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Effectiveness of Acceptance and Commitment Therapy on Psychological Flexibility and Negative Automatic Thoughts (NAT) of Students at Islamic Azad University

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ABSTRACT

Background and Objective: Acceptance and Commitment Therapy (ACT), one of the third-wave psychological approaches, has shown promise in modifying individuals' perceptions of stressors by fostering acceptance of thoughts and emotions and commitment to change. This study aimed to investigate the effectiveness of ACT on psychological flexibility and negative automatic thoughts (NAT) among students at Islamic Azad University, Gachsaran Branch. **Method:** A quasi-experimental design with pre-test, post-test, and control group was employed. The statistical population included all postgraduate students in the academic year 1400–1401, from which 30 participants were selected using convenience sampling and randomly assigned to experimental (n=15) and control (n=15) groups. The student-Academic Commitment Questionnaire (SACQ; Baker & Siryak, 1984) measured psychological flexibility, while the Automatic Thoughts Questionnaire (ATQ; Holon & Kendall, 1980) assessed negative automatic thoughts. Data were analyzed using multivariate analysis of covariance (MANCOVA). **Results:** Findings indicated that ACT produced significant improvements in psychological flexibility and reductions in negative automatic thoughts compared with the control group. **Conclusion:** The results suggest that ACT effectively reduces maladaptive cognitive patterns while enhancing flexibility and adaptability. By lowering psychological distress, ACT promotes resilience and helps students align with personal values, leading to greater well-being. Techniques such as cognitive defusion, acceptance of unpleasant emotions, and value clarification encourage individuals to embrace life challenges while maintaining joy, purpose, and adaptability.

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1. INTRODUCTION

University students face numerous psychological challenges that may negatively affect their academic performance, social functioning, and overall well-being. Among these challenges, negative automatic thoughts (NAT) recurrent, intrusive, and maladaptive cognitions have been linked to higher levels of depression, anxiety, and academic stress [8],[9]. One of the emerging therapeutic approaches addressing these issues is Acceptance and Commitment Therapy (ACT), which emphasizes psychological flexibility, or the ability to engage in values-consistent behaviors despite distressing internal experiences [10]. While ACT has been validated in diverse clinical and non-clinical populations, its application to student populations, including those in culturally specific contexts such as Islamic Azad University, requires further empirical attention.

The present study explores the effectiveness of ACT on enhancing psychological flexibility and reducing NAT among students. Such findings could have significant implications for student well-being, academic resilience, and the design of culturally adapted psychological interventions.

2. LITERATURE REVIEW

Acceptance and Commitment Therapy has been extensively investigated for its role in improving psychological flexibility, which is considered the central process of change within ACT. Psychological flexibility allows individuals to regulate internal experiences without excessive avoidance or suppression, thus promoting adaptive coping and engagement in value-driven actions [10]. Several randomized controlled trials (RCTs) with university students have shown that ACT workshops significantly improve psychological flexibility, reduce stress, and enhance overall well-being [1-2]. A systematic review and meta-analysis also reported moderate effects of ACT in increasing psychological flexibility and reducing inflexibility in undergraduate populations [3].

Evidence from non-clinical student populations highlights ACT's utility in addressing cognitive processes related to automatic negative thinking. For example, guided self-help ACT interventions with Turkish university students demonstrated significant reductions in depression, anxiety, and stress, alongside improvements in psychological flexibility [4]. Similarly, ACT-based programs that targeted mindfulness and acceptance processes revealed decreased intrusive cognitions and better academic outcomes [5]. While research directly measuring NAT within ACT interventions is limited, findings from mindfulness-based interventions indicate that these approaches reduce automatic negative thoughts and improve emotional regulation among students [7].

The theoretical background of NAT stems from Beck's cognitive model, which identifies maladaptive cognitions as a key factor in depression and anxiety [8],[9]. The Automatic Thoughts Questionnaire (ATQ-30) has been widely used to assess NAT and provides a foundation for evaluating how ACT may influence these cognitions [14]. Compared to traditional cognitive-behavioral approaches that focus on directly disputing NAT, ACT emphasizes acceptance and cognitive defusion, aiming to alter the functional relationship between the individual and their thoughts rather than changing the content of thoughts themselves [10],[13]. This perspective highlights ACT's transdiagnostic potential in managing distressing cognitive patterns in university settings.

Research within Iranian contexts, including Islamic Azad University, provides further support for ACT's cultural adaptability. For instance, ACT interventions improved cognitive flexibility and academic buoyancy among adolescents with attention deficit problems [16]. Other studies reported enhanced psychological flexibility, emotional self-regulation, and coping strategies among participants in ACT-based programs [17]. These findings suggest that ACT not only addresses psychological inflexibility but also strengthens resilience and adaptive coping, which are critical for student success in academic environments.

Taken together, prior studies support the effectiveness of ACT in promoting psychological flexibility and mitigating maladaptive cognitive processes across diverse student populations. However, limited research has explicitly focused on NAT as an outcome variable in ACT interventions among university students. The current study therefore seeks to fill this gap by examining the effects of ACT on psychological flexibility and NAT in students at Islamic Azad University, contributing to both the global and local evidence base for ACT in higher education contexts [18-20].

3. RESEARCH METHOD

The research method in this study was quasi-experimental. Among the main types of quasi-experimental designs, a pre-test–post-test control group design was employed. The statistical population included all master's degree students at the Islamic Azad University, Gachsaran Branch, who were enrolled during the 2021–2022 academic year. Participants were selected using convenience sampling and randomly assigned to experimental and control groups. In total, 15 students were assigned to the experimental group and 15 to the control group.

With two groups (experimental and control), an alpha level of 0.05, and an effect size of 0.50, a sample size of 15 participants per group provided a test power of 0.88. To measure psychological adjustment, the Student Adaptation to College Questionnaire (SACQ) developed by Baker and Siryk was used, while negative automatic thoughts were assessed using the Automatic Thoughts Questionnaire (ATQ) designed by Hollon and Kendall.

To examine the effectiveness of Acceptance and Commitment Therapy (ACT) on psychological adjustment and negative automatic thoughts among students, Multivariate Analysis of Covariance (MANCOVA) was applied.

4. RESEARCH FINDINGS

4.1. Descriptive Indices

4.1.1. Mean and Standard Deviation of Psychological Adjustment

The mean and variance of psychological adjustment for both control and experimental groups were measured across three stages: pre-test, post-test, and follow-up.

Table 1. Distribution of Psychological Adjustment Scores

Group	Test Type	Mean	Variance
Experimental	Pre-test	79.45	18.65
	Post-test	245.85	4.92
	Follow-up	221.68	5.12
Control	Pre-test	80.31	18.45
	Post-test	81.87	17.31
	Follow-up	78.11	18.48

As the data show, in the experimental group, students' adjustment scores increased significantly after the intervention (from 79.45 in the pre-test to 245.85 in the post-test). Although a decline was observed at follow-up (221.68), the scores still indicated qualitative improvement compared to the pre-test. The variance also decreased considerably after the intervention (from 18.65 to 4.92), suggesting greater consistency among participants, with only a slight, non-significant increase at follow-up. In contrast, the control group demonstrated no meaningful changes in either the post-test or follow-up, despite having access to the training materials used in the experimental group. This suggests that the structured training sessions played a substantial role in enhancing students' overall adjustment to university life.

4.1.2. Descriptive Indices of Social Adjustment Subscales

As noted earlier, social adjustment was assessed through four subscales: academic adjustment, social adjustment, personal-emotional adjustment, and attachment to the university. Among these, academic adjustment included the largest number of items (24), followed by social adjustment (20 items), personal-emotional adjustment (15 items), and attachment to the university (7 items). Table 2 presents descriptive indices for these subscales across pre-test, post-test, and follow-up.

Table 2. Descriptive Indices of Adjustment Subscales

Subscale	Group	Pre-test (M/Var)	Post-test (M/Var)	Follow-up (M/Var)
Academic Adjustment	Experimental	40.11 / 7.18	95.51 / 3.14	97.17 / 4.62
	Control	41.25 / 8.15	43.32 / 9.64	40.17 / 9.34
Social Adjustment	Experimental	45.70 / 8.25	86.36 / 8.65	90.77 / 7.25
	Control	44.17 / 14.5	43.58 / 13.63	40.12 / 15.42
Personal-Emotional Adj.	Experimental	41.39 / 11.65	69.52 / 8.27	71.75 / 6.84
	Control	35.58 / 5.36	36.74 / 6.56	33.12 / 5.45
University Attachment	Experimental	17.17 / 4.23	30.17 / 3.12	29.96 / 3.75
	Control	18.78 / 4.8	19.45 / 5.56	18.12 / 5.14

As shown, the experimental group exhibited improvements in three subscales academic adjustment, social adjustment, and personal-emotional adjustment at follow-up compared to post-test. In contrast, attachment to the university declined slightly after training and follow-up, though this decrease was not statistically significant. Although the control group had access to the experimental group's training materials, they demonstrated only minor and statistically insignificant improvements in post-test scores, which were not sustained at follow-up.

4.1.3. Descriptive Indices of Negative Automatic Thoughts

Table 3. Descriptive Indices (Mean and Variance) of Negative Automatic Thoughts

Group	Test Type	Mean	Variance
Experimental	Pre-test	48.56	31.33
	Post-test	14.76	10.90
	Follow-up	12.65	8.52
Control	Pre-test	52.15	33.67
	Post-test	51.92	36.41
	Follow-up	51.87	37.23

As seen in Table 3, the mean scores in the experimental group declined significantly from pre-test to post-test, and this reduction was sustained at follow-up. In contrast, the control group, despite having access to the handouts and materials used in the experimental sessions, did not show any noticeable or significant changes. Their mean scores across pre-test, post-test, and follow-up remained relatively stable.

4.2. Inferential Findings

4.2.1. Examination of Homogeneity of Variances Between Post-test and Follow-up in Psychological Adjustment

A t-test was employed to test the hypothesis that Acceptance and Commitment Therapy (ACT) significantly enhances students' psychological adjustment.

Table 4: Results of the t-Test for Examining the Significance of the Mean Difference in Pre-Test and Post-Test Scores for Psychological Adjustment

	Levene's Test for Equality of Variances		t-Test for Equality of Means			
	F	**Sig**	**t**	**df**	**2-tailed**	**Mean Difference**
Assuming Equal Variances	19.019	0.00	14.58	28	0.00	24.66
Assuming Unequal Variances			14.58	14.17	0.00	24.66

Note: Levene's test indicates that the assumption of homogeneity of variances was violated ($p < 0.05$). Therefore, the results from the t-test assuming unequal variances are considered. The findings reveal a significant increase in psychological adjustment scores from pre-test to post-test.

As shown in Table 4, Levene's test indicated a significant result ($F = 19.019$, $p < 0.001$), rejecting the assumption of equal variances. Consequently, the second row of the table is used. Under the assumption of unequal variances, the difference between the groups remained significant ($t = 14.58$, $df = 14.27$, $p < 0.001$). This confirms that the mean difference between the post-test and follow-up scores in the experimental group was significantly lower than in the control group, indicating the effectiveness of ACT in improving social adjustment.

4.2.2. Examination of Psychological Adjustment Subscales

Table 5. Tests of Subscales of Psychological Adjustment (Post-test and Follow-up)

Subscale	Stage	F	df1	df2	Sig. (p)
Academic Adjustment	Post-test	0.159	1	28	0.923
	Follow-up	1.046	1	28	0.386
Social Adjustment	Post-test	1.647	1	28	0.198
	Follow-up	1.614	1	28	0.336
Personal-Emotional Adj.	Post-test	0.430	1	28	0.556
	Follow-up	0.968	1	28	0.420
Attachment to University	Post-test	0.826	1	28	0.489
	Follow-up	0.688	1	28	0.566

Levene's test for homogeneity of variances was also applied to the subscales during both post-test and follow-up stages. Results showed that none of the variables reached statistical significance ($p > 0.05$ in all cases), confirming the assumption of homogeneity of variances.

4.2.3. Homogeneity of Variances in Negative Automatic Thoughts

For negative automatic thoughts, Levene's test again confirmed homogeneity of variances:

Table 6. Levene's Test for Negative Automatic Thoughts

Stage	F	df1	df2	Sig. (p)
Post-test	0.721	1	28	0.245
Follow-up	1.125	1	28	0.425

Thus, the assumption of equal variances was met at both stages.

4.3. Multivariate Analysis of Covariance (MANCOVA)

Given the pre-test, post-test, and follow-up design of the study, MANCOVA was employed to control for the effects of the pre-test. For this type of analysis, certain assumptions must be satisfied to ensure the validity of the results:

- **Homogeneity of variance-covariance matrices**: tested using Box's M test, confirming equality across groups.
- **Homogeneity of variances**: examined with Levene's test (results reported above).
- **Homogeneity of regression slopes**: tested through the interaction between pre-test scores of the subscales and the independent variable (group) at post-test. The interaction was not significant, indicating that the assumption was met.

Finally, Wilks' Lambda was used as the multivariate test statistic, which was found to be significant at the 99% confidence level ($\alpha = 0.01$).

4.3.1. Hypothesis Testing: Effectiveness of Acceptance and Commitment Therapy on Psychological Adjustment

4.3.1.1. Examination of the M-Box Test

Table 7. Results of the M-Box Test for Psychological Adjustment

Variable	M-Box	F	df1	df2	Sig.
Psychological Adjustment	**7.820**	**1.173**	**3**	**605520**	**0.091**

As shown in Table 7, the results of the M-Box test indicate that the covariance matrices of the dependent variables across groups are equal.

4.3.1.2. Examination of Regression Slopes

Table 8. Results of Regression Slope Tests for Psychological Adjustment

Dependent Variable	Assessment Stage	SS	df	MS	F	Sig.
Psychological Adjustment	Post-test	10.080	1	10.080	1.809	0.184
	Follow-up	120.506	1	102.506	0.315	0.577

As seen in Table 8, the regression slope differences are not significant, thereby satisfying the assumption of homogeneity of regression slopes required for conducting Multivariate Analysis of Covariance (MANCOVA).

4.3.2. Multivariate Analysis of Covariance Controlling for Pre-test Effects

Table 9. Results of MANCOVA for Psychological Adjustment

Variable	Test Statistic	Value	F	Hypothesis df	Error df	Sig.	Effect Size
Pre-test	Pillai's Trace	0.061	1.718	2	26	0.189	0.058
	Wilks' Lambda	0.962	1.718	2	26	0.189	0.058
	Hotelling's Trace	0.061	1.718	2	26	0.189	0.058
	Roy's Largest Root	0.061	1.718	2	26	0.189	0.058
Group	Pillai's Trace	0.479	25.731	2	26	0.0001	0.479
	Wilks' Lambda	0.521	25.731	2	26	0.0001	0.479
	Hotelling's Trace	0.919	25.731	2	26	0.0001	0.479
	Roy's Largest Root	0.919	25.731	2	26	0.0001	0.479

As shown in Table 9, after controlling for the effect of the pre-test, there was a significant difference between the experimental and control groups in psychological adjustment at both the post-test and follow-up stages ($F = 25.731$, $p < 0.0001$).

Based on the Wilks' Lambda results, it can be concluded that the linear combination of the four dependent variables was significantly influenced by the independent variable (treatment method). Furthermore, the follow-up results confirmed that the dependent variables continued to be affected by the independent variable. Therefore, it can be concluded that the overall MANCOVA model was significant.

Having established the overall impact of the independent variable on the combined dependent variables, the next step is to examine whether the independent variable also exerts significant effects on each individual dependent variable, which will be addressed in the subsequent section.

4.3.3. Univariate Analysis of Covariance for Group Comparison at Post-Test and Follow-Up with Pre-Test Control

Table 10. Results of Univariate ANCOVA for Group Comparison at Post-Test and Follow-Up with Pre-Test Control

Variable	Source of Variation	Sum of Squares	df	Mean Square	Observed F	p	Effect Size
Post-test	**Pre-test**	17.748	1	17.746	3.245	0.077	0.054
	Group	179.746	1	179.746	32.824	0.001	0.365
	Error	312.132	27	5.476	-	-	-
	Total	12023	30	-	-	-	-
Follow-up	**Pre-test**	9.669	1	9.669	0.569	0.454	0.010
	Group	215.621	1	215.621	12.692	0.001	0.182
	Error	968.364	27	16.989	-	-	-
	Total	13035	30	-	-	-	-

As shown in Table 10, after controlling for the pre-test effect, there was a significant difference between the groups in psychological adjustment at the post-test stage ($F = 32.824$, $p = 0.001$). Similarly, after controlling for pre-test scores, a significant difference was observed between the groups at follow-up ($F = 12.692$, $p = 0.001$).

4.3.4. ANCOVA for Subscales After Controlling Pre-Test Effects on Post-Test Scores

Table 11. Results of ANCOVA for Psychological Adjustment Subscales (Post-Test)

Subscales	Source	SS	df	MS	F	Sig.	Eta²
Academic Adjustment	**Pre-test**	1.34	1	1.34	0.076	0.780	0.034
	Group	1161.8	1	1168.8	65.29	0.001	0.760
Social Adjustment	**Pre-test**	102.97	1	102.97	5.88	0.024	0.220
	Group	1501.38	1	1501.38	85.75	0.001	0.800
Personal-Emotional Adj.	**Pre-test**	4.99	1	4.99	0.43	0.521	0.020
	Group	1237.26	1	1237.26	105.48	0.001	0.830
Institutional Attachment	**Pre-test**	145.78	1	145.78	4.63	0.065	0.200
	Group	1437.25	1	1437.25	90.96	0.001	0.640

As Table 11 indicates, significant differences were found in the mean post-test scores of all psychological adjustment subscales after removing the pre-test effect. Specifically, academic adjustment ($F = 65.29$, $p < 0.001$, $\eta^2 = 0.76$), social adjustment ($F = 85.75$, $p < 0.001$, $\eta^2 = 0.80$), personal-emotional adjustment ($F = 105.48$, $p < 0.001$, $\eta^2 = 0.83$), and institutional attachment ($F = 90.96$, $p < 0.001$, $\eta^2 = 0.64$) all showed significant improvement. This demonstrates that the intervention significantly increased each psychological adjustment subscale at the post-test stage.

4.3.5. ANCOVA for Subscales After Controlling Pre-Test Effects on Follow-Up Scores

Table 12. Results of ANCOVA for Psychological Adjustment Subscales (Follow-Up)

Subscales	Source	SS	df	MS	F	Sig.	Eta²
Academic Adjustment	**Pre-test**	17.45	1	17.45	1.15	0.180	0.065
	Group	1476.47	1	1476.47	45.25	0.001	0.760
Social Adjustment	**Pre-test**	18.21	1	18.21	2.12	0.160	0.092
	Group	1002.26	1	1002.26	116.85	0.001	0.850
Personal-Emotional Adj.	**Pre-test**	0.11	1	0.11	0.007	0.935	0.001
	Group	1908.37	1	1908.37	119.34	0.001	0.850
Institutional Attachment	**Pre-test**	146.48	1	146.48	12.90	0.002	0.381
	Group	749.89	1	749.89	66.10	0.001	0.760

As shown in Table 12, significant differences were observed in all subscales at the follow-up stage after controlling for pre-test effects. Thus, the intervention led to significant and lasting improvements in academic, social, personal-emotional, and institutional attachment aspects of psychological adjustment.

4.3.6. Testing the Hypothesis: Effect of Acceptance and Commitment Therapy on Reducing Negative Automatic Thoughts

Table 13. Results of the *t*-test for Mean Differences in Pre-Test and Post-Test Scores of Negative Automatic Thoughts

	Levene's Test for Equality of Variances		t-Test for Equality of Means			
	F	**Sig**	**t**	**df**	**2-tailed**	**Mean Difference**
Assuming Equal Variances	21.45	0.00	23.17	28	0.00	14.58
Assuming Unequal Variances			23.17	5.19	0.00	14.58

According to Levene's test ($F = 21.45$, $p < 0.001$), the assumption of equal variances was rejected. Under the condition of unequal variances, the t-test revealed a significant difference between the two groups ($t = 23.17$, $df = 5.19$, $p < 0.001$). Thus, the mean difference in post-test and follow-up scores of the experimental group was significantly lower than that of the control group. These findings confirm that Acceptance and Commitment Therapy (ACT) was effective in reducing students' negative automatic thoughts.

5. CONCLUSION

The findings of this study demonstrate that Acceptance and Commitment Therapy (ACT) significantly enhances psychological adjustment among master's degree students at the Islamic Azad University, Gachsaran Branch. The experimental group, which underwent ACT training, exhibited substantial improvements in overall psychological adjustment and its subscales academic adjustment, social adjustment, and personal-emotional adjustment across both post-test and follow-up assessments compared to the control group. Although a slight decline in adjustment scores was observed in the follow-up phase, the improvements remained qualitatively significant relative to the pre-test, underscoring the sustained impact of the intervention. Additionally, ACT effectively reduced negative automatic thoughts in the experimental group, as evidenced by a significant decrease in mean scores from pre-test to post-test, with this reduction largely maintained in the follow-up phase. In contrast, the control group, despite having access to the same educational materials, showed no significant changes in either psychological adjustment or negative automatic thoughts, highlighting the critical role of structured ACT training. These results confirm the efficacy of ACT in fostering psychological adjustment and mitigating negative automatic thoughts among university students, with statistically significant differences supported by multivariate and univariate analyses of covariance (MANCOVA and ANCOVA) at $p < 0.001$.

6. RECOMMENDATION

Based on the robust findings of this study, it is recommended that universities, particularly those with diverse student populations like the Islamic Azad University, integrate Acceptance and Commitment Therapy (ACT) into their mental health and student support programs. Implementing structured ACT-based interventions, facilitated by trained professionals, could enhance students' psychological adjustment and reduce negative automatic thoughts, thereby improving academic performance and overall well-being. To maximize impact, universities should consider offering regular ACT workshops or counseling sessions, tailored to the specific needs of students, and evaluate their long-term effectiveness through longitudinal studies. Additionally, further research is recommended to explore the application of ACT across different academic levels and cultural contexts to validate its generalizability and optimize its delivery for diverse student populations.

Transparency Statement

The data supporting this study are available upon reasonable request to the corresponding author, subject to ethical and confidentiality considerations.

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Declaration of Interest

The authors declare that they have no competing interests.

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