



A Comparative Study on Intolerance of Uncertainty, Cognitive Flexibility, and Emotion Regulation among Young Adults

Samruddhi Singh Bais, *Amity Institute of Psychology and Allied Sciences*

Amity University Uttar Pradesh, Noida, India

samruddhisingh16@gmail.com

Abstract: This study examined intolerance of uncertainty, cognitive flexibility, and emotion regulation among young adults using standardized psychological scales. Data were collected from undergraduate students aged 18–25 years through purposive sampling. The findings showed significant relationships among the variables, where higher intolerance of uncertainty was associated with less adaptive emotion regulation, while greater cognitive flexibility was linked with more adaptive emotion regulation strategies. Gender differences were also examined. The results highlight the importance of tolerating uncertainty and flexible thinking in managing emotions during young adulthood. Limitations include the use of self-report measures and a limited sample, suggesting the need for future research with larger samples and additional variables.

Keywords: *Intolerance Of Uncertainty, Cognitive Flexibility, Emotion Regulation, Young Adults, University Students.*

1. Introduction

Young adulthood is a significant developmental period characterized by the transition from adolescence to adulthood, increased independence, and the formation of personal and professional identities. University students navigating this phase often experience academic pressures, social challenges, and uncertainty about future career paths. According to Jeffrey Jensen Arnett (2000), emerging adulthood involves exploration in identity, relationships, and career directions, which can also lead to psychological stress. When individuals lack adequate coping resources, such uncertainties may contribute to anxiety, emotional distress, and reduced

well-being (Huntley et al., 2022). Understanding the cognitive and emotional processes that influence how young adults manage uncertainty has therefore become an important area of psychological research.

Three psychological constructs that have received considerable attention in this context are Intolerance of Uncertainty (IU), Cognitive Flexibility (CF), and Emotion Regulation (ER). These constructs function as interconnected processes that shape how individuals interpret and respond to uncertain situations. Intolerance of uncertainty is considered a cognitive vulnerability factor, cognitive flexibility represents an adaptive cognitive resource, and emotion regulation reflects the behavioural strategies used to manage emotional experiences (Gross & John, 2003).

Intolerance of uncertainty refers to the tendency to perceive uncertain situations as threatening or distressing. Individuals with high IU often struggle to tolerate ambiguity and experience persistent worry about future events. According to Carleton (2016), IU reflects discomfort with the unknown rather than fear of specific outcomes. Research suggests that IU consists of two dimensions: prospective anxiety, which involves excessive concern about future events and a desire for predictability, and inhibitory anxiety, which reflects avoidance or behavioural paralysis in response to uncertainty (Sahib et al., 2023).

Another important factor influencing adaptation to uncertainty is cognitive flexibility. Cognitive flexibility refers to the ability to modify thinking patterns, consider multiple perspectives, and generate alternative solutions when faced with changing circumstances (Dennis & Vander Wal, 2010). This construct includes two components: alternatives, the ability to generate multiple solutions to problems, and control, the belief in one's capacity to manage challenging situations. Individuals with higher cognitive flexibility are more likely to reinterpret stressful or ambiguous situations and adopt adaptive coping strategies (Ghosh & Halder, 2020).

Emotion regulation represents the processes through which individuals monitor and modify their emotional responses. The Process Model of Emotion Regulation proposed by Gross (1998) distinguishes between antecedent-focused strategies, such as cognitive reappraisal, and response-focused strategies, such as expressive suppression. Cognitive reappraisal involves reinterpreting situations to alter their emotional impact and is generally associated with positive psychological outcomes. In contrast, expressive suppression involves inhibiting emotional expression after emotions have arisen and is often associated with greater physiological stress and poorer psychological adjustment (Gross & John, 2003).

Previous research has highlighted the relationships among these constructs. Studies have shown that intolerance of uncertainty and cognitive flexibility influence stress and psychological adjustment among university students (Demirtaş & Yıldız, 2019; Ghosh & Halder, 2020). Other studies indicate that adaptive emotion regulation strategies can reduce psychological distress associated with uncertainty (Godara et al., 2023; Gullo et al., 2023). Intervention-based research also suggests that improvements in emotion regulation skills can reduce intolerance of uncertainty and enhance psychological well-being (Clayton et al., 2023; Nedaei et al., 2023). Recent findings further support the protective role of cognitive flexibility and adaptive emotion regulation in reducing anxiety and psychological symptoms (Boragh et al., 2024; Kim et al., 2025; Baltacı et al., 2026).

Despite increasing research on these constructs, many studies examine them independently rather than as part of an integrated cognitive-emotional system. Additionally, much of the existing literature focuses on clinical populations, leaving relatively limited research on non-clinical undergraduate students. Many studies also rely on overall scores, overlooking the specific contributions of subcomponents such as prospective anxiety, inhibitory anxiety, alternatives, and control.

Therefore, the present study aims to examine the relationships among intolerance of uncertainty, cognitive flexibility, and emotion regulation among young adults. By analyzing these constructs simultaneously and considering their subcomponents, the study seeks to provide a deeper understanding of the cognitive and emotional mechanisms that influence how young adults cope with uncertainty and regulate their emotions.

2. Methodology

2.1 Aim

To investigate the comparative, relational, and predictive roles of Intolerance of Uncertainty and Cognitive Flexibility in determining Emotion Regulation strategies among young adults (18–25 years).

2.2 Research Objectives

- a) To compare male and female young adults on levels of Intolerance of Uncertainty, Cognitive Flexibility, and Emotion Regulation strategies (Cognitive Reappraisal and Expressive Suppression).
- b) To examine the relationships among Intolerance of Uncertainty, Cognitive Flexibility, and Emotion Regulation strategies.

- c) To determine whether Intolerance of Uncertainty and Cognitive Flexibility predict Emotion Regulation strategies among young adults.

2.3 Hypotheses

Alternative Hypotheses (H_1)

H1: There will be significant gender differences in Intolerance of Uncertainty, Cognitive Flexibility, and Emotion Regulation strategies among young adults.

H2: Intolerance of Uncertainty will be negatively associated with Cognitive Flexibility and positively associated with Expressive Suppression, whereas Cognitive Flexibility will be positively associated with Cognitive Reappraisal.

H3: Cognitive Flexibility will significantly predict Emotion Regulation strategies and will explain greater variance in adaptive emotion regulation (Cognitive Reappraisal) compared to Intolerance of Uncertainty.

Null Hypotheses (H_0)

H0₁: There will be no significant gender differences in Intolerance of Uncertainty, Cognitive Flexibility, or Emotion Regulation strategies.

H0₂: There will be no significant relationships among Intolerance of Uncertainty, Cognitive Flexibility, and Emotion Regulation strategies.

H0₃: Cognitive Flexibility will not significantly predict Emotion Regulation strategies nor explain greater variance compared to Intolerance of Uncertainty.

2.4 Variables

Independent Variables

- Intolerance of Uncertainty
- Cognitive Flexibility

2.5 Dependent Variable

- Emotion Regulation strategies (Cognitive Reappraisal and Expressive Suppression)

2.6 Sample Size

The study consisted of 300 undergraduate students, including 150 males and 150 females, aged 18 to 25 years.

2.7 Inclusion and Exclusion Criteria

Inclusion criteria included undergraduate students aged 18–25 who were enrolled in a full-time university program and willing to complete the questionnaires. Individuals outside this age range, not enrolled full-time, or with a self-reported history of major psychiatric disorders or ongoing intensive psychological treatment were excluded to ensure a non-clinical sample.

2.8 Research Design

The present study employed a quantitative cross-sectional correlational research design to examine gender differences, relationships, and predictive effects among Intolerance of Uncertainty, Cognitive Flexibility, and Emotion Regulation strategies. A cross-sectional design allows the simultaneous assessment of multiple variables within a specific population and is commonly used in psychological research (Creswell & Creswell, 2018).

2.9 Sampling Technique

A convenience sampling technique was used to recruit participants from different academic disciplines including Humanities, Social Sciences, STEM, and Professional Studies.

2.10 Measures

a) *Intolerance of Uncertainty Scale – Short Form (IUS-12)*

The Intolerance of Uncertainty Scale – Short Form (IUS-12) developed by Carleton, Norton, and Asmundson (2007) was used to assess individuals' tendency to perceive uncertain situations as stressful or distressing. The scale contains 12 items rated on a 5-point Likert scale from 1 (Not at all characteristic of me) to 5 (Entirely characteristic of me). It includes two subscales: Prospective Anxiety and Inhibitory Anxiety. Higher scores indicate greater intolerance of uncertainty. The scale has shown high internal consistency (Cronbach's $\alpha \approx .91$) and is widely used in psychological research (Carleton et al., 2007; Carleton, 2016).

b) *Cognitive Flexibility Inventory (CFI)*

The Cognitive Flexibility Inventory (CFI) developed by Dennis and Vander Wal (2010) was used to assess an individual's ability to adapt thinking and generate alternative solutions in challenging situations. The inventory consists of 20 items rated on a 7-point Likert scale and includes two subscales: Control (belief that difficult situations can be managed) and Alternatives (ability to generate multiple solutions). Higher scores indicate greater cognitive flexibility (Dennis & Vander Wal, 2010).

c) *Emotion Regulation Questionnaire (ERQ)*

The Emotion Regulation Questionnaire (ERQ) developed by Gross and John (2003) was used to measure emotion regulation strategies. The questionnaire includes 10 items rated on a 7-point Likert scale and assesses two strategies: Cognitive Reappraisal (6 items) and Expressive Suppression (4 items). The scale has shown good reliability with Cronbach's alpha of .85 for reappraisal and .75 for suppression (Gross & John, 2003).

2.11 Procedure

Participants were recruited from university settings and included undergraduate students aged 18–25 years from different academic disciplines. Before participation, informed

consent was obtained, assuring confidentiality, anonymity, and voluntary participation. Participants first completed a demographic form and then three questionnaires: IUS-12, CFI, and ERQ. The survey was administered through a secure online platform, allowing participants to respond at their own pace. Responses were checked for completeness, and incomplete data were excluded. The final dataset was prepared for statistical analysis to examine gender differences and relationships among intolerance of uncertainty, cognitive flexibility, and emotion regulation.

3. Results

The Shapiro–Wilk test indicated that all variables significantly deviated from normal distribution ($p < .001$). However, with a large sample size ($N = 300$), the Central Limit Theorem allows the use of parametric tests such as the t -test and Linear Regression.

Levene’s test showed unequal variances for some variables, including Expressive Suppression, Prospective Anxiety, and Inhibitory Anxiety ($p < .001$). Therefore, Welch’s t -test was used for gender comparisons as it does not assume equal variances.

Table 1: Normality Test (Shapiro-Wilk)

	W	p
Cognitive reappraisal (ERQ)	0.903	<.001
Expressive Suppression	0.916	<.001
Prospective Anxiety [iuc]	0.964	<.001
Inhibitory Anxiety [iuc]	0.979	<.001
control subscale [cfi]	0.951	<.001
Alternative subscale [cfi]	0.948	<.001
Age	0.970	<.001

Note. A low p-value suggests a violation of the assumption of normality

Table 2: Homogeneity of Variances Test (Levene's)

	F	df	df2	p
Cognitive reappraisal (ERQ)	1.7055	1	298	0.193
Expressive Suppression	13.2245	1	298	<.001
Prospective Anxiety [iuc]	35.1943	1	298	<.001
Inhibitory Anxiety [iuc]	69.9575	1	298	<.001
control subscale [cfi]	0.0226	1	298	0.881

Alternative subscale [cfi]	17.8136	1	298	<.001
Age	17.4434	1	298	<.001

Note. A low p-value suggests a violation of the assumption of equal variances

Descriptive Statistics

Means, medians, and standard deviations were calculated to summarize participants' scores on ERQ, IUS-12, CFI, and age.

Table 3: Descriptive Statistics

	Cognitive reappraisal (ERQ)	Expressive Suppression	Prospective Anxiety	Inhibitory Anxiety	control subscale	Alternative subscale	Age
N	300	300	300	300	300	300	300
Missing	0	0	0	0	0	0	0
Mean	23.0	15.4	21.4	15.0	25.0	60.9	21.5
Median	24.0	16.0	20.0	14.0	24.0	64.0	21.0
Standard deviation	4.39	3.22	5.91	4.48	8.97	16.0	1.77
Minimum	6	4	7	5	7	16	17
Maximum	30	20	35	25	49	89	25

Welch's *t*-test showed significant gender differences in most variables. Females reported higher Prospective Anxiety and Inhibitory Anxiety. Males scored higher in Expressive Suppression and the Control subscale of cognitive flexibility. No significant difference was found for Cognitive Reappraisal.

Table 4: Independent Sample T-Test

									95% Confidence Interval	
		Statistic	df	p	Mean difference	SE difference		Effect Size	Lower	Upper
Cognitive reappraisal (ERQ)	Welch's t	-0.736	297	0.462	-0.373	0.507	Cohen's d	-0.0850		
Expressive Suppression	Welch's t	-2.368	282	0.019	-0.873	0.369	Cohen's d	-0.2734		
Prospective Anxiety [iuc]	Welch's t	11.133	263	<.001	6.400	0.575	Cohen's d	1.2856		

Inhibitory Anxiety [iuc]	Welch's t	10.666	232	<.001	4.707	0.441	Cohen's d	1.2316		
control subscale [cfi]	Welch's t	-6.757	297	<.001	-6.527	0.966	Cohen's d	-0.7802		
Alternative subscale [cfi]	Welch's t	9.197	291	<.001	15.047	1.636	Cohen's d	1.0619		
Age	Welch's t	-4.392	287	<.001	-0.873	0.199	Cohen's d	-0.5071		

Note. $H_a: \mu_{\text{Female}} \neq \mu_{\text{Male}}$

Testing of Hypothesis 2: Correlational Analysis

Pearson correlation analysis showed strong negative relationships between cognitive flexibility control and both prospective anxiety and inhibitory anxiety. Cognitive reappraisal was positively correlated with both anxiety variables, and a strong positive correlation was also found between cognitive reappraisal and expressive suppression.

Table 5: Correlation Matrix

		Cognitive reappraisal (ERQ)	Expressive Suppression	Prospective Anxiety	Inhibitory Anxiety	control subscale	Alternative subscale	Age
Cognitive reappraisal (ERQ)	Pearson's r	—						
	95% CI Upper	—						
	95% CI Lower	—						
Expressive Suppression	Pearson's r	0.699***	—					
	95% CI Upper	0.753	—					
	95% CI Lower	0.636	—					
Prospective Anxiety [iuc]	Pearson's r	0.234***	0.131*	—				
	95% CI Upper	0.338	0.240	—				
	95% CI Lower	0.124	0.018	—				
Inhibitory Anxiety [iuc]	Pearson's r	0.188**	0.166**	0.830***	—			
	95% CI Upper	0.295	0.274	0.862	—			
	95% CI Lower	0.076	0.054	0.791	—			
control subscale [cfi]	Pearson's r	-0.380***	-0.364***	-0.515***	-0.537***	—		
	95% CI Upper	-0.279	-0.262	-0.426	-0.451	—		

	95% CI Lower	-0.473	-0.458	-0.593	-0.613	—		
Alternative subscale [cfi]	Pearson's r	0.389***	0.264***	0.580***	0.487***	- 0.815***	—	
	95% CI Upper	0.481	0.366	0.650	0.569	-0.773	—	
	95% CI Lower	0.288	0.155	0.499	0.395	-0.850	—	
Age	Pearson's r	0.137*	0.147*	-0.213***	-0.207***	0.225***	-0.248***	—
	95% CI Upper	0.247	0.256	-0.102	-0.096	0.329	-0.139	—
	95% CI Lower	0.025	0.034	-0.318	-0.313	0.114	-0.352	—

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Testing of Hypothesis 3: Multiple Regression Analysis

Regression analysis showed that cognitive flexibility significantly predicted emotion regulation. The Alternative subscale positively predicted Cognitive Reappraisal, while the Control subscale negatively predicted both Cognitive Reappraisal and Expressive Suppression. Predictors of Cognitive Reappraisal The first regression model aimed to predict Cognitive Reappraisal using the subscales of IU and CF as predictors.

Table 6: Predictors of Cognitive Reappraisal Linear Regression

Model Fit Measures		
Model	R	R ²
1	0.408	0.166

Note. Models estimated using sample size of N=300

Model Coefficients - Cognitive reappraisal (ERQ)				
Predictor	Estimate	SE	t	p
Intercept	22.4211	2.7896	8.037	<.001
Prospective Anxiety [iuc]	0.0618	0.0774	0.799	0.425
Inhibitory Anxiety [iuc]	-0.1004	0.0987	-1.018	0.310
control subscale [cfi]	-0.1083	0.0477	-2.272	0.024
Alternative subscale [cfi]	0.0576	0.0273	2.109	0.036

Interpretation: The model was significant and explained 16.6% of the variance in Cognitive Reappraisal ($R^2 = 0.166$, $p < .001$). Anxiety subscales were not significant predictors.

However, Cognitive Flexibility was significant: the Control subscale predicted lower reappraisal ($\beta = -0.108$, $p = .024$), while the Alternative subscale predicted higher reappraisal ($\beta = 0.057$, $p = .036$). This suggests that generating alternative solutions supports the use of cognitive reappraisal.

Predictors of Expressive Suppression The second regression model focused on predicting the use of Expressive Suppression.

Table 7: Predictors of Expressive Suppression Linear Regression

Model Fit Measures		
Model	R	R ²
1	0.372	0.139

Note. Models estimated using sample size of N=300

Model Coefficients - Expressive Suppression				
Predictor	Estimate	SE	t	p
Intercept	20.8302	2.0786	10.021	<.001
Prospective Anxiety [iuc]	-0.0480	0.0577	-0.832	0.406
Inhibitory Anxiety [iuc]	0.0228	0.0735	0.309	0.757
control subscale [cfi]	-0.1584	0.0355	-4.459	<.001
Alternative subscale [cfi]	-0.0121	0.0204	-0.593	0.554

Interpretation: The regression model for Expressive Suppression explained 13.9% of the variance ($R^2=0.139$, $p<.001$). The Control Subscale emerged as the strongest and only significant unique predictor ($\beta=-0.158$, $p<.001$). This suggests that a person's perceived sense of control in difficult situations is a major factor in reducing the need to suppress emotions. As the sense of control increases, the tendency to use suppression significantly decreases.

4. Discussion

The study examined the relationships between Intolerance of Uncertainty, Cognitive Flexibility, and Emotion Regulation strategies among young adults, as well as gender differences across these variables. The findings support cognitive-behavioral perspectives suggesting that intolerance of uncertainty contributes to anxiety and emotional dysregulation (Dugas et al., 1998; Buhr & Dugas, 2002).

Hypothesis 1 was partially supported. Female participants reported higher prospective and inhibitory anxiety, indicating greater distress in uncertain situations, which is consistent

with previous research on gender differences in anxiety (McLean & Anderson, 2009). Male participants showed higher expressive suppression and greater perceived cognitive control, possibly reflecting gender socialization patterns encouraging emotional restraint in men (Gross & John, 2003). No gender difference was found for cognitive reappraisal.

Hypothesis 2 was supported. Intolerance of uncertainty was negatively associated with cognitive flexibility, particularly the control dimension, indicating that individuals with higher uncertainty-related anxiety perceive less control over difficult situations. Intolerance of uncertainty was also positively related to expressive suppression, suggesting that individuals experiencing greater uncertainty may rely more on less adaptive emotion regulation strategies.

Hypothesis 3 was supported by regression analysis. The control dimension of cognitive flexibility significantly predicted lower expressive suppression, while the alternatives dimension predicted greater use of cognitive reappraisal. This suggests that individuals who can perceive control and generate multiple solutions are better able to regulate emotions adaptively (Bandura, 1977). Overall, the findings indicate that intolerance of uncertainty increases anxiety and maladaptive regulation, whereas cognitive flexibility supports adaptive emotional regulation in young adults.

5. Limitations

The cross-sectional design limits causal interpretation. The use of self-report measures may introduce response bias. Additionally, the sample consisted of university students, which may limit generalizability. The regression model explained a modest amount of variance, suggesting that other factors such as personality, coping styles, or mindfulness may also influence emotion regulation.

5.1 Future Implications

Future research should use longitudinal designs to examine developmental changes in these variables. Including additional psychological factors such as resilience, mindfulness, and personality traits may provide deeper insights. Cognitive-behavioral interventions and educational programs may help improve cognitive flexibility and reduce maladaptive responses to uncertainty.

6. Conclusion

The study shows that intolerance of uncertainty is linked to higher anxiety and greater use of expressive suppression, while cognitive flexibility is associated with adaptive emotion regulation such as cognitive reappraisal. Gender differences were found in anxiety and

suppression but not in reappraisal. Overall, improving cognitive flexibility and tolerance of uncertainty may enhance emotional well-being in young adults.

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