

Analysis of Nursing Students' Attitudes Toward the Elderly: A Cross-Sectional Study Using Latent Profile Methods

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Abstract: *Background:* Nursing students' attitudes toward older adults was considered as one of the main reasons of willingness to provide elderly care. Previous studies could not consider the heterogeneity characteristics of nursing students' attitudes towards older adults. This study was to identify nursing students' attitude towards the elderly using Latent Profile Analysis (LPA) and discussed the influence factors of different potential attitudes. *Methods:* 622 participants were included. *Palmore's Facts on Aging Quiz, Kogan's Attitude Toward Older People Scale and Interpersonal Reactivity Index* were completed. LPA and Logistic regression were used to categorize participants into distinct KAOP subgroups and identify predictors of KAOP subgroup classification, respectively. *Results:* Latent Profiles Analysis produced two profiles: Positive attitude (60.1%, n = 373), negative attitude (39.9%, n = 249). Positive attitude towards the elderly was decreased from 95.8% to 60.1% based on the population heterogeneity. Logistic regression analysis revealed that multiple-child family, the relationship with older adults, knowledge of aging, perspective-taking and empathic concern affect nursing students' attitude towards the elderly. *Conclusions:* Targeted interventions to improve attitudes might focus on those subgroups from person-oriented approach through helping them to build good relationship with older adults, strengthening knowledge of aging and cultivating empathy.

Keywords: Nursing Students; Attitude Towards Older Adults; Latent Profile Analysis.

1. INTRODUCTION

Rapid global aging population exacerbate the burden of healthcare for the elderly, especially in China which population account for 18% of the world. It was estimated will be 365 million by 2050 in China [1]. Accordingly, great challenges of caring for the older adults are raised and large number of professional healthcare providers are highly needed. Nurses are definitely one of the most predominant workforces but insufficient. What's worse, extensive studies [2,3] have showed that nurses are not interested in caring for older adults, resulting in dilemma for healthy aging. In response to this dilemma and challenges, improving attitudes towards older people to increase the willingness to work for elderly care among nursing students is considered as a critical way to prepare knowledgeable and professional nursing care [4]. As the reserve army of future healthcare professionals, nursing students' attitudes towards the elderly seriously affect whether they will work in the geriatric care industry in the future. A negative attitude towards older people not only conditions the choice of work, but also the quality of the care provided [5]. Some studies [6] have shown that nursing students have a positive attitude towards the elderly after intervention, but do not improve their desire to work in nursing.

Extensive studies have found multiple-faceted factors affecting nursing students' attitude to the elderly [7,8]. For example, Veronek J [9] reported that different regions and receiving full-time study in geriatric nursing were the influencing factors of nursing students' attitudes towards the elderly. A longitudinal study demonstrated attitudes, aging anxiety, empathy and clinical practice were predictors for student nurses' career motivation toward gerontological nursing in China [10]. Insun Jang [11] found that contact quality with older adults, empathy, anxiety about aging and attitude toward the elderly affected willingness to care for older adults in Korea and the United States students. It is worth mentioning that nursing students attitudes to the elderly can determine the quality of their interactions with older persons and their willingness to work with this age group. Insufficient knowledge and empathy toward older adults give rise to barriers to provide care for older adults. For instance, a study of dental student surveys [12] revealed that empathy is particularly germane to quality care for older people and has been linked to positive clinical outcomes. Both knowledge of aging and empathy seemed to be important factors associated with both attitudes and willingness to care for older adults.

Exploring nursing students' attitudes to care for older adults is essential for making recommendations to develop proper interventions that would match the needs of the elder community. Albeit many advances in findings [13,14],

existing knowledge about attitude towards older adults of nursing students were discussed as a whole merely focusing on mean scores or total scores of KAOP under variable-centered approach, and chi-squared test or linear regression analysis is mostly used, while attitude is a potential variable that is difficult to be directly measured. The traditional multivariate statistical method is not enough to study the heterogeneity of attitudes in the population. Latent Profile Analysis (LPA) is centered on individuals, and samples can be classified based on the response mode of individuals with explicit variables. Patients with similar compliance behaviors can be divided into different subgroups, which is helpful to further study the population characteristics and influencing factors of different subgroups. Considering attitude towards older adult varied in terms of age, gender, and many other factors such as previous experience of taking care of older adults [11], it is necessary to assess nursing students' attitudes towards the elderly from a personal centered lens, taking into account of individual differences into consideration. To the best of our knowledge, no study has explored latent subgroups of nursing students' attitude towards older adults from person-centered approach. Of note, nurses were found might holding both positive and negative attitudes towards older adult simultaneously [5]. Therefore, the present study aimed at exploring the KAOP subgroups among nursing students by LPA. Subsequently, associated factors affecting KAOP was examined in the current study from the latent profile of KAOP perspective.

2. MATERIALS AND METHODS

2.1 Design and Participants

This is a cross-sectional study. A total of 640 nursing students were recruited from two universities and participated in the current study between from December, 2019 to December, 2020. Only 622 students completed questionnaires validly. Inclusive criteria All participating nursing students should be aged at least 18 years of age and registered as a full-time undergraduate in two nursing school of Henan province. Eighteen nursing students were not included due to invalid questionnaire.

2.2 Instruments

The total questionnaire included questionnaires about geriatric knowledge, empathy, attitudes towards older people, demographic characteristics such as age, gender, residence, only child or non-only child, and attitude-related questions which were prepared according to a light of literatures [15,16] including having learned geriatric related courses, raised by grandparents in childhood, experiences of taking care of older adults, living with older adults such as grandparents, having good relationships with older adults such as grandparents, contacting with older adults such as grandparents.

Chinese version of Palmore's Facts on Aging Quiz (C-FAQ) was used to examine the knowledge about aging (KA) and measure misconceptions regarding the older adults[17]. C-FAQ consisted of 25-items with answers of true (T) or false (F) or don't know. A score of 1 was obtained if the answer was true. Higher score indicates higher level of KA. Cronbach's α in the current study is 0.862.

Chinese version of the Kogan's Attitude Toward Older People Scale (C-KAOP) was used to evaluate attitude towards older people consisting of 34- item statements about older adults [18]. Likert-6 score system was applied (from strongly disagree to strongly agree without a score of 4. 17-item of negative statements are reversed scored. higher total score of KAOP mean more positive attitude towards older adults. Cronbach's α in this study was 0.797 for KAOP.

Chinese version of Interpersonal reactivity Index (IRI) was 5-point Likert self-rated questionnaire which was always used to explore empathy of nursing students. IRI consisted of 22 items and four different subscales labeled as consisting four subscales with namely perspective-taking (PT), empathic concern (EC), personal distress (PD), and fantasy (FS), respectively [19,20]. From inappropriate to very appropriate, the score was scored from 0 to 4, and the total score ranged from 0 to 88. The higher the total score, the stronger the empathy ability. In this study, the Cronbach's α was 0.823.

2.3 Ethical Considerations

The current study was approved by the Institutional Review Boards and Ethics Committee of Sias University (LL-2019007). Written informed consent was obtained from the nursing students after elucidating participants the purpose of the study. Nursing students were free to enter and withdraw from the study whenever they want, and

their information would be maintained in a confidential status.

2.4 Data Analysis

SPSS 26.0 and Mplus 8.0 were used for statistical analysis, and the data analysis consisted of three parts. Firstly, the continuous variables were described in mean ± SD, and the categorical variables were described in frequencies and proportions to understand the basic characteristics of nursing students. Secondly, Mplus 8.0 was used to conduct latent profile analysis based on the items of nursing students' attitudes toward the elderly. Starting from a single category model, the number of categories in the model was gradually increased, and the fitness of the model was judged according to the model fitting treatment, until the model fitting index reached the best. Akaike information criterion (AIC), Bayesian information criterion (BIC) and adjusted Bayesian information criterion (aBIC) were used to compare the models. Lower values of AIC, BIC and aBIC indicated better model fit. Likelihood ratio test (LMR) and bootstrap-based likelihood ratio test (BLRT) were used to determine whether the K-class model fitted better than the model with k-1 class, with significant p values ($P < 0.05$) indicating that K-class was better. Entropy ranges from 0 to 1, with a value closer to 1 indicating a more accurate classification (ideally above 0.80) [21]. Third, SPSS26.0 was used to analyze the influencing factors. Chi-square test and t test were used to compare the potential categories of nursing students' attitudes toward the elderly between groups, and logistic regression analysis was used to analyze the influencing factors of each potential category of nursing students' attitudes toward the elderly. Significance was set at a p-value < 0.05 for all analyses.

3. RESULTS

3.1 Latent Profile Analysis

Table 1 compares model fit indices of the LPA models with different numbers of profiles. The two-profile model was selected based on the predefined model selection criteria. The two categories by profile on 34 items in the C-KAOP questionnaire scores are presented in Figure 1. Posterior probabilities of the two-profile solution ranging from 0.967 to 0.980 are shown in Table 2. Taken together, the optimal two-profile solution was shown Figure 1 (X-coordinate: number of KAOP questions, Y-coordinate: mean scores of KAOP per questions). The two-profile solution was labeled class 1 as positive attitude (PA, 60.1%, $n = 373$), class 2 as negative attitude (NA, 39.9%, $n = 249$).

Table 1: Fit Indices for Six Latent Profiles in the Sample ($n = 622$).

Fit indices	Number of KAOP profiles					
	1	2	3	4	5	6
AIC	60117.397	<i>57360.768</i>	56164.569	55307.053	54944.190	54556.815
BIC	60418.837	<i>57817.360</i>	56776.315	56073.952	55866.241	55634.019
aBIC	60202.947	<i>57490.351</i>	56338.187	55524.704	5525.874	4862.532
Entropy		<i>0.911</i>	0.927	0.943	0.915	0.906
LMR		<i>0.032</i>	0.429	0.412	0.778	0.767
BLRT		<i>< 0.001</i>	< 0.001	< 0.001	< 0.001	< 0.001

Note: KAOP = Kogan's Attitude Toward Older People Scale;

AIC = Akaike information criterion; BIC = Bayesian information criterion;

aBIC = adjusted Bayesian information criterion; LMR = Lo-Mendell-Rubin;

BLRT = bootstrap likelihood ratio test;

Italic values indicate the optimal model.

Table 2: Average Latent Profile Class Probabilities for the Most Likely Class Membership (Row) by Latent Class (Column) in the Test Sample ($n = 622$).

Latent class	The most likely class membership	
	NA	PA
1	0.967	0.033
2	0.020	0.980

Note: NA = negative attitude; PA = positive attitude.

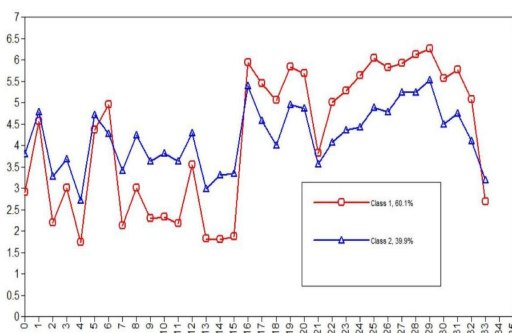


Figure 1: Latent profile plot based on the KAOP for nursing students.

3.2 Differences in Demographics and KAOP Related Characteristics by Profiles

The nursing students' average age was 23.76 ± 1.33 . Of all participants ($n=622$), 77.2% were female. The great majority lived in the rural (70.9%). Most of the participants did not live with older adults such as grandparents (60.1%), and 38.3% showed a good relationship with older adults such as grandparents. The total scores of KAOP and FAQ of nursing students were (164.96 ± 18.32) and (10.44 ± 3.01) respectively. 95.8% of the students had a positive attitude towards the elderly. These data are summarized in Table 3, 4. Using the results of potential profiles analysis as the dependent variable, Table 3 and Table 4 distinguishing analyzes the difference of general data and the FAQ, IRI scores of nursing students in the two-profile. We found that FAQ, PT, EC, FS, residence, only child, having learned geriatric related courses, experiences of taking care of older adults, having good relationships with older adults such as grandparents, contacting with older adults such as grandparents were significantly associated with risk of students' attitudes towards the elderly among the two profile.

Table 3: Comparisons of related factors between distinct profiles of KAOP among nursing students ($n = 622$).

Characteristics		Total Sample ($n = 622$)	NA ($n = 249$)	PA ($n = 373$)	χ^2 /Fisher	p
Gender	Male	142 (22.8%)	65 (26.1%)	77 (20.6%)	2.528	0.068
	Female	480 (77.2%)	184 (73.9%)	296 (79.4%)		
Residence	Rural	441 (70.9%)	188 (75.5%)	253 (67.8%)	4.262	0.047
	Urban	181 (61.1%)	61 (24.5%)	120 (32.2%)		
Only child	Yes	97 (15.6%)	28 (11.2%)	69 (18.5%)	5.969	0.018
	No	525 (84.4%)	221 (88.8%)	304 (81.5%)		
Having learned geriatric related courses	Yes	333 (53.5%)	112 (45.0%)	221 (59.2%)	12.224	< 0.001
	No	289 (46.5%)	137(55.0%)	152 (40.8%)		
Raised by grandparents in childhood	Yes	161 (25.9%)	56(22.5%)	105 (28.2%)	2.492	0.135
	No	461(74.1%)	193(77.5%)	268 (71.8%)		
Experiences of taking care of older adults	Yes	162 (26.0%)	53 (21.3%)	109 (29.2%)	4.884	0.017
	No	460 (74.0%)	196(78.7%)	264 (70.8%)		
Living with older adults such as grandparents	Yes	248 (39.9%)	100 (40.2%)	148 (39.7%)	0.014	0.933
	No	374 (60.1%)	149 (59.8%)	225 (60.3%)		
Relationships with older adults such as grandparents	1 Good	508 (81.7%)	176 (70.7%)	332 (89.0%)	34.959	< 0.001
	2 Normal	107 (17.2%)	67 (26.9%)	40 (10.7%)		
	3 Bad	7 (1.1%)	6 (2.4%)	1 (0.3%)		
Contacting with older adults such as grandparents	1 Frequently	322 (51.8%)	101 (40.6%)	221 (59.2%)	24.669	< 0.001
	2 Normal	208 (33.4%)	95 (38.1%)	113 (30.3%)		
	3 Non-frequently	92 (14.8%)	53 (21.3%)	39 (10.5%)		

Note: NA = negative attitude; PA = positive attitude

Table 4: Comparison scores of age, FAQ and empathy between two profiles of KAOP among nursing students (n = 622).

	Total Sample (n = 622)		NA (n = 249)		PA (n = 373)		t	p
	M	SD	M	SD	M	SD		
Age	23.76	1.33	21.73	1.36	21.78	1.32	-0.438	0.662
FAQ	10.44	3.01	9.56	3.07	11.01	2.83	-6.042	< 0.001
PT	13.01	2.69	12.28	2.74	13.49	2.56	-5.612	< 0.001
PD	11.62	3.09	11.75	2.84	11.53	3.24	0.884	0.377
EC	18.97	2.57	14.03	2.47	16.09	2.86	-9.578	< 0.001
FS	13.09	2.98	14.50	2.66	15.82	3.35	-5.458	< 0.001

Note: NA = negative attitude; PA = positive attitude; FAQ = Facts on Aging Quiz; PT = Perspective-taking; PD = personal distress; EC=Empathic Concern; FS = Fantasy.

3.3 Logistic Regression Analysis of Factors Influencing KAOP's Among the Two Latent Profiles

We then performed logistic regression to validate the risk factors of students' attitudes towards the elderly, using the results of univariate analysis indicators as independent variables (Table 5, Fig. 2). The result showed that only child, the degree of relationship with the elderly (Normal VS Good), FAQ, PT, and EC were the factors affecting the nursing students' positive attitude towards the elderly.

Table 5: Logistic regression analysis of different latent profiles of KAOP among nursing students.

Variables	B	SE	95% CI		OR	p
Only child	-0.727	0.277	0.281	0.832	0.484	0.009
Having learned geriatric related courses	-0.060	0.194	0.643	1.378	0.941	0.756
Experiences of taking care of older adults	-0.371	0.225	0.444	1.072	0.690	0.099
Relationships with older adults such as grandparents						
Normal	-0.734	0.278	0.278	0.828	0.480	0.008
Bad	-1.809	1.155	0.017	1.575	0.164	0.117
Contacting with older adults such as grandparents						
Normal	-0.299	0.222	0.480	1.144	0.741	0.177
Not frequently	-0.478	0.311	0.337	1.140	0.620	0.124
FAQ	0.143	0.033	1.082	1.230	1.153	< 0.001
PT	0.076	0.038	1.001	1.164	1.079	0.048
FS	0.017	0.035	0.950	1.090	1.018	0.617
EC	0.262	0.042	1.198	1.410	1.299	< 0.001

Note: B value refers to the regression coefficient and intercepts (constant term); SE is the standard error; OR = odds ratio; CI = confidence interval;

FAQ = Facts on Aging Quiz; PT = Perspective-taking; FS = Fantasy; EC=Empathic Concern; OR = 0.221.

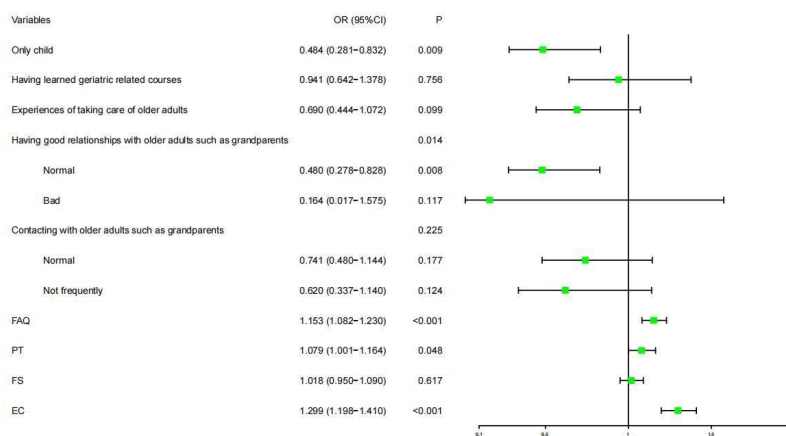


Figure 2: Logistic regression analysis of different latent profiles.

4. DISCUSSION

The results of this study show that the total KAOP score is (164.96±18.32). From variable-centered approach, the total mean score of KAOP in the current study was highly comparable or higher [15] than previous finding [22,23], suggesting positive attitude towards older adults [24], and we also found that 95.8% of the nursing students had a positive attitude towards the elderly. However, considering the heterogeneity and person-oriented approach, we found that about 60.1% of the nursing students had a positive attitude towards the elderly by using the LPA. Our result was consistent with tradition findings that majority of nursing students' attitude towards older people were positive (60.0%) [24]. Using the variable-centered approach and using the person-oriented approach, the nursing students' positive attitude towards the elderly changed (95.8% VS 60.1%). This indicates that the attitude of nursing students towards the elderly is not so positive as it appears. The reason for the decline in the proportion of nursing students' positive attitude towards the elderly might be linked to methodological difference used in the study as individual distinct responds to each item of KAOP was fully considered from person-oriented approach rather than homogenous judgement. Negative attitudes even agism to older people among medical students were also found in China [25,26]. Our study shows that there are still some nursing students (39.9%) who have negative attitudes towards the elderly, which is consistent with other studies [8,27]. Besides, discrepancy in attitude towards older adults might be associated with different assessment tools [28]. Majority of positive findings on attitudes towards older adults were assessed by Kogan's Attitude toward Older People Scale which mainly assesses explicit prejudice and stereotypes towards older people, while relatively negative attitudes towards older adults among Chinese undergraduate were found using Fraboni scale of Ageism (FSA) which examine not only attitude towards older adults, but also prejudice and discrimination simultaneously [26]. Therefore, in the current situation of the lack of geriatric nursing talents in China, it is necessary for medical colleges and universities to take a variety of measures to guide nursing students to look at the elderly group comprehensively and objectively, and cultivate their positive attitudes towards the elderly.

As mentioned above, we sought to identify predictors of nursing students attitudes towards the elderly. In our study, we found that non-only child is a risk factor for nursing students positive attitude to the elderly. This is consistent with a previous study [29]. They think that the one-child family is mostly three generations living together, the family relationship is harmonious, and it is more likely to live with the elderly, enjoy the love and care of the elderly, and have deep feelings and dependence on the elderly, so they have a positive attitude towards the elderly. However, the results of this study are not consistent with another previous study, which may be due to the fact that now more non-only children are raised by intergeneration, and more only children are raised by their parents, which has less contact with the elderly and leads to less positive attitudes towards the elderly [30]. It is also possible that this occurs with the use of LPA from the person-oriented approach.

Further investigation found that nursing students who had a good relationship with the elderly had a more positive attitude towards the elderly. It may be because the nursing students who have a better relationship with the elderly are more likely to pay attention to the positive qualities of the elderly and thus hold a positive attitude [31]. Some studies [32] have shown that nursing students who have practiced or apprenticed in the department of Geriatrics of hospitals have a positive attitude towards the elderly. Nursing students have more opportunities to communicate with the elderly and establish a good relationship with the elderly during clinical practice or apprenticed. At the same time, under the influence of the traditional thought of respecting the elderly, nursing students are also willing to pay attention to the elderly, and their attitude towards the elderly will be more objective. Therefore, geriatric nursing education for nursing students should regard the elderly as resources, develop positive interactions between nursing students and the elderly, establish good relationships, correct their cognition of aging knowledge at the social level, change the stereotype of the elderly group, and establish a more positive attitude.

It is very important for nursing students to master the knowledge about aging. They can use this knowledge to deal with various related aging problems. Our findings proved that nursing students' knowledge about aging can affect their attitudes towards older people. Consistent with De Guzman [33], Hsu M [23], further explained knowledge about aging in the present study directly influenced attitude. Chiu-Yen Yu et al. [34] conducted an intervention study on care workers and found that after 4 weeks of training and simulation training, the participants in the experimental group had a significant improvement in their cognition of aging and attitudes toward the elderly. In theory, nursing students with higher education and greater knowledge about aging should present positive attitudes [35]. They were better at anticipating and identifying the needs of older people than those without any expertise in this area and those with less knowledge. However, in a study, we found an interesting phenomenon. A slight inverse relationship was seen in the knowledge-attitude correlation [7]. Another study also found [36] that subjects with a higher level of education or taking courses outside of school tended to show negative attitudes. As far as

nursing students with knowledge of aging are concerned, their negative attitudes seem likely to stem from the difficult working conditions of geriatric nursing and the overweight workload of professional duties. This suggests that educators should actively adjust the curriculum system of geriatric nursing, improve the knowledge level of nursing students, eliminate discrimination and stereotyping of the elderly so as to promote the positive attitude of nursing students towards the elderly.

Empathy is also a key component of nursing students' positive attitudes towards the elderly. The results of the study showed that PT and EC two subscales in the Interpersonal reactivity Index of nursing students were the factors affected the positive attitudes towards the elderly. Studies [37] have shown that merely enhancing nursing students' knowledge of aging does not change attitudes towards the elderly, but interventions involving empathy or focusing solely on empathetic building strategies do successfully improve positive attitudes towards the elderly. Suggesting that empathy may play an important but underappreciated role. An intervention study in Iran [38], which trained 63 nursing students in empathy skills, showed that empathy skills training did improve the empathy and attitude of nursing students towards the elderly. Besides, previous research [39] has investigated the role of empathic skills acquired by nursing students in nursing courses in reducing negative attitudes of nursing students toward older adults. It is reminded that nursing educators should cultivate undergraduate nursing students' empathy in various aspects, make full use of empathy to affect their attitudes towards the elderly, so as to further affect students' willingness to engage in nurse-related occupations, enrich the talent pool for elderly care services, and improve the quality of elderly care services.

Our results limited its generalizability as a result of convenience sampling from only two universities of Henan Province in Chinese, future studies by adapting nationally representative samples are needed to examine the cross-cultural characteristics of profiles. Moreover, cross-sectional designs entailed the uncertainty of causality between factors influencing attitudes and willingness to care for older adults. Hence, Longitudinal studies are needed and latent transition analyses might be helpful to clarify the nature and trends of empathy profile across time.

5. CONCLUSION

To our knowledge, this study is the first to analyze the factors influencing nursing students' attitudes toward older adults using LPA. The proportion of each attitudes among nursing students changed after using the attitude classification determined by variable-centered approach and using the LPA classification. The attitude of nursing students towards the elderly is not so positive as it appears. When we discuss the factors that affect nursing students' attitude towards the elderly, there is a contrary phenomenon in other studies. Compared with the only-child nursing students, non-only child is a risk factor for nursing students to hold a positive attitude towards the elderly. And it is important to improve the positive attitude of nursing students towards the elderly through strengthening geriatric knowledge, empathy training and contact with the elderly. Our findings can be used to guide future research on how nursing students improve their attitudes toward older adults.

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