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Latent profile analysis of ethical competence and its relationship with nursing organization climate and positive psychological capital among nursing interns

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Abstract

Background Nursing ethical competence remains insufficiently developed, with limited research conducted in China. Existing evidence suggests that both organizational climate and psychological capital positively influence ethical competence. This study aimed to identify latent profiles of ethical competence among nursing interns and their associated factors, and to examine differences in ethical competence across these profiles.

Methods A cross-sectional study was conducted from December 2024 to March 2025, and a total of 578 nursing students were recruited. The participants completed the Ethical Competence Questionnaire, the Nursing Organizational Climate Scale, and the Positive Psychological Capital Questionnaire. Latent Profile Analysis (LPA) was used to identify latent profiles of ethical competence, and multiple logistic regression was employed to assess predictors of ethical competence across these profiles. One-way ANOVA and the Kruskal–Wallis test were used to compare scores on the Nursing Organizational Climate Scale and the Positive Psychological Capital Questionnaire across different latent profiles of ethical competence among nursing interns.

Results This study identified four distinct latent profiles among nursing interns. “Lowest Level–Sensitivity Deficient” (n = 95, 20.9%), “Lower–Medium Level–Knowledge Deficient” (n = 186, 40.4%), “Upper–Medium Level–Low Motivation” (n = 154, 31.9%), and “Highest Level–Balanced”. Multiple logistic regression analysis indicated that serving as a class officer was a significant predictor of ethical competence among nursing interns. Significant differences in psychological capital and organizational climate were observed across different ethical competence profiles ($p < 0.001$).

Conclusions Ethical competence was divided into four latent profiles. Nursing students with higher levels of ethical competence also demonstrated correspondingly higher levels of organizational climate and psychological capital. It is recommended that nursing educators develop tailored intervention strategies based on the characteristics and associated factors of these latent profiles of ethical competence, thereby improving students' overall ethical competence.

1 Introduction

With the rapid advancement of medical technology, an increasing number of ethical dilemmas have emerged in nursing. When faced with ethical dilemmas, nursing staff often experience confusion and uncertainty and may develop negative emotions, such as frustration, guilt, uneasiness, a sense of defeat, and self-doubt [1]. These negative emotions can adversely affect the physical and mental health of nursing staff and impede further improvements in the quality of nursing care. Ethical competence is essential for addressing ethical dilemmas and related challenges. It enables nursing staff to manage ethical issues more effectively, contribute to high-quality nursing care [2], and reduce the likelihood of negative emotional responses. As a key component of the future nursing workforce, the level of ethical competence among nursing interns may influence healthcare system reform and the quality of care. Therefore, enhancing the ethical competence of nursing interns may better equip them to address the opportunities and challenges associated with the evolving nursing profession.

Ethical competence, also known as moral competence [3], is defined as the ability to identify ethical values and dilemmas, understand diverse interests, and articulate ethical issues in professional practice [4]. Ethical competence is conceptualized as a multidimensional construct comprising multiple components. The three key components are “knowing how to be,” “knowing,” and “being able.” According to Jormsri, ethical competence in nursing involves recognizing and reflecting on emotions, making informed decisions, and acting in accordance with patients’ best interests across diverse situations [5]. As an essential competency in healthcare, ethical competence is critically important. However, research on ethical competence in the medical field remains limited, with even fewer studies focusing on nursing interns. As a key component of the future nursing workforce, adequate ethical competence among

undergraduate nursing interns is not only related to the stability of the nursing workforce but also critical to ensuring safe practice and ethical conduct in their future careers. Therefore, it is both necessary and valuable to examine the level of ethical competence among nursing interns.

Organizational climate is defined as the relatively stable internal environment of an organization, as perceived by its members and as influencing their behavior, and is described in terms of a set of organizational characteristics. It has a strong influence on organizational employees and has a subtle impact on each employee's work attitude and work efficiency [6]. A good organizational climate can stimulate nurses' work enthusiasm, relieve negative emotions caused by work pressure, enhance psychological resilience, and promote mental health [7]. Moreover, research has shown that a favorable nursing organizational climate can reduce nurses' moral dilemmas, enhance their capacity to address ethical issues [8], foster the development of nurses' skills, and, consequently, elevate the standard of nursing care. No existing research delves into the relationship between ethical competence and the organizational climate in nursing, and the research on student nurses during their internship is even rarer.

Psychological capital is a constructive psychological energy that people exhibit as they grow and develop. It effectively mirrors a person's psychological condition and serves as a distinct, observable, and quantifiable sign of mental health that can be improved through advanced training and development. [9]. As a beneficial mental state, psychological capital can reduce work-related stress [10] and boost feelings of professional achievement [11]. Mental health is strongly linked to psychological capital. A higher level of psychological capital can improve nurses' subjective well-being [12] and job competency [13]. Student nurses need a relatively high level of psychological capital during their internship to address issues such as nurse-patient communication and ethical and moral dilemmas, and to improve their problem-solving abilities.

Although previous studies have suggested a potential relationship among ethical competence, positive psychological capital, and organizational climate, it has been difficult to identify the multidimensional patterns of these factors in individuals. Latent profile analysis effectively identifies intrinsic subgroups with similar characteristics, thereby systematically elucidating the multidimensional interactions and combinatory patterns of ethical competence among nursing interns. This provides an empirical basis for enhancing their professional ethics and optimizing the overall quality of nursing care.

2 Methods

2.1 Participants

The medical ethics committee approved this cross-sectional study. This research is a cross-sectional study conducted between December 2024 and March 2025, using convenience sampling to recruit 578 nursing internship students from various colleges and universities. The criteria for inclusion were: Nursing internship students who are registered full-time; Normal psychological and mental state; Understanding the purpose and content of this study and voluntarily participating. The exclusion criteria were as follows: Internship duration < 3 months; Those who could not fill out the questionnaire for various objective reasons.

2.2 Sample

The sample size was determined using logistic regression [14], which recommends a sample size of 10–15 times the number of independent variables. With 22 research variables in this study, 220–330 participants were required. Considering a 20% invalid response rate, a preliminary sample of 264 was considered for inclusion.

2.3 Data collection

This research involved surveying with Questionnaire Star (an online survey platform widely adopted in China). Before handing out the questionnaire, we informed all participants about its purpose, importance, content, and any important considerations to ensure they gave informed consent. The responses were collected anonymously to maintain the reliability and validity of the results. The following measures were implemented for quality control: □ All questionnaire questions must be fully completed before submission. □ Questionnaires filled out in less than 2 minutes were discarded. □ Questionnaires with regular responses were removed. □ Each IP address and each device was allowed to complete the questionnaire only once.

2.4 Measurements

2.4.1 Participants' general characteristics

Researchers designed the survey content by referencing relevant literature on gender, being an only child, family residence, and whether a nursing major is the first choice, among other topics.

2.4.2 Ethical Competence Scale

Our research team measured Ethical competence using the Ethical Competence Scale developed by Lin et al [15]. The scale shows high levels of reliability and validity, consisting of 5 dimensions, namely ethical knowledge, ethical skills, moral sensitivity, ethical motivation, and ethical qualities, with 40 items. The questionnaire was scored on a 5-point Likert-type scale ranging from 1 ('not at all') to 5 (‘strongly agree’□. A total score between 40 and 200 suggests that higher scores indicate stronger ethical competence. The Cronbach's α is 0.854 in the present study.

2.4.3 Nursing Organization Climate Scale

The Nursing Organizational Climate Scale, developed by He et al, measured organizational climate [16]. This tool consists of 24 questions, split into four parts. It evaluates different aspects of the nursing organizational climate, including supportive behavior, colleague behavior, interpersonal climate behavior, and intimate and aggressive climate behavior. A 5-point Likert-type scale was used to score the questionnaire. Higher scores reflected a more positive perception of the organizational climate by nurses. The Cronbach's α was 0.866 in the present study.

2.4.4 Positive Psychological Capital Questionnaire

The Positive Psychological Capital Questionnaire, adapted by Zhang et al., assessed positive psychological capital [17]. This instrument consisted of 24 items with four subdomains: self-efficacy (7 items), optimism (6 items), hope (6 items), and resilience (7 items). Each item was rated on a 7-point Likert scale, with 'strongly agree' receiving the highest score and 'not at all' receiving 1 point. A higher score reflected greater positive psychological capital. The Cronbach's α was 0.899 in the present study.

2.5 Ethical consideration

This study adheres to the principle of informed consent for research subjects, respects their right to self-determination and privacy, ensures their anonymity when completing the questionnaire, and strictly maintains the confidentiality of all data for academic purposes only. This study has been reviewed and approved by the ethics committee (No. 2022-0018)

2.6 Data analysis

Mplus 8.3 software was used to conduct a latent profile analysis of nursing interns' ethical competence. Model fit indices included the Akaike Information Criterion (AIC), the Bayesian Information Criterion (BIC), the sample-corrected Bayesian Information Criterion (aBIC), and entropy. Lo-Mendell-Rubin Test (LMRT) and the bootstrap likelihood ratio test (BLRT). Smaller values of AIC, BIC, and aBIC indicate better model fit; Entropy values range from 0 to 1 [18]; an Entropy value ≥ 0.8 indicates acceptable classification accuracy; $P < 0.05$ for LMRT and BLRT indicates that the k-class model fits

better than the k-1-class model [19]. The category probability represents the relative proportion of each latent category within the entire sample, which is generally no less than 5%. To explore differences in demographic characteristics, positive psychological capital, and organizational climate across the subtypes identified by LPA, data analysis was conducted in SPSS 27.0. Quantitative data were expressed as (M ± SD) if they followed a normal distribution, and as M (P25, P75). Categorical or ordinal data were presented as frequencies, percentages, or proportions. One-way ANOVA, chi-square tests, and the Kruskal-Wallis test were used to determine differences in positive psychological capital and organizational climate across each latent category. Logistic regression models were employed for multivariate analysis to identify predictive factors within each group. Statistical significance was identified at a two-tailed *P* value < 0.05.

3 Results

3.1 Test for common method bias

To assess potential common-method bias, this study employed Harman's one-factor test and conducted a principal component analysis (PCA) of all items from the scales (Ethical Competence Questionnaire, Positive Psychological Capital Scale, and Organizational Climate Questionnaire). The results of the exploratory factor analysis of the three scales/questionnaires revealed 19 common factors with eigenvalues > 1. The first factor explained 22.43% of the variance (< 40.00%), suggesting that common method bias was within an acceptable range.

3.2Characteristics of participants

The study collected 578 questionnaires. There were 464 valid questionnaires in this study, with an effective recovery rate of 80.28%. The nursing interns had an average age of 22.18 years (standard deviation = 1.16) and ranged from 20 to 27 years. Females made up 90.52% of the participants. Refer to Table 1 for more information.

Table 1
Comparison of demographic and work-related characteristics between the four profiles by latent profile membership (n = 464)

Variables	Total sample (n = 464)	c1 (n = 95)	c2 (n = 186)	c3 (n = 154)	c4 (n = 29)	χ^2	*P*
	n (%)	n (%)	n (%)	n (%)	n (%)		
Gender						4.23	0.237
man	44	7(15.9)	14(31.8)	18(40.9)	5(11.4)		
woman	420	88(21.0)	172(41.0)	136(32.4)	24(5.7)		
Age						3.232	0.358
20-22years	322	66(20.5)	136(42.2)	99(30.7)	21(6.5)		
23-27years	142	29(20.4)	50(35.2)	55(38.7)	8(5.6)		
Family residence						4.102	0.667
city	165	35(21.2)	64(38.8)	52(31.5)	14(8.5)		
county, township	212	43(20.3)	89(42.0)	68(32.1)	12(5.7)		
rural area	87	17(19.5)	33(17.7)	34(22.1)	3(3.4)		
An only child						4.102	0.667
Yes	112	21(18.8)	42(37.5)	44(39.3)	5(4.5)		
No	352	74(21.0)	144(40.9)	110(31.3)	24(6.8)		
The level of practice of the hospital						8.66	0.182
Third Class A	443	90(20.3)	181(40.9)	145(32.7)	27(6.1)		
Third Class B	12	4(33.3)	2(16.7)	6(50.0)	0(0.0)		
Second Class A	9	1(11.1)	3(33.3)	3(33.3)	2(22.2)		
Educational level						2.405	0.572
Undergraduate	415	83(20.0)	167(40.2)	137(33.0)	28(6.7)		
Postgraduate	49	12(24.5)	19(38.8)	17(34.7)	1(2.0)		
A nursing major is the first choice.						2.484	0.482
Yes	286	52(18.2)	117(40.9)	98(34.3)	19(6.6)		
No	178	43(24.2)	69(38.8)	56(31.5)	10(5.6)		
Taking courses related to ethics in school						6.753	0.083
Yes	422	83(19.7)	165(39.1)	147(34.8)	27(6.4)		
No	42	12(28.6)	21(50.0)	7(16.7)	2(4.8)		
Served as a class officer						9.881	0.019
Yes	201	30(14.9)	84(41.8)	69(34.3)	18(9.0)		
No	263	65(24.7)	102(38.8)	85(32.3)	11(4.2)		

3.3 Latent profiles of ethical competence

To identify the optimal model, five models were estimated and compared in this study. Table 2 presents the fit statistics of each model. As shown in Table 2, as the number of latent classes increased, the values of AIC, BIC, and aBIC decreased progressively. Simultaneously, the LMRT and BLRT were statistically significant ($p < 0.05$), indicating a progressive improvement in model fit, while entropy values exceeded 0.80 across all models. However, in the five-class model, the smallest class proportion was 0.02, indicating poor class stability; although both LMRT and BLRT remained significant ($p < 0.05$), the four-class latent profile model was ultimately selected as the optimal solution.

Table 2
Fit statistics of the latent profile analysis (n = 464)

Profiles	AIC	BIC	aBIC	Entropy	LMR(*p*)	BLRT(*p*)	Proportions
1-profile	3192.006	3233.405	3201.667				1.00
2-profile	2380.796	2447.034	2396.254	0.855	0.0000	0.0000	0.556/0.444
3-profile	2057.243	2148.32	2078.498	0.865	0.0004	0.0000	0.227/0.305/0.468
4-profile	1869.834	1985.751	1896.886	0.901	0.0001	0.0000	0.209/0.404/0.319/0.069
5-profile	1778.763	1919.519	1811.611	0.921	0.0001	0.0000	0.0182/0.211/0.388/0.066/0.317

Note. AIC, Akaike information criterion; BIC, Bayesian information criterion; aBIC, adjusted Bayesian information criterion; LMR, Lo-Mendell-Rubin test; BLRT, bootstrapped likelihood ratio test

Figure 1 shows the scores and trend of the four-profile model for the five dimensions. The four latent profiles of practical nursing students' ethical competence showed no overlap across items and exhibited relatively consistent patterns. This study identified four latent categories of ethical competence based on relative differences along a single dimension. Class 1 exhibited the largest relative difference in the ethical sensitivity dimension and had the lowest score in ethical sensitivity; therefore, this subgroup was named “Lowest Level-Sensitivity Deficient.”; Class 2 scored lowest on the ethical knowledge dimension, so this subgroup was named the “Lower-Medium Level Knowledge Deficient”; Class 3 scored higher on the ethical motivation dimension than on other dimensions within the same category, so this subgroup was named the “Upper Medium Level-Low Motivation”; Class 4 demonstrated balanced performance across all dimensions and a high overall level, so this subgroup was named the “Highest Level-Balanced”.

The mean score on the Ethical Competence Scale for the 464 nursing students was (4.07 ± 0.38) points; the mean scores across each dimension are shown in Table 3.

Table 3
Ethical competence of nursing interns and positive psychological capital, organizational climate scores

Variables	M ± SD
Knowledge	3.89 ± 0.64
Skills	4.06 ± 0.40
Sensitivity	3.95 ± 0.50
Motivation	4.28 ± 0.45
Characteristic	4.25 ± 0.44

Table 4 shows the distribution of the five dimensions of ethical competence in the four-profile model. The Kruskal-Wallis test was employed to examine distributional differences across the four latent subtypes of ethical competence in the dimensions of knowledge, skills, sensitivity, motivation, and characteristics (Table 4). The most significant between-group differences were observed in the “Skills” dimension (H = 401.538), followed by the “Sensitivity” dimension (H = 376.813). Post-hoc multiple comparisons with the Bonferroni correction showed that the Balanced Excellence group scored significantly higher than all other groups on the skills and sensitivity dimensions.

Table 4
Comparison of differences among latent subtypes of ethical competence across its four internal dimensions.

[M(Q1,Q3)] Dimension	C1	C2	C3	C4	F/H	Post Hoc Comparisons
Knowledge	17(15,18)	19(17,20)	21(20,22)	23(20.5,25)	184.653***	c4 > c3>c2 > c1
Skills	66(63,68)	72(70,74)	79(77,81)	88(86,90)	401.538***	c4 > c3>c2 > c1
Sensitivity	27(25,28)	31(30,32)	35(34,36)	40(38,40)	376.813***	c4 > c3>c2 > c1
Motivation	15(14,16)	16.5(16,18)	18(18,19)	20(20,20)	205.536***	c4 > c3>c2 > c1
Characteristic	19(18,20)	21(20,22)	23(22,24)	25(24,25)	233.942***	c4 > c3>c2 > c1

Note. ***$P < 0.001$, C1: Lowest Level-Sensitivity Deficient group, C2: Lower-Medium Level Knowledge Deficient group, C3: Upper Medium Level-Low Motivation group, C4: Highest Level-Balanced group.

3.4 The Relationship Between Ethical Competence, Positive Psychological Capital, and Organizational Climate

Spearman's correlation analysis was used to examine the relationships among the five dimensions of ethical competence, positive psychological capital, and organizational climate. Table 5 presents the results of the Spearman's correlation analysis, which show that each dimension of ethical competence is positively correlated with positive psychological capital and organizational climate.

Table 5
Correlation analysis of ethical competence, positive psychological capital, and organizational climate

Variables	Positive psychological capital	Nursing organizational climate
Ethical competence	.533**	.636**
ethical knowledge	.435**	.472**
ethical skills	.522**	.630**
moral sensitivity	.474**	.547**
ethical motivation	.366**	.453**
ethical characteristic	.374**	.497**
Note.** p < 0.001		

3.5 Univariate and multivariate analyses

Table 1 summarizes the comparisons of demographic characteristics across the four groups. The results indicate a significant between-group difference in students' status as class officers ($p < 0.05$). To identify demographic factors associated with ethical competence among nursing students across groups, logistic regression analysis was performed with Class 1 as the reference category (Table 6). The results indicate that serving as a class officer was a significant predictor of group membership ($p < 0.05$).

Table 6
Multinomial logistic regression analysis of predictors of latent profile membership (n = 464)

Variables	C2vsC1			C3vsC1			C4vsC1		
	OR	**95%CI**	**P**	**OR**	**95%CI**	**P**	**OR**	**95%CI**	**P**
Served as a class officer	1.784	1.061–3.002	0.029	1.759	1.028–3.008	0.039	3.545	1.491–8.428	0.004

The results of the multinomial logistic regression analysis showed that, compared to the group with low ethical sensitivity, student nurses serving as class officers were significantly more likely to be in the Balanced Excellence group (OR = 3.545, 95% CI: 1.491–8.428, P = 0.004). This suggests that serving as a class officer may be closely associated with the development of higher levels of ethical competence.

3.6 Comparison of Positive Psychological Capital and Organizational Climate Scores across latent profiles

Table 7 shows the differences in scores for the four latent categories regarding positive psychological capital and organizational climate. The results indicate that both positive relational capital (H = 112.499) and organizational climate (H = 161.879) exhibit statistically significant differences. The positive psychological capital scores of nursing interns in classes 1, 2, 3, and 4 were 111 (102, 122), 123 (114, 132), 133 (123, 143), and 140 (124, 150.5). The organizational climate scores of nursing interns in classes 1, 2, 3, and 4 were 86 (81, 91), 92 (87.75, 97), 101 (94.75, 106), and 108 (101.5, 116). There were statistically significant differences in all pairwise comparisons between groups ($p < 0.001$). As ethical competence levels increased, individuals' positive psychological capital and their perceived organizational climate in nursing also showed an upward trend.

Table 7
Differences in latent subtypes of ethical competence across positive psychological capital and organizational climate.

Variables	Organizational climate	Positive psychological capital
	[M(Q1,Q3)]	[M(Q1,Q3)]
C1	86(81, 91)	111(102, 122)
C2	92(87.75, 97)	123(114, 132)
C3	101(94.75, 106)	133(123, 143)
C4	108(101.5, 116)	140(124, 150.5)
H	161.879***	112.499***
Post Hoc Comparisons	C4 > C3>C2 > C1	C4 > C3>C2 > C1
Note.*** p < 0.001		

4 Discussion

4.1 Ethical Competence Among Nursing Students Shows Group Heterogeneity

The results of this survey indicate that the mean score for ethical competence among nursing students was (4.07 ± 0.38). This is consistent with the findings of Obeid S [20], who found that graduates even demonstrated greater ability to handle ethical dilemmas than practicing nurses. This suggests that nursing students can adapt to the clinical environment relatively well as they transition from classroom learners to clinical practitioners. Among the scores for the various dimensions of ethical competence, the ethical motivation dimension received the highest score (4.28 ± 0.45), indicating that nursing students have a strong intrinsic motivation in areas such as nurse-patient communication, humanistic care, professional knowledge, and the enhancement of their own skills. They possess a “patient-centered” nursing philosophy, place importance on improving their soft skills in nursing [21], and demonstrate a relatively high sense of professional responsibility to save lives and promote health. They recognize the value and mission of nursing work and possess the intrinsic motivation to become qualified nurses. Scores for the ethical knowledge (3.83 ± 0.64) and ethical sensitivity (3.95 ± 0.50) dimensions were relatively low. The lowest score in the ethical knowledge dimension indicates that student nurses have an incomplete grasp of ethics-related knowledge and a lack of deep understanding. There is a phenomenon in which, although instructors have covered ethics-related content during clinical rotations or classroom instruction, students remain unclear about specific ethical concepts. The relatively low score on the ethical sensitivity dimension suggests that students focus excessively on standardizing technical procedures during their studies and practice, while lacking proactive reflection on ethical adaptability in specific situations. This leads to a dulled ethical sensitivity, preventing them from promptly identifying ethical dilemmas in clinical scenarios and thereby hindering the development of nursing students' competence.

4.2 Latent Profile Characteristics of Ethical Competence Among Nursing Students

The results of this study indicate that the ethical competence of nursing students can be classified into four latent categories, “Lowest Level—Sensitivity Deficient” (n = 95, 20.9%), “Lower-Medium Level—Knowledge Deficient” (n = 186, 40.4%), “Upper-Medium Level—Low Motivation” (n = 154, 31.9%), and “Highest Level—Balanced” (n = 29, 6.9%), This demonstrates the heterogeneity of ethical competence among nursing students. It complements previous studies that

treated nursing students as a homogeneous group and guides the development of targeted interventions to enhance their ethical competence.

The “Lowest Level-Sensitivity Deficient group” scored low across all dimensions, with a particularly pronounced deficiency in the ethical sensitivity dimension. This may stem from students' superficial grasp of ethical knowledge, insufficient practical training in privacy protection, and a lack of clinical experience, making it difficult for them to identify clinical ethical dilemmas [22] accurately. As ethical sensitivity is a key competency for nursing professionals in identifying, understanding, and addressing ethical issues, its level directly impacts the quality of nursing care and patient rights [23]. Nursing educators should strengthen ethics instruction and increase practical ethics training to enhance pre-licensure nursing students’ ability to perceive ethical issues, thereby improving their ethical competence.

The “Lower-Medium Level Knowledge Deficient group” accounted for the largest proportion among the four categories. While this group scored lowest on the ethical knowledge dimension, their scores on the motivation and character dimensions were relatively high. This indicates that pre-licensure nursing students in this category possess good ethical attitudes and a sense of responsibility but lack sufficient ethical knowledge. Previous research indicates that ethical competence is a multidimensional system encompassing ethical cognition, judgment, motivation, and behavior [24]. If nursing students lack a solid foundation of ethical knowledge, the normativity of their ethical decision-making may be compromised. Furthermore, studies suggest that medical students’ ethical competence does not necessarily improve with advancing academic stages [25], implying that accumulated experience alone cannot compensate for deficiencies in theoretical knowledge; therefore, nursing educators must prioritize cultivating foundational knowledge.

The “Upper Medium Level-Low Motivation group” scored highest on the ethical motivation dimension, while other dimensions were at a medium level. This indicates that nursing students have developed a strong sense of responsibility and ethical identity during clinical practice; however, due to insufficient practical experience and skills training, they may be slightly deficient in ethical judgment and responding to ethical scenarios, and their ability to apply ethics in complex situations still needs improvement. Nursing educators can enhance students' practical abilities to identify, make decisions about, and address ethical issues through methods such as scenario simulations, role-playing, and case-based teaching.

The “Highest Level-Balanced group” scored highly across all dimensions, representing the top tier among nursing students; however, their proportion is relatively low. This suggests a shortage of students possessing multidimensional ethical competence. Nursing educators should identify students with high levels of ethical competence and strengthen their exemplary and leadership roles to promote an overall improvement in ethical competence.

4.3 Analysis of Factors Influencing the Ethical Competence Profiles of Nursing Students

The results indicate that the demographic factor influencing category classification is serving as a class officer. In this study, nursing students serving as class officers were more likely to be classified into the “Highest Level-Balanced group.” This is consistent with the findings of previous studies [26] and may stem from the fact that students in organizational or managerial roles gain more practical opportunities to assume responsibility, handle complex situations, and engage in interpersonal communication. These experiences strengthen their professional identity and ethical motivation, making them more likely to act in accordance with ethical standards. Research indicates that individuals with moral leadership demonstrate superior performance in moral sensitivity and decision-making, offering valuable insights for nursing ethics education [27, 28].

However, other demographic variables in this study (such as age, educational background, and whether or not students had taken ethics courses) did not show statistically significant differences across the latent categories. This suggests

that, compared to static background factors, dynamic role experiences have a greater influence on students' ethical competence.

Our study also indicates significant differences in nursing students' positive psychological capital and organizational climate across different latent categories of ethical competence. Nursing students in higher ethical competence categories scored significantly higher on positive psychological capital than those in other categories, while those in lower categories scored relatively lower. This may be because positive psychological capital enhances individuals' self-regulation and stress resilience, making it easier for them to identify ethical issues arising in complex clinical dilemmas and make timely ethical decisions [29]. At the same time, nursing interns with higher ethical competence perceive a more positive organizational atmosphere, whereas those with lower ethical competence perceive a relatively weaker one. Nursing interns working in healthy, positive departments feel the help, support, and encouragement of colleagues and managers. This motivates them to continuously improve their nursing skills and ethical literacy, thereby enhancing their ethical competence. This indicates that the combined effects of individual and environmental factors can jointly promote the enhancement of ethical competence. Nursing educators and administrators should prioritize a dual approach to development that addresses both individual and environmental factors. Hospital managers should not only monitor the psychological changes of student nurses during their internship, intervene promptly, and offer emotional support and psychological guidance at an early stage, create a stress - relieving environment, and assist student nurses in finding appropriate ways to soothe their emotions, but also establish a positive mechanism for handling interpersonal relationships, foster an open, warm, and positive hospital nursing organizational climate, and encourage student nurses to improve their possibility continuously. Meanwhile, hospitals and schools should regularly organize educational lectures for student nurses to attend, thereby improving ethical competence to some extent. Hospital managers should not only monitor the psychological changes of student nurses during their internship, intervene promptly, and offer emotional support and psychological guidance at an early stage, create a stress - relieving environment, and assist student nurses in finding appropriate ways to soothe their emotions, but also establish a positive mechanism for handling interpersonal relationships, foster an open, warm, and positive hospital nursing organizational climate, and encourage student nurses to improve their possibility continuously. Meanwhile, hospitals and schools should regularly organize educational lectures for student nurses to attend, thereby improving ethical competence to some extent.

5 Limitations

This study has several limitations. First, convenience sampling was used to collect the sample; therefore, the representativeness of the sample and the generalizability of the findings may be limited. Future studies should employ a diverse and stratified sample. Second, this study is cross-sectional; therefore, its findings cannot be used to establish causal relationships. Consequently, it is not possible to determine whether nursing interns have a causal relationship with positive psychological capital or organizational climate. Further longitudinal studies are needed to establish these relationships.

6 Conclusion

This study employed Latent Profile Analysis (LPA) to identify latent categories and predictive factors of ethical competence among nursing students. The results indicate that the ethical competence of nursing students is at a slightly above-average level and exhibits heterogeneity, and can be classified into four categories: "Lowest Level—Sensitivity Deficient," "Lower-Medium Level—Knowledge Deficient," "Upper-Medium Level—Low Motivation," and "Highest Level—Balanced." Furthermore, this study explored the influencing factors of different latent categories, revealing that "whether serving as a class officer" is a significant predictor of ethical competence classification. This study provides a basis for the precise identification and stratified intervention of nursing students' ethical competence. Nursing educators should pay attention to nursing students at different levels of ethical competence, focus on their mental health, enhance

their psychological capital, and foster a positive organizational atmosphere in nursing. At the same time, they should cultivate students' leadership abilities to improve the overall ethical literacy and clinical practice capabilities of nursing professionals.

Declarations

Ethics approval and consent to participate

This research was approved by the Medical Ethics Committee of Shandong Provincial Hospital of Traditional Chinese Medicine (approval no. 2022-00187). All methods were carried out in accordance with relevant guidelines and regulations. Informed consent was obtained from all participants. To protect participants' privacy, all collected data were kept anonymous and confidential.

Consent for publication

Not applicable.

Date availability

The data supporting the conclusions of this research will be made available from the corresponding authors upon reasonable request.

Competing interests

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Author contributions

Xiyu Wang designed the study. Zhongning Zhou, Yi Lu, and Yanmin Xue collected the data. Jie Pan and Xiaoting Li contributed to data analysis and produced the original draft. Bo Wang and Mingxia Li took responsibility for revising the manuscript. All authors contributed to the article and approved the submitted version.

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References

1. Neumann JL, Mau LW, Virani S, et al. Burnout, moral distress, work-life balance, and career satisfaction among hematopoietic cell transplantation professionals. Biol Blood Marrow Transplant. 2018;24:849-860.
2. Xu JH, Ma Y, Zhang N, et al. Cross-cultural adaptation and psychometric testing of the Nurse Ethical Competence Scale. Med Philos. 2023;44:35-8.
3. Robichaux C, Grace P, Bartlett J, et al. Ethics education for nurses: Foundations for an integrated curriculum. J Nurs Educ. 2022;61:123-30. doi:10.3928/01484834-20220109-02
4. Höglund AT, Helgesson G, Eriksson S. Ethical dilemmas and ethical competence in the daily work of research nurses. Health Care Anal. 2010;18:239-51. doi:10.1007/s10728-009-0126-z
5. Jormsri P, Kunaviktikul W, Ketefian S, et al. Moral competence in nursing practice. Nurs Ethics. 2005;12:582-94. doi:10.1191/0969733005ne828oa
6. Cao YL. A study on organizational climate, organizational change, and their relationship. J Dongbei Univ Finance Econ. 2008;1:13-6.
7. Li N, Zou XF, Deng YH, et al. Mediating and moderating effects of negative affect and psychological resilience between work stress and nursing organizational climate among nurses in tertiary hospitals. Occup Health. 2023;39:2354-8. doi:10.13329/j.cnki.zyyjk.2023.0433
8. Liu FZ, Li QP, Zhou WH. Correlation between moral distress and nursing organizational climate among nurses in the infectious diseases department. Contemp Nurse (Mid-Monthly). 2022;29:134-7.
9. Luthans F, Youssef CM, Avolio BJ. Psychological Capital: Developing the Competitive Edge. Li C, trans. Beijing: China Light Industry Press; 2018.
10. Liang NN, Zhao J, Ren JS, et al. Mediating effect of positive psychological capital between nurses' spare time planning and occupational stress. J Nurs Sci. 2025;40:82-5, 123.
11. Zhang SF. A study on the relationship between core competence, psychological capital, and professional benefit among midwives [doctoral dissertation]. Shandong University of Traditional Chinese Medicine; 2021. doi:10.27282/d.cnki.gsdzu.2021.000323

12. Gu Y. Correlation between subjective well-being, psychological capital, and work stress among nurses in the ICU of tertiary hospitals. China J Health Psychol. 2019;27:264-7. doi:10.13342/j.cnki.cjhp.2019.02.028
13. Jia XP, Li GF, Zhang YH, et al. Influence of psychological capital on job competence among ICU nurses. J Nurs Sci. 2021;36:5-8.
14. Fang JQ. Health Statistics. 7th ed. Beijing: People's Medical Publishing House; 2012:399.
15. Lin SH. Construction and validation of an ethical competence model for clinical nurses [doctoral dissertation]. Shandong University of Traditional Chinese Medicine; 2024. doi:10.27282/d.cnki.gsdzu.2024.000237
16. He LP, Li QJ, Man J. Development of the Nursing Organizational Climate Scale and testing its reliability and validity. Chin J Mod Nurs. 2011;17:873-5.
17. Zhang K, Zhang S, Dong YH. Positive psychological capital: Measurement and its relationship with mental health. Stud Psychol Behav. 2010;8:58-64.
18. Ding CS. Fundamentals of Applied Multidimensional Scaling for Educational and Psychological Research. Cham, Switzerland: Springer; 2018.
19. Lo YT. Likelihood ratio tests of the number of components in a normal mixture with unequal variances. Stat Probab Lett. 2005;71:225-35.
20. Obeid S, Man M. Strengthening perceptions of ethical competence among nursing students and graduates. SAGE Open Nurs. 2020;6:2377960820924170.
21. Miao M, Yao L, Zhang GM, Lu SY. Current status of nursing soft skills and their relationship with DISC personality among dental specialist nurses. Contemporary Nurse (Mid-Monthly). 2022;29:122-6. doi:10.19792/j.cnki.1006-6411.2022.26.038
22. Wang XW, Wang XX, Zhang JW, et al. Analysis of the current situation and influencing factors of ethical sensitivity among nursing students in colleges and universities. Health Vocat Educ. 2025;43:77-80. doi:10.20037/j.issn.1671-1246.2025.22.21
23. Bao B, Cao MJ, He X, et al. Ethical sensitivity and its influencing factors among nursing students: a study. Chin J Nurs Educ. 2024;21:183-8.
24. Koskenvuori J, Stolt M, Suhonen R, et al. Healthcare professionals' ethical competence: a scoping review. Nurs Open. 2019;6:5-17.
25. Nadolny S, Bruns F, Nowak A, et al. Moral competency of students at a german medical school–a longitudinal survey. BMC Med Educ. 2024;24:691.
26. Komives SR, Owen JE, Longerbeam SD, et al. Developing a leadership identity: a grounded theory. J Coll Stud Dev. 2005;46:593-611.
27. Zhang N, Ren X, Xu Z, et al. Investigating the influence of self-leadership on moral sensitivity in medical students: a comparative study. Acta Psychol (Amst). 2025;254:104817.
28. Meng J, Guo X. The relationship between ethical leadership, moral sensitivity, and moral courage among head nurses. BMC Nurs. 2025;24:538.
29. Avey JB, Reichard RJ, Luthans F, et al. Meta-analysis of the impact of positive psychological capital on employee attitudes, behaviors, and performance. Hum Resour Dev Q. 2011;22:127-52.

Figures

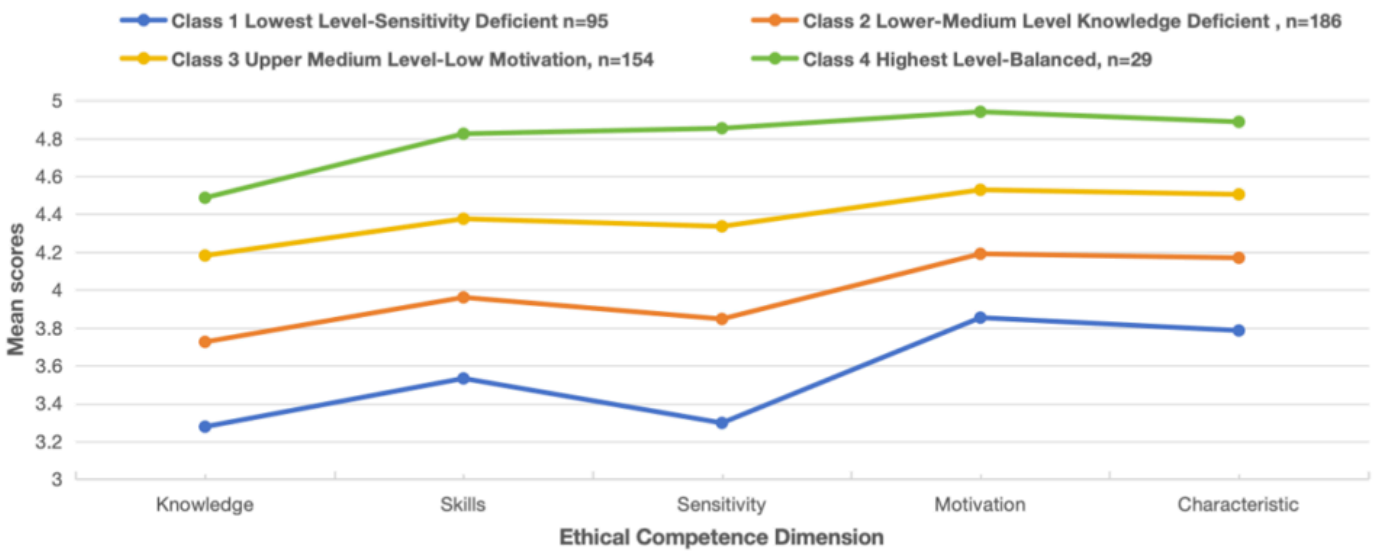


Figure 1

Latent profiles of ethical competence among nursing interns.