# Mindfulness And Assertiveness Model For Emotional Issues Among Adolescents



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## Abstract

**Background:** Emotional disorders have taken a toll on adolescents which has been increasing at a faster pace lately. The World Health Organization (WHO) has therefore brought to light the challenges that concerns with children and adolescents' mental health. Researchers have identified the need for numerous interventions basing mindfulness and assertiveness that may be useful in combating such challenges. However, prior to developing and implementing interventions, impact of mindfulness and assertiveness should be studied. Researches have also examined that these variables also impact stress and self-esteem, whereas the latter impact anxiety and depression that also share direct effects with mindfulness and assertiveness. Therefore, the current study aims at examining the mediating effect of self-esteem and stress on the relationship of mindfulness and assertiveness with anxiety and depression. **Method:** A total sample of 339 adolescents completed a set of questionnaires that assessed their mindfulness, assertiveness, self-esteem, stress, anxiety, and depression. Partial Least Square- Structural Equation Modeling was used to assess the mediation effect that mindfulness and assertiveness exerted on anxiety and depression through self- esteem and stress. **Findings:** The results confirm the relationship among the above-mentioned constructs. The in-sample and out of sample predictive relevance depicts moderate predictive validity of the research model. **Interpretation:** The mediation effect of stress and self-esteem in the relationship of mindfulness and assertiveness with anxiety and depression was derived from the results. The findings are corroborated with the past research carried out that provides the evidence of significant relation amongst all the variables stating the mediating role of self-esteem and stress.

**Keywords:** Anxiety, Assertiveness, Depression, Mindfulness, Self-Esteem, Stress
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## 1. Introduction

Adolescents comprises about 16 per cent of the worlds' population. They undergo a transition phase between childhood and adulthood, the time period where they experience significant growth and development. Adolescence is extremely crucial for an individual's social and emotional development, as well as well-being. In addition to this, adolescence comes with a lot of vulnerabilities which is a major concern as it may manifest mental health problems (World Health Organization, 2021). It has also been estimated globally that one in seven adolescents aged 10 to 19 years' experience mental health conditions which still remains untreated and unidentified. Researchers have revealed that emotional disorders are common during this age (Patton et al., 2014). Many initiatives are being taken by several organizations to combat this challenge, one of which being "World Health Organization (WHO)". It has identified nine grand challenges in Mental Health, one of which is 'Child and Adolescent Health' (Bajbouj et al., 2022). Mixed Method Interventions are

gaining worldwide importance as treatment strategies to combat issues like anxiety and depression among adolescents (Fàbregues et al., 2022) and suggesting a connection between emotional and spiritual aspects (Roslan et al., 2020). This paper attempts to examine mindfulness and assertiveness as predictors of anxiety and depression with the mediating role of stress and self-esteem among adolescents.

## 2. Research Model and hypotheses formulation

### 2.1. Research Model

The proposed research model in Figure 1 is conceptualized based on the previous research carried out with adolescents for their emotional issues.

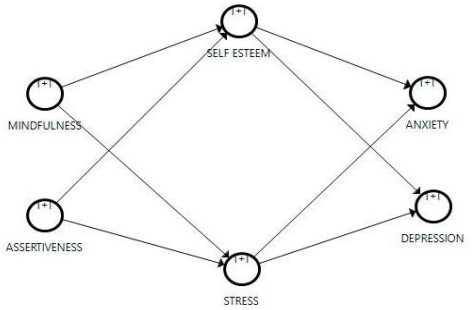


**Figure 1** Research Model

### 2.2. Self-Esteem and Stress as mediators

Researchers have identified stress and self-esteem as important mediators that impact the relationship of mindfulness and assertiveness with depression and anxiety individually (Valikhani et al., 2019). Relatively enormous studies have accounted the relationship of stress (Ray et al., 2017) and self-esteem (Liu et al., 2014) with anxiety and depression. Therefore, consistent with the proposed research model, the literature supports that the adolescents deal with self-esteem issues which may have adverse effects and further lead to anxiety and depression. Past literature has reviewed the importance of mindfulness and assertiveness in the adolescent's life. Researchers have also shown the impact of mindfulness and assertiveness on the anxiety and depression. Literature has also explored the role of stress and self-esteem in impacting anxiety and depression. However, there is a dearth of research that examines stress and self-esteem together as mediators between mindfulness with assertiveness and anxiety with depression among adolescents. Therefore, this paper attempts to study the mediating effect of self-esteem and stress on the relationship of mindfulness and assertiveness with anxiety and depression, and see if the relationship exists amongst all the variables.



### 2.3. Hypothesis Formulation

Once the research model in the figure 1 was conceptualised, based on that, certain hypotheses were formulated.

H1: Mindfulness, Assertiveness, Self-Esteem, Stress, Anxiety and Depression will be correlated.

H2a: Self-Esteem will mediate the relationship between Mindfulness and Anxiety.

H2b: Self-Esteem will mediate the relationship between Mindfulness and Depression.

H3a: Stress will mediate the relationship between Mindfulness and Anxiety.

H3b: Stress will mediate the relationship between Mindfulness and Depression.

H4a: Self-Esteem will mediate the relationship between Assertiveness and Anxiety.

H4b: Self-Esteem will mediate the relationship between Assertiveness and Depression.

H5a: Stress will mediate the relationship between Assertiveness and Anxiety.

H5b: Stress will mediate the relationship between Assertiveness and Depression.

## 3. Method

### 3.1. Participant Characteristics

A total sample of 399 adolescents gave the consent to be a part of the study, however, consent from the parents were also taken. In the sample, 142 were males comprising of 41.9% and 197 were females that comprised of 58.1% of the population. The mean age of the population was 17.68 with the standard deviation (SD) of 1.21.

### 3.2. Sampling procedures

Data was collected using purposive sampling due to the nature of specific population to be included in the study (Campbell et al., 2020). The adolescents from the age group 13 to 19 were selected from the non-clinical population.

### 3.3. Sample size, power, and precision

G* power software is used to calculate the sample size. It tells the minimum sample size

with respect to certain parameters that are required for the calculation. Firstly, number of predictors or the independent variables are defined, mediating variables are also considered as predictors therefore, four was mentioned in the input area. Secondly, $f^2$ which is the effect size is usually followed (S. Cohen & Williamson, 1998) within the medium range that is 0.15 (Hair et al., 2019). Thirdly, power of the test is defined at 0.80, following which in the test family, F test is selected prior to selecting the statistical test that should be selected at linear multiple regression, Fixed model, $R^2$, deviation from 0. The type of power analysis should be set as 'a priori compute required sample size, given α power and effect sizes (Faul et al., 2009). After calculating the output, the sample size came out to be 85, however thrice of this sample size was considered. The minimum sample size selected for the study was then 255, however, a sample of 339 participants were made available for the analysis.

### 3.4. Measures and mediators

#### 3.4.1. Mindfulness

Cognitive and Affective Mindfulness Scale-Revised (CAMS-R) is a 10-item Likert type scale (Feldman et al., 2022) ranging from 1 as "Rarely/ Not at all" to 4 as "Almost always" with just one item "the fifth item" as reversely scored. CAMS-R provides a strong theoretical orientation and empirical findings as compared with other measure with good reliability and validity (Chan et al., 2016).

#### 3.4.2. Assertiveness

A 20-item Likert type scale was used to assess assertiveness with Assertiveness Formative Questionnaire (Gaumer Erickson et al., 2016). It is measured at 5-point scale 1 being "Not very like me" to 5 being "Very like me". The validity and reliability reported is also good (Gaumer Erikson & Noonan, 2021).

#### 3.4.3. Self- Esteem

The revised version of Rosenberg Self-Esteem Scale was used to assess self-esteem which is a 10-item Likert-type scale (Crandal, 1973) that ranges from 1 as "Strongly agree" to 4 as "Strongly disagree" with items 2, 5, 6, 8 and 9 as reverse scores. The scale is considered to have good reliability and validity (Sarkova et al., 2013).

#### 3.4.4. Stress

Perceived Stress Scale-10 (PSS-10) is a 10-item, 5-point Likert type scale (S. Cohen & Williamson, 1998) ranging from 0 as "never" to 4 as "very often" with a reverse scoring on the items 4, 5, 7 and 8. The validity and reliability have also found to be good (Baik et al., 2019).

#### 3.4.5. Anxiety

The anxiety among adolescents was measured using Beck's Anxiety Inventory-BAI (Beck et al., 1988). It is a 21-item, 4-point Likert type scale with 0 score as "not at all" and 3 as "severely- it bothered me a lot". The validity and reliability of the scale was found to be good (Ediz et al., 2017).

#### 3.4.6. Depression

Beck's Depression Inventory (BDI) is a 21-item scale with a scoring of 0 to 3, responded based on the statements given for each item (Beck et al., 1996). Researchers have found the scale to be valid and reliable in their studies (Kumar et al., 2012).

### 3.5. Data Analysis

Partial Least Square Structural Equation Modeling (PLS-SEM) using SmartPLS 3 was used to assess the research model that included the evaluation of the measurement model by calculating the construct reliability and validity, and discriminant validity, following which path analysis was carried out to evaluate the structural model. The complex nature of model required mediation analysis and the data was also not normally distributed, therefore, PLS-SEM was the most appropriate technique to be used for the analysis (Hair et al., 2019).

## 4. Results

### 4.1. Preliminary analysis

The preliminary analysis determined the mean, standard deviation, reliabilities, and correlation was calculated using SPSS v27.

**Table 1** Mean, Standard Deviation, Reliabilities (α) and Correlations

| | Mean | SD | A | Mindfulness | Assertiveness | Self-Esteem | Stress | Anxiety | Depression |
|---|---|---|---|---|---|---|---|---|---|
| **Mindfulness** | 28.01 | 5.322 | 0.767 | 1 | | | | | |
| **Assertiveness** | 68.33 | 9.778 | 0.740 | .511** | 1 | | | | |
| **Self-Esteem** | 27.76 | 6.422 | 0.812 | .488** | .434** | 1 | | | |
| **Stress** | 21.73 | 6.953 | 0.818 | -.558** | -.350** | -.506** | 1 | | |
| **Anxiety** | 21.71 | 15.002 | 0.947 | -.295** | -.229** | -.429** | .470** | 1 | |
| **Depression** | 13.11 | 11.210 | 0.927 | -.545** | -.400** | -.539** | .567** | .629** | 1 |

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

Table 1 depicts significant correlations among each variable namely, Mindfulness, Assertiveness, Self-Esteem, Stress, Anxiety and Depression at α= 0.01 level.

## 4.2. Measurement Model

The measurement model comprises of six latent variables namely, mindfulness, assertiveness, self-esteem, stress, anxiety, and depression with their fifty-one observed variables. The prerequisite for the measurement model is assessing the item reliability, construct validity, convergent validity, and discriminant validity in order proceed with the path analysis also known as evaluation of structural model.

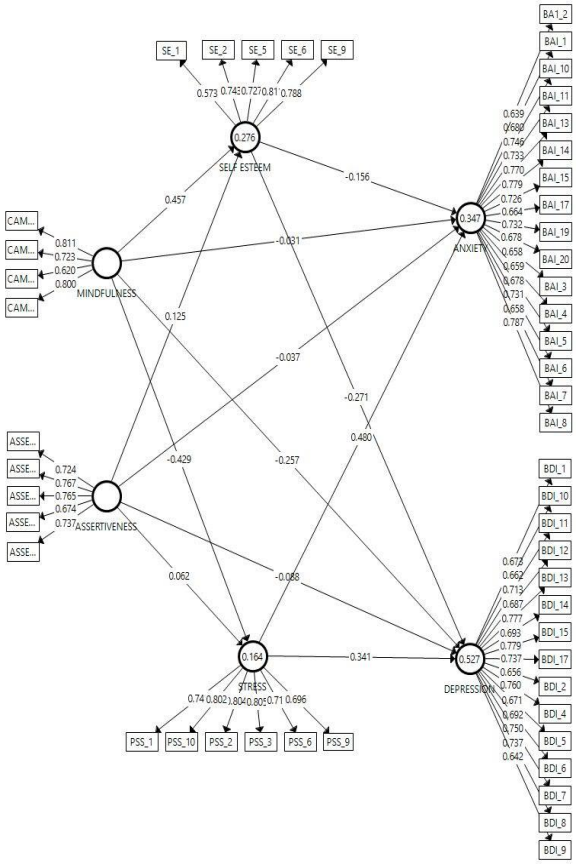


**Figure 2** Measurement Model

The graphical representation of the model in figure 2 presents the standardised factor leadings for each construct with their respective items.

**Table 2** Convergent Validity Results

| Construct | Items | Loadings | VIF | Cronbach's Alpha (α) | rho_A | Composite Reliability | Average Variance Extracted (AVE) |
|---|---|---|---|---|---|---|---|
| **Mindfulness** | CAMSR_1 | 0.811 | 1.603 | 0.729 | 0.753 | 0.829 | 0.551 |
| | CAMSR_6 | 0.723 | 1.335 | | | | |
| | CAMSR_8 | 0.620 | 1.282 | | | | |
| | CAMSR_9 | 0.800 | 1.564 | | | | |
| **Assertiveness** | ASSER_11 | 0.724 | 1.361 | 0.789 | 0.796 | 0.854 | 0.539 |
| | ASSER_12 | 0.767 | 1.785 | | | | |
| | ASSER_13 | 0.765 | 1.881 | | | | |
| | ASSER_4 | 0.674 | 1.527 | | | | |
| | ASSER_9 | 0.737 | 1.404 | | | | |
| **Self-Esteem** | SE_1 | 0.573 | 1.173 | 0.780 | 0.784 | 0.852 | 0.538 |
| | SE_2 | 0.743 | 1.590 | | | | |
| | SE_5 | 0.727 | 1.723 | | | | |
| | SE_6 | 0.811 | 1.855 | | | | |
| | SE_9 | 0.788 | 1.680 | | | | |
| **Stress** | PSS_1 | 0.741 | 1.689 | 0.854 | 0.862 | 0.892 | 0.579 |
| | PSS_10 | 0.802 | 1.866 | | | | |
| | PSS_2 | 0.804 | 1.975 | | | | |
| | PSS_3 | 0.805 | 1.924 | | | | |
| | PSS_6 | 0.711 | 1.564 | | | | |
| | PSS_9 | 0.696 | 1.529 | | | | |
| **Anxiety** | BA1_2 | 0.639 | 1.813 | 0.934 | 0.937 | 0.942 | 0.503 |
| | BAI_1 | 0.680 | 1.900 | | | | |
| | BAI_10 | 0.746 | 2.382 | | | | |
| | BAI_11 | 0.733 | 2.668 | | | | |
| | BAI_13 | 0.770 | 2.683 | | | | |
| | BAI_14 | 0.779 | 2.431 | | | | |
| | BAI_15 | 0.726 | 2.630 | | | | |
| | BAI_17 | 0.664 | 2.105 | | | | |
| | BAI_19 | 0.732 | 2.862 | | | | |
| | BAI_20 | 0.678 | 2.075 | | | | |
| | BAI_3 | 0.658 | 1.825 | | | | |
| | BAI_4 | 0.659 | 1.841 | | | | |
| | BAI_5 | 0.678 | 2.186 | | | | |
| | BAI_6 | 0.731 | 2.399 | | | | |
| | BAI_7 | 0.658 | 1.875 | | | | |
| | BAI_8 | 0.787 | 2.573 | | | | |
| **Depression** | BDI_1 | 0.673 | 1.741 | 0.929 | 0.932 | 0.938 | 0.504 |
| | BDI_10 | 0.662 | 1.685 | | | | |
| | BDI_11 | 0.713 | 2.051 | | | | |
| | BDI_12 | 0.687 | 1.958 | | | | |
| | BDI_13 | 0.777 | 2.432 | | | | |
| | BDI_14 | 0.693 | 1.972 | | | | |
| | BDI_15 | 0.779 | 2.385 | | | | |
| | BDI_17 | 0.737 | 2.137 | | | | |
| | BDI_2 | 0.656 | 1.774 | | | | |
| | BDI_4 | 0.760 | 2.167 | | | | |
| | BDI_5 | 0.671 | 1.879 | | | | |
| | BDI_6 | 0.692 | 1.851 | | | | |
| | BDI_7 | 0.750 | 2.146 | | | | |
| | BDI_8 | 0.737 | 2.168 | | | | |
| | BDI_9 | 0.642 | 1.737 | | | | |

Table 2 shows the factor loadings which is the item reliability, Cronbach Alpha (α), and the average variance explained (AVE). Most of the factor loadings were greater than 0.708 suggesting a good reliability, however, few of the factor loadings came out to be less than 0.708, but were still retained as the constructs were suggestive of having reliability, convergent validity, and discriminant validity. The Cronbach alpha, rho_A composite reliability (CR) were within the stipulated range between 0.70 and 0.95 for all the constructs. Convergent validity

was estimated by AVE which should be greater than 0.50 (Hair, 2014) which came out to be higher for all the constructs. The VIF was also assessed to check the presence of collinearity issue among the variable. The results showed no existence of collinearity issue as all the values were below 3.

**Table 3** Discriminant Validity Results

| | Anxiety | Assertiveness | Depression | Mindfulness | Self-Esteem | Stress |
|---|---|---|---|---|---|---|
| Anxiety | | | | | | |
| Assertiveness | 0.191 | | | | | |
| Depression | 0.679 | 0.390 | | | | |
| Mindfulness | 0.355 | 0.588 | 0.679 | | | |
| Self- Esteem | 0.430 | 0.405 | 0.669 | 0.664 | | |
| Stress | 0.607 | 0.168 | 0.629 | 0.488 | 0.508 | |

The discriminant validity was assessed using Heterotrait- Monotrait (HTMT) Ratio that gives the cross loadings on each factor. The results in table 3 suggests the presence of discriminant validity, showing the distinctiveness among all the constructs as the values are less than 0.85 (Henseler et al., 2015).

## 4.4. Structural Model

The structural model was proposed to examine the structural relationship among the variables that includes standard assessment criteria namely, the coefficient of determination ($R^2$), the blindfolding-based cross-validated redundancy measure ($Q^2$), and the statistical significance and relevance of the path coefficients. The prediction power of the model was also assessed using PLSpredict (Hair et al., 2019).

**Table 4** Structural Model Results

| Relationship | β Coefficient | P Values | Confidence Interval Bias Corrected Lower Limit | Confidence Interval Bias Corrected Upper Limit | $R^2$ | Effect Size $f^2$ |
|---|---|---|---|---|---|---|
| Assertiveness → Anxiety | -0.037 | 0.493 | -0.139 | 0.070 | 0.347* | 0.002 |
| Mindfulness → Anxiety | -0.031 | 0.613 | -0.148 | 0.092 | | 0.001 |
| Self Esteem → Anxiety | -0.156 | 0.006 | -0.263 | -0.038 | | 0.125 |
| Stress → Anxiety | 0.480 | 0.000 | 0.376 | 0.573 | | 0.271 |
| Assertiveness → Depression | -0.088 | 0.069 | -0.177 | 0.013 | 0.527* | 0.013 |
| Mindfulness → Depression | -0.257 | 0.000 | -0.372 | -0.142 | | 0.085 |
| Self Esteem → Depression | -0.271 | 0.000 | -0.369 | -0.160 | | 0.103 |
| Stress → Depression | 0.341 | 0.000 | 0.259 | 0.423 | | 0.189 |
| Assertiveness → Self-Esteem | 0.125 | 0.019 | 0.019 | 0.228 | 0.276* | 0.017 |
| Mindfulness → Self-Esteem | 0.457 | 0.000 | 0.347 | 0.566 | | 0.230 |
| Assertiveness → Stress | 0.162 | 0.049 | -0.041 | -0.180 | 0.164* | 0.147 |
| Mindfulness → Stress | -0.429 | 0.000 | -0.529 | -0.324 | | 0.176 |

*Significant at p-value ≤ 0.05

The measure of in-sample predictive power was evaluated which is also referred to as $R^2$ with their respective effect sizes ($f^2$). The constructs mindfulness, assertiveness, self-esteem, and stress predicted 34.7% variance in anxiety symptoms, however, 52.7% in depressive symptoms. Mindfulness and assertiveness depicted 27.6% variance in self-esteem, however, 16.4% variance in stress which showed a range of weak to moderate explanatory power of the model (Henseler et al., 2009) significant at p-value ≤ 0.05 with small to medium effect size (Cohen, 2013).

## 4.5. Mediation Analysis

The bootstrap procedure is used to test the indirect effect of a construct on another, in which several subsamples are withdrawn randomly (Carrión et al., 2017), in this case 5000 subsamples were drawn.

**Table 5** Results of Mediation Analysis

| Relationship | Direct Effects | Indirect Effects | Total Effects | Confidence Interval Bias Corrected Lower Limit | Confidence Interval Bias Corrected Upper Limit | VAF | DM | Result |
|---|---|---|---|---|---|---|---|---|
| Assertiveness→ Self-Esteem → Anxiety | -0.037 | -0.020 | -0.027 | -0.049 | 0.003 | - | - | - |
| Assertiveness → Stress → Anxiety | | 0.030* | | -0.020 | 0.088 | | | Partial Mediation |
| Mindfulness → Self Esteem → Anxiety | -0.031 | -0.071* | -0.308 | -0.130 | -0.021 | 0.230 | 0.135 | Partial Mediation |
| Mindfulness → Stress → Anxiety | | -0.206* | | -0.274 | -0.148 | 0.669 | | Partial Mediation |
| Assertiveness → Self Esteem → Depression | -0.088 | -0.034* | -0.100 | -0.068 | -0.007 | - | - | Partial Mediation |
| Assertiveness → Stress → Depression | | 0.021 | | -0.013 | 0.065 | | | - |
| Mindfulness → Self Esteem → Depression | -0.257* | -0.124* | -0.527 | -0.187 | -0.072 | 0.235 | 0.022 | Partial Mediation |
| Mindfulness→ Stress → Depression | | -0.146* | | -0.203 | -0.103 | 0.277 | | Partial Mediation |

*Significant at p-value ≤ 0.05

Table 5 depicts the results of mediation analysis carried out suggesting the presence of mediating effect of self-esteem on the relationship of mindfulness and anxiety, assertiveness and depression, as well as mindfulness and depression. The results also show the presence of mediating effect of stress on the relationship of assertiveness and anxiety, mindfulness and anxiety, mindfulness and depression which were significant at p-value ≤ 0.05 suggesting partial mediation among all the relationships. The VAF (variance accounted for) value was calculated to see the strength in the partial mediation by calculating the ratio of the indirect to the total effects, that showed partial strength as the values were within the range of 20 to 80% (Carrión et al., 2017). Since, there was a presence of two mediators, the difference between the mediators was calculated to check as to which one of the mediators is stronger as compared with other (Lau & Cheung, 2010). The positive value of

difference of the mediators (DM) signifies that self-esteem is a stronger mediator as compared to stress in the model.

### 4.6. Prediction Relevance

This section deals with the analysis of the data pertaining to the estimation of the predictive relevance of the model by generating the probability score for each respondent.

### 4.6.1 Blindfolding

The $Q^2$ value was calculated to assess the predictive accuracy of the path model using a procedure called blindfolding which gives the combined results of the in-sample and explanatory power of the model and establishes a predictive relevance of the endogenous constructs (Shmueli et al., 2016).

**Table 6** Construct Crossvalidated Redundancy (In sample analysis)

| Construct | SSO | SSE | $Q^2$ (=1-SSE/SSO) | Predictive Relevance |
|---|---|---|---|---|
| Anxiety | 6206.000 | 4549.232 | 0.267 | Medium |
| Depression | 5085.000 | 3767.938 | 0.259 | Medium |
| Self-Esteem | 1919.000 | 1452.765 | 0.243 | Medium |
| Stress | 2606.000 | 1847.891 | 0.291 | Medium |

Table 6 depicts the prediction power using the blindfolding procedure at a distance (D) as 7, by default, for anxiety, depression, self-esteem, and stress. The $Q^2$ value is calculated using sum of squared errors (SSE) and sum of square of total (SSO) which came out to be 0.267, 0.259, 0.243 and 0.291 respectively suggesting medium relevance of the proposed model on the sample derived.

### 4.6.2. PLSpredict (Out-sample prediction)

The PLSpredict procedure helps in understanding the estimation of the model based on analysis of the holdout sample, also referred to as the holdout sample to evaluate its predictive performance on the data other than the analysis sample collected for the study. It generates sub-groups from the total sample, by default subgroups set at k=5 (Shmueli et al., 2019).

**Table 7** Linear Model (LM) Prediction Summary

| | PLS | | LM | |
|---|---|---|---|---|
| | MAE | $Q^2$_predict | MAE | D (PLS MAE-LM MAE) |
| BAI_4 | 0.868 | 0.063 | 0.864 | 0.004 |
| BAI_8 | 0.899 | 0.158 | 0.907 | -0.008 |
| BAI_14 | 0.928 | 0.157 | 0.937 | -0.009 |
| BA1_2 | 0.839 | 0.216 | 0.850 | -0.011 |
| BAI_6 | 0.887 | 0.164 | 0.888 | -0.001 |
| BAI_1 | 0.843 | 0.151 | 0.846 | -0.003 |
| BAI_7 | 0.903 | 0.162 | 0.923 | -0.02 |
| BAI_11 | 0.867 | 0.056 | 0.835 | 0.032 |
| BAI_10 | 0.817 | 0.117 | 0.795 | 0.022 |
| BAI_17 | 0.866 | 0.168 | 0.867 | -0.001 |
| BAI_20 | 0.772 | 0.153 | 0.773 | -0.001 |
| BAI_15 | 0.79 | 0.155 | 0.794 | -0.004 |
| BAI_5 | 0.939 | 0.069 | 0.917 | 0.022 |
| BAI_19 | 0.759 | 0.167 | 0.764 | -0.005 |
| BAI_3 | 0.864 | 0.225 | 0.878 | -0.014 |
| BAI_13 | 0.858 | 0.233 | 0.898 | -0.04 |
| BDI_7 | 0.523 | 0.158 | 0.526 | -0.003 |
| BDI_8 | 0.628 | 0.185 | 0.637 | -0.009 |
| BDI_12 | 0.674 | 0.173 | 0.678 | -0.004 |
| BDI_1 | 0.525 | 0.177 | 0.54 | -0.015 |
| BDI_17 | 0.632 | 0.22 | 0.634 | -0.002 |
| BDI_9 | 0.448 | 0.18 | 0.460 | -0.012 |
| BDI_15 | 0.618 | 0.212 | 0.620 | -0.002 |
| BDI_10 | 0.77 | 0.127 | 0.788 | -0.018 |
| BDI_11 | 0.679 | 0.156 | 0.691 | -0.012 |
| BDI_4 | 0.635 | 0.237 | 0.648 | -0.013 |
| BDI_14 | 0.616 | 0.153 | 0.622 | -0.006 |
| BDI_5 | 0.624 | 0.165 | 0.629 | -0.005 |
| BDI_13 | 0.619 | 0.165 | 0.635 | -0.016 |
| BDI_2 | 0.527 | 0.156 | 0.531 | -0.004 |
| BDI_6 | 0.725 | 0.166 | 0.739 | -0.014 |
| SE_1 | 0.819 | 0.117 | 0.813 | 0.006 |
| SE_9 | 0.747 | 0.164 | 0.758 | -0.011 |
| SE_6 | 0.821 | 0.175 | 0.828 | -0.007 |
| SE_2 | 0.895 | 0.147 | 0.883 | 0.012 |
| SE_5 | 0.864 | 0.151 | 0.866 | -0.002 |
| PSS_10 | 0.974 | 0.177 | 0.983 | -0.009 |
| PSS_6 | 0.87 | 0.154 | 0.878 | -0.008 |
| PSS_9 | 0.916 | 0.152 | 0.935 | -0.019 |
| PSS_3 | 0.870 | 0.159 | 0.877 | -0.007 |
| PSS_2 | 0.910 | 0.151 | 0.920 | -0.01 |
| PSS_1 | 0.923 | 0.070 | 0.917 | 0.006 |

Table 7 shows the results of the Linear Model (LM) prediction summary calculated for the indicators of the dependent variables present in the model, namely, depression, anxiety, self-esteem, and stress. The next step was to check the normality of the residual errors, which showed that the scores seem to be concentrated towards one area suggestive of non-normal distribution of residual errors. Therefore, Mean Absolute Error (MAE) was taken into consideration for both the models, Linear Model (LM) and PLS Model, and the results were compared with each other. The Difference (D) was calculated by subtracting LM-MAE results from PLS-MAE results. As seen in the Table 7, most of the subtracted (D) values are negative stating that the errors produced by the PLS Model were less

as compared with the Linear Model. Therefore, the research model conceptualized has greater out of sample predictive relevance. The $Q^2$ values for most of the indicator ranges between 15% to 35% also suggesting a moderate predictive ability.

### 4.7. Importance-Performance Map Analysis (IPMA)

The Importance-Performance Map Analysis (IPMA) helps in identifying the antecedents with relatively high importance that have a stronger total effect with the constructs having a relatively low performance with low scores on the average latent variables (Ringle & Sarstedt, 2016).

Figure 3 depicts that stress plays an extremely important role and has high performance in explaining anxiety. It suggests that one-point increase in stress performance increases anxiety nearly by 0.45 to 0.50 unit. Similarly, the performance on the constructs namely, assertiveness, mindfulness, and self-esteem have high importance. The graph suggests that one-unit increase in assertiveness, mindfulness, and self-esteem leads to decrease in anxiety by 0.05, 0.3, and 0.15 respectively.

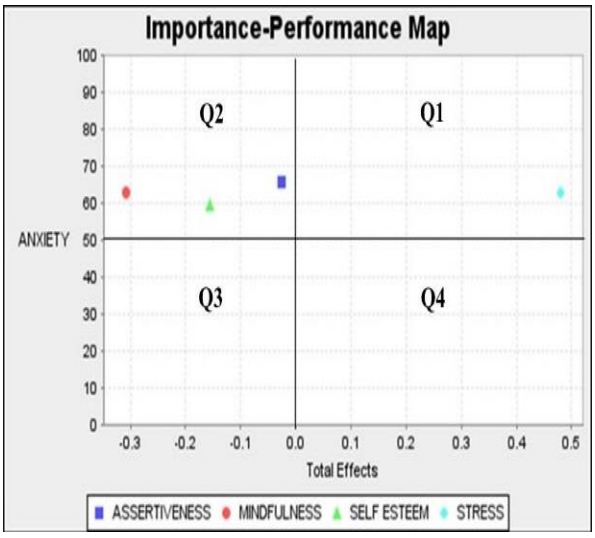


**Figure 3** Importance-Performance Map [Anxiety] (Constructs, Standardized Effects)

Figure 4 shows that stress has an important role and high-performance level in explaining depression as well like anxiety. It is suggestive that a point increase in stress performance leads to an increase in depression by 0.3 to 0.4 points. Simultaneously, the performance on other constructs like assertiveness, mindfulness, and self-esteem are high in performance, however, low in performance level. This shows that on point increase in assertiveness, mindfulness, and self-esteem leading to decrease in depression by 0.1, 0.52 and 0.35 respectively.



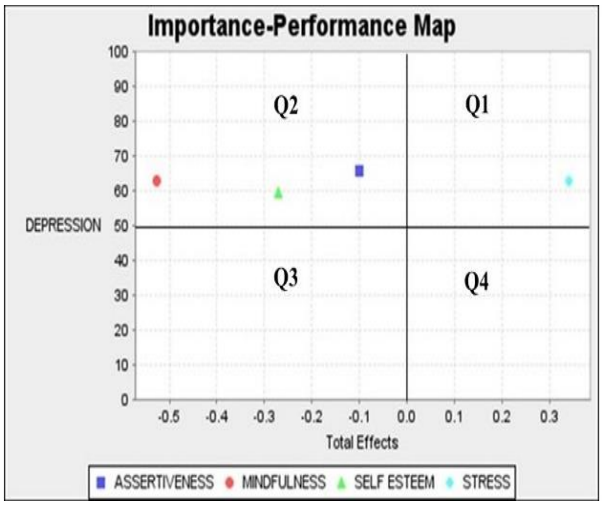


**Figure 4** Importance-Performance Map [Depression] (Constructs, Standardized Effects)

## 5. Discussion

The purpose of the study was to examine the direct and indirect effects of mindfulness and assertiveness on anxiety and depression with stress and self-esteem as mediating factors. The results from the mediation model depicted stress and self-esteem partially mediated the relationship of mindfulness and assertiveness with anxiety and depression. Therefore, the research evidenced the impact of mindfulness and assertiveness in reducing the individual's anxiety and depression was partially due to reduction in their stress levels and enhancing their self-esteem. Further, mindfulness also contributed to the reduction in stress and an increase in self-esteem consequently reducing anxiety and depressive symptoms. Researchers in previous studies have quoted that mindfulness and assertiveness helps in the decrease in stress (Fàbregues et al., 2022). The past researches have also identified the role of mindfulness and assertiveness in enhancing self-esteem (Sarkova et al., 2013). Mindfulness and assertiveness both play a major role in combating anxiety and depressive symptoms (Valikhani et al., 2019), thus corroborating the results from the current research.

Hence, the mediating role of stress and self-esteem was examined in the present study, thereby proving the hypotheses to be true. However, the current research should also be interpreted with its limitations in mind. One of the most important limitations of this study is that the data were collected using self-report questionnaires, and not interviews and observations which may have raised the possibility of biasness in data collection that could have affected the results. The study also limits to non-clinical population, therefore, the generalizability of the results across the clinical and non-clinical population becomes an issue. Nonetheless, the findings of the research have valuable therapeutic implications. The results have suggested that mindfulness and assertiveness interventions can be used to reduce psychological distress like stress, anxiety, and depression. Similarly, these interventions are beneficial in enhancing self-esteem among adolescents. Mindfulness meditation and assertive training can be proved to be useful and simple interventions that can be included in the schools as well, to enhance their well-being. Figure 3 and 4 has depicted the Importance-Performance Map for anxiety and depression which identifies the need for focus on enhancing mindfulness, self-esteem and assertiveness to better deal with anxiety and depression. Interventions can be developed that may have an emphasis on improving mindfulness, self-esteem, and assertiveness to help the adolescents in combating their anxiety and depression.

## 6. Conclusion

The current research identified mindfulness and assertiveness to have direct and indirect association with anxiety and depression through stress and self-esteem. Mindfulness and assertiveness were partially mediated with depression and anxiety through stress and self-esteem. However, assertiveness to anxiety through self-esteem and assertiveness to depression through stress were insignificant. Hence, the overall conclusion drawn from the results is that mindfulness and assertiveness may help in reducing anxiety and depression at least partially by reducing stress and enhancing self-esteem. Nonetheless, more empirical research studies are required to determine the potential relationship.

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