



The Association between Physical activity with Subjective Affectivity and Depression in Adolescents and Young Adults in Indian population

¹Ishaan Taneja, Master of Arts, Clinical Psychology, Amity Institute of Psychology and Allied Sciences, Noida, India
ishaantaneja16@gmail.com

Abstract

The aim of the research is to assess the association between physical activity with depression and subjective affectivity. Plenty of research have contributed to the fact that engaging into regular physical activity gives a boost to your mental health. Additionally, plenty of research have also proven the hormonal benefits of engaging in physical exercises like an increase in endorphins, serotonin, and dopamine. A total of 120 participants (south-Asians) were taken from the age of 15-27 and a purposive non-random sampling technique was being employed. Statistically, Pearson's correlation and linear regression was being utilized. The results have indicated that there is a low positive significant relationship between positive affectivity and physical activity ($r=.206$) and a low positive correlation between patient health questionnaire

and physical activity ($r=0.25$). The correlation between negative affectivity and physical activity came out to be negative ($r=-.038$) which means that the more an individual is going to engage in physical activity the less negative affectivity they would have. Regression analysis was also conducted the study the exact correlation between the independent variable which is physical activity and dependent variable which is positive affectivity in which the p-value came out to be 0.024. Another, linear regression analysis was done between the independent variable (physical activity) and the dependent variable which is PHQ-9 in which the p value came out to be 0.789. To conclude the research, it can be said that indulging into physical exercise alone cannot be a predictor for an individual to have positive affectivity or having a lower chance of suffering from depression although the correlation between negative affectivity and physical exercise with the r value being-.038 which states that the more an individual does physical exercise the less they go through negative emotions.

Keywords: *Physical activity, depression, subjective affectivity, hormones, endorphins, serotonin, dopamine.*

Introduction

The association of physical activity with subjective affectivity and depression in adolescents and young adults in Indian population is the aim of the current research. The research is aimed to investigate what impact does physical activities like running, jogging, or engaging in yoga has on one's affectivity as well as depression. The word subjective affectivity which is also termed as subjective well-being (SWB) is a concept in positive psychology which refers to the kind of mood one has i.e., positive mood or negative mood which depends upon a variety of factors. The research, will further identify the kind of emotions or mood that is triggered by the engaging in physical exercise. The word depression or major depressive

disorder is a kind of mental disorder which is explained both in DSM and ICD is a kind of mood disorder which is characterized by having a diminished interest in pleasure activities.

Physical Activity and Mental Health

Exercise and mental health have a complex relationship. For instance, inactivity can contribute to or result from mental disease. However, there are numerous ways that physical activity can enhance mental well-being. Exercise alters the amounts of chemicals in the brain, including endorphins, stress hormones, and serotonin. You can have better sleep if you exercise often. Additionally, getting enough sleep aids with mood regulation. An individuals' ability to cope, feel in control, and self-worth can all be enhanced by exercise. Regular exercisers frequently talk about how great it feels to accomplish a goal.

Exercise can help an individual try new things and divert their attention from unpleasant thoughts. If one workout with others, it provides a chance to interact with people and receive social support. The energy levels rise as the person exercises. One's frustrations can be released through physical activity. One can feel more at ease by exercising since it helps release tension in your skeletal muscles. Exercise's physical advantages are crucial for those who suffer from mental illnesses. It enhances an individual's general physical well-being and cardiovascular health. This is significant since there is a link between mental health disorders and chronic physical illnesses like diabetes, asthma, arthritis, and heart disease.

Review of Literature

Zartaloudi et al., (2023) did research with the purpose to study self-esteem, body image, social anxiety related to physical appearance, body mass index (BMI) characteristics, and

potential relationships between these variables. In addition to participating in track and field, football, and basketball athletics, 245 adults who were part of gym training programs also filled out a sociodemographic questionnaire that included the Body-Esteem Scale for Adolescents and Adults, the Social Physique Anxiety Scale, and the Rosenberg Self-Esteem Scale. The questionnaire also recorded the participants' BMI values. The findings found that compared to men and people with lower BMI, women and those with higher BMI reported statistically significant lower levels of body-esteem and higher levels of social physique anxiety, respectively ($p < 0.05$). Of our participants, 25.3% were classified as "overweight," and 20.4% had previously been overweight.

Rezaie et al., (2023) did a research to study which looked at the connections between patients with MDD's levels of physical activity, emotion control, and sleep quality. 118 MDD patients (mean age: 31.85 years) who answered questionnaires about depression, emotion management, physical activity, and sleep quality made up the sample. The results showed that more sleep problems were associated with worse emotion dysregulation, and more physical activity was associated with fewer sleep problems and less emotion dysregulation.

Blumenthal et al., (2023) did research to find out whether major depressive disorder (MDD), the world's largest cause of mental health impairment and general disability, can benefit from exercise as a possible therapy approach. A rising number of randomized clinical trials (RCTs) comparing exercise to recognized therapies, placebo controls, or usual care in healthy adults and varied disease populations provide the greatest evidence in favor of this use. Due to the comparatively high number of RCTs, several reviews and meta-analyses have been conducted, and they have typically produced consistent results showing that exercise reduces the symptoms of depression, boosts self-esteem, and improves several quality-of-life

characteristics. Taken together, these findings suggest that exercise ought to be seen as a therapeutic approach to enhance cardiovascular health and mental wellness. The growing body of data additionally has led to a new proposed subspecialty of “lifestyle psychiatry”, which promotes the use of exercise as an adjunctive treatment for patients with MDD. Indeed, some medical organizations have now endorsed lifestyle-based approaches as foundational aspects of depression management, with adoption of exercise as a treatment option for MDD. This review summarizes research in the area and provides practical suggestions for the use of exercise in clinical practice.

Xu et al., (2023) conducted a Research which has demonstrated that subjective cognitive decline, or SCD, is a significant risk factor for moderate cognitive impairment or even dementia; however, it is yet unknown how physical activity, or PA, and SCD are related. Examining the relationship between different physical activities and SCD is the aim of the current investigation. The study comprised 216,593 adult participants from the Behavioral Risk Factor Surveillance System (BRFSS). The researchers used the participants' self-report to measure SCD and PA. To lessen the impact of confounding variables, multinomial propensity score and the nearest matching approach of propensity score were employed. When contrasted with the idle, the Regardless of the kind of PA, the weighted adjusted odds ratios (AORs) of SCD among physically active individuals were <1 ($p < 0.005$); running (AOR: 0.51, 95% CI: 0.50–0.52); aerobic exercise (AOR: 0.55, 95% CI: 0.53–0.56); and weightlifting (AOR: 0.60, 95% CI: 0.59–0.62) were the top three PA in weighted AORs.

Tzenios et al., (2023) did research on the connection between depression and obesity. To provide readers a thorough grasp of the intricate interactions that occur between depression and obesity, this essay will methodically evaluate the body of previous research. The research

emphasized the reciprocal nature of the relationship by looking at both experimental and epidemiological data, and it also considers possible moderators and mediators. The significance of a multidisciplinary strategy to address both disorders concurrently is highlighted in the discussion of the implications of these findings for prevention and therapy.

Methodology

Sample

For the study a total of 120 participants have participated both men and women from an urban population, adolescents and young adults were the target population from the age group of 15-27. Purposive Nonprobability sampling was employed.

Inclusion Criteria

Individuals who are between the ages of 15 and 27. Those who are enrolled in educational institutions people who are literate in English and are prepared to provide permission for the study.

Exclusion Criteria

individuals who are below the age of 15 and above the age of 27 were not included in the study, people who could not read or write were not included in the study, participants were only selected from an urban population.

Description of tools

PANAS Scale: The Positive and Negative Affect Schedule (PANAS) is a commonly used scale for assessing mood and emotion, developed by Watson, Clark, and Tellegen (1988).

There are twenty items on this short scale; ten of them measure positive affect (such as inspired or thrilled) and ten of them measure negative affect (such as upset or terrified).

Reliability: According to Watson, Clark, and Tellegen (1988), the internal consistency ranges for the PANAS were .84-.87 for negative affect and .86-.90 for positive affect. For the PANAS (1 week), test-retest reliability was reported to be .81 for negative affect and .79 for positive affect.

Validity: The PANAS and HSCL have a correlation of .74 for negative affect and -.19 for good affect.

Patient Health Questionnaire-9: Introduced in 2001, the nine-item Patient Health Questionnaire (PHQ-9) is a diagnostic instrument used to evaluate adult patients in primary care settings for depression symptoms.

Reliability: Concerning dependability, they discovered that Cronbach's alpha for the PHQ-9 was 0.86 among 3,000 OB-GYN patients and 0.89 in a sample of 3,000 general care patients. In contrast, the PHQ-9's total score is practically unidimensional, according to the findings of the extensive study conducted by Bianchi et al. PHQ-9 scores from phone and in-person interviews with the same patients showed a 0.84 correlation.

Validity: Kroenke et al. (1986) evaluation of construct validity revealed a 0.73 association between the PHQ-9 and the SF-20 mental health scale. A mental health expert verified depression diagnoses based on PHQ-9 scores from 580 participants to evaluate criteria validity; the results showed 88% sensitivity and 88% specificity.

Godin-Leisure Time Exercise Questionnaire: A brief questionnaire designed by Godin and Shephard gauges an individual's level of exercise during their free time.

Reliability: Test-retest reliabilities were high ($r > 0.80$) for the vigorous exercise category and the total leisure activity score, and low ($r < 0.20$) for the mild and moderate exercise categories. Test-retest reliabilities for the mild and moderate exercise categories in males were moderate ($r = 0.30-0.45$), whereas the total leisure activity score and the intense exercise category had moderate ($r = 0.50-0.60$).

Validity: Ten professionals evaluated the content validity, and the results showed that it was outstanding. To evaluate the psychometric qualities of the scale, 150 university office workers were administered it. The scale displayed excellent test-retest reliability (0.88) and internal consistency (0.99). we were able to assess its concurrent validity, and the results indicated an excellent validity of 0.86 (< 0.001).

Procedure

Following topic selection, students were given the instrument or questionnaires containing the variables to collect data. Since all the surveys used in the study are self-reported, instructions were only briefly explained.

Statistical Analysis

Pearson's Correlation as well as linear regression was being applied.

Results**Table-1***Correlational-Analysis*

		Godin leisure time exercise questionnaire	Positive affectivity	Negative affectivity	PHQ-9
Godin leisure time exercise questionnaire	Pearson's correlation Sig. (2-tailed N	1 120	.206 .024 120	-.038 .681 120	.025 .789 120
Positive affectivity	Pearson's correlation Sig. (2-tailed N	.206 .024 120	1 120	.010 .914 120	.011 .903 120
Negative affectivity	Pearson's correlation Sig. (2-tailed N	-.038 .681 120	.010 .914 120	1 120	.400** <.001 120
PHQ-9	Pearson's correlation Sig. (2-tailed N	.025 .789 120	.011 .903 120	.400** <.001 120	1 120

Note: The above table represents a Pearson's correlational analysis between the Godin leisure time exercise questionnaire, positive affectivity, and patient health questionnaire-9.

Table-2*Regression analysis (Model summary)*

Model Summary				
Mod el	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.206 ^a	.043	.034	7.102
a. Predictors: (Constant), Godin liesure time exercise				

Table-2.1*ANOVA Table*

ANOVA^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	264.231	1	264.231	5.238	.024 ^b
	Residual	5952.436	118	50.444		
	Total	6216.667	119			
a. Dependent Variable: Positive affectivity						
b. Predictors: (Constant), Godin liesure time exercise						

Table 2.2*Coefficients Table*

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	28.874	1.382		20.895	<.001
	Godin liesure time exercise	.059	.026	.206	2.289	.024
a. Dependent Variable: Positive affectivity						

Note: The above tables 2-2.2 shows the Linear regression between the independent variable (Godin-Leisure time exercise questionnaire) and the dependent variable (Positive affectivity)

Table-3*Regression-Analysis (Model summary table)*

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.025 ^a	.001	-.008	5.618
a. Predictors: (Constant), Godin liesure time exercise				

Table-3.1
ANOVA Table

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.268	1	2.268	.072	.789 ^b
	Residual	3723.732	118	31.557		
	Total	3726.000	119			
a. Dependent Variable: PHQ-9						
b. Predictors: (Constant), Godin leisure time exercise						

Table-3.2
Coefficients-Table

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.241	1.093		8.455	<.001
	Godin leisure time exercise	.005	.020	.025	.268	.789
a. Dependent Variable: PHQ-9						

Note- The above tables 3-3.2 shows the regression analysis between the independent variable (Godin leisure time exercise questionnaire) and dependent variable (patient-health questionnaire-9)

Discussion of Results

Correlational Analysis

The aim of the research is to assess the effect of regular exercise on subjective affectivity and depression levels.

Pearson's correlation between Godin leisure time exercise questionnaire and positive affectivity came out to be ($r=.206$) which tells us that there is a low positive correlation between the two that states that the more a person is involved in doing weekly exercises be it strenuous, moderate or mild the more she / he experiences positive emotions which are being strong, interested, proud and many others which are further mentioned in the PANAS questionnaire.

Pearson's correlation between Godin leisure time exercise questionnaire and negative affectivity came out to be ($r = -0.38$) which tells us that there is a weak negative association between negative affectivity and Godin leisure time exercise questionnaire

The correlation between PHQ-9 which helps in the measurement of the depression levels and Godin leisure time exercise questionnaire comes out to be ($r = 0.25$) which is a low positive correlation

Null Hypothesis (H_0): The participant's depression and subjective affectivity are not significantly impacted by the amount of physical activity they engage in. According to this hypothesis, there is no connection between depression (as determined by the PHQ-9) and physical exercise, as well as positive and negative subjective affectivity. The correlation matrix, however, shows that Godin leisure time exercise and positive affectivity have some notable, albeit small, relationships ($r = 0.206$, $p = 0.024$). Consequently, there is data to refute H_0 on the connection between positive affectivity and Hypothesis Alternative (H_1 or H_a): One's subjective affectivity is greatly influenced by their degree of physical activity, which also reduces the likelihood of developing depression or experiencing. According to this theory, exercise reduces the chance of depression and has a favourable impact on subjective affectivity. Godin's hypothesis is somewhat supported by the positive connection ($r = 0.206$, $p = 0.024$) between positive affectivity and leisure time exercise.

Hypothesis 2 (alternative): One's subjective affectivity is negatively impacted by their degree of physical activity, which can result in increased levels of depression, the onset of depression, or low mood. This hypothesis is not supported by the data, as there is no significant negative association found between physical activity and either positive or negative affectivity.

Regression analysis between Godin Leisure Time Exercise and positive affectivity.

The above is a part of the regression analysis (model summary) table. The regression analysis is being done to have a better understanding of the relationship between the independent variable (Godin leisure time exercise questionnaire) as well as the dependent variable (positive affectivity).

The above table gives the correlational coefficients which is the r and r square values. The r values is the (.206) which states that there is a weak positive linear relationship between the independent and the dependent variables. The r square values which are 0.43 which basically states that there is a 4.3% variance in the positive affectivity because of the Godin leisure time exercise questionnaire. The adjusted R value which is .34 which indicates that the model's descriptive power is limited. The standard error of estimates which is 7.102 which states that when lower values are going to get applied, they are going to have a better anticipating accuracy.

The above is the ANOVA table which is an integral part of the regression analysis which states the relationship between the independent variable which is the Godin leisure time exercise questionnaire, and the dependent variable is positive affectivity. The regression sum of squares is 264.231 which represents the changes in the positive affectivity because of the manipulation of the independent variable. Now coming to the residual sum of squares which states the variability aor the error which lies in the model which comes out to be 5952.436. The above used regression model has a degree of freedom of 1 and for residual the degree of freedom is 118 and the total degree of freedom is 119. The p value associated with the f statistic 0.024 that is 0.024. the P value being less than the alpha level of 0.05 which states that the regression model is statistically significant at 0.05 level of significance.

The 3rd and the final table are the intercept which states that when the independent variable which is the Godin leisure time exercise questionnaire or the number of times when one engages in exercises weekly is 0 at that time the anticipated score of the dependent variable which is the positive affectivity is 28.874. The independent variable coefficient which is Godin leisure time exercise questionnaire is 0.059 which states that every one percent increase in the independent variable poses a 0.059% change in the dependent variable. The beta coefficient for the independent variable which is Godin leisure time exercise questionnaire is 0.206 which indicates a moderate positive effect between the independent and dependent variable. The P value tells us that the coefficient for Godin leisure time exercise questionnaire (independent variable) is 0.024 which tells us that it is statistically significant at 0.05 significance level.

Regression analysis between Godin leisure time exercise questionnaire and patient health questionnaire.

The first table which is the model summary table which states that the Pearson correlation between the independent variable which is Godin leisure time exercise questionnaire and dependent variable which is patient health questionnaire, the r is 0.025 which indicates a very slight positive correlation between the 2. The r square here is 0.001% which indicates an extremely weak positive correlation between the 2. The adjusted r square which is -0.008 states that more the exercise an individual does not pose as a predictor in the difference between the amount of depression an individual will be having. The standard error of estimates states the values as 5.618 which states that there is a high degree of error.

The second table of the regression analysis which is the ANOVA table states that the null hypothesis is being proved here which means that the independent variable which is Godin leisure time exercise questionnaire is not that statistically significant in explaining the change

in PHQ-9 as the p value is 0.789 which is higher than 0.05 which is going to tell us that the regression between the independent variable and dependent variable is not significant statistically in the explanation of the variance.

The 3rd table for regression tells us that the unstandardized coefficient B for the independent variable being of the value of 0.005 which states that as weekly regular exercise increases the PHQ-9 automatically increases by 0.005% of level. "Godin leisure time exercise" has a t-value of 0.268 and a matching p-value (Sig.) of 0.789. We are unable to reject the null hypothesis since the p-value is higher than the usual significance level of 0.05, indicating that the coefficient for "Godin leisure time exercise" is not statistically significant in predicting PHQ-9 scores.

Conclusion

To conclude the research which investigates the effect of indulging in weekly regular exercise on depression and subjective affectivity, the Pearson's correlation between the independent variable (Godin leisure time exercise questionnaire) and the dependent variable (positive affectivity) in which $r=0.206$ which furthermore indicates a weak positive correlation which is there between them and somehow goes on to prove the alternate hypothesis to some extent. Now talking about the correlation between the independent variable and the dependent variable which is negative affectivity stands to be ($r= -.83$) which states that there is a slight negative correlation between both. The correlational analysis between the independent variable and the dependent variable which is patient health questionnaire which gave the correlational value ($r=0.25$) which states that there is a slight positive correlation between both which goes on to explain the alternate hypothesis to some extent. The regression analysis also took place which further goes on to explain the in-depth relationship between the independent variable which is the Godin leisure time exercise questionnaire and the dependent variable which is

positive affectivity and the value for the regression between the above two came out to be 0.024 which is less than 0.5 which means they are statistically significant but not that significant. The regression analysis which happened between the independent variable which is Godin leisure time exercise questionnaire and dependent variable which is patient health questionnaire-9 which measures depression levels of the participant, the p value is 0.789 which is higher than usual significance level 0.05 which means they are statistically not that significant.

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