of industry research, gym membership numbers have increased considerably over the past 10 years, rising from 36.3 million in 2002 to more than 42.8 million by 2011 [1]. As individuals are becoming more and more educated on the topic of physical exercise and the benefits, the number of gym memberships increase as well. With such a large number of the population, nearly 43 million in 2011 that purchased gym memberships, it is shocking that according to the WHO or World Health Organization, physical inactivity is the fourth leading risk factor for all global deaths, with 31% of the world's population not physically active [2]. Health benefits from physical exercise are the standard reason for individuals to begin and continue exercising on a regular basis. What individuals might not know is that recently studies have been conducted to show that physical exercise has in fact been proven to increase mood and increase job performance. Many psychologists and top companies have incorporated physical exercise into the corporate strategy to help increase mood and job performance which results in more productive employees. Individuals today have many options to choose from as to what form of physical exercise they wish to engage in. Anything from the gym (lifting weights) to sports (tennis, basketball, swimming, etc.) to going for a run outside.

The objectives of this research study are as follows: 1. To study an individual's job performance as a result of physical exercise 2. To study an individual's subjective health as a result of physical exercise 3. To study an individual's mood as a result of physical exercise. The importance of this research is to contribute to theory of effects of exercise on job performance found by [3]; to know the mechanism by which subjective health and good mood influence job performance and to contribute to the knowledge in this area.

Although the study is a non-experimental, bootstrapping analysis method of Preacher and Hayes [4] will be used to evaluate the research model in an indicative manner. Specifically it is hypothesized that (1) physical exercise will increase or have a positive effect on job performance. It's further expected that the physical exercise-job performance relationship would generate mediating affects such as increased good mood and subjective health. Therefore, it is hypothesized that (2) subjective health and (3) good mood will mediate the relationship of physical exercise and job performance.

Objective of the Study

The objective of study is to investigate the mediating effects of subjective health and good mood on the relationship of an individual's job performance as a result of physical exercise in Baltimore County, Maryland. Specifically, this research proposes that there is a positive relationship between physical exercise and job performance and that relationship is mediated by good mood and subjective health.

Hypothesis

To carry out the objectives of the study, the following hypotheses were tested.

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Hypothesis 1: The researcher believes that physical exercise will increase or have a positive effect on job performance.

Hypothesis 2: The researcher believes that there is a mediating effect of the physical exercise-job performance relationship such as subjective health.

Hypothesis 3: The researcher believes that there is a mediating effect of the physical exercise-job performance relationship such as good mood.

Literature Review

After reviewing all the various literature on physical exercise, job performance, good mood and subjective health, it is clear that engaging in physical exercise has a positive effect on job performance as well as mediating effects including increased subjective health and good mood.

Physical exercise and job performance

The first hypothesis of the study states that physical exercise will increase or have a positive correlation on job performance. A study by health professor, Jim McKenna, supports the researchers claim that engaging in exercise has an increase or positive correlation on job performance. In this particular study, researchers found that exercise caused an overall work performance boost of about 15 percent [3]. About 200 workers at three sites were studied: a university, a computer company and a life insurance firm. Workers were asked to complete questionnaires about their job performance and mood on days when they exercised at work and days when they didn't. Participants were free to engage in the physical activity of their choice. Most of them spent 30 to 60 minutes at lunch doing everything from yoga and aerobics to strength training and playing pick-up games of basketball. Six out of 10 workers said their time management skills, mental performance and ability to meet deadlines improved on days when they exercised according to the findings, which were presented at a meeting of the American College of Sports Medicine in Nashville, Tenn [3]. McKenna says his findings should give companies an additional incentive to offer workplace exercise programs, which may also help cut down on sick days and reduce health-care costs [5].

In a separate study, research was conducted to gather actual data to show how exercise actually improves the brains ability to make decisions faster and more effectively [6]. It was found that steady-paced aerobic exercise improved the brain's ability to solve problems and make decisions fast and effectively. After exercise, people seemed to be able to concentrate and focus much better than before. They were better able to block information that was irrelevant to the task at hand, and responded much faster to information relevant to the task. The benefits were seen in both men and women [6].

Subjective health

The second hypothesis of the study states that there is a mediating effect of the physical exercise-job performance relationship such as subjective health. A study published in *Medicine and Science in Sports and Exercise*, took 40 participants, all of whom had been recently diagnosed with depressive disorders but were not taking any form of antidepressant medication, and divided them into two groups: a control group that rested for 30 minutes and an exercise group that walked on a treadmill for 30 minutes [7]. The participants were asked to complete written surveys before their rest or exercise and at regular intervals afterwards, and the results showed that although both groups reported fewer feelings of negativity afterwards (tension, depression, anger, fatigue), only the exercise group expressed increased good feelings such as 'vigour' or 'well-being' [7].

A study in 2011 showed that the health status of your employees directly influences their on-the-job performance and improving employee well-being would result in a more productive workforce [8]. Research shows that the health status of your employees directly influences their work behavior, attendance and on-the-job performance. Therefore, improving employee well-being will result in a more productive workforce. That's why 75 percent of high performing companies now measure employee health status as a key part of their overall risk management strategy, and many pursue active wellness programs [9]. These, often larger, organizations have recognized that the workplace can be used to promote or reinforce healthier working practices and lifestyle choices. They also know that they can influence several aspects of their employee's physical and psychological well-being in ways which can improve their productivity, commitment and attendance [10].

Good mood

The third hypothesis of the study states that there is a mediating effect of the physical exercise-job performance relationship such as good mood. A study by researchers at the University of Vermont supports the researchers claim that increased good mood is a mediating effect of physical exercise. In this particular study, it was identified that people are in a better mood for up to 12 hours after they engage in physical exercise [11]. The researcher delves deeper into understanding the relationship between physical exercise and good mood. As such, the researcher identified a positive correlation between physical exercise and good mood. The researched identified that respondents had stronger feelings towards positive moods including feeling interested, strong, alert, inspired and many others after engaging in physical exercise.

A recent study found employee mood had a clear impact on performance, including both how much work employees did and how well they did it [12]. The researcher delves deeper into understanding whether or not good mood will increase or have a positive correlation on job performance. As such, the researcher identified a positive correlation between good mood and job performance.

Method

Participants

The target population of this research study is the working labor force of men and woman in Baltimore County, Maryland in the United States of America. In 2010, the total population of Baltimore County was an estimated by the U.S. Department of Commerce, United States Census Bureau at around 805,029 people. More specifically for this study, the researcher was aimed at collecting information from the working population of men and woman in Baltimore County, Maryland. In 2014, Maryland's Department of Labor, Licensing and Regulation estimated Baltimore County's Labor Force average population at 448,635 people.

The sampling method for this study is convenient sampling of the general work force population of men and woman in Baltimore County, Maryland in the United States. This will allow the researcher to identify: 1. If there is a relationship between physical exercise and job performance 2. If there's a mediating effect of the physical-exercise relationship such as increased good mood and 3. If there's a mediating effect of the physical-exercise relationship such as increased subjective health.

To distribute the questionnaire, the researcher used Survey Monkey. The questionnaire was designed in English language. This was because English is the language spoken by the majority of the target population in Baltimore County, Maryland. The research questions were designed accordingly to answer the main objectives of the study. Emails were sent directly to the participants with a link that took the participant directly to the questionnaire. The population for this study was comprised of full-time working population in Baltimore County, Maryland. A total of 413 participants participated in this study.

The results show about 2/3 of the participants, (62.22%), were female while 37.78% were male. The research showed that the majority of respondents (30.86 %) were between the ages of 18-24 years and (18.52%) were between the ages of 25-34 years. Additionally, the research showed that (17.28%) were between the ages of 35-44 years and (21.48%) were between the ages of 45-54. Finally, (4.3%) were between the ages of 55-64 year and (4.94%) we ages 65 and above.

More than half of the respondents held a bachelor's degree or higher. The research showed that (6.67%) graduated from high school and (11.85%) have some college credit but no degree. It also showed that (0.25%) had trade/technical/vocational training and (3.21%) had an associate's degree. (47.65%) of the respondents had a bachelor's degree and (24.44%) had a master's degree. Finally, (1.48%) of the respondents had a doctorate degree and (4.44%) had a professional degree.

The majority of the respondents, 82.47% were predominately white. It also showed that (7.16%) we of the Hispanic or Latino ethnicity and (2.22%) were part of the black or African American ethnicity. Finally, the results of the study showed that (0.25%) we of the Native American or American Indian ethnicity, (6.42%) were part of the Asian or Pacific Islander ethnicity and (1.48%) were part of an ethnicity not listed as an option.

Instruments

The questionnaire was divided into five sections: (1) Physical Exercise (2) Job Performance (3) Mood (4) Subjective Health (5) Demographics

Job performance: Job performance variable was assessed with the perceived productivity scale which was adopted from authors Matthew G Wattles and Chad Harris authors of the paper: *The relationship between fitness levels and employee's perceived productivity, job satisfaction, and absenteeism*. Authors Wattles and Harris, cite the original questions on productivity were created by Rudman WJ from the work titled *Do onsite health and fitness programs affect worker productivity* [13]. For this question, the participant responded on the Likert scale from 1to 5. 1. SD (Strongly Agree), 2. D (Disagree), 3. UD (Undecided), 4. A (Agree), 5. SA (Strongly Agree). The participants were then asked to apply one of the above values (1-5) to a list of seven statements. Based on the results and findings from authors Wattles and Harris, The seven item scale measuring employees' perceived productivity had a reliability coefficient of alpha=0.92. Nearly 92% of all employees agreed or strongly agreed that regular exercise would help them to be more productive at work.

Good mood: Good mood variable was assessed with PANAS scale which was adopted from authors John R Crawford and Julie D [14]. This section assessed the participants' mood by asking questions about their mood after engaging in exercise. The participants were asked to read each item and list the number from the scale next to each word. The participant was to indicate to what extent they feel this way right now, that is at the present moment (after exercising). For this question, the participant responded on the Likert scale from 1 to 5. 1. (Very slightly or Not at all), 2. (A little), 3. (Moderately), 4. (Quite a bit), 5. (Extremely). Based on the results and findings from authors John R Crawford and Julie D Henry- The reliabilities of the PANAS scales, as measured by Cronbach's alpha, were 0.89 for PA and 0.85 for NA. The narrowness of the confidence limits associated with these coefficients indicate that they can be regarded as providing very accurate estimates of the internal consistency of the PANAS in the general adult population. Thus, both PA and NA scales can be viewed as possessing adequate reliability [14,15].

Subjective health: Subjective health variable was assessed with Short Form 12 Health Survey or (SF-12) scale [16]. This section assessed the participants' subjective health by asking questions about their subjective health through the use of the Short Form 12 Health Survey or (SF-12). There were 3 different scales used for subjective health questions including: 1. (Yes, Limited A lot), (Yes, Limited a little), (No, Not limited at all). 2. (All of the time), (Most of the time), (Some of the time), (A little of the time), (None of the time). 3. (Not at all), (A little bit), (Moderately), (Quite a bit), (Extremely). The SF-12 is able to produce the two summary scales originally developed from the SF-36 with considerable accuracy and yet with far less respondent burden. Consequently, the SF-12 may be an instrument of choice where a short generic measure providing summary information on physical and mental health status is required [16]. Based on the results of Luo X et al. [17] the SF-12 was studied and found to have internal consistency and construct validity. In their paper titled, *Reliability, validity, and responsiveness of the short form 12-item survey (SF-12) in patients with back pain:* It states, the two summary scales of the short form 12-item survey, physical component summary and mental component summary, demonstrated internal consistency reliability, with Cronbach alpha for both scales exceeding the recommended level of 0.70 demonstrating the construct validity of the short form 12-item survey.

Procedure

Data collection

This research study will be using a survey/questionnaire to identify if there is a relationship, if any between the independent variable physical exercise and dependent variable job performance. As well as identifying if there are mediating effects of physical exercise such as subjective health and good mood. This research study will use a survey/questionnaire to gain a better understanding of the participants' demographics as well as physical exercise variables, job performance variables, mood variables and subjective health variables.

Sample size

The sample size of this research was determined using the table suggested by the following method of Krejcie and Morgan to represent the population in the millions. Within the sample size of 384, according to Krejcie and Morgan, this assumes standard error of 0.05. The researched planned on a sample size of 384, but an additional 29 respondents ended up completing the survey within the given time period which resulted in a total of 413 respondents.

Research design

This study used bootstrapping analysis called "indirect script" of Preacher and Hayes [4] to evaluate the research model. The term bootstrapping refers to any test or metric that relies on random

sampling with replacement. Bootstrapping allows assigning measures of accuracy to sample estimates. The researcher predicted that physical exercise would increase job performance, and that the relationship would be mediated by subjective health and good mood.

Results

Preliminary analysis

The data for this research were analyzed using Statistical Package for the Social Sciences 22nd version for Mac OSX. To detect multi-collinearity effect, the researcher ran correlations between demographic characteristics such as gender, age, education and ethnicity and the variables in the models including good mood, subjective health and job performance. Table 1 presents means and standard deviation of respondents' gender, age, education and ethnicity and their correlations with good mood, subjective health and job performance.

Gender was significantly related to good mood, subjective health and job performance. As gender was dichotomous with 2 designated as female the results indicated that female participants tended to have good mood, enjoyed good subjective health and performed well in their jobs. Age was significantly related to good mood and job performance. The majority of participants were within the 18-24 age group and tended to experience positive moods and have high level of performance at their job. The correlation between the participant's age and subjective health was not significant. Education was significantly related to good mood, subjective health, and job performance. The participants with higher education tended to experience positive moods, increased sense of subjective health, and higher level performance at their job. Ethnicity was significantly related to good mood only.

Bootstrapping analysis in the SPSS program with indirect script [4] was used to test the model. Table 2 and Figure 1 display the results of the analysis. As shown in Table 2 and Figure 1 physical exercise is related to job performance (β=0.1140, p<0.001).

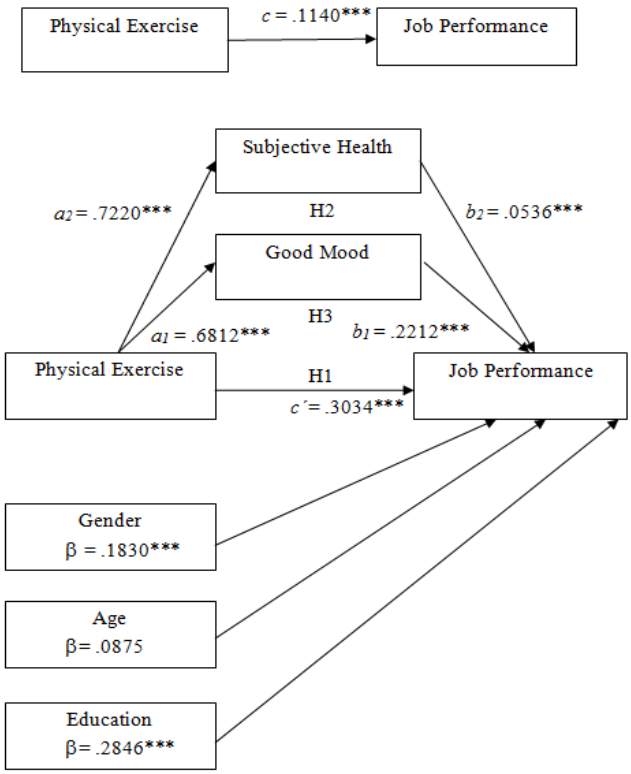
Note: Bias corrected and accelerated intervals: Total indirect effect: -0.0273 to -0.3740; Physical Exercise→Good Mood→Job Performance: -0.0217 to - 0.0090; Physical Exercise→Subjective Health→Job Performance: -0.0444 to -0.0077. Results were produced with bootstrap re-sample of 5000, 95% confidence interval and bias corrected and accelerated options in the bootstrap dialogue box in indirect script [4].

The mediation effects were tested using a bootstrap script [4], specifying 95% confidence interval and 5,000 bootstrap re-samples [18]. As gender, age and education were correlated with dependent variable, job performance, they were entered as control variables in bootstrap script. Table 2 displays the results of the mediating effects of subjective health and good mood on the relationship between physical exercise and job performance.

Analysis of the Hypothesis

The relationship between physical exercise and job performance (c path) was hypothesized in our study and was statistically significant (β=0.1140; p<0.001); Hypothesis 1 was supported. In the mediation model with subjective health and good mood as mediators, the direct effects of physical exercise and subjective health (a path, β=0.7220; p<0.001), and on good mood (a path, β=0.6812; p<0.001) were statistically significant. The direct effect subjective health and job performance (b path, β=-0.0536; p<0.001) and the relationship between good mood on job performance (b path, β =-0.2212; p<0.001) were statistically significant.

The $a \times b$ indirect effects of the independent variable (physical exercise) on dependent variable (job performance) through the



Upper figure: Total effect (physical exercise and job performance). Lower figure: Indirect effect, subjective health and good mood as mediators. Total indirect effect (*β*)=-0.0295, *SE*=0.0880; Good Mood (β)=-0.0062, *SE*=0.0567; Subjective Health (*β*)=-0.0302, *SE*=0.0683. ***p<0.001.

Figure 1: Physical exercise and job performance.

	Mean	Std. Dev	Gender	Age	Education	Ethnicity	Mood	Subjective Health	Job Performance
Gender	1.33	0.535	1						
Age	1.58	1.133	0.3	1					
Education	6.04	1.68	0.32**	0.14**	1				
Ethinicity	1.3	1	0.22**	0.06	0.23**	1			
Good Mood	4.17	1.222	0.20**	0.16**	0.36**	0.20*	1		
Subjective Health	2	0.953	0.26**	0.047	0.31**	0.09	0.25**	1	
Job Performance	3.96	1.557	0.20**	0.12*	0.38**	0.043	0.28**	0.15**	1

**Correlation is significant at the 0.01 level (2-tailed)

*Correlation is significant at the 0.005 level (2-tailed)

Table 1: Descriptive statistics: Means and standard deviation of respondents' gender, age, education and ethnicity and their correlations with good mood, subjective health and job performance.

Standardized			
Path Effect	**β**	**SE**	***p***
c Physical Exercise→Job Performnace	0.114	0.15	<0.001
a1 Physical Exercise →Good Mood	0.6812	0.11	<0.001
a1 Physical Exercise →Subjective Health	0.722	0.08	<0.001
b1 Good Mood →Job Performance	0.2212	0.06	<0.001
b2 Subjective Health →Job Performance	0.0536	0.08	<0.001
c Physical Exercise→Job Performnace	0.3034	0.16	<0.001
a*b Indirect Effects: Total	-0.0295	0.88	
Good Mood		0.567	
Subjective Health		0.683	
Control Variables on DV (Job Performance)			
Gender	0.183	0.14	<0.001
Age	0.0875	0.6	0.232
Education	0.2846	0.04	<0.001

Table 2: Bootstrap results to test significance of mediation effects.

mediation of good mood was significant (bootstrap result, β=-0.0062, bias corrected and accelerated confidence interval ([BCACI]=-0.0217 to -0.0090). The $a \times b$ indirect effect of the independent variable (physical exercise) on dependent variable (job performance) through the mediation of subjective health was significant (bootstrap result, β=-0.0302, bias corrected and accelerated confidence interval ([BCACI]= -0.0444 to -0.0077). Therefore, Hypotheses 2, and 3 were supported.

Discussion

The objective of this research was to examine the relationship between physical exercise and job performance. In addition, this research identifies the relationship of mediating effects subjective health and good mood. The result of this research provides important information about the relationship physical exercise has on job performance as well as mediating effects subjective health and good mood.

The first hypothesis of the study states that physical exercise will increase or have a positive correlation on job performance. The results show that there is a positive correlation between physical exercise and job performance with β=0.30, with p<0.001, significant at 99.9% confidence interval with Bootstrap Resample Size of 5,000. The result of this research is consistent with the previous studies that support the statement that physical exercise will increase or have a positive correlation on job performance. Studies regarding the relationship between physical exercise and job performance have provided supporting evidence that engaging in physical exercise will cause an increase or positive correlation on job performance.

The second hypothesis of the study states that there is a mediating effect of the physical exercise-job performance relationship such as subjective health. The results show that there is a positive correlation between physical exercise and job performance with the mediating effect of subjective health β=-0.0302 which falls within the bias corrected confidence intervals of -0.0444 and -0.0077. Significant at the 95% confidence interval with Bootstrap Resample Size of 5,000. The result of this research is consistent with the previous studies that support the statement that there's a mediating effect of physical exercise, such as increased subjective health.

The third hypothesis of the study states that there is a mediating effect of the physical exercise-job performance relationship such as good mood. The results show that there is a positive correlation between physical exercise and job performance with the mediating effect of good mood β=-0.0062 which falls within the bias corrected confidence intervals of -0.0217 and -0.0090. Significant at the 95% confidence interval with Bootstrap Resample Size of 5,000.

Conclusions and Implications

It is recommended that when conducting questionnaires with the respondents, future researchers test the optimal time of day to exercise in order to maximize job performance. This would allow researchers to test respondents at different times during the day (morning, noon and night) to see which exercise periods increase job performance the most. This could help arm business owners and decision makers with the necessary knowledge to potentially start work later or extend lunch breaks if the result would be happier, healthier and more productive employees. Thus potentially yielding higher returns for the company.

Engaging in physical exercise has become a key component to increased job performance. Engaging on physical exercise not only increases job performance, it has shown to have positive correlations with mediating effects such as good mood and subjective health. Research shows that health care costs are becoming increasingly high as a result of the population. Owners and managers of companies are looking for new ways to decrease health care costs and to improve the performance of their employees. This has led to companies offering gym memberships and even wellness programs to help get their employees active and healthy.

As such, the result of this research proves that engaging in physical exercise will result in an increase or positive correlation on job performance. The research findings also show that there are mediating effects of physical exercise such as increased good mood and subjective health. Therefore companies looking for an answer to increasing health care costs less active workers and should consider incentives to get the employees engaging in physical exercise. It is also important for companies to understand the mediating effects of engaging in physical exercise including an increase or positive correlating with good mood and subjective health. Participants that engaged in physical exercise experienced an increase or positive correlation with job performance, good mood and subjective health. This means that participants are not only feeling more productive at work, they are also in better moods and feeling healthier. Thus, when considering a solution to increase job performance, business owners and managers should encourage employees to engage in physical exercise.

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