Relationships of the adversity quotient subtypes of nursing interns with depression, coping styles, positive psychological capital, and professional adaptability: a cross-sectional study

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Abstract

Background Nursing interns encounter numerous professional pressures during clinical practice. Assessing adversity quotient levels and understanding the influencing factors are crucial for supporting students' seamless transition to professional nurses.

Purpose This study examined the adversity quotient subtypes of nursing interns and explored the relationships between adversity quotient and depression, coping styles, positive psychological capital, and professional adaptability.

Methods This study employed a cross-sectional research design, involving a survey of 287 nursing interns in five general hospitals in Shanghai, China. Latent profile analysis was conducted to explore the subtypes of adversity quotient with the four domains as input variables. Multinomial logistic regression models and multiple correspondence analysis were used for subsequent data analysis.

Results The average adversity quotient score of the nursing interns was 116.63 ± 32.22. A three-profile solution was obtained based on the latent profile analysis results. Three distinct subtypes emerged: a high-adversity quotient subtype ($n = 50$, 17.4%), a medium-adversity quotient subtype ($n = 189$, 65.9%), and a relatively low-adversity quotient subtype ($n = 48$, 16.7%). Multinomial logistic regression revealed that nursing interns in the high-adversity quotient subtype tended to be male, and had higher scores for positive psychological capital, negative coping style, and professional adaptability ($p < 0.05$).

Conclusion Most of the nursing interns were in the medium adversity quotient subtype. Gender, positive psychological capital, negative coping style and professional adaptability were all significantly related to the adversity

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quotient. Boosting the positive psychological capital of nursing interns is an effective way to improve the adversity quotient.

Keywords Adversity quotient, Influencing factors, Latent profile, Nursing interns

Introduction

Nursing is widely recognized as a demanding profession, both physically and mentally, often characterized by staffing shortages and numerous clinical challenges [1]. The training of nursing students includes both theoretical instruction and extensive clinical internships. The internship phase is crucial for students as they transition from being students to being professional nurses [2]. The majority of nursing students in China must undergo internships lasting 8 to 12 months before graduating [3]. During this period, nursing interns are exposed to a variety of professional stresses [4], including taking care of patients [5]; poor relationships with clinical teams [6]; inadequate clinical knowledge [7] and fear of making mistakes [8]. Thus, assessing the present stress coping abilities of nursing interns is crucial for supporting their seamless transition from students to professional nurses.

In theory, the ability to face setbacks, overcome challenges, and transcend difficulties is referred to as the adversity quotient (AQ) [9]. Research indicates that students' learning autonomy and health behaviors can be influenced by their adversity quotient [10, 11]. Previous studies have indicated that nursing students have average adversity quotient scores ranging from 116 to 130 [3, 12–14]. Stoltz [9] studied 7,500 respondents from a wide range of occupations, ages, ethnicities, and cultures to classify the adversity quotient into five levels: very high (166 to 200), high (135 to 165), moderate (95 to 134), low (60 to 94) and very low (less than 60). In China, the research and application of the five levels of adversity quotient are widely used, especially in the student group. Based on the original cut-offs, these studies were rated as moderate. Similarly, different populations have similarly produced moderate results [12, 15]. Due to the distinctive stressors and challenges in nursing, conventional assessments of the adversity quotient might not fully capture how adversity impacts individuals, potentially overlooking the specific and unique circumstances encountered in caregiving. Differences in adversity quotient among individuals with similar scores should be considered. To bridge this gap, latent profile analysis (LPA) offers a nuanced solution. Unlike variable-centered approaches that consider relationships across the entire sample, latent profile analysis is a person-centered statistical technique that identifies distinct subgroups based on how individuals respond to a set of variables [16]. This study utilized the latent profile analysis to uncover hidden disparities among nursing interns, providing a detailed stratification of their adversity quotient. This enables targeted support and intervention strategies tailored to address the specific challenges and needs of this group [17]. In this context, employing latent profile analysis emphasizes the significance of acknowledging distinct nursing occupational stressors, facilitating a more focused comprehension of adversity and resilient occupations.

Coping styles comprise the cognitive strategies and behaviors individuals employ when facing adversities and are categorized into positive and negative coping styles [18]. Typically, coping serves as the initial response to adversity [19]. A cross-sectional study by Liu and Wang [20] suggested that positive coping styles positively influence the adversity quotient in nursing students. However, the interaction between these factors has not been explored in the context of nursing interns. Additionally, depression status may influence stress coping styles, warranting its inclusion as a variable in this study.

Positive psychological capital originates from positive psychology, which refers to the positive psychological state of the individual [21]. Research has demonstrated that psychological capital mediates the relationship between various work stressors and emotional responses [22]. A study indicated that positive mental capital in nursing students aids in dealing with stress and promotes robust mental health [23]. Although previous research has supported the connection between positive psychological capital and the adversity quotient, the nature of this relationship is still not fully understood.

Professional adaptability refers to the ability of college students to actively adjust their psychology and behavior to adapt to professional learning [24]. Recent literature indicates a link between professional adaptability and adversity quotient in nursing students, yet further evidence is required in nursing interns. Tian and Fan (2014) [25] identified a positive association between adversity quotient and professional adaptability in nursing students, highlighting the significant influence of certain learning environment variables on adversity quotient. However, the results of the existing studies are also divergent. In a study of nursing interns, no significant relationship was found between adversity quotient and professional adaptability [26].

Therefore, this study explored the relationships between adversity quotient and depression, coping styles, positive psychological capital, and professional adaptability. The findings will offer valuable insights to nursing educators and managers on facilitating a successful transition to practice for nursing interns.

Methods

Design

This cross-sectional study was conducted from October to December 2021 in five tertiary hospitals in Shanghai, China. The variables of the study included demographic characteristics, adversity quotient, depression severity, coping styles, positive psychological capital, and professional adaptability. The completion and submission of the online survey implied consent to participate. The survey was clearly communicated to respondents at the commencement of the survey.

Participants and procedure

Study participants were examined using the convenience sampling method. The inclusion criteria were (1) nursing students who were in their clinical internships and (2) who had participated in the internship at least once, with a total duration of not less than two months. The exclusion criteria were (1) interns who were absent for more than two-thirds of the internship period and (2) those who were receiving psychological intervention during the internship year. In this study, the G*Power program version 3.1.9.7 was used to calculate the sample size, the effect size d was 0.30, the significance level was 0.05, and the power was 0.95 [27]. The estimated sample size was 147. Considering a sample loss rate of 20%, we determined that the estimated sample size of this study was 177. Ultimately, 304 nursing interns agreed to participate, and 287 questionnaires were included in the final analysis, for an effective response rate of 94.41%. The research maintained the anonymity and confidentiality of all collected data throughout the process.

Instruments

General information

The general information collected encompassed sociodemographic details, academic characteristics, and clinical practices of each participant. This included age, gender, residence, sibling status, experience as a student leader, and level of interest in nursing, as well as the type of internship hospital and satisfaction with the internship.

The adversity quotient scale

We assessed the adversity quotient levels of the nursing interns using the adversity quotient scale, which was translated into Chinese by scholars [27]. Originally developed by Stoltz in 1997 [9], this scale comprises 40 items across four dimensions-control, ownership, reach, and endurance-each containing 10 items. Responses are recorded using a 5-point Likert scale (1=strongly disagree/never to 5=strongly agree/always), where a higher score signifies a higher adversity quotient. In this study, the scale demonstrated a Cronbach's alpha of 0.87, indicating good reliability.

The patient health questionnaire-9

The patient health questionnaire-9 (PHQ-9) is a self-reported depression screening tool, that is scored on a scale of 0 (not at all) to 3 (nearly every day) [28]. A total score greater than five on this scale indicates that the subject has depressive symptoms, and the higher the score is, the more severe the depressive symptoms. In our study, the Cronbach's alpha of this scale was 0.90, indicating excellent reliability.

The positive psychological capital scale

The positive psychological capital scale was developed by the Chinese scholars Zhang et al [21]. It includes 26 items and four dimensions (self-efficacy, resilience, optimism and hope). The 7-point Likert scoring method is used to evaluate items with 1–7 points from "completely disagree" to "completely agree". A higher score indicates a greater level of positive psychological capital. In this study, the Cronbach's alpha of the scale was 0.94.

The simplified coping style scale

The instrument was adapted by Xie based on the characteristics of the Chinese population [29]. It measures an individual's coping style to understand its relationship with psychosomatic health using a 4-point Likert scale ranging from 0 ('never') to 3 ('very often'). This scale consists of 20 items and is composed of 2 subscales: positive coping (12 items) and negative coping (8 items). In our study, this scale had excellent reliability for both active coping styles (Cronbach's alpha=0.95) and passive coping styles (Cronbach's alpha=0.89).

Professional adaptability scale

The scale was developed by Tang [30]. The scale contains 38 items, including four dimensions: professional commitment, professional learning motivation, professional learning behavior, and professional self-efficacy. It employs a 4-point Likert scale ranging from 1 ('totally inconsistent') to 4 ('fully compliant'). The total score of the scale ranges from 38 to 152, with a higher score indicating better professional adaptability. This scale had excellent reliability (Cronbach's alpha=0.97).

Data analysis

The latent profile analysis was performed using the 4 dimensions of adversity quotient as indicators with Mplus 8.3. In this study, the following fit indices were used to select the optimal number of profiles: the Bayesian information criterion (BIC), the Akaike information criterion (AIC), the value of the BIC adjusted to sample size (aBIC), and the entropy test for model evaluation; the Lo-Mendell-Rubin likelihood ratio test (LMR) and the bootstrapped likelihood ratio test (BLRT) were also used for model comparison.

Table 1 Comparison of different models after latent profile analysis of the adversity quotient

Model	AIC	BIC	aBIC	LMR p value	BLRT p value	Entropy	Class probability
1-class LPA	7662.497	7691.773	7666.404	—	—	—	—
2-class LPA	7693.301	7740.874	7699.650	<0.0001	<0.0001	0.953	0.182,0.827
3-class LPA	7273.361	7339.232	7282.152	0.0022	<0.0001	0.951	0.174,0.659,0.167
4-class LPA	7124.762	7208.930	7135.995	0.2362	<0.0001	0.954	0.108,0.589,0.179,0.124

—, not applicable

Note. AIC=Akaike information criterion; BIC=Bayesian information criterion; aBIC=adjusted Bayesian information criterion; LMR=Lo–Mendell–Rubin likelihood ratio test; BLRT=Bootstrapped likelihood ratio test

Table 2 Subtype score of the adversity quotient

	Dimension 1 (Control)	Dimension 2 (Origin)	Dimension 3 (Reach)	Dimension 4 (Endurance)	Adversity quotient
Class 1(n=50, 17.4%)	39.42±6.51	40.52±4.82	41.30±4.43	40.42±5.07	161.66±17.32
Class 2(n=189, 65.9%)	30.63±4.52	28.54±4.52	29.75±3.93	29.68±3.34	118.61±11.01
Class 3(n=48, 16.7%)	19.27±7.67	15.23±5.87	13.67±4.76	13.77±5.13	61.94±17.05

Note: Class 1: high-adversity quotient subtype; Class 2: medium-adversity quotient subtype; Class 3: low-adversity quotient subtype

SPSS 25.0 statistical software was also used for data analysis. The general data were presented as frequencies and percentages. When the data conformed to a normal distribution, continuous variables such as the values of the adversity quotient were presented as the mean and standard deviation. Conversely, the median and interquartile range were reported instead. Categorical variables between potential adversity quotient classes were compared using the chi-square test. When continuous variables conformed to a normal distribution, univariate analysis of variance (ANOVA) was used. Conversely, the Kruskal–Wallis H was used. Associations between adversity quotient and the variables were examined using multinomial logistic regression. We used a multiple correspondence analysis (MCA) model to investigate the potential relationships between latent classes and various influencing factors based on a visualized factor map. A statistically significant difference was accepted at a *p* value<0.05.

Results

Latent profile analysis of the adversity quotient

We described the specific information for each of the five levels based on Stoltz's classification (Supplementary Materials 1). Except for the moderate group (*n*=171, 59.6%), the numbers in the other groups were small. As subjective merging of groups is not feasible, we used the data-driven LPA method for classification. As shown in Table 1, we extracted and compared the 1 to 4 latent classes to classify and identify the optimal model. When comparing the models, the smaller the AIC and BIC are, the greater the entropy index is, and the greater the LMR and BLRT are (*p*<0.05), the better the model fit is. The 2-class model was excluded because of the high AIC, BIC and aBIC; the 4-class model was excluded because of the nonsignificant LMR. Finally, we determined that

the adversity quotient was divided into 3 latent classes, with 50 (17.4%) in Class 1, 189 (65.9%) in Class 2, and 48 (16.7%) in Class 3.

Based on the latent profile model, Table 2 presents the adversity quotient scores following the classification into latent profiles, where Class 1, Class 2, and Class 3 are designated the high, medium, and low adversity quotient subtypes, respectively.

Demographic characteristics of the participants

Of the 287 participants, 246 (85.7%) were female, and 41 (14.3%) were male. Most participants (207, 72.1%) were 21 years and younger, and 146 (50.9%) had siblings. In terms of internship satisfaction, 23.7% were satisfied, 48.1% were neutral, and 28.1% were dissatisfied. There were significant differences in the effects of gender and internship satisfaction (*p*<0.05) (refer to Table 3).

Results of psychological factors in the full sample and in each latent profile

The descriptive statistics of the continuous variables in the full sample and for each class are shown in Table 4. The data did not pass the normality test, so the results are presented as the median and interquartile range. Class 1 had the highest scores for positive coping style, positive psychological capital and professional adaptability. On some scores (such as positive coping style, resilience, and professional self-efficacy), Class 2 and Class 3 had similar scores. The results showed that in addition to depression and resilience, there was a significant effect on the levels of the other psychological factors and the adversity quotient (*p*<0.05). Although the overall difference in PHQ scores among the classes was not significant, the prevalence of depressive symptoms was slightly higher in individuals with a low adversity quotient. PHQ scores of 5 or higher were observed in 52.0% of the high-adversity

Table 3 Demographic characteristics of interns with different adversity quotient subtypes

	Overall *n* = 287	Class 1 *n* = 50, 17.4%	Class 2 *n* = 189, 65.9%	Class 3 *n* = 48, 16.7%	*p*
Age					0.774
21 years and below (*n* = 207)	115.71 ± 31.53	158.09 ± 15.04	119.34 ± 10.80	60.20 ± 17.68	
22 years and above (*n* = 80)	119.03 ± 34.02	169.25 ± 19.82	116.63 ± 11.44	66.62 ± 14.84	
Gender					0.033*
Male (*n* = 41)	125.59 ± 31.93	161.31 ± 14.26	119.18 ± 9.10	71.67 ± 18.22	
Female (*n* = 246)	115.14 ± 32.09	161.78 ± 18.46	118.53 ± 11.26	60.55 ± 16.64	
Residence					0.136
Rural (*n* = 97)	123.51 ± 33.97	166.42 ± 21.98	118.43 ± 11.30	63.50 ± 16.64	
Town (*n* = 80)	114.76 ± 28.56	154.54 ± 5.03	118.65 ± 9.33	66.80 ± 16.60	
Urban (*n* = 110)	111.93 ± 32.39	160.00 ± 13.09	118.72 ± 11.94	57.57 ± 17.29	
Having siblings					0.324
Yes (*n* = 146)	120.03 ± 31.64	163.43 ± 18.03	118.74 ± 10.61	66.32 ± 15.59	
No (*n* = 141)	113.11 ± 32.55	159.00 ± 16.30	118.47 ± 11.45	58.23 ± 17.64	
Experience in being a student leader					0.934
Yes (*n* = 90)	115.39 ± 33.92	162.81 ± 18.84	117.50 ± 10.90	60.31 ± 19.20	
No (*n* = 197)	117.20 ± 31.48	161.12 ± 16.84	119.10 ± 11.07	62.75 ± 16.14	
Level of interest in nursing					0.487
Disinterested (*n* = 21)	107.33 ± 36.74	-	118.80 ± 13.75	55.20 ± 15.27	
Neutral (*n* = 112)	114.40 ± 33.03	160.37 ± 17.25	117.29 ± 11.60	60.20 ± 18.56	
Interested (*n* = 154)	119.52 ± 30.80	161.33 ± 16.75	119.53 ± 10.13	64.91 ± 16.09	
Type of internship hospital					0.827
Western Medicine Hospital (*n* = 82)	115.21 ± 31.86	155.44 ± 12.75	117.65 ± 11.00	60.14 ± 19.48	
Traditional Chinese Medicine Hospital (*n* = 31)	115.42 ± 34.47	167.50 ± 22.52	123.20 ± 9.33	63.43 ± 15.77	
Integrated Chinese and Western Medicine Hospital (*n* = 174)	117.52 ± 32.14	164.20 ± 18.38	118.25 ± 11.17	62.48 ± 16.61	
Internship satisfaction					0.002**
Dissatisfied (*n* = 81)	112.43 ± 29.96	156.40 ± 15.38	118.07 ± 12.07	65.56 ± 19.28	
Neutral (*n* = 138)	116.18 ± 27.15	156.39 ± 9.04	119.05 ± 10.49	62.84 ± 16.01	
Satisfied (*n* = 68)	122.54 ± 42.37	168.36 ± 21.19	118.15 ± 11.03	56.15 ± 15.31	

Note: -, not applicable; *p < 0.05, **p < 0.01. Class 1: high-adversity quotient subtype; Class 2: medium-adversity quotient subtype; Class 3: low-adversity quotient subtype

Table 4 Results of each scale in the full sample and in each latent profile

	Overall *n* = 287	Class 1 *n* = 50, 17.4%	Class 2 *n* = 189, 65.9%	Class 3 *n* = 48, 16.7%	*p*
Depression	5.00(2.00, 8.00)	5.00(0.00, 8.00)	6.00(3.00, 8.00)	5.00(0.25, 7.75)	0.274
Positive copying style	24.00(18.00, 26.00)	24.00(24.00, 34.25)	24.00(18.00, 24.00)	24.00(12.00, 32.75)	< 0.001**
Negative copying style	13.00(8.00, 16.00)	16.00(9.50, 18.00)	12.00(8.00, 16.00)	11.00(8.00, 16.00)	0.007**
Positive psychological capital	120.00(107.00, 136.00)	136.00(120.75, 152.00)	118.00(104.50, 133.50)	121.00(104.00, 148.00)	< 0.001**
Self-efficacy	34.00(28.00, 39.00)	41.00(35.00, 45.00)	31.00(28.00, 36.00)	34.00(25.75, 41.75)	< 0.001**
Resilience	28.00(27.00, 33.00)	27.50(26.00, 32.50)	28.00(27.00, 32.50)	28.00(26.00, 33.75)	0.413
Optimism	30.00(25.00, 36.00)	36.00(30.00, 39.00)	30.00(24.00, 33.00)	30.00(24.00, 36.00)	< 0.001**
Hope	29.00(24.00, 32.00)	32.00(28.00, 36.00)	28.00(24.00, 32.00)	28.00(24.00, 35.00)	< 0.001**
Professional adaptability	112.00(102.00, 114.00)	114.00(113.75, 139.25)	110.00(101.50, 114.00)	114.00(97.00, 130.00)	< 0.001**
Professional commitment	29.00(26.00, 30.00)	30.00(29.00, 36.25)	28.00(26.00, 30.00)	29.50(26.00, 31.00)	< 0.001**
Professional learning motivation	27.00(23.00, 27.00)	27.00(27.00, 34.25)	26.00(23.00, 27.00)	27.00(23.25, 29.00)	< 0.001**
Professional learning behavior	39.00(36.00, 39.00)	39.00(39.00, 49.00)	39.00(35.00, 39.00)	39.00(32.25, 47.00)	< 0.001**
Professional self-efficacy	18.00(16.00, 18.00)	18.00(18.00, 24.00)	18.00(16.00, 18.00)	18.00(16.00, 22.75)	< 0.001**

Note: **p < 0.01. Class 1: high-adversity quotient subtype; Class 2: medium-adversity quotient subtype; Class 3: low-adversity quotient subtype

quotient subtype, 60.8% of the medium-adversity quotient subtype, and 62.5% of the low-adversity quotient subtype.

Multinomial logistic regression

Table 5 presents the multinomial logistic regression results. Compared with class 1 (high adversity quotient subtype), positive psychological capital (*OR*=0.971, *95%CI* [0.947–0.995], *p*=0.019), negative coping style (*OR*=0.969, *95%CI* [0.941–0.998], *p*=0.045), professional adaptability (*OR*=0.969, *95%CI* [0.941, 0.998], *p*=0.021) and male sex(*OR*=0.349, *95%CI* [0.147, 0.830], *p*=0.017) were significantly related to class 2 (medium adversity quotient subtype). Compared to class 1, positive psychological capital (*OR*=0.957, *95%CI* [0.929, 0.985], *p*=0.003) was strongly related to class 3(low adversity quotient subtype). There was no significant difference between class 2 (medium adversity quotient subtype) and class 3 (low adversity quotient subtype).

Multiple correspondence analysis

We further entered categorical variables into the multiple correspondence analysis model to evaluate the potential associations among various latent classes. The continuous variables were converted into categorical variables according to the different quartiles (e.g., depression (PHQ9), negative coping style (NCS), positive coping style (PCS), positive psychological capital (PPQ), professional adaptability (PA)). Regarding the numerical scale, "1" represents the lowest score, while "4" represents the highest score. In the multiple correspondence analysis plot, the distance between any row or column points reflects the similarity (or non-similarity) among the variables. Categorical variables with similar profiles were visualized on a coordinate chart (Fig. 1), which showed that male sex, satisfied, PHQ≤2, 24<PCS≤26, and NCS>16 were associated with a high adversity quotient;

female sex, dissatisfied, neutral, PCS≤18, 8<NCS≤13, PPQ≤107, PA≤102 and 103<PA2≤112 were correlated with medium adversity quotient; and 3<PHQ≤5, NCS≤8, PCS>26, PPQ>136, and PA>114 were associated with a low adversity quotient, respectively.

Discussion

In our study, the application of the multiple correspondence analysis model revealed potential associations among various latent classes identified within our sample. Our analysis revealed significant relationships between adversity quotient levels and factors such as gender, satisfaction level, degree of depression, coping style, positive psychological capital, and professional adaptability. For instance, individuals in the high adversity quotient group tended to be male, express satisfaction, and possess higher levels of positive psychological capital and professional adaptability. In contrast, those in the medium adversity quotient group were more likely to be female, express dissatisfaction, and have a higher incidence of depression. These findings suggest that differences in adversity quotient might be closely related to individual psychological characteristics and professional adaptability traits. The insights gained from our analysis offer a new perspective for understanding the determinants of adversity quotient and provide important information for designing targeted interventions to increase adversity quotient. Future research could further explore how these factors specifically influence adversity quotient development and how targeted interventions could promote higher levels of adversity quotient.

In this study, we classified the latent profiles of adversity quotient and evaluated the factors that influence adversity quotient in nursing interns. We identified three subtypes of the adversity quotient: a high-adversity quotient subtype, a medium-adversity quotient subtype, and a relatively low-adversity quotient subtype. The results

Table 5 Results of the multinomial logistic regression of the adversity quotient classes

	Class 2 vs. Class 1		Class 3 vs. Class 1		Class 2 vs. Class 3	
	OR (95%CI)	p	OR (95%CI)	p	OR (95%CI)	p
Depression	0.969(0.882–1.064)	0.512	0.920(0.819–1.033)	0.160	1.053(0.965, 1.150)	0.246
Positive copying style	1.037(0.968–1.110)	0.300	1.073(0.985–1.168)	0.106	0.966(0.906, 1.031)	0.302
Negative copying style	0.969(0.941–0.998)	0.045*	0.906(0.820–1.002)	0.055	1.012(0.937, 1.094)	0.758
Positive psychological capital	0.971(0.947–0.995)	0.019*	0.957(0.929–0.985)	0.003**	1.015(0.994, 1.035)	0.163
Professional adaptability	0.969(0.941–0.998)	0.037*	0.977(0.941–1.013)	0.208	0.992(0.964, 1.021)	0.588
Gender						
Male	0.349(0.147–0.830)	0.017*	0.387(0.125–1.200)	0.100	0.901(0.336, 2.419)	0.836
Female	Ref		Ref		Ref	
Internship satisfaction						
Dissatisfied	0.882(0.266–2.918)	0.836	0.842(0.203–3.500)	0.813	1.047(0.355, 3.087)	0.934
Neutral	1.490(0.592–3.749)	0.397	0.799(0.258–2.472)	0.697	1.864(0.773, 4.493)	0.166
Satisfied	Ref		Ref		Ref	

Note: *p<0.05, **p<0.01. *OR*: odds ratio; *95%CI*: 95% confidence interval. Class 1: high-adversity quotient subtype; Class 2: medium-adversity quotient subtype; Class 3: low-adversity quotient subtype
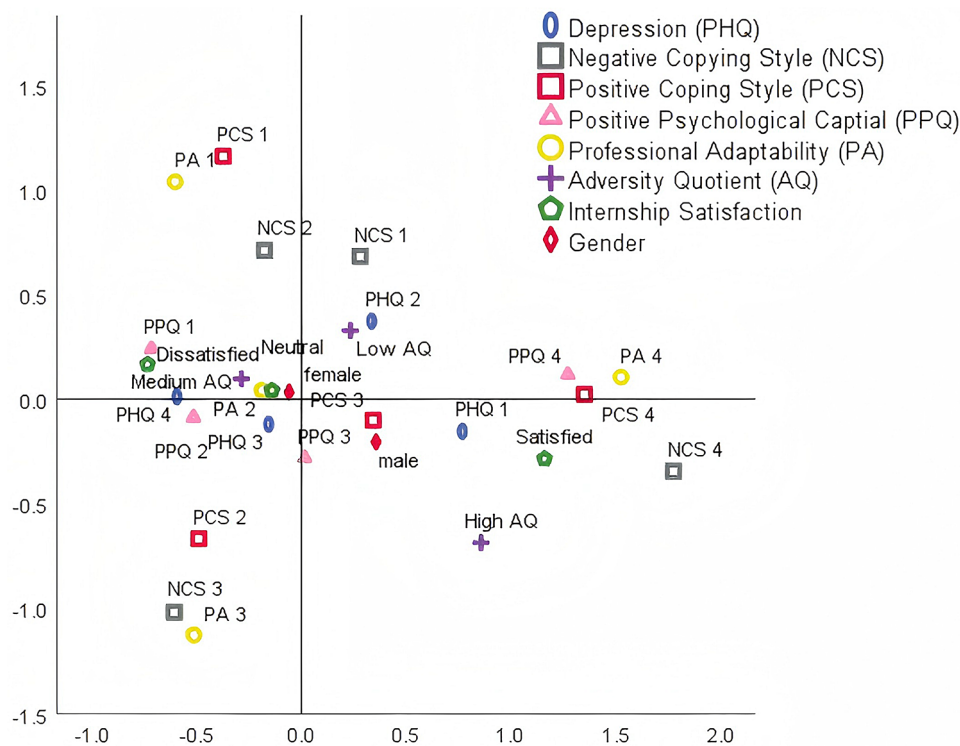
Fig. 1 Multiple correspondence analysis

showed that nursing interns with a high adversity quotient are more likely to be male or have a higher negative coping style, professional adaptability, and positive psychological capital. Individuals with the medium and low adversity quotient subtypes are more likely to have lower levels of positive psychological capital. The adversity quotient score of the nursing interns in this study was 116.63±32.22, which was similar to that of nursing students in Macau [12], but higher than that of Intensive care unit (ICU) nurses [15].

In addition to the demographic factors, positive psychological capital was significantly associated with the adversity quotient. The higher the level of positive psychological capital is, the higher the adversity quotient of the nursing interns will be. This study demonstrates the effectiveness and adaptability of positive psychological capital in enhancing adversity quotient and stress management in nursing students. Nursing educators can enhance students' stress coping abilities by strengthening their positive psychological capital, thereby developing effective stress management strategies. One study showed that promoting positive factors enhances specialty satisfaction in nursing students [31]. Therefore, psychological interventions should be provided to nursing interns [32, 33]. Additionally, clinical nurses should foster a positive practice atmosphere.

According to our regression analysis, we found that nursing interns with high professional adaptability were

more likely to belong to the high adversity quotient subtype than to the moderate-adversity quotient subtype. Good adaptation to the profession during clinical practice facilitates the integration of nursing interns into the clinical environment. In addition to basic research, one study used interviews to identify nursing students' placement adaptation strategies [34]. The internship was facilitated by intervening and adapting inappropriate strategies.

Positive coping strategies can help nursing students better adapt to the challenges they face in the clinical setting [20]. Contrary to findings from some studies [8, 13, 35], our study did not find a significant association between positive coping styles and adversity quotient in nursing interns, suggesting a possible contextual disparity between clinical settings and educational environments. This discrepancy requires further investigation into the specific dynamics influencing coping strategies and their effectiveness in different settings.

In contrast, in the present study, we did not find a strong association between depression level, internship satisfaction and adversity quotient in the regression analysis. However, in the MCA analysis, the results suggested that individuals with high internship satisfaction was more likely to have a high adversity quotient. The relationship between high internship satisfaction and a higher adversity quotient may result from individuals with a high adversity quotient being better at coping

with challenges and pressures, thereby gaining more satisfaction during the internship [36]. A positive attitude and strong coping abilities enable them to feel a greater sense of achievement and satisfaction during the internship. Secondly, our study found that high adversity quotient was associated with low levels of depression. In theory, individuals with a high adversity quotient tend to have stronger psychological resilience and self-efficacy, enabling them to maintain a better psychological state in the face of adversity and avoid depression [37]. Conversely, depression may lower an individual's adversity quotient, making them more likely to feel helpless and frustrated when facing internship challenges, thus reducing their satisfaction [4]. Future research could further investigate the relationships among internship satisfaction, depression, and adversity quotient.

We also found that the adversity quotient of nursing interns was mostly at a medium or low level. Recommendations for nursing education focus on enhancing psychological resilience through targeted curriculum development and professional training. Acknowledging the influence of social support [38], integrating adversity quotient education, and fostering a proactive approach to challenge management could significantly benefit nursing students.

This study's pioneering use of the latent profile analysis to examine the adversity quotient levels of nursing interns highlights its innovative approach, despite limitations such as nonrandom sampling and a relatively small, geographically confined sample. Future studies should aim to mitigate these limitations by employing broader, randomized sampling methods and exploring diverse geographical contexts to enhance the generalizability of the findings.

Conclusion
Clinical practice plays a pivotal role in the training of nursing interns, where a high adversity quotient is instrumental in fostering the cognitive skills essential for cultivating positive thoughts and effective coping strategies, thereby reducing the potential negative impact of adversity. This study revealed that a majority of the surveyed nursing interns were in the medium adversity quotient subgroup. Factors such as gender, positive psychological capital, negative coping style, and professional adaptability were significantly associated with adversity quotient levels. Enhancing nursing interns' positive psychological capital has emerged as a key strategy for boosting adversity quotient, suggesting that targeted interventions aimed at strengthening this aspect could be particularly beneficial.

Abbreviations
AIC The Akaike Information Criterion
BIC The Bayesian Information Criterion
BLRT The Bootstrapped Likelihood Ratio Test
ICU Intensive Care Unit
LMR The Lo-Mendell-Rubin likelihood ratio test
LPA Latent profile analysis
MCA Multiple correspondence analysis
NCS Negative coping style
PA Professional adaptability
PCS Positive coping style
PHQ-9 The patient health questionnaire-9
PPQ Positive psychological capital

Supplementary Information
The online version contains supplementary material available at https://doi.org/10.1186/s12909-024-05853-w.

Supplementary Material 1

Declarations

Ethics approval and consent to participate
The study meets the requirements of the Helsinki declaration and got approval from Shanghai University of Traditional Chinese Medicine Research Ethics Committee.

Consent for publication
Not applicable.

Informed consent
Informed written consent was obtained from all the participants. Participants were informed about the purpose of the study, the voluntary nature of their participation, and the anonymity of their responses before filling out the survey.

Competing interests
The authors declare no competing interests.

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