



The Effects of Optimistic and Pessimistic Personality Traits on Emotional States among College Students following the COVID-19 Epidemic

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Abstract. This study explores how college students' optimistic and pessimistic traits affect their emotions after an epidemic using the Cognitive Appraisal Theory of Emotion and Positive Psychology principles. It also investigates the mediating role of general outcome expectancy tendencies and involves a questionnaire survey and mood-evoking measurement experiment. Findings reveal: (1) Stable personality traits, Particularly Pessimism, influence emotional states, leading to more negative emotions in adverse situations. (2) Different Generalized Outcome Expectancies are associated with significant variations in personality traits and emotional states. (2) Generalized Outcome Expectancies partially mediate the effects of Personality Traits on emotional states.

Keywords: Emotional States; Personality Traits; Post-epidemic.

1 Introduction

During the three-year pneumonia epidemic, individuals experienced prolonged negative emotional states such as anxiety¹. Although major disaster events can cause considerable psychological trauma², there is limited research on people's emotional state after such epidemics. This study focuses on the post-epidemic period to understand the factors influencing emotional states following major disasters.

College students' well-being is crucial for societal development. Understanding their post-epidemic emotional state is essential due to limited empirical research. This study aims to provide practical suggestions for future psychological interventions by examining university students.

2 Current Research Status

2.1 Optimistic and Pessimistic Personality Traits

In challenging situations, people's emotional responses reflect two mindsets: optimism and pessimism, significantly influencing psychological and social adaptability³. Trait optimism entails positive future beliefs and expectations of favorable outcomes, while trait pessimism represents the opposite, reflecting enduring traits⁴.

Based on the trait congruence hypothesis, optimists and pessimists process information and respond differently emotionally. An Emotional Stroop Task⁵ experiment showed attentional bias for emotional information among different traits, but didn't conclusively establish differences in selective information processing⁶. Therefore, Study 1 uses an event-priming approach to evoke emotions, aiming to explore disparities in information processing between these mindsets and investigate their influence on emotional states.

2.2 Influencing Factors of Individual Emotional State

Emotions are complex and subjective, often blending various feelings⁷. Zheng Pu et al⁸. emphasized individual differences in emotional states, indicating limited exploration of specific personality trait impacts. This study integrates stable individual personality traits with cognitive appraisal theory to investigate emotional influencers.

2.3 General Outcome Expectancies in Personality and Emotions

Generalised Outcome Expectancies assess events⁹. Taosha et al¹⁰ found that optimistic and pessimistic tendencies are significantly correlated and relatively independent, with pessimistic tendencies playing a stronger role in negative emotions. This study hypothesised that the general outcome expectancy tendency mediates the relationship between optimistic and pessimistic personality traits and mood states. The research model is shown in Fig. 1.

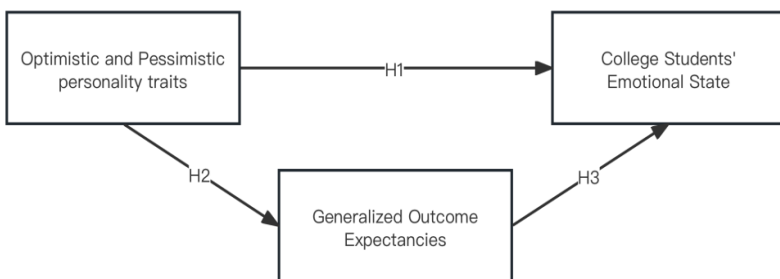


Fig. 1. Research framework of the influence mechanism of mood state

3 Methods

3.1 Subjects and Procedures

3.1.1 Study 1: Main Effect Measurement of Individuals' Stable Personality Traits Influencing Mood States

Hypothesis 1: Long-term stable optimistic and pessimistic personality traits have positive effects on individuals' positive and negative mood states, respectively.

Thirty subjects were randomly selected from the 589 subjects in the questionnaire to start the experiment. They were equally divided into pessimistic and optimistic groups based on their questionnaire scores. Both groups showed similar arousal levels and emotional states at a calmness level.

Profile Of Mood States were used to identify emotions across seven dimensions and categorize them as positive, neutral, or negative. Subjects provided basic information, completed the attributional style questionnaire, and were classified into optimistic and pessimistic personalities. They then viewed nine sets of emotionally arousing pictures and completed the emotion scale. The specific experimental procedure is as Fig. 2:

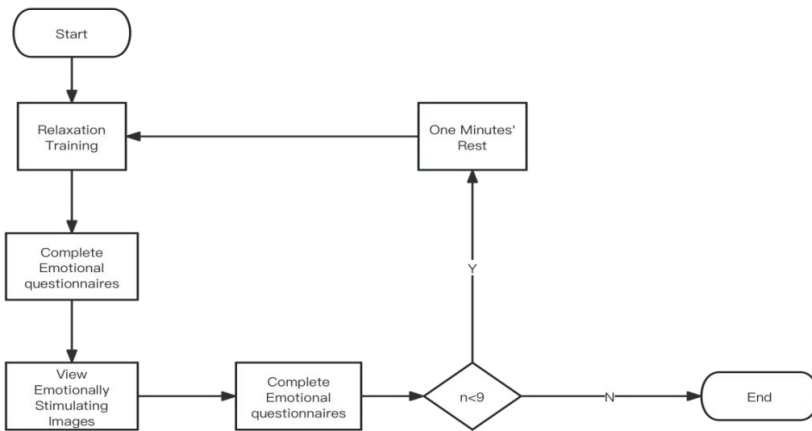


Fig. 2. Empirical Process

3.1.2 Study 2: Generalized Outcome Expectancies in Personality and Emotions

Hypothesis 2: Generalized Outcome Expectancies align with an individual's personality traits over time. Hypothesis 3: These expectancies mediate the relationship between Personality Traits and Emotional States.

Using G*Power3.1, 210 subjects were estimated (Effect Size=0.5, $\alpha=0.01$, Power=0.95). 612 questionnaires were collected from university students in Wuhan, with 589 valid after excluding 23. 105 data points from each optimistic and pessimistic group were selected.

A one-way within-subjects design was used, controlling for gender, grade, and psychiatric history. The primary dependent variable was the subjects' general outcome expectancy tendency. Randomization was used to group subjects and exclude bias based

on demographics. Subjects were then grouped by their optimistic and pessimistic tendencies, and their emotional states were measured. Another one-way within-subjects design was used, focusing on individual expectancy tendencies, while controlling for demographics. The primary dependent variable was the subject's emotional state.

3.2 Research Instruments

Study 1: (1) Attributional Style Questionnaire (ASQ): Measures attributional style with high reliability (overall standardized reliability of 0.943). (2) Geneva Emotion Picture Database (GAPED): Used for emotion induction. (3) Mood Measurement Scale: Records real-time emotional responses using a short-form POMS scale with added narrative option.

Study 2: (1) The Life Orientation Test Revised (LOT-R), developed by Scheier et al.¹¹, assesses subjects' expectations of future life outcomes. With an overall standardized reliability of 0.631, it measures an individual's tendency toward happiness/pessimism. (2) General Situation Questionnaire: Self-developed. (3) BPOMS: Assesses emotional state with high reliability (Cronbach's $\alpha=0.972$) using the Chinese norm of the Brief POMS.

4 Results

4.1 Descriptive Statistics

In Study 1, all total scores for the normality test were >0.05 , indicating a normal data distribution, as presented in Table 1.

Table 1. Normality Test

Test for Normality							
Variable	Group	Kolmogorov-Smirnov (V) ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Total Positivity Score	Negative	0.165	15	0.200*	0.905	15	0.115
	Positive	0.118	15	0.200*	0.957	15	0.635
Total Negativity Score	Negative	0.228	15	0.035	0.886	15	0.059
	Positive	0.161	15	0.200*	0.925	15	0.229
Total Neutrality Score	Negative	0.164	15	0.200*	0.906	15	0.116
	Positive	0.148	15	0.200*	0.94	15	0.378

Note: *. Lower bound of true significance; a. Significance correction according to Lilliefors.

The descriptive statistics for the variables of interest are presented in Table 2.

Table 2. Descriptive Statistics

Demo- graphic Varia- bles	University Area					Total (589)	χ^2	p
	Tier 1 cit- ies(117)	new Tier 1 cit- ies(159)	Tier 2 cit- ies(199)	Tier 3 cities(80)	Other cities(34)			
Grade								
Fresh- man	31%(36)	23%(37)	14%(27)	18%(14)	21%(7)	21%(121)		
Sopho- more	39%(45)	50%(80)	59%(117)	48%(38)	47%(16)	50%(296)	28.705(12)	0.004
Junior	18%(21)	21%(34)	21%(42)	29%(23)	30%(10)	22%(130)		
Senior	13%(15)	5%(8)	7%(13)	6%(8)	3%(1)	7%(42)		
Gender								
Female	55%(64)	60%(95)	56%(111)	56%(45)	62%(21)	57%(336)	1.197(4)	0.879
Male	45%(53)	40%(64)	44%(88)	44%(80)	39%(13)	43%(253)		
History of Men- tal Ill- nesses								
Yes	17%(20)	24%(38)	22%(43)	16%(13)	15%(5)	20%(119)	3.705(4)	0.447
No	83%(97)	76%(159)	78%(156)	84%(67)	85%(29)	80%(470)		

Optimistic and pessimistic groups (105 each) were compared using the Mann-Whitney U test. Results in Table 3 and Table 4 show significant differences in stable personality traits and general outcome expectancy tendencies between the groups. Individuals with optimistic and pessimistic tendencies also significantly differed in personality traits and emotional states.

Table 3. Normality Test

Test for Normality						
	Kolmogorov-Smirnov (V)a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
ASQ	0.190	105	0.000	0.849	105	0.000
LOT-R	0.126	105	0.000	0.941	105	0.000
POMS	0.109	105	0.004	0.963	105	0.005

Note: a. Significance correction according to Lilliefors.

Table 4. Non-parametric Rank Sum Test

Non-parametric Rank Sum Test				
Variable	Optimistic Group	Pessimistic Group	z	p
ASQ	153.00(150,164)	88.00(75,100.5)	-12.524	0.000**
LOT-R	5.00(2,7)	0.00(-1,0)	-11.383	0.000**
POMS	126.00(111,151.5)	162.00(152,176)	9.421	0.000**

Note: *p<0.05**p<0.01

4.2 Analyzing optimistic and pessimistic personality effects on mood

The analysis showed little difference in the impact of optimistic and pessimistic personality in positive and neutral situations. However, in negative situations, pessimistic personality led to a more negative emotional state (see Table 5), confirming Hypothesis 1.

Table 5. t-Test

t-Test					
Main Variable			M±SD	t	p
Emotional Score	Total Positivity Score	Negative	3.8±3.57	0.291	0.774
		Positive	3.4±3.96	0.291	0.774
	Total Negativity Score	Negative	22.2±5.51	3.122	0.004*
		Positive	16.67±4.10	3.122	0.004*
	Total Neutrality Score	Negative	10.40±3.44	0.061	0.952
		Positive	10.33±2.49	0.061	0.952

*. Significant at 0.05 level (two-tailed).

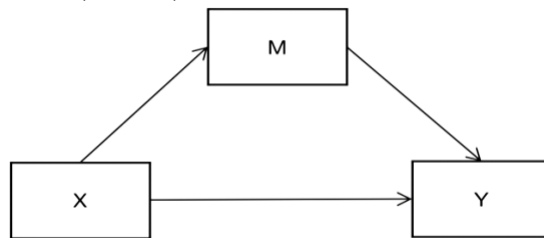


Fig. 3. Intermediary model Model 4

To validate general outcome expectancy as a mediator between personality traits and emotional states, this study employed a bias-corrected, nonparametric percentile Bootstrap method to test for mediation effects using a simple mediation model (Model 4, Fig. 3).

Table 6. Descriptive statistics and correlations for each variable (N=210)

	M	SD	ASQ	LOT-R	POMS
ASQ	149.26	12.586	1		
LOT-R	1.98	3.661	0.742**	1	
POMS	146.01	27.947	-0.630**	-0.640**	1

**.

The mediation model results (Table 6) indicated that personality traits positively predicted general outcome expectancy tendency. When both entered the regression equation (Table 7), they both negatively predicted emotional state, confirming Hypothesis 2.

Table 7. Regression analyses of individual variables in the mediation model (N=210)

Variable	Model 1		Model 2		Model 3	
	β	t	β	t	β	t
Personality Trait	-1.2436	-10.0153	0.196	12.7595	-0.6023	-3.9508
Generalized Outcome Expectancies	-	-	-	-	-3.2724	-6.3219
R2	0.4376		0.4986		0.5298	
F	39.8836		50.9623		45.9649	

Note: Model 1 - Personality trait predicting emotional state; Model 2 - Personality trait predicting general outcome expectancy; Model 3 - Personality trait and general outcome expectancy jointly predicting emotional state.

The Bootstrap 95% CI for the mediating effect, as shown in Table 8, was significant, confirming that general outcome expectancy tendency partially mediated the impact of optimistic and pessimistic personality traits on mood states, accounting for 51.57% of the total effect, thus confirming Hypothesis 3.

Table 8. Generalized outcome expectancies tendency mediating effect analysis

	Effect Size	Standard Error	Bootstrap 95%CI			Proportion of Total Effect
			Lower Limit	Upper Limit		
Total Effect	-1.2436	0.1242	-1.4884	-0.9988		
Direct Effect		-0.6023	0.1525	-0.9029	-0.3017	
Indirect Effect		-0.6413	0.1293	-0.9159	-0.4061	51.57%

5 Conclusions

(1) Long-term stable optimistic and pessimistic personality traits positively affect individuals' emotional state. Pessimistic personality exhibits a more negative emotional state in negative situations, consistent with trait congruence theory. According to the Cognitive Appraisal Theory of Emotion, pessimistic mindsets distort cognition, affecting emotions, motivation, and interpersonal relationships, perpetuating a cyclic pattern of feelings and behaviors.

(2) Personality traits positively predicted general outcome expectancy tendencies, which in turn negatively predicted emotional states. Optimistic and pessimistic individuals differed significantly in both personality traits and emotional states, establishing a new dimension in research and providing theoretical references for future studies.

(3) Personality traits predicted general Outcome Expectancy Tendencies, which in turn predicted emotional states. Optimistic and pessimistic individuals differed significantly in both, offering a new dimension in research for future studies.

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References

1. Adiukwu F., Ojeahere M., Adesokun O. & Babalola G. (2022) Mental health distress during the COVID-19 pandemic in Nigeria: Need for psychological intervention. *South African Journal of Psychiatry*, 28(0): e1-e6.
2. Mingguo W., Donghai X. (2011) Research on Traumatic Psychological Disorders and Rescue for Major Disaster Event Groups [J]. *Journal of Wuhan University of Technology (Social Science Edition)*, 24(06): 800-805
3. Juanjuan W., Xue Z, Ling Z. (2007) Review of Optimistic Research Abroad [J]. *Progress in Psychological Science*, (1): 129-133
4. Carver C S, Scheier M F. Dispositional optimism[J]. *Trends in cognitive sciences*, 2014, 18(6):293-299.
5. Segerstrom S. C. Optimism and Attentional Bias for Negative and Positive Stimuli[J]. *Personality and Social Psychology Bulletin*, 2001, 27(10):1334-1343.
6. Algom D, Chajut E, Lev S. A rational look at the emotional stroop phenomenon: a generic slowdown, not a stroop effect[J]. *Journal of experimental psychology: general*, 2004, 133(3):323-338.
7. Kai W. (2022) *Experimental Design and Analysis of Emotion Recognition* [D]. Harbin Institute of Technology, DOI: 10.27061/d.cnki.ghgdu.2021-003467
8. Pu Z, Conghui L, Guoliang Y. (2012) Review of emotional induction methods [J]. *Progress in Psychological Science*, 20 (01): 45-55
9. Scheier M F, Carver C S. Dispositional optimism and physical wellbeing: the influence of generalized outcome expectancies on health. *Journal of Personality*, 1987, 55:169-210.
10. Sha T. (2006) The relationship between optimism, pessimism, and depression, as well as the regulatory effects of stress and gender [J]. *Journal of Psychology*, (06): 886-901
11. Scheier M F, Carver C S, Bridges M W. Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): a reevaluation of the life orientation test[J]. *Journal of personality and social psychology*, 1994, 67(6):1063-1078.

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