

The Relationship Between Psychological Flexibility and Depression, Anxiety and Stress: A Latent Profile Analysis

Jing Wang¹, Shuanghu Fang¹, Chunying Yang², Xiaobin Tang³, Luosha Zhu³, Yu Nie⁴

¹School of Educational Science, Anhui Normal University, Wuhu, People's Republic of China; ²School of Special Education, Zhengzhou Normal University, Zhengzhou, People's Republic of China; ³School of Marxism, Anhui Normal University, Wuhu, People's Republic of China; ⁴Office of Student Affairs, Anhui Normal University, Wuhu, People's Republic of China

Correspondence: Shuanghu Fang, Email fsh9075@163.com

Purpose: To explore the potential classification of psychological flexibility (PF) among Chinese college students, analyze whether there is group heterogeneity in PF, and discuss the differences in the latent profile of PF in the negative emotions of depression, anxiety, and stress.

Methods: A total of 1769 college students were investigated using the Psychological Flexibility Questionnaire and Depression-Anxiety-Stress Self-rating Scale, and heterogeneity was tested by latent profile analysis.

Results: The PF of college students can be divided into three latent profiles: self-contradiction group (19.2%), high PF group (34.1%), and low PF group (46.7%). The scores of depression, anxiety, and stress are significantly different among the groups.

Conclusion: There is obvious group heterogeneity in the PF of college students, and they can be divided into the self-contradiction group, the high PF group, and the low PF group. The self-contradiction and low PF groups score significantly higher on the negative emotions of depression, anxiety, and stress than the high PF group.

Keywords: acceptance and commitment therapy, psychological flexibility, negative emotions, latent profile analysis

Introduction

In the early 1990s, American psychologist Hayes creatively proposed Acceptance and Commitment Therapy (ACT), known as the “third wave” of behavior therapy which expanded the first and second generation of behavioral tradition.^{1,2} ACT is based on functional contextualism and relational frame theory.^{3,4} ACT does not focus on alleviating symptoms or changing the content or form that disturbs cognition. Its main purpose is to change how clients handle problems and think.⁵ Symptom relief is the subsequent result, and its core goal is to improve psychological flexibility (PF). Psychological flexibility refers to a psychological trait in which individuals consciously experience the present moment, adjust their perspectives according to their value orientation, adapt to changing internal and external environments, and focus on valuable actions to achieve life goals and self-worth. Based on the basic concept of PF and the analysis of numerous clinical cases, Hayes concluded a PF model that consists of six processes: cognitive defusion, acceptance, present moment awareness, self-as-context, values, and committed action, corresponding to six known psychological dimensions (emotion, cognition, attention, ego, motivation, and explicit behavior).^{6,7}

Hayes et al summarized the worldwide mediation literature on psychosocial interventions for mental health between 1985–2018 and identified 54,633 studies for inclusion in the title and abstract screening phase.⁸ Meta-analytic studies found that psychological flexibility was the most important variable for maintaining mental health. Hayes et al propose that psychological flexibility consists of three pillars: open, aware, and engagement.⁹ That is, the six processes of psychological flexibility can be defined in terms of three “dyadic” processes. The first process pillar of psychological flexibility is greater openness, corresponding to the traditional ACT model of cognitive defusion and experiential

acceptance. The second process pillar in ACT is greater awareness, there are two features of this pillar: present moment awareness and self-as-context. The final process pillar in ACT is values-based life engagement, which includes both values and committed action processes (dimensions). Francis et al developed a comprehensive assessment of acceptance and commitment therapy processes (CompACT) based on the psychological flexibility model.¹⁰ The CompACT is able to measure the three pillars of psychological flexibility (clustering ACT's six processes into three dyadic processes).

Depression, anxiety, and stress are three common negative emotions among college students and important indicators of mental health.¹¹ In recent years, the detection rate of negative emotions among college students has been increasing.^{12–16} A meta-analysis was conducted on the prevalence and influencing factors of major mental health problems among Chinese college students during 2010–2020, the results showed that The detection rate of anxiety was 13.7% and depression was 20.8%.^{17,18} 《Report on National Mental Health Development in China (2019–2020)》 shows that the detection rate of depressive symptoms among Chinese adolescents is 24.60%.¹⁹ The COVID-19 pandemic has accentuated mental health issues, Lu Lin Academician Team reported findings for 1000 survivors 20 months after diagnosis of COVID-19 in a community-based cohort in China, the mental symptoms were reported with the 48.3%, one-tenth mental cases need psychotherapy.²⁰ Therefore, it is necessary to understand which factors are associated with the reduction of depression, anxiety, and stress to carry out mental health education.

As an important protective factor for mental health,²¹ PF has been extensively studied in pathologic psychology, focusing on emotional and behavioral disorders.^{22,23} The research on PF in the psychological development of adolescents and college students has been expanding. Existing studies have explored the relationship between PF and self-compassion and the emotional health,²⁴ mindfulness, and behavior of college students.²⁵ Studies have found that PF is closely related to the negative emotions of college students.^{26,27} Specifically, PF has a predictive effect on negative emotions. The stronger the PF, the weaker the negative emotions of college students.^{24,28} These achievements enrich the research in this field but ignore the current state of heterogeneity among college students, which is caused by different research methods. Traditional research methods divide the subjects according to the total or average score of the questionnaire, which is highly practical in explaining the correlation of variables but cannot address the deficiency of category variables.

This study objectively examines the research object from the person-centered research perspective so as to reveal the characteristics of PF of college students more accurately. The first purpose of this study is to reveal the heterogeneity of PF among Chinese college students by latent profile analysis and to determine the PF subgroups according to the PF model that consists of six processes to analyze the status quo and characteristics of PF among college students. The second purpose is to investigate the relationship between PF and depression, anxiety and stress in college students, to understand the current situation of college students' negative emotions, so as to facilitate targeted intervention. A third objective is to explore the effects of gender, source of students, and student cadre on the latent profiles of PF, which allows us to use different intervention pathways and strategies depending on the focus of the intervention when using ACT with different latent profiles of college students.

Methods

Participants

After convenient sampling, 1800 paper questionnaires were sent to two universities in Anhui Province, China. A total of 1769 valid questionnaires were obtained, with an effective recovery rate of 98.3%. All subjects consented to this study. The specific procedures are as follows: First, determine the school and major to be investigated, contact the student counselor or the course teacher and obtain consent, and conduct the formal on-site test according to the schedule arranged in advance. Before the test, we introduced the purpose, filling instructions, and precautions of the questionnaire to the subjects emphasized the principle of voluntary confidentiality, and required the subjects to answer seriously according to their real situation. The informed consent was issued with the questionnaire, and the time for the subjects to complete the questionnaire was about 20–25 minutes. The sample includes 1108 females (62.6%) and 661 males (37.4%) whose age was 18 to 23 years old, with an average age of 19.28 ± 0.99 . Table 1 shows the demographic information.

Table 1 Demographic Information

Variables	Value	Number	Proportion of the Total Population (%)
Gender	Male	661	37.40
	Female	1108	62.60
Grade	Freshman	1171	66.20
	Sophomore	531	30.00
	Junior	67	3.80
Source of students	Urban area	746	42.20
	Rural area	1023	57.80
Only child or not	Only child	605	34.20
	Non-only child	1164	65.80
Major	Humanities and social sciences	454	25.70
	Science and Engineering	644	36.40
	Medical Science	671	37.90
Student cadre	Yes	530	30.00
	No	1239	70.00
The experience of falling behind	Yes	875	49.5
	No	894	50.5

Measures

Comprehensive Assessment of Acceptance and Commitment Therapy Processes

Comprehensive assessment of Acceptance and Commitment Therapy processes (CompACT) is a combination of 11 ACT process assessment tools developed by Francis using the Delphi method.¹⁰ The Chinese version, revised by Shuanghu Fang et al, consists of 18 items and is divided into Openness to Experience (OE), Behavioral Awareness (BA), and Valued Action (VA) dimensions.²⁹ The OE dimension contains 6 items (1–6 questions), the BA dimension contains 5 items (7–11 questions), and the VA dimension contains 7 items (12–18 questions). A 7-point scale was used, ranging from 0 (completely false) to 6 (completely true), and the score of all items was summed. The higher the score is, the higher the PF level of the individual. In this study, the Cronbach α coefficient of CompACT was 0.75.

Depression Anxiety Stress Scale (DASS-21)

The DASS-21, developed by Lovibond et al,³⁰ is a measurement tool used to define common mood disorders such as depression, anxiety, and stress. The Chinese version contains 21 items, including three subscales of depression, anxiety, and stress. There are 7 items of depression factors (3, 5, 10, 13, 16, 17, and 21), 7 items of anxiety factors (2, 4, 7, 9, 15, 19, and 20), and 7 items of stress factors (1, 6, 8, 11, 12, 14 and 18), scored with 4 points, from 0 (totally inconsistent) to 3 (completely consistent). The scores of all items were summed. The higher the score is, the stronger the negative emotional experience is. In this study, the Cronbach α coefficient of DASS-21 was 0.96.

Data Analysis

Latent variable modeling plays an important role in many fields, such as psychology.³¹ This method can effectively mine data information on category variables and divide research objects into different potential groups through observable continuous variables.³² Based on the discussion of heterogeneity within the group, effective interventions are put forward according to the characteristics of the homogenous group, which is significant for solving practical problems.

Firstly, latent profile analysis was conducted with 18 items of PF as explicit indexes using Mplus8.3 software. The Akaike information criterion (AIC), Bayesian information criterion (BIC), sample-size-adjusted BIC (aBIC), Entropy index, Lo-Mendell-Rubin correction likelihood ratio (LMR) test and Bootstrapped Likelihood Ratio Test (BLRT) was taken as adaptation indexes, with the number of potential categories in the model increased from 1 to 5. The fit of AIC, BIC, aBIC, Entropy, LMR, and BLRT was observed. The smaller the values of AIC, BIC, and aBIC are, the better the model fitting is. Entropy ranges from 0 to 1, with a higher value indicating a more accurate classification of latent profiles. Lubke and Muthén have shown that Entropy greater than 0.8 means correctly classified cases of more than 90% and an acceptable model.³³ The LMR test in tech11 and the BLRT test in tech14 were used to compare the differences in model fitting. The LMR and BLRT reached a significant level ($p < 0.05$), indicating that the k-class model was superior to the K-1 class model.³⁴ After the latent profile of PF was determined, the heterogeneity of PF among college students and the difference in latent profiles in depression, anxiety, and stress were tested by the variance analysis post-test method in SPSS26.0 software. Then, ANOVA and Chi-square were used to test whether there were significant differences in demographic variables among college students with different latent profiles. When $p < 0.05$, the difference was considered statistically significant.

Results

Common Method Deviation Test

Harman's single-factor test method was used to perform Exploratory Factor Analysis (EFA, unrotated) on all the original items in the study. The test results showed that KMO=0.956. The chi-square of the Bartlett spherical test was 39,147.419 ($p < 0.001$), and there were 5 factors with characteristic roots greater than 1. The variance interpretation rate of the first common factor was 32.03%. Generally, the variation of single-factor explanation does not exceed 40%, indicating no serious common methodology bias in this study.

Latent Profile Analysis of PF Among College Students

Taking 18 items of PF as indexes, the types of PF among college students were divided into 1, 2, 3, 4, and 5 categories to estimate the model fit of latent profile analysis. The results showed that AIC and BIC values decreased with the increase in model categories, indicating that model 3 was superior to model 2, Model 4 was superior to model 3, and model 5 was superior to model 4. Additionally, LMR and BLRT reached a significant level in model 2, model 3, and model 4. The LMR value of model 5 was not significant, indicating that the fitting effect of model 5 was not good. Category models 2, 3, and 4 can be considered. A comparison of the Entropy indicator showed that models 3 and 4 had the highest Entropy value. Based on the three pillars model of psychological flexibility, model 3 has more theoretical basis than model 4. Further analysis revealed that model 4 had a small group, and the model lacks heterogeneity and accuracy. Model 3 was qualitatively different from the trajectories that emerged in model 4, so we kept model 3, which is consistent with previous studies.^{35,36} Further analysis revealed that model 4 had a small group. The attribution probability matrix results showed that the average probability of college students in the three categories belonging to each latent profile was greater than 91%. Rost believed that the classification model with an average probability greater than 0.8 is credible.³⁷ Thus, model 3 was retained as the latent profile analysis model. Detailed fitting information is shown in Table 2.

Naming the Latent Profiles of the PF of the College Students

Figure 1 shows that the conditional mean values of the 3 latent profiles on the 18 items of PF are significantly different. According to the three dimensions of the Chinese version of the CompACT, the latent profiles of the PF of college students can be named according to the different scores of the three groups on OE, BA, and VA. The first group (C1) included 339 people, accounting for 19.2%. Team score differences existed in the three dimensions, with lower scores on the OE and BA dimensions and higher scores on the VA dimension. This result showed that although the college students in C1 could take effective action based on the value orientation of people, they could not actively face and accept the internal experience; their cognitive dissociation ability was weak, and their awareness of their current states was low. This group can be named as "self-contradiction group". There were

Table 2 Fitting Information of Latent Profile Analysis

Model		AIC	BIC	aBIC	Entropy	LMR _p	BLRT _p	n (%)	Probability of Attribution
C1		107,571.364	107,768.578	107,654.209	–	–	–		
C2		104,035.037	104,336.336	104,161.606	0.846	<0.001	<0.001		
	C2 _{K1}							1170 (66.1)	0.969
	C2 _{K2}							599 (33.9)	0.929
C3		101,461.859	101,867.244	101,632.151	0.858	<0.001	<0.001		
	C3 _{K1}							339 (19.2)	0.915
	C3 _{K2}							603 (34.1)	0.938
	C3 _{K3}							827 (46.7)	0.944
C4		100,269.240	100,778.710	100,483.256	0.858	<0.001	<0.001		
	C4 _{K1}							623 (35.2)	0.926
	C4 _{K2}							619 (35.0)	0.912
	C4 _{K3}							358 (20.2)	0.918
	C4 _{K4}							169 (9.6)	0.932
C5		99,186.823	99,800.378	99,444.563	0.879	0.476	<0.001		
	C5 _{K1}							78 (4.4)	0.946
	C5 _{K2}							246 (13.9)	0.908
	C5 _{K3}							687 (38.9)	0.927
	C5 _{K4}							593 (33.5)	0.914
	C5 _{K5}							165 (9.3)	0.926

Abbreviations: C, class; AIC, akaike information criterion; BIC, bayesian information criterion; aBIC, sample-size-adjusted BIC; LMR, Lo-Mendell-Rubin correction likelihood ratio; BLRT, Bootstrapped Likelihood Ratio Test.

603 students in the second group (C2), with a proportion of 34.1%. The scores of this group were at a medium level on the OE dimension and a relatively high level on the BA and VA dimensions. This result indicated that the college students in C2 were open to their internal experience, could perceive the environment and physical and mental activities at the moment, and could take action to realize their value. This group can be named as “high PF group”. The third group (C3) had 827 students, accounting for 46.7%. The scores of this group on OE, BA, and VA did not differ greatly and were at a low level, indicating the relatively low PF of the college students in C3. This group can be named as “low PF group”. The conditional mean values of the 3 latent profiles of the PF of college students on the 18 items are shown in [Figure 1](#).

Comparison of the PF Scores of College Students with Different Latent Profiles

To explore whether the latent profiles of the PF of college students are heterogeneous, the three latent profiles were compared. The results of variance analysis showed that the scores of the PF and three dimensions of college students with different latent profiles were significantly different ($p < 0.001$). The results of the a posteriori test showed that the overall score of the PF of the high PF group was significantly higher than that of the low PF group, and the overall score of the PF of the low PF group was significantly higher than that of the self-contradiction group. Regarding the OE dimension, the low PF group had a significantly higher score than the high PF group, and the high PF group had a significantly higher score than the self-contradiction group. On the BA dimension, the score of the high PF group was significantly higher than that of the low

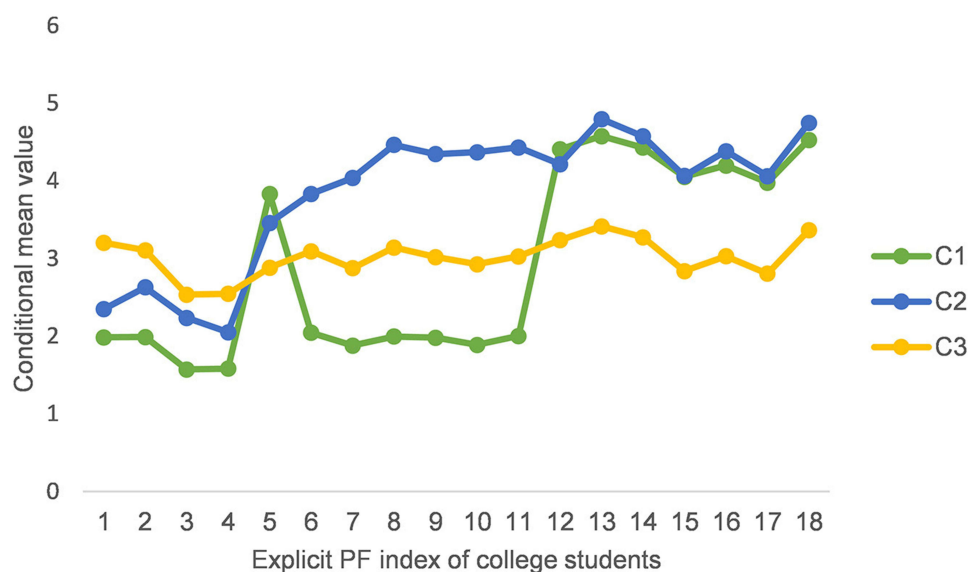


Figure 1 Conditional mean values of the 3 latent profiles on the 18 items.

Abbreviation: C, class.

PF group, and the score of the low PF group was significantly higher than that of the self-contradiction group. As for the VA dimension, the high PF group had a significantly higher score than the self-contradiction group, and the self-contradiction group had a significantly higher score than the low PF group. The details are listed in Table 3.

Comparison of the Scores of Depression, Anxiety, and Stress of College Students with Different Latent Profiles

To explore whether college students with different latent profiles differ significantly in depression, anxiety, and stress, the scores of depression, anxiety, and stress of college students with the three latent profiles were compared. The results of variance analysis showed significant differences in the scores of depression, anxiety, and stress among college students with different latent profiles ($p < 0.001$). The results of the a posteriori test showed that the total score of the DASS and the scores of depression, anxiety, and stress were significantly higher in the self-contradiction group than in the high PF group; those were significantly higher in the low PF group than

Table 3 Comparison of the PF Scores of College Students with Different Latent Profiles

Variables	Class 1 Self-Contradiction Group	Class 2 High PF Group	Class 3 Low PF Group	F	LSD
CompACT	52.86±5.92	69.09±8.42	54.15±7.06	863.01***	2>3>1
Openness to Experience	12.89±3.63	16.6±5.27	17.37±3.96	127.94***	3>2>1
Behavioral Awareness	9.7±3.77	21.69±3.6	14.9±3.92	1182.46***	2>3>1
Valued Action	30.27±4.42	30.8±4.79	21.88±4.33	826.92***	2>1>3

Notes: N=1769, data is M±SD, * $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$.

Abbreviations: PF, psychological flexibility; CompACT, comprehensive assessment of acceptance and commitment therapy; LSD, Least Significant Difference.

Table 4 Comparison of the Scores of Depression, Anxiety, and Stress of College Students with Different Latent Profiles

Variables	Class 1 Self-Contradiction Group	Class 2 High PF Group	Class 3 Low PF Group	F	LSD
DASS	19.69±13.65	9.65±9.91	20.31±12.8	149.99***	1>2, 3>2
Depression	5.99±4.88	2.31±3.36	6.24±4.78	155.79***	1>2, 3>2
Anxiety	6.48±4.73	3.24±3.45	6.67±4.52	126.74***	1>2, 3>2
Stress	7.22±4.63	4.11±3.82	7.4±4.22	120.15***	1>2, 3>2

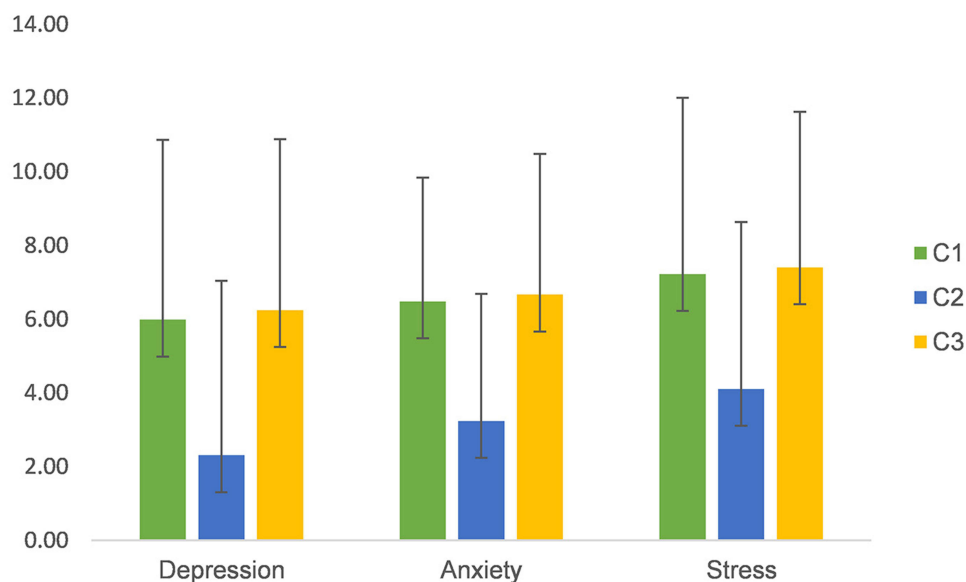
Notes: N=1769, data is M±SD, * $p<0.05$, ** $p<0.01$, and *** $p<0.001$.

Abbreviations: PF, psychological flexibility; DASS, depression anxiety stress scale; LSD, Least Significant Difference.

in the high PF group; no significant differences existed between the self-contradiction group and the low PF group. The details are shown in Table 4 and Figure 2.

Influences of Demographic Variables on the Latent Profile

To further understand the influences of demographic variables on the latent profile of the PF of college students, a difference test was conducted. The ANOVA and Chi-square results showed no significant differences among different types of college students in terms of age ($F=0.443$, $p<0.05$), but there are significant differences in gender ($\chi^2=16.922$, $p<0.001$), source of students ($\chi^2=9.738$, $p<0.01$), major ($\chi^2=14.496$, $p<0.01$), and student cadre ($\chi^2=8.625$, $p<0.05$). Multiple logistic regression analysis was performed with the classification results of latent profiles as dependent variables, gender, source of students, major, and student cadre as independent variables, and age as a covariable. The low PF group was used as the comparison reference category. The fitting test showed that the logistic model was statistically significant ($\chi^2=39.98$, $p<0.001$). Further analysis revealed that gender, source of students, and student cadre had statistically significant impacts on the latent profiles. According to the values of P and OR, male students had lower PF than female students (OR=0.719, $p<0.01$), urban college students had higher PF than rural students (OR=1.329, $p<0.05$), and students with student cadre experience had higher PF than ordinary students (OR=1.328, $p<0.05$). The details are shown in Table 5.

**Figure 2** Difference analysis of depression, anxiety, and stress among the three latent profiles.

Abbreviation: C, class.

Table 5 Results of Multiple Logistic Regression Analysis

Independent Variable	β	SE	Wald χ^2	OR	95% CI
Gender	-0.330	0.124	7.041	0.719**	0.564~0.917
Source of students	0.284	0.110	6.638	1.329*	1.070~1.650
Student cadre	0.284	0.119	5.716	1.328*	1.052~1.675

Notes: N=1769, * $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$.

Discussion

Latent Profile Characteristics and Heterogeneity of the PF of College Students

The main purpose of this study is to use latent profile analysis to explore the heterogeneity of the PF of college students. The responses of individuals to the 18 items indicated obvious grouping characteristics of the PF of college students. The statistical results supported three types of latent profile models, including the self-contradiction group (C1), the high PF group (C2), and the low PF group (C3). They had significant differences in the scores of different dimensions of PF, indicating the heterogeneity of the PF of college students. The three-classification model is consistent with the existing research results.^{35,36} Specifically, the college students in the self-contradiction group (19.2%) were characterized by a lack of balance in PF and large fluctuations in different dimensions. Although the number of this group is relatively small, their mental health problems should be paid high attention to. This group of university students should strengthen their skills in the two dimensions of openness and awareness.³⁸ The students in the high PF group (34.1%) were characterized by a moderate level of self-acceptance and high levels of self-awareness and value action. The students in the low PF group (46.7%) accounted for the highest proportion, the PF of such college students was relatively balanced but low. Because PF is an ability that can be improved by interventions,^{39,40} the PF of college students in this group can be gradually improved through the intervention of acceptance commitment therapy. This group of students should strengthen their overall training in the three dimensions of openness, awareness, and engagement.^{41,42}

Difference in the Latent Profiles of PF in Depression, Anxiety, and Stress

The results showed significant differences in the scores of depression, anxiety, and stress among the three groups of college students. The scores of the self-contradiction group and the low PF group were significantly higher than those of the high PF group. Specifically, compared with the college students in the high PF group, those in the self-contradiction group and the low PF group experienced more obvious depression, anxiety, and stress. These results indicated that the college students in the two groups had relatively high negative emotions, which may hurt their mental health and require concern. Existing studies have revealed that PF is a key factor in mental health,^{26,43} and low PF is closely related to high mental health problems,⁴⁴ which is consistent with the results of this study. No significant difference existed in the scores of depression, anxiety, and stress between the self-contradiction group and the low PF group, indicating that the college students in the two groups should be highly valued by educators. Based on the heterogeneity of the three groups of college students, the intervention should focus on the reasons for the college students in the self-contradiction group to improve their self-dissociation ability and self-awareness level.⁴⁵ For college students with low PF group, ACT should be considered for intervention,⁴⁶ and six core processes should be used to help them acquire positive psychological skills and gradually improve their PF.⁴⁷

Influences of Demographic Variables on the Latent Profile

The regression analysis results of demographic variables showed lower PF of male students than that of female students. Existing studies have illustrated that female students have stronger mindfulness experience than male students and are more prone to being influenced by negative emotions on them,⁴⁸ indicating that they are more likely to be aware of the current environment and personal physical and mental activities. Female students have higher PF, while male students need more attention in this area. Compared with rural students, urban college students have higher PF, which is not

surprising to us. According to the cultural reproduction theory,⁴⁹ urban children inherit more cultural capital in family education, which can help them achieve higher educational achievements. Based on this, we think urban college students may inherit more psychological capital in family education, so their PF is relatively high, which needs further verification in future studies. College students with student cadre experience have higher PF than ordinary students. Student cadre experience can provide college students with more opportunities to engage with society, accept new things and get along with people from different cultural backgrounds to expand their vision and improve their PF. These findings provide a clearer view to counselors of the profile of the broader spectrum of the psychological flexibility model to facilitate change in clients.

Limitations

This study has some limitations and deficiencies. First of all, this study only investigated college students in Anhui province and adopted convenient sampling, which may have regional bias and limited sample representativeness, so it can be sampled in a larger scope in the future. Secondly, this study is a cross-sectional study, which can only reflect the relationship between psychological flexibility and depression, anxiety, and stress of college students, and it is difficult to judge the causal relationship. Longitudinal tracking studies and new research methods could be used in the future. Thirdly, in terms of statistical model selection, we choose model 3 based on the theoretical model of ACT. In fact, the discussion on model 4 may also be meaningful, which can be further discussed in future research. In addition, the influence factors on the latent classification of the PF of college students need to be further discussed. Given these limitations, the findings from this study should be interpreted with caution.

Implications

Most of the previous studies were based on structural equation models. In this study, from the perspective of internal heterogeneity, the method of latent variable modeling was adopted to explore the latent profiles of the PF of college students, and the differences in the latent profiles of the PF of college students in depression, anxiety, and stress were analyzed, further enriching the research in the PF field. The following recommendations are presented based on the study findings and discussion.

For researchers, longitudinal tracking methods and other new approaches could be used in the future to explore the relationship between psychological flexibility and depression, anxiety, and stress in university students. Researchers can use Online Photovoice (OPV) to conduct research on the same or similar topics. OPV, as one of the latest and most effective innovative qualitative research methods, allows participants to express their own experiences with as little or no manipulation as possible compared to traditional quantitative methods.^{50,51} OPV is particularly suited to exploring psychological flexibility, depression, anxiety, and stress in university students. Future researchers could conduct only qualitative or mixed methods to see if OPV research on such topics is valid. In addition, the relationship between other relevant variables and the latent profile of the PF of college students could be further analyzed in future studies.

For mental health practitioners, it is important for them to be aware of the potential classification of psychological flexibility in university students and the differences in the latent profile of psychological flexibility in the negative emotions of depression, anxiety, and stress. On the basis of these findings, we assert that the comprehensive examination of an individual's psychological flexibility profile could help mental health professionals to tailor interventions/treatments that capitalize on the individual's specific strengths and work to address their specific deficits. Like the legs of a stool, when a person is open, aware, and active, a steady foundation is created for more flexible thinking, feeling, and behaving.⁹ ACT increases the psychological flexibility of participants by fostering a more open, aware, and active approach to living. This study suggests that we should adopt targeted ACT interventions to enhance the psychological flexibility of different types of individuals according to their different characteristics on the three dimensions of psychological flexibility and hence their psychological well-being.

Compliance with Ethical Standards

All the methods were performed in accordance with the Declaration of Helsinki. The study was approved by the Ethical Committee of Anhui Normal University. Informed consent was obtained from all individual participants included in the study.

Acknowledgments

We would also like to thank EssentialsLink Language Services for its linguistic assistance.

Funding

This study was funded by the Philosophy and Social Sciences Planning Project of Anhui Province (AHSKQ2021D45).

Disclosure

The authors report no conflicts of interest in this work.

References

1. Tanhan A. Acceptance and commitment therapy with ecological systems theory: addressing Muslim mental health issues and wellbeing. *J Posit Schl Psychol*. 2019;3(2):197–219. doi:10.47602/jpsp.v3i2.172
2. Tanhan A *Spiritual Strength: the use of Acceptance and Commitment Therapy (ACT) with Muslim clients* [Unpublished master's thesis] Rochester, NY: University of Rochester; 2014. Available from: <https://www.researchgate.net/publication/357164226>. Accessed March 21, 2023.
3. Hayes SC, Luoma JB, Bond FW, Masuda A, Lillis J. Acceptance and commitment therapy: model, processes and outcomes. *Behav Res Ther*. 2006;44(1):1–25. doi:10.1016/j.brat.2005.06.006
4. Hayes SC. Acceptance and commitment therapy, relational frame theory, and the third wave of behavioral and cognitive therapies - republished article. *Behav Ther*. 2016;47(6):869–885. doi:10.1016/j.beth.2016.11.006
5. Harris R. Embracing your demons: an overview of acceptance and commitment therapy. *Aust Psychol*. 2006;12(4):2–8. doi:10.3316/informit.545561433272993
6. Hayes SC. Acceptance and commitment therapy: towards a unified model of behavior change. *World Psychiatry*. 2019;18(2):226–227. doi:10.1002/wps.20626
7. Hayes SC. Constructing a liberated and modern mind: six pathways from pathology to euthymia. *World Psychiatry*. 2020;19(1):51–52. doi:10.1002/wps.20715
8. Hayes SC, Ciarrochi J, Hofmann SG, Chin F, Sahdra B. Evolving an idionomic approach to processes of change: towards a unified personalized science of human improvement. *Behav Res Ther*. 2022;156:104155. doi:10.1016/j.brat.2022.104155
9. Hayes SC, Villatte M, Levin M, Hildebrandt M. Open, aware, and active: contextual approaches as an emerging trend in the behavioral and cognitive therapies. *Annu Rev Clin Psychol*. 2011;7:141–168. doi:10.1146/annurev-clinpsy-032210-104449
10. Francis AW, Dawson DL, Golijani-Moghaddam N. The development and validation of the comprehensive assessment of acceptance and commitment therapy processes (CompACT). *J Cont Behav Sci*. 2016;5(3):134–145. doi:10.1016/j.jcbs.2016.05.003
11. Lovibond PF, Lovibond SH. The structure of negative emotional states: comparison of the Depression Anxiety Stress Scales (DASS) with the beck depression and anxiety inventories. *Behav Res Ther*. 1995;33(3):335–343. doi:10.1016/0005-7967(94)00075-u
12. Ibrahim AK, Kelly SJ, Adams CE, Glazebrook C. A systematic review of studies of depression prevalence in university students. *J Psychiatr Res*. 2013;47(3):391–400. doi:10.1016/j.jpsychires.2012.11.015
13. Beiter R, Nash R, McCrady M, et al. The prevalence and correlates of depression, anxiety, and stress in a sample of college students. *J Affect Disord*. 2015;173:90–96. doi:10.1016/j.jad.2014.10.054
14. Guo X, Meng Z, Huang G, et al. Meta-analysis of the prevalence of anxiety disorders in mainland China from 2000 to 2015. *Sci Rep*. 2016;6:28033. doi:10.1038/srep28033
15. Lun KW, Chan CK, Ip PK, et al. Depression and anxiety among university students in Hong Kong. *Hong Kong Med J*. 2018;24(5):466–472. doi:10.12809/hkmj176915
16. Gao L, Xie Y, Jia C, Wang W. Prevalence of depression among Chinese university students: a systematic review and meta-analysis. *Sci Rep*. 2020;10(1):15897. doi:10.1038/s41598-020-72998-1
17. Chen Y, Zhang Y, Yu G. Prevalence of mental health problems among college students in mainland China from 2010 to 2020: a meta-analysis. *Adv Psychol Sci*. 2022;30(5):991. doi:10.3724/SP.J.1042.2022.00991
18. Yu G. Chinese students' mental health problems: the detection rate and educational implications. *Tsinghua J Educ*. 2022;43(04):20–32. doi:10.14138/j.1001-4519.2022.04.002013
19. Fu X, Zhang K, Chen X. *Report on National Mental Health Development in China (2019–2020)*. Beijing, China: Social Sciences Academic Press; 2021.
20. Zhao Y, Shi L, Jiang Z, et al. The phenotype and prediction of long-term physical, mental and cognitive COVID-19 sequelae 20 months after recovery, a community-based cohort study in China. *Mol Psychiatry*. 2023;2023:1–9. doi:10.1038/s41380-023-01951-1
21. Larsson A, Hartley S, McHugh L. A randomised controlled trial of brief web-based acceptance and commitment Therapy on the general mental health, depression, anxiety and stress of college Students. *J Contextual Behav Sci*. 2022;24:10–17. doi:10.1016/j.jcbs.2022.02.005
22. Luoma J, Drake CE, Kohlenberg BS, Hayes SC. Substance abuse and psychological flexibility: the development of a new measure. *Addict Res Theory*. 2011;19(1):3–13. doi:10.3109/16066359.2010.524956
23. White ZL. *Self-Concealment, Psychological Flexibility, and Severity of Eating Disorders*. Columbia University; 2018.
24. Marshall EJ, Brockman RN. The relationships between psychological flexibility, self-compassion, and emotional well-being. *J Cogn Psychother*. 2016;30(1):60–72. doi:10.1891/0889-8391.30.1.60

25. Ashe SC. *The Relationship Between Psychological Flexibility, Mindfulness, and Goal-Directed Behaviors Controlled by Executive Function*. Southern Illinois University at Carbondale; 2018.
26. Kashdan TB, Rottenberg J. Psychological flexibility as a fundamental aspect of health. *Clin Psychol Rev*. 2010;30(7):865–878. doi:10.1016/j.cpr.2010.03.001
27. Doorley JD, Goodman FR, Kelso KC, Kashdan TB. Psychological flexibility: what we know, what we do not know, and what we think we know. *Soc Personal Psychol Compass*. 2020;14(12):1–11. doi:10.1111/spc3.12566
28. Uğur E, Kaya Ç, Tanhan A. Psychological inflexibility mediates the relationship between fear of negative evaluation and psychological vulnerability. *Curr Psychol*. 2021;40(9):4265–4277. doi:10.1007/s12144-020-01074-8
29. Fang S, Huang M. Revision and reliability and validity evaluation of the Chinese version of comprehensive assessment of acceptance and commitment therapy processes (CompACT) in college students. *Chin J Clin Psychol*. 2023;31(01):121–126. doi:10.16128/j.cnki.1005-3611.2023.01.022
30. Lovibond SH, Lovibond PF. *Manual for the Depression Anxiety Stress Scales*. Psychology Foundation of Australia; 1996.
31. Carragher N, Adamson G, Bunting B, McCann S. Subtypes of depression in a nationally representative sample. *J Affect Disord*. 2009;113(1–2):88–99. doi:10.1016/j.jad.2008.05.015
32. McLachlan GJ, Peel D. Finite mixture model. *Technometrics*. 2000;44:1. doi:10.1002/0471721182
33. Lubke G, Muthén BO. Performance of factor mixture models as a function of model size, covariate effects, and class-specific parameters. *Struct Equ Modeling*. 2007;14(1):26–47. doi:10.1080/10705510709336735
34. Asparouhov T, Muthén B. Using Mplus TECH11 and TECH14 to test the number of latent classes. *Mplus Web Notes*. 2012;14(22):1–17.
35. Tyndall I, Waldeck D, Pancani L, Whelan R, Roche B, Pereira A. Profiles of psychological flexibility: a latent class analysis of the acceptance and commitment therapy model. *Behav Modif*. 2020;44(3):365–393. doi:10.1177/0145445518820036
36. Bi D, Li X. Psychological flexibility profiles, college adjustment, and subjective well-being among college students in China: a latent profile analysis. *J Contextual Behav Sci*. 2021;20:20–26. doi:10.1016/j.jcbs.2021.01.008
37. Rost J. Latent-class-analyse. *Handbuch der psychologischen Diagnostik*. 2006;4:275–287.
38. Levin ME, Hildebrandt MJ, Lillis J, Hayes SC. The impact of treatment components suggested by the psychological flexibility model: a meta-analysis of laboratory-based component studies. *Behav Ther*. 2012;43(4):741–756. doi:10.1016/j.beth.2012.05.003
39. Wersebe H, Lieb R, Meyer AH, Hofer P, Gloster AT. The link between stress, well-being, and psychological flexibility during an acceptance and commitment therapy self-help intervention. *Int J Clin Health Psychol*. 2018;18(1):60–68. doi:10.1016/j.ijchp.2017.09.002
40. Uğur E, Koç M. The effectiveness of acceptance and commitment therapy based psychoeducation program in reducing fear of negative evaluation. *Turkish Psychol Couns Guid J*. 2021;11(60):101–110.
41. Räsänen P, Muotka J, Lappalainen R. Examining mediators of change in wellbeing, stress, and depression in a blended, Internet-based, ACT intervention for university students. *Internet Interv*. 2020;22:100343.
42. Zhao C, Wampold BE, Ren Z, Zhang L, Jiang G. The efficacy and optimal matching of an Internet-based acceptance and commitment therapy intervention for depressive symptoms among university students: a randomized controlled trial in China. *J Clin Psychol*. 2022;78(7):1354–1375. doi:10.1002/jclp.23329
43. Tanhan A, Çiçek İ, Uğur E, Nalbant A, Kalenderoglu A. Counseling's effect on psychological flexibility: a quasi experimental study. *E-Int J Educ Res*. 2022;13:2. doi:10.19160/e-ijer.1063518
44. Bond FW, Hayes SC, Baer RA, et al. Preliminary psychometric properties of the Acceptance and Action Questionnaire-II: a revised measure of psychological inflexibility and experiential avoidance. *Behav Ther*. 2011;42(4):676–688. doi:10.1016/j.beth.2011.03.007
45. Hayes L, Ciarrochi J, Bailey A. *What Makes You Stronger: How to Thrive in the Face of Change and Uncertainty Using Acceptance and Commitment Therapy*. Oakland, CA: New Harbinger Publications; 2022.
46. Wang J, Fang S. Effects of Internet-Based Acceptance and Commitment Therapy (IACT) on adolescents: a systematic review and meta-analysis. *Int J Ment Health Promot*. 2023;2023:25304. doi:10.32604/ijmhp.2023.025304
47. Harris R. *ACT Made Simple: An Easy-To-Read Primer on Acceptance and Commitment Therapy*. 2nd ed. Oakland, CA: New Harbinger Publications; 2019.
48. Rojiani R, Santoyo JF, Rahrig H, Roth HD, Britton WB. Women benefit more than men in response to college-based meditation training. *Front Psychol*. 2017;8:551. doi:10.3389/fpsyg.2017.00551
49. Bourdieu P, Passeron J-C. *Reproduction in Education, Society and Culture*. Sage; 1990.
50. Doyumgaç I, Tanhan A, Kiyamaz MS. Understanding the most important facilitators and barriers for online education during COVID-19 through online photovoice methodology. *Int J High Educ*. 2021;10(1):166–190.
51. Yıldırım M, Muhammad A, Tanhan A, Young JS. Mental health facilitators and barriers during covid-19 in Nigeria. *J Asian Afr Stud*. 2022;2022:21909622111354. doi:10.1177/00219096221111

Psychology Research and Behavior Management

Dovepress

Publish your work in this journal

Psychology Research and Behavior Management is an international, peer-reviewed, open access journal focusing on the science of psychology and its application in behavior management to develop improved outcomes in the clinical, educational, sports and business arenas. Specific topics covered in the journal include: Neuroscience, memory and decision making; Behavior modification and management; Clinical applications; Business and sports performance management; Social and developmental studies; Animal studies. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <https://www.dovepress.com/psychology-research-and-behavior-management-journal>