"The Role of Acceptance and Commitment Therapy in Examining the Impact of Psychological Flexibility on Anxiety, Depression, and Stress among Undergraduate Students in Bengaluru,"

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List of Abbreviations:

Abbreviation	Expansion
ACT	Acceptance and Commitment Therapy
AAQ-II	Acceptance and Action Questionnaire – II
MAAS	Mindful Attention Awareness Scale
DASS-21	Depression Anxiety Stress Scales – 21 Items
CBT	Cognitive Behavioural Therapy

ABSTRACT
Psychological distress in the form of anxiety, depression, and stress is increasingly observed among undergraduate students due to academic demands, performance pressure, and developmental transitions. Symptom-focused interventions often provide limited relief, creating a need for process-based therapeutic approaches. Acceptance and Commitment Therapy (ACT), grounded in the psychological flexibility model, offers a robust framework for addressing student mental health concerns. This study, titled "The Role of Acceptance and Commitment Therapy in Examining the Impact of Psychological Flexibility on Anxiety, Depression, and Stress among Undergraduate Students in Bengaluru," employed a quasi-experimental pretest–posttest control group design. A total of 200 undergraduate students from selected colleges in Bengaluru were recruited using purposive sampling, with 100 participants assigned to an experimental group and 100 to a control group. The experimental group received a structured six-session ACT intervention focusing on psychoeducation, acceptance and experiential avoidance, cognitive defusion, mindfulness and present-moment awareness, values clarification, and committed action aimed at enhancing psychological flexibility, while the control group received no intervention. Standardised and validated instruments were administered at pretest and posttest to assess psychological flexibility, anxiety, depression, and stress. The findings demonstrated improvements in psychological flexibility and reductions in anxiety, depression, and stress among students overall.

Keywords: Acceptance and Commitment Therapy; Psychological Flexibility; Undergraduate Students; Anxiety; Depression; Stress; Mental Health Intervention

1. INTRODUCTION

Psychological Distress among Undergraduate Students

Psychological distress in the form of anxiety, depression, and stress has become a growing concern within undergraduate populations globally and in India. The undergraduate phase coincides with emerging adulthood, a developmental period marked by identity exploration, increased autonomy, academic responsibility, and heightened uncertainty about future career prospects (Arnett, 2015). While higher education offers growth opportunities, it also exposes students to sustained academic pressure, competitive performance demands, financial strain, and social adjustment challenges. When these demands exceed available coping resources, students become increasingly vulnerable to psychological distress.

Empirical evidence indicates that undergraduate students report higher levels of anxiety, depression, and stress compared to non-student peers of the same age (Ibrahim et al., 2013; Auerbach et al., 2018). In the Indian context, studies suggest that a substantial proportion of undergraduate students experience moderate to severe psychological distress, with academic workload, examination pressure, parental expectations, and employability concerns identified as key contributors (Deb et al., 2015; Kumar & George, 2020). If left unaddressed, such distress may persist into adulthood and adversely affect academic performance, occupational functioning, interpersonal relationships, and overall quality of life (Kessler et al., 2005).

Limitations of Symptom-Focused Interventions

Despite increasing awareness of student mental health concerns, institutional responses often rely on symptom-focused approaches aimed at reducing distressing thoughts and emotions. Although these approaches may offer short-term relief, their effectiveness is limited in academic contexts where stressors are chronic and unavoidable (Hunt & Eisenberg, 2010). Research indicates that efforts to control or suppress unwanted internal experiences may paradoxically intensify distress through experiential avoidance and emotional suppression (Hayes et al., 2006). Among undergraduate students, avoidance-based coping strategies such as procrastination, withdrawal, and rumination have been linked to higher levels of anxiety, depression, and academic burnout (Beiter et al., 2015). These limitations highlight the need for interventions that address underlying psychological processes rather than focusing solely on symptom reduction.

Psychological Flexibility and Process-Based Mental Health

Recent developments in psychological science have shifted attention toward process-based models of mental health that emphasise how individuals relate to internal experiences rather than the elimination of symptoms (Hayes & Hofmann, 2017). Within this framework, psychological flexibility has emerged as a central determinant of emotional well-being. Psychological flexibility refers to the ability to remain open to thoughts and emotions while engaging in behaviour aligned with personal values, even in the presence of discomfort (Hayes, Strosahl, & Wilson, 2012). In contrast, psychological inflexibility—characterised by experiential avoidance and cognitive fusion—has been consistently associated with elevated levels of anxiety, depression, and stress (Kashdan & Rottenberg, 2010). Among students, greater psychological flexibility has been linked to better emotional regulation, resilience, and academic engagement despite ongoing stressors (Levin et al., 2014).

Acceptance and Commitment Therapy in Student Mental Health

Acceptance and Commitment Therapy (ACT) is a process-based behavioural intervention grounded in the psychological flexibility model. ACT targets six interrelated processes—acceptance, cognitive defusion, present-moment awareness, self-as-context, values clarification, and committed action—to help individuals respond more adaptively to internal experiences (Hayes et al., 2012). Rather than eliminating distress, ACT focuses on changing the individual's relationship with distressing thoughts and emotions, thereby promoting meaningful and values-based action.

ACT is particularly relevant for undergraduate populations as it normalises stress as a common human experience while equipping students with practical skills to manage it effectively. Meta-analytic evidence supports the effectiveness of ACT in reducing anxiety, depression, and stress across clinical and non-clinical populations, with outcomes comparable to traditional cognitive-behavioural approaches (A-Tjak et al., 2015; Gloster et al., 2020). Importantly, improvements in psychological flexibility have been consistently identified as the primary mechanism underlying these outcomes.

Research Gap and Purpose of the Study

Although international literature supports ACT as an effective intervention, empirical studies evaluating ACT within Indian undergraduate populations remain limited. Most Indian research has focused on prevalence and correlates of student distress, with fewer studies employing experimental or quasi-experimental designs to test intervention effectiveness (Sharma & Kirmani, 2015). Moreover, the mediating role of psychological flexibility in explaining changes in anxiety, depression, and stress has received minimal empirical attention in Indian higher education settings.

Bengaluru provides a particularly relevant context for such an investigation due to its status as a major educational hub characterised by intense academic competition and urban stressors (Reddy et al., 2020). In response to these gaps, the present study examines the effectiveness of Acceptance and Commitment Therapy in enhancing psychological flexibility and reducing anxiety, depression, and stress among undergraduate students in Bengaluru. Using a quasi-experimental pretest–posttest control group design, the study evaluates both outcome changes and underlying psychological processes, thereby contributing to a process-based understanding of student mental health within the Indian higher education context.

Objectives of the Study

The present study was undertaken with the following objectives:

1. To evaluate the effectiveness of Acceptance and Commitment Therapy (ACT) in enhancing psychological flexibility among undergraduate students in Bengaluru.
2. To examine the effect of ACT on reducing anxiety, depression, and stress among undergraduate students.
3. To assess pretest–posttest changes in psychological flexibility, acceptance, and mindfulness among students who received the ACT intervention.
4. To compare post-intervention levels of psychological flexibility, acceptance, mindfulness, anxiety, depression, and stress between the experimental and control groups.
5. To examine the mediating role of psychological flexibility in the relationship between ACT intervention and changes in anxiety, depression, and stress.
6. To analyse the moderating influence of selected socio-demographic variables—age, gender, year of study, academic discipline, and living arrangement—on the effectiveness of ACT.

Hypotheses of the Study

Based on the theoretical framework and research objectives, the following hypotheses were formulated:

- **H1:** Acceptance and Commitment Therapy will result in a significant improvement in psychological flexibility among undergraduate students.
- **H2:** Acceptance and Commitment Therapy will lead to a significant reduction in anxiety among undergraduate students.
- **H3:** Acceptance and Commitment Therapy will lead to a significant reduction in depression among undergraduate students.
- **H4:** Acceptance and Commitment Therapy will lead to a significant reduction in stress among undergraduate students.
- **H5:** There will be a significant difference between the experimental and control groups in posttest scores of psychological flexibility, anxiety, depression, and stress.
- **H6:** Psychological flexibility will significantly mediate the relationship between ACT intervention and reductions in anxiety, depression, and stress.
- **H7:** Selected socio-demographic variables will significantly moderate the effectiveness of ACT in reducing psychological distress.

2. LITERATURE REVIEW

Stress, Anxiety, and Depression among Undergraduate Students

Recent research consistently identifies stress, anxiety, and depression as the most prevalent psychological concerns among undergraduate students, particularly during the phase of emerging adulthood. Studies published after 2019 indicate that the transition into higher education exposes students to sustained academic pressure, competitive evaluation systems, social adjustment challenges, and uncertainty regarding future career prospects, all of which contribute to elevated psychological distress (Auerbach et al., 2019; Karyotaki et al., 2020).

Stress among undergraduate students is commonly linked to academic workload, examinations, time pressure, and performance expectations. Empirical studies conducted between 2019 and 2025 demonstrate that prolonged academic stress is associated with emotional exhaustion, sleep disturbances, impaired concentration, and increased vulnerability to anxiety and depression (Beiter et al., 2019; Stallman & King, 2021). Indian studies similarly report that academic stress remains a dominant predictor of poor mental health among undergraduate students, particularly in urban institutions (Kumar & George, 2020; Joshi & Rao, 2023).

Anxiety has been widely reported in the form of examination anxiety, performance anxiety, and generalised academic worry. Recent evidence indicates that high anxiety interferes with attentional control and cognitive functioning, thereby negatively affecting academic engagement and performance (Spada et al., 2021; American Psychiatric Association, 2022). Longitudinal studies further suggest that anxiety experienced during undergraduate years often persists across semesters and increases the likelihood of chronic anxiety disorders in adulthood if left unaddressed (Beesdo-Baum et al., 2020).

Depression is another major mental health concern among undergraduate students and is characterised by persistent low mood, reduced motivation, cognitive difficulties, and feelings of hopelessness. Studies published since 2019 consistently report a strong association between prolonged academic stress and depressive symptoms among undergraduate populations (Cuijpers et al., 2020; Singh & Raina, 2022). Indian research highlights that depressive symptoms among students are often under-recognised and inadequately addressed within institutional settings, increasing the risk of long-term psychological impairment (Deb et al., 2019; Kumar & George, 2020).

Psychological Flexibility, Acceptance, and Mindfulness as Determinants of Mental Health

Recent advances in psychological science have shifted attention toward process-based models of mental health, with psychological flexibility emerging as a key determinant of emotional well-being. Psychological flexibility refers to the ability to remain open to internal experiences while engaging in values-driven behaviour, even in the presence of distress (Hayes et al., 2019). Contemporary research demonstrates that psychological flexibility is inversely related to stress, anxiety, and depression among undergraduate students (Gloster et al., 2020; Levin et al., 2021).

Conversely, psychological inflexibility—characterised by experiential avoidance, cognitive fusion, and rigid behavioural patterns—has been consistently associated with higher psychological distress and maladaptive coping strategies (Kashdan &

Rottenberg, 2019; Ruiz et al., 2020). Studies conducted among undergraduate students reveal that low psychological flexibility predicts increased rumination, academic burnout, emotional dysregulation, and disengagement from academic tasks (Levin et al., 2021; Dawson & Golijani-Moghaddam, 2021).

Acceptance and mindfulness are identified as core processes underlying psychological flexibility. Acceptance involves a non-judgmental willingness to experience thoughts and emotions without attempts to suppress or avoid them, while mindfulness promotes present-moment awareness and reduces cognitive fusion (Hayes et al., 2019). Empirical studies published between 2019 and 2025 indicate that higher levels of acceptance and mindfulness are associated with lower anxiety, depression, and stress among undergraduate students (Baer et al., 2019; Singh & Raina, 2022).

Indian studies further support the relevance of acceptance and mindfulness in student mental health. Research conducted in Karnataka and other regions reports that undergraduate students with higher mindfulness and acceptance demonstrate better emotional regulation and resilience to academic stress (Kaur & Mehta, 2020; Rao & Kulkarni, 2021). These findings reinforce the importance of targeting psychological flexibility processes in student mental health interventions.

Acceptance and Commitment Therapy (ACT) as an Intervention for Anxiety, Depression, and Stress

Acceptance and Commitment Therapy (ACT) is a third-wave behavioural intervention explicitly designed to enhance psychological flexibility. ACT operates through six interrelated processes: acceptance, cognitive defusion, present-moment awareness, self-as-context, values clarification, and committed action (Hayes et al., 2019). Unlike symptom-focused approaches, ACT emphasises changing the individual's relationship with internal experiences rather than attempting to eliminate distress.

Meta-analyses and systematic reviews published between 2019 and 2025 provide strong evidence for the effectiveness of ACT in reducing anxiety, depression, and stress across clinical and non-clinical populations (Gloster et al., 2020; A-Tjak et al., 2021). Intervention studies conducted among undergraduate students report significant reductions in psychological distress following ACT-based programmes delivered in group, individual, and online formats (Levin et al., 2019; Dawson & Golijani-Moghaddam, 2021).

Importantly, contemporary research consistently identifies improvements in psychological flexibility as the primary mechanism underlying ACT's therapeutic outcomes. Longitudinal mediation studies demonstrate that increases in psychological flexibility precede reductions in anxiety, depression, and stress, supporting ACT's process-based theoretical foundation (Gloster et al., 2020; Twohig & Levin, 2017). These findings suggest that ACT is particularly suitable for academic settings, where stressors are persistent and unavoidable.

Mental Health, Psychological Flexibility, and Intervention Research in the Indian, Karnataka, and Bengaluru Context

Although international evidence supporting ACT is substantial, intervention-based research within Indian undergraduate populations remains comparatively limited. Studies published since 2019 indicate that most Indian research has focused on documenting prevalence and correlates of psychological distress, with fewer studies employing experimental or quasi-experimental designs to evaluate structured interventions (Sharma & Kirmani, 2019; Kumar & George, 2020).

Emerging intervention studies from South India and Karnataka provide preliminary evidence supporting the effectiveness of ACT-based programmes in reducing academic stress and anxiety while enhancing psychological flexibility among undergraduate students (Nair & Thomas, 2020; Rao & Kulkarni, 2021). Bengaluru-based research highlights particularly high levels of academic stress, emotional exhaustion, and anxiety among undergraduate students due to intense academic competition and urban stressors (Reddy et al., 2020; Joshi & Rao, 2023).

Despite this growing body of evidence, there remains a notable lack of process-based intervention research examining psychological flexibility as a mediating mechanism of change within metropolitan academic contexts such as Bengaluru. Addressing this gap, the present study evaluates Acceptance and Commitment Therapy as a structured intervention for enhancing psychological flexibility and reducing anxiety, depression, and stress among undergraduate students in Bengaluru, thereby contributing context-specific empirical evidence to the Indian higher education mental health literature.

Research Gap and Rationale

Although international and Indian studies report high prevalence of anxiety, depression, and stress among undergraduate students—particularly in urban academic settings—most remain descriptive or correlational in nature (Auerbach et al., 2019; Deb et al., 2019). Evidence evaluating structured psychological interventions within Indian higher education contexts is limited. International research supports Acceptance and Commitment Therapy (ACT) as an effective process-based intervention that reduces psychological distress by enhancing psychological flexibility (Levin et al., 2020; Gloster et al., 2023). However, Indian studies rarely employ ACT or empirically test psychological flexibility as a mechanism of change. Moreover, intervention research in metropolitan academic environments such as Bengaluru remains scarce. Addressing these gaps, the present study evaluates ACT using a quasi-experimental design and examines psychological flexibility as a mediating mechanism in reducing anxiety, depression, and stress among undergraduate students in Bengaluru.

Theoretical and Conceptual Framework

The present study is grounded in the psychological flexibility model underlying Acceptance and Commitment Therapy (ACT), a process-based behavioural framework derived from functional contextualism and Relational Frame Theory (Hayes, Strosahl, &

Wilson, 2012; Hayes & Hofmann, 2017). Psychological flexibility refers to the ability to remain open to internal experiences while engaging in value-consistent behaviour, even in the presence of psychological discomfort, and has been identified as a transdiagnostic determinant of mental health outcomes. ACT conceptualises reductions in anxiety, depression, and stress as occurring through changes in core processes—acceptance, cognitive defusion, present-moment awareness, values clarification, and committed action—rather than through direct symptom control. Accordingly, the study's conceptual framework positions ACT as the independent intervention, psychological flexibility as the central change mechanism, and anxiety, depression, and stress as outcome variables. The research model operationalises this framework by empirically testing (a) the direct effects of ACT on psychological distress and (b) the indirect effects operating through psychological flexibility, thereby aligning outcome evaluation with process-based theory. This integrated framework enables examination of both intervention effectiveness and underlying mechanisms within the undergraduate context.

3. METHOD

Research Design

The study employed a quasi-experimental pretest–posttest control group design to examine the effectiveness of Acceptance and Commitment Therapy (ACT) in enhancing psychological flexibility and reducing anxiety, depression, and stress among undergraduate students. This design was selected due to ethical and institutional constraints that precluded full randomisation, while still allowing systematic comparison between intervention and control conditions. The design enabled assessment of both within-group changes across time and between-group differences following the intervention.

Participants and Sampling

Participants were undergraduate students enrolled in selected higher education institutions in Bengaluru, India. Using purposive sampling based on predefined inclusion and exclusion criteria, 200 students were recruited and allocated to an experimental group (n = 100) and a control group (n = 100). Eligible participants were full-time undergraduates aged 18–23 years who provided informed consent. Students currently receiving psychological or psychiatric treatment or reporting severe mental health conditions were excluded to minimise confounding effects. Baseline equivalence between groups was established through pretest comparisons.

Intervention

The experimental group received a structured six-session Acceptance and Commitment Therapy intervention, delivered in a group format over a defined intervention period. The programme was grounded in ACT's six core processes: acceptance, cognitive defusion, present-moment awareness, self-as-context, values clarification, and committed action. Sessions incorporated psychoeducation, experiential exercises, guided mindfulness practices, metaphors, group discussion, and values-based behavioural tasks. The intervention was delivered by a trained facilitator with formal ACT training. The control group continued routine academic activities and did not receive any psychological intervention during the study period.

Measures

Psychological flexibility was assessed using the Acceptance and Action Questionnaire–II (AAQ-II). Anxiety, depression, and stress were measured using the Depression Anxiety Stress Scale–21 (DASS-21). Mindfulness was assessed using the Mindful Attention Awareness Scale (MAAS). All instruments are well-validated and demonstrated adequate reliability for use with Indian undergraduate populations.

Procedure

Following institutional approval, participants were briefed about the study and provided written informed consent. Pretest assessments were administered to both groups prior to intervention. The experimental group then participated in the ACT sessions, while the control group received no intervention. Posttest assessments were conducted for both groups after completion of the intervention period.

Ethical Considerations

Ethical approval was obtained from the relevant institutional ethics committee. Participation was voluntary, confidentiality was ensured, and participants were informed of their right to withdraw at any stage without penalty. Data were anonymised and used solely for research purposes.

Data Analysis

Data were analysed using SPSS. Descriptive statistics summarised participant characteristics and study variables. Paired-sample t-tests assessed within-group pretest–posttest changes, independent-sample t-tests examined posttest differences between groups, and ANCOVA was used where appropriate to control for baseline scores. Effect sizes were calculated to estimate the magnitude of intervention effects. Mediation and moderation analyses were conducted to examine psychological flexibility as a mechanism of change and the influence of selected socio-demographic variables.

4. RESULTS

4.1 Sociodemographic Characteristics of the Participants

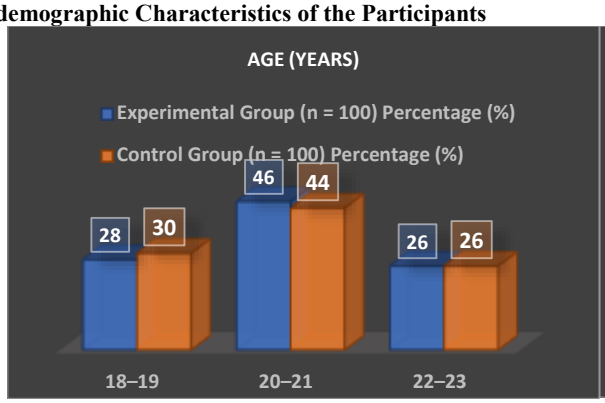

Fig. 1. *Age-wise percentage distribution.*

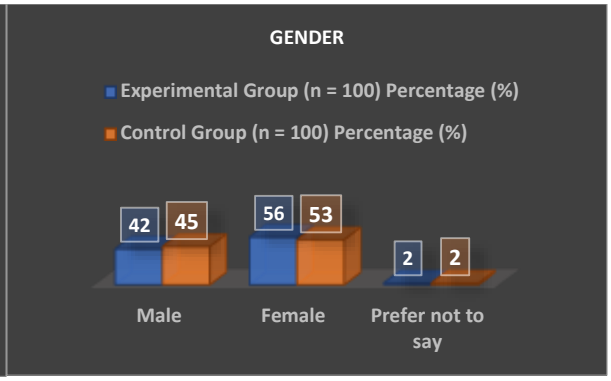

Fig. 2. *Gender-wise percentage distribution*

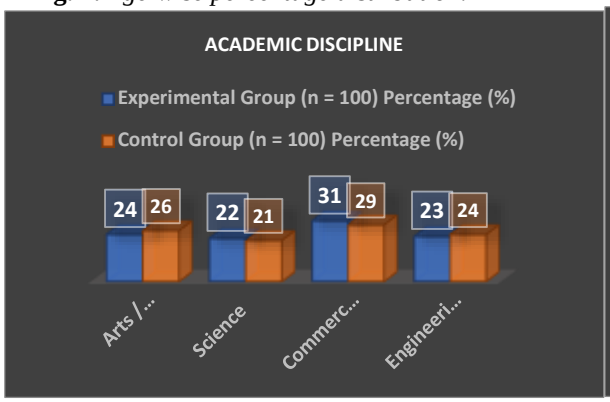

Fig. 3. *Academic Discipline-wise percentage distribution*

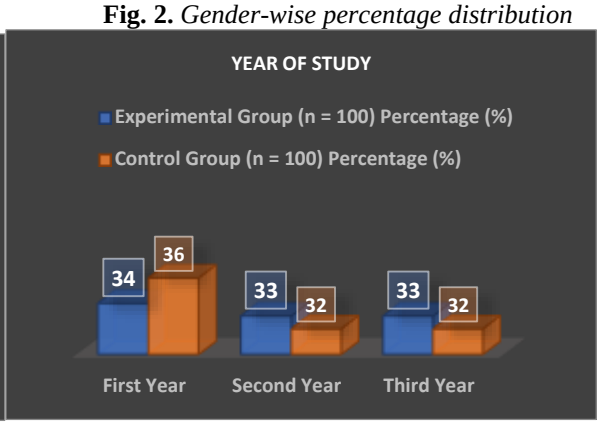

Fig. 4. *Year of study-wise percentage distribution*

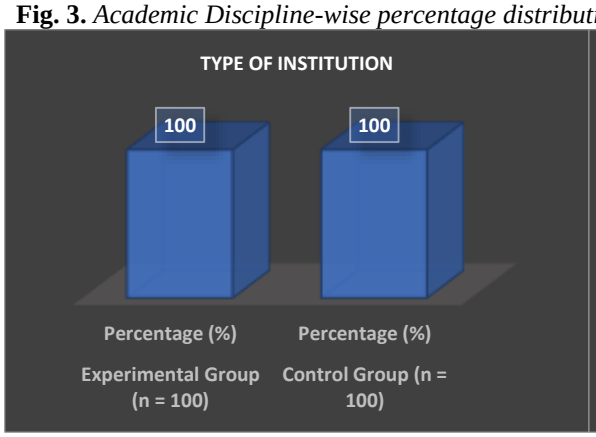

Fig. 5. *Type of institution-wise percentage distribution.*

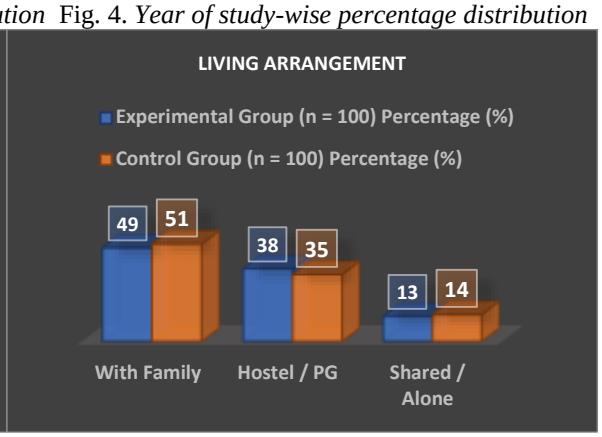

Fig. 6. *Year of living arrangement-wise percentage distribution*

Interpretation of Sociodemographic Variables

The sociodemographic profile indicates strong comparability between the experimental and control groups across all variables. Age-wise distribution showed that the 20–21 years group was most prevalent, comprising 46.0% of the experimental group and 44.0% of the control group, reflecting the dominant middle phase of undergraduate study. Gender distribution revealed a higher prevalence of female participants (56.0% experimental; 53.0% control), with males forming a substantial proportion and minimal non-disclosure (2.0% in both groups).

Discipline-wise analysis indicated Commerce/Management as the most represented stream (31.0% experimental; 29.0% control), followed by relatively balanced representation from Arts/Humanities, Engineering/Technology, and Science. Year-wise distribution was nearly uniform, with first-year students slightly predominant (34.0% experimental; 36.0% control). All participants were drawn from private/self-financed institutions (100.0%). Regarding residence, living with family was most prevalent (49.0% experimental; 51.0% control), followed by hostel/PG accommodation. Overall, the trends confirm demographic equivalence and minimise potential confounding effects.

4.2 Baseline Equivalence between Experimental and Control Groups (Objective 1)

Table 1. Baseline Equivalence of Experimental and Control Groups on Pretest Scores

Variable	Group	Mean ± SD	*t*	df	Sig. (2-tailed)
Depression (DASS-21)	Experimental	18.42 ± 4.36	0.45	198	0.651
	Control	18.15 ± 4.21			
Anxiety (DASS-21)	Experimental	17.06 ± 4.02	0.32	198	0.748
	Control	16.88 ± 3.95			
Stress (DASS-21)	Experimental	21.63 ± 4.78	0.49	198	0.624
	Control	21.29 ± 4.61			
Psychological Flexibility (AAQ-II)	Experimental	33.87 ± 5.14	0.46	198	0.646
	Control	33.54 ± 5.02			

Interpretation

The independent-samples t-test results presented in Table 1 indicate that there were no statistically significant differences between the experimental and control groups at pretest across all study variables. Specifically, baseline depression scores were comparable between the experimental group (M = 18.42, SD = 4.36) and the control group (M = 18.15, SD = 4.21), with no significant difference observed, t(198) = 0.45, p = 0.651. Similarly, pretest anxiety scores did not differ significantly between the experimental (M = 17.06, SD = 4.02) and control groups (M = 16.88, SD = 3.95), t(198) = 0.32, p = 0.748.

Baseline stress levels were also statistically comparable, with the experimental group reporting a mean score of 21.63 (SD = 4.78) and the control group a mean score of 21.29 (SD = 4.61), t(198) = 0.49, p = 0.624. Likewise, no significant difference was found in psychological flexibility, as measured by the AAQ-II, between the experimental group (M = 33.87, SD = 5.14) and the control group (M = 33.54, SD = 5.02), t(198) = 0.46, p = 0.646. Overall, the absence of statistically significant differences (p > 0.05) across all variables confirms that the experimental and control groups were equivalent at baseline, thereby satisfying the assumption of group comparability and supporting the validity of subsequent analyses examining the effects of the ACT intervention.

4.3 Effect of ACT on Psychological Flexibility (Objective 2)

Table 2. Paired Samples t-Test for Psychological Flexibility and Mindfulness
(Experimental Group, Pretest vs Posttest)

Variable	Mean Difference	Std. Deviation	t	df	Sig. (2-tailed)
Psychological Flexibility (AAQ-II)	15.51	5.92	21.08	99	< .001
Mindfulness (MAAS)	–1.36	0.71	–19.17	99	< .001

Note: *Negative mean difference for MAAS indicates an increase in mindfulness from pretest to posttest.*

Table 3. Effect Size (Cohen's d) for ACT-Induced Changes (Experimental Group)

Variable	Cohen's d	Effect Size Interpretation
Psychological Flexibility (AAQ-II)	2.11	Very Large
Mindfulness (MAAS)	1.92	Very Large

Interpretation

Secondary Objective 2 examined changes in psychological flexibility and mindfulness among undergraduate students following the Acceptance and Commitment Therapy (ACT) intervention. The paired samples t-test results (Table 16) demonstrated a statistically significant improvement in psychological flexibility, with a substantial mean difference of 15.51, t(99) = 21.08, p < 0.001. As lower AAQ-II scores indicate greater psychological flexibility, this result confirms a marked enhancement in students' acceptance of internal experiences and engagement in value-driven behaviour after the intervention, leading to rejection of the null hypothesis.

Similarly, mindfulness levels showed a significant increase from pretest to posttest, as indicated by a mean difference of –1.36, t(99) = –19.17, p < 0.001. The negative mean difference reflects higher posttest mindfulness scores, supporting the rejection of the corresponding null hypothesis. The robustness of these findings is reinforced by the very large effect sizes reported in Table 17 (Cohen's d = 2.11 for psychological flexibility and d = 1.92 for mindfulness), indicating strong practical significance. Overall, the results provide compelling evidence that the ACT intervention effectively enhanced both psychological flexibility and mindfulness among undergraduate students, thereby fully supporting Secondary Objective 2.

4.4 Effect of ACT on Anxiety, Depression, and Stress (Objective 3)

Table 4. Paired Samples t-Test Results for Anxiety, Depression, and Stress
(Experimental Group: Pretest vs Posttest, n = 100)

Variable	Pretest Mean ± SD	Posttest Mean ± SD	Mean Difference	t	df	Sig. (2-tailed)
Depression (DASS-21)	18.42 ± 4.36	9.18 ± 3.02	9.24	18.62	99	< .001
Anxiety (DASS-21)	17.06 ± 4.02	8.67 ± 2.91	8.39	17.94	99	< .001
Stress (DASS-21)	21.63 ± 4.78	10.94 ± 3.44	10.69	19.11	99	< .001

Table 5. Effect Size (Cohen's d) for ACT-Induced Changes (Experimental Group)

Variable	Cohen's d	Effect Size Interpretation
Depression (DASS-21)	1.86	Very Large
Anxiety (DASS-21)	1.79	Very Large
Stress (DASS-21)	1.94	Very Large

Interpretation

Secondary Objective 3 examined changes in anxiety, depression, and stress among undergraduate students following the Acceptance and Commitment Therapy (ACT) intervention. The paired samples t-test results presented in Table 20 revealed statistically significant reductions across all three psychological distress variables after the intervention. Depression scores showed a substantial mean reduction of 9.24 points, $t(99) = 18.62$, $p < 0.001$, indicating a marked decrease in depressive symptoms and leading to rejection of the corresponding null hypothesis. Similarly, anxiety levels decreased significantly, with a mean reduction of 8.39 points, $t(99) = 17.94$, $p < 0.001$, confirming that the ACT intervention effectively reduced anxiety symptoms. Stress levels also demonstrated a pronounced decline, with a mean reduction of 10.69 points, $t(99) = 19.11$, $p < 0.001$, reflecting a significant reduction in perceived stress following the intervention. Accordingly, the null hypotheses associated with anxiety and stress were rejected.

The practical significance of these findings is supported by the very large effect sizes reported in Table 21, with Cohen's d values of 1.86 for depression, 1.79 for anxiety, and 1.94 for stress. Overall, the results provide strong empirical evidence that ACT produced robust and meaningful reductions in psychological distress among undergraduate students, thereby fully supporting Secondary Objective 3.

4.5 Between-Group Comparison of Posttest Scores (Objective 4)

Table 6. Independent Samples t-Test (Posttest Comparison)

Variable	t	df	Sig. (2-tailed)	Mean Difference
Psychological Flexibility (AAQ-II)	−23.18	198	< 0.001	−14.60
Mindfulness (MAAS)	15.09	198	< 0.001	1.27
Depression (DASS-21)	−16.42	198	< 0.001	−8.56
Anxiety (DASS-21)	−15.73	198	< 0.001	−7.84
Stress (DASS-21)	−17.01	198	< 0.001	−9.89

Table 7. Effect Size (Cohen's d) for Posttest Between-Group Differences

Variable	Cohen's d	Effect Size Interpretation
Psychological Flexibility (AAQ-II)	2.60	Very Large
Mindfulness (MAAS)	2.13	Very Large
Depression (DASS-21)	2.33	Very Large
Anxiety (DASS-21)	2.24	Very Large
Stress (DASS-21)	2.41	Very Large

Interpretation

Secondary Objective 4 examined post-intervention differences between the experimental and control groups in psychological flexibility, mindfulness, anxiety, depression, and stress. The independent samples t-test results presented in Table 24 revealed statistically significant differences across all outcome variables at posttest. The experimental group demonstrated significantly greater psychological flexibility than the control group, as indicated by lower AAQ-II scores ($t(198) = -23.18$, $p < 0.001$). Similarly, mindfulness levels were significantly higher in the experimental group ($t(198) = 15.09$, $p < 0.001$).

In contrast, the experimental group reported significantly lower levels of depression ($t(198) = -16.42$, $p < 0.001$), anxiety ($t(198) = -15.73$, $p < 0.001$), and stress ($t(198) = -17.01$, $p < 0.001$) compared to the control group. These results indicate that students who received the ACT intervention exhibited more favourable psychological outcomes across all assessed domains. The magnitude of these between-group differences is further supported by the very large effect sizes reported in Table 25, with Cohen's d values exceeding 2.0 for all variables. Collectively, these findings provide robust evidence that Acceptance and Commitment Therapy produced superior post-intervention outcomes relative to no intervention, leading to rejection of the null hypothesis and full support for Secondary Objective 4.

4.6 Mediation Effects of Psychological Flexibility on the Relationship between ACT and Psychological Outcomes (Objective 5)

Table 8. Summary of Mediation Effects

Outcome Variable	Direct Effect (c′) B (p)	Indirect Effect (a×b) B	Bootstrapped 95% CI (LLCI–ULCI)	Mediation Type
Depression	**−2.98 (< .001)**	**0.71**	**4.12 – 8.94**	Partial mediation
Anxiety	**−2.54 (< .001)**	**0.64**	**3.28 – 7.86**	Partial mediation

Stress	**−3.41 (< .001)**	**0.79**	**4.98 – 10.12**	Partial mediation

Note. *Indirect effects were estimated using the PROCESS macro (Model 4) with 5,000 bootstrap samples. Mediation is considered significant when the 95% confidence interval does not include zero.*

Interpretation

Secondary Objective 5 examined whether improvements in psychological flexibility mediated the effect of Acceptance and Commitment Therapy (ACT) on anxiety, depression, and stress outcomes. The mediation results summarised in Table 35 indicate that psychological flexibility functioned as a significant partial mediator across all three psychological distress variables.

For depression, both the direct effect of ACT on change in depression ($c' = -2.98$, $p < .001$) and the indirect effect through psychological flexibility ($a \times b = 0.71$) were statistically significant. The bootstrapped 95% confidence interval for the indirect effect (LLCI = 4.12, ULCI = 8.94) did not include zero, confirming a significant mediation effect. This indicates that improvements in psychological flexibility accounted for a meaningful portion of the reduction in depressive symptoms following ACT, while the intervention also exerted a direct effect. A similar mediation pattern was observed for anxiety. The direct effect of ACT remained significant ($c' = -2.54$, $p < .001$), and the indirect effect via psychological flexibility was also significant ($a \times b = 0.64$), with the bootstrapped confidence interval (3.28–7.86) excluding zero. This finding confirms that psychological flexibility partially mediated the relationship between ACT and anxiety reduction.

For stress, the results again demonstrated significant direct ($c' = -3.41$, $p < .001$) and indirect effects ($a \times b = 0.79$), with a bootstrapped confidence interval of 4.98–10.12. This indicates that enhancements in psychological flexibility significantly contributed to reductions in stress, while ACT retained a direct impact beyond the mediating pathway.

Overall, the mediation analysis provides strong empirical support for the rejection of the null hypothesis and acceptance of the alternative hypothesis. Psychological flexibility emerged as a significant partial mediator linking ACT to reductions in anxiety, depression, and stress, thereby substantiating the process-based theoretical foundation of Acceptance and Commitment Therapy.

4.7 Moderating Role of Socio-Demographic Variables (Objective 6)

Table 9. Summary of Moderation Effects of Socio-Demographic Variables on ACT Outcomes

Moderator	Outcome Variable	Interaction Term (Group × Moderator) B	p-value	Moderation Supported
Age	Depression	−0.48	0.023	Yes
Gender	Anxiety	−0.92	0.019	Yes
Year of Study	Stress	−0.88	0.010	Yes
Academic Discipline	Depression	−0.31	0.286	No
Living Arrangement	Anxiety	−1.06	0.002	Yes

Note. *Moderation is supported when the interaction term (Group × Moderator) is statistically significant ($p < .05$).*

Interpretation

The present study examined whether selected socio-demographic variables moderated the effectiveness of Acceptance and Commitment Therapy (ACT) in reducing depression, anxiety, and stress among undergraduate students.

The moderation analysis revealed that age significantly moderated the effect of ACT on posttest depression (Group × Age: $B = -0.48$, $t = -2.29$, $p = .023$), indicating that the magnitude of depression reduction following ACT varied across age groups. Although age did not exert a direct main effect, the significant interaction suggests age-related differences in responsiveness to the intervention. Gender significantly moderated the effect of ACT on posttest anxiety (Group × Gender: $B = -0.92$, $t = -2.36$, $p = .019$), demonstrating that anxiety reduction associated with ACT differed between male and female students. The main effect of gender was non-significant, confirming that moderation occurred through interaction rather than baseline differences.

Similarly, year of study significantly moderated ACT effectiveness for posttest stress (Group × Year of Study: $B = -0.88$, $t = -2.59$, $p = .010$), indicating that students at different stages of undergraduate education experienced differential stress reduction following the intervention. Living arrangement also emerged as a significant moderator for posttest anxiety (Group × Living Arrangement: $B = -1.06$, $t = -3.21$, $p = .002$), suggesting that residential context influenced the extent to which ACT reduced anxiety symptoms. In contrast, academic discipline did not significantly moderate ACT outcomes for depression (Group × Discipline: $B = -0.31$, $t = -1.07$, $p = .286$), indicating that the effectiveness of ACT was consistent across academic fields.

Overall, the moderation findings demonstrate that while ACT is broadly effective, its impact varies across specific socio-demographic contexts. Accordingly, the null hypothesis (H_{07}) was partially rejected and the alternative hypothesis (H_{17}) was partially supported, confirming that age, gender, year of study, and living arrangement significantly condition ACT outcomes, whereas academic discipline does not.

Table 10. Moderating Role of Socio-Demographic Variables (Objective 6)

Summary of Moderation Effects of Socio-Demographic Variables on ACT Outcomes

Moderator	Outcome Variable	Interaction Term (Group × Moderator) B	p-value	Moderation Supported
Age	Depression	−0.48	0.023	Yes
Gender	Anxiety	−0.92	0.019	Yes
Year of Study	Stress	−0.88	0.010	Yes

Academic Discipline	Depression	−0.31	0.286	No
Living Arrangement	Anxiety	−1.06	0.002	Yes

Note. *Moderation is supported when the interaction term (Group × Moderator) is statistically significant ($p < .05$).*

Interpretation

The present study examined whether selected socio-demographic variables moderated the effectiveness of Acceptance and Commitment Therapy (ACT) in reducing depression, anxiety, and stress among undergraduate students.

The moderation analysis revealed that age significantly moderated the effect of ACT on posttest depression (Group × Age: B = −0.48, t = −2.29, p = .023), indicating that the magnitude of depression reduction following ACT varied across age groups. Although age did not exert a direct main effect, the significant interaction suggests age-related differences in responsiveness to the intervention. Gender significantly moderated the effect of ACT on posttest anxiety (Group × Gender: B = −0.92, t = −2.36, p = .019), demonstrating that anxiety reduction associated with ACT differed between male and female students. The main effect of gender was non-significant, confirming that moderation occurred through interaction rather than baseline differences.

Similarly, year of study significantly moderated ACT effectiveness for posttest stress (Group × Year of Study: B = −0.88, t = −2.59, p = .010), indicating that students at different stages of undergraduate education experienced differential stress reduction following the intervention. Living arrangement also emerged as a significant moderator for posttest anxiety (Group × Living Arrangement: B = −1.06, t = −3.21, p = .002), suggesting that residential context influenced the extent to which ACT reduced anxiety symptoms. In contrast, academic discipline did not significantly moderate ACT outcomes for depression (Group × Discipline: B = −0.31, t = −1.07, p = .286), indicating that the effectiveness of ACT was consistent across academic fields.

Overall, the moderation findings demonstrate that while ACT is broadly effective, its impact varies across specific socio-demographic contexts. Accordingly, the null hypothesis (H_{07}) was partially rejected and the alternative hypothesis (H_{17}) was partially supported, confirming that age, gender, year of study, and living arrangement significantly condition ACT outcomes, whereas academic discipline does not.

5. DISCUSSION

This study examined the effectiveness of Acceptance and Commitment Therapy (ACT) in reducing anxiety, depression, and stress among undergraduate students in Bengaluru, while also explaining how and for whom the intervention was most effective. The findings demonstrate that ACT produced significantly greater reductions in all three outcomes compared to the control group, supporting its applicability as a transdiagnostic intervention within academic settings characterised by chronic evaluative stress (Hayes et al., 2012; Twohig & Levin, 2017). Consistent with the ACT psychological flexibility model, improvements in psychological flexibility partially mediated the effects of ACT on depression, anxiety, and stress. This confirms that ACT operates through process-level change rather than symptom suppression alone, aligning with contextual behavioural science perspectives that emphasise flexible responding to internal experiences as the basis for sustainable psychological improvement (Kashdan & Rottenberg, 2010; Gloster et al., 2020). The presence of partial mediation further suggests that ACT's multi-component structure—encompassing acceptance, defusion, values clarification, and committed action—contributes to outcome change through overlapping pathways.

Moderation analyses revealed that ACT effectiveness was context-sensitive rather than uniform. Age moderated depression outcomes, gender and living arrangement moderated anxiety outcomes, and year of study moderated stress outcomes, while academic discipline did not moderate any outcome. These findings are theoretically coherent with ACT's emphasis on contextual factors influencing experiential avoidance patterns and skill application (Hayes et al., 2012). Importantly, the absence of moderation by academic discipline supports ACT's transdiagnostic claim, indicating that its core processes function consistently across fields of study.

Overall, the integration of mediation and moderation findings advances ACT research by demonstrating that ACT is both mechanism-driven and context-responsive. The study contributes to process-based intervention literature by clarifying not only whether ACT works, but also how its effects emerge and under what socio-demographic conditions they are most pronounced.

6. CONCLUSION AND IMPLICATIONS

The study provides robust evidence that ACT is an effective intervention for reducing anxiety, depression, and stress among undergraduate students. Psychological flexibility emerged as a key mechanism of change, while socio-demographic variables selectively shaped the magnitude of outcomes, confirming ACT's contextual sensitivity.

From a policy perspective, the findings support the inclusion of ACT-based programmes within university mental health initiatives, particularly for students at vulnerable academic stages or living contexts. For practice, the results highlight the value of process-based and context-informed ACT delivery rather than uniform intervention models. Future research should extend these findings using longitudinal and multi-site designs to further refine subgroup-sensitive ACT implementation.

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Conflict of Interest
The authors declare no conflicts of interest regarding this work to disclose.

Author Contributions
Research scholar Uma G conducted the study under the guidance and complete support of Dr Garima Kumar, who provided expert advice and oversight throughout the research process.

Ethics Approval
This study was reviewed and approved by the Ethics Committee at the Department of Arts & Social Studies, Shyam University, Dausa – 303511, Rajasthan, India. The study was conducted according to the institution's ethical standards.

Data Availability
The datasets generated and analysed during the current study are available from the corresponding author upon reasonable request.

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