

A Study on the Social and Cultural Well-Being of Chinese English Majors: A Multiple Regression Analysis Based on Python

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Abstract: Learners' well-being is one of the elements that need to be considered in foreign language education, but the academic community has not paid enough attention to its social and cultural aspects. This study is based on the social and cultural well-being scale for EFL learners compiled by Xu Jinfen's team in 2025. The questionnaire was distributed to 163 English majors in many universities in China through the questionnaire star platform, and 157 valid questionnaires were collected. The study uses Python for data analysis, with multiple regression analysis as the core method, through hierarchical regression and interaction effect design, systematically examines the impact of demographic variables, English learning characteristics and regional differences on social and cultural well-being. The results show that English majors' cultural well-being is higher than their social well-being, and their recognition of the social value of English is low. There are differences in the influence of gender, education level, learning years, college type and region on the dimensions of well-being. There is a significant interaction effect between education level and learning years. The low level of happiness in the 3-5 years of master's degree provides support for optimizing the training program of English majors and improving students' social and cultural well-being.

1. Introduction

Since the 1970 s, psychological research has shifted from focusing on shortcomings to focusing on positive factors, especially factors that promote individual or collective development and well-being. Seligman & Csikszentmihalyi[1], a representative of positive psychology, advocates the use of rigorous and scientific methods to study positive factors such as happiness, gratitude and hope, and to explore the significance of a happy life. They clearly put forward the three core of positive psychology, in which subjective positive experience is mainly personal subjective well-being and happiness experience. Happiness is an individual's satisfaction and positive emotional experience in terms of current living conditions, personal growth, and environmental adaptation [2]. Learners with high well-being have a stronger perception of the meaning of life,

which can effectively regulate academic emotions[3], strengthen the belief of overcoming setbacks, and maintain a continuous motivation for foreign language learning[4]. In the field of foreign language teaching, the study of foreign language learners' well-being has important research value. Previous studies have carried out a large number of empirical studies on the antecedent variables of foreign language learning well-being [5][6]. However, there is not enough research on the specific performance of well-being and its internal mechanism among English learners in China, especially for English majors. Exploring the mechanism of Chinese English learners' social and cultural well-being is helpful to innovate foreign language teaching strategies. Therefore, it is important and necessary to carry out extensive empirical research.

2. Literature review

2.1 The Connotation of Happiness

Happiness has the characteristics of shifting from philosophy to psychology. In ancient Greece, scholars launched a philosophical debate around hedonic and eudaimonic [7]. The happiness theory regards happiness as a pleasant psychological experience, while the realization theory emphasizes that happiness involves the objective process of personal growth, self-identity, meaning pursuit and potential realization [8]. These two views lay the foundation for the study of subjective well-being and psychological well-being after the 1960s: subjective well-being is represented by Diener et al. [9], focusing on individual emotional state and life satisfaction; psychological well-being criticizes that subjective well-being equates positive feelings with happiness, emphasizing mental health and cognitive potential realization[10]. Keyes [11] proposed social well-being, including five dimensions: social integration, social recognition, social contribution, social realization, and social harmony, highlighting the impact of social functions. Xu Jinfen[12] based on a qualitative study of Chinese EFL learners' English learning experience, found that cultural well-being is also an important aspect of the overall development of Chinese EFL learners, and for the first time included socio-cultural well-being as an important component of foreign language learners' well-being experience, making up for the neglect of this dimension in existing research. In general, well-being is a dynamic process of pursuing pleasure, satisfaction and meaning, involving emotional experience, cognitive development, social activities and cultural perception, which plays a key role in individuals and society.

2.2 Happiness and second language learning

With the introduction of positive psychology into the field of second language acquisition, the attention of foreign language scholars to happiness is increasing[13][14]. The promoting effect of well-being on second language learning is mainly reflected in the regulation of learning engagement and motivation: the interaction of personality advantage, motivation and identity can enhance learning engagement; happiness affects second language learning by regulating motivation, forming a virtuous circle: positive emotions maintain learning motivation[15], and recognition of learning meaning arouses motivation. Happiness can predict classroom learning engagement, improve learning outcomes, and have a long-term impact on learners' attitudes towards life, personality traits, and emotional regulation[16][8].

In recent years, domestic scholars have carried out increasingly in-depth discussions on emotions in second language learning. Jiang Guiying and Li Chengchen [17] systematically combed the research on second language acquisition from the perspective of positive psychology, and pointed out that the research on emotions has gradually shifted from a single negative emotion research to a comprehensive paradigm of positive emotions and multiple emotions. Li Chengchen and Han

Ye[18] examined the predictive effect of foreign language pleasure, anxiety and boredom on the effectiveness of online learning, and found that the three emotions had a significant synergistic predictive effect on learning effectiveness.

However, there are still few empirical studies on the components of English learning well-being and its internal mechanism. Previous studies have shown that factors such as English proficiency, psychological resilience, learning motivation, and growth thinking can directly or indirectly enhance happiness[6]. Teachers' emotional scaffolding can also enhance happiness in English learning[5]. Positive emotions, meaningful engagement, social relationships and achievements in second language learning can enhance happiness[16][19][20].

2.3 Happiness model

Positive psychology researchers advocate the concept of 'well-being' to be specific and operable, that is, to establish a well-being model. Among them, PERMA and EMPATHICS are widely used in foreign language education research[21]. In 2011, Seligman[2] established the PERMA model and proposed that the five elements of happiness are: positive emotions, engagement, relationship, meaning and achievement, emphasizing the independence of dimensions, but ignoring cultural factors, and there is a dynamic correlation between the elements [22][20]. In 2016, Oxford[3] drew on Costa & Kallick's [23] 16 thinking habits and PERMA's 24 personality advantages. The EMPATHICS model of nine dimensions affecting happiness is further proposed: Emotion and Empathy, Meaning and Motivation, Perseverance, Agency and Autonomy, Time, Hardiness and Habits of Mind, Intelligences, Character Strengths and Self Factors. This model enriches the elements of well-being, reflects the interaction and complex changes between psychological variables and social environment in foreign language learning, and helps to understand the dynamic process of foreign language learners' psychology, but pays less attention to culture[24]. Based on the situation of Chinese learners, Xu Jinfen [12] constructed a four-dimensional model including psychology, cognition, culture and social well-being through grounded theory, fully considering the interaction between various dimensions, and rooted in the macro well-being influencing factors of social culture. On the basis of this, Yang Jiaqi and Xu Jinfen[25] through exploratory factor analysis and confirmatory factor analysis, finally determined that social and cultural well-being is composed of two second-order factors: 'social well-being' and 'cultural well-being'. The development of the scale provides an effective measurement tool for the quantitative study of social and cultural well-being of Chinese EFL learners.

In general, the existing research has insufficient quantitative verification of the internal mechanism of well-being, and the applicability of the Western model in the context of foreign language education in China needs to be tested. Based on the sociocultural well-being scale for EFL learners compiled by Xu Jinfen in 2025, this study designs a questionnaire to explore the overall situation and internal mechanism of English majors' sociocultural well-being in China. Therefore, this study intends to explore the following three questions: What is the general situation of Chinese English majors' English learning socio-cultural well-being? What are the effects of demographic variables, English learning characteristics, regional differences and other factors on sociocultural well-being and its sub-dimensions? What is the interaction effect between education level and learning years?

3. Research methods

3.1 Research object

The subjects of this study are EFL learners of English major undergraduates, postgraduates and

doctoral students (comprehensive universities, foreign language universities, science and engineering universities, etc.) from several universities across the country. A total of 163 people participated in the questionnaire survey, and 157 valid questionnaires were obtained after removing invalid answers, with an effective recovery rate of 96.31 %.

3.2 Research tools

Based on Xu Jinfen's Socio-Cultural Well-being Scale for EFL Learners compiled in 2025, the questionnaire of this study consists of two parts: scale measurement and personal information collection. The first part is the sociocultural well-being scale of EFL learners, covering six dimensions of society, social recognition, social contribution, cultural awareness, cultural self-confidence and cultural recognition, with a total of 47 items. All items were designed using the Likert seven-level scale, with 1 point indicating 'completely disagree' and 7 points indicating 'completely agree', so as to comprehensively measure the level of learners' social and cultural well-being. The second part focuses on collecting personal information such as gender, age, major, college, and English learning years of the subjects for subsequent data grouping and correlation analysis.

In the process of scale preparation, it has been reviewed, discussed and improved for many rounds : literature review ; semi-structured interviews were conducted on 20 target subjects ; and invite five scholars with relevant teaching and research background to review ; finally, three expert teachers were invited again for the second round of evaluation and group discussion to ensure scientificity and comprehensibility. The scale has passed the reliability and validity test. The reliability of the model is determined by Cronbach's α coefficient of each dimension calculated by SPSS. The convergence validity is measured by composite reliability (CR) and average variance extraction (AVE). From the perspective of reliability, the Cronbach's α coefficient of each dimension was higher than 0.900, indicating that the overall reliability of the sample data was good ; the combined reliability of the five first-order dimensions is between 0.920 and 0.967, which is greater than the reference value of 0.7, indicating that the EFL learners' social and cultural well-being scale has high internal consistency. In addition, the AVE square root value of each dimension of the model is greater than its correlation coefficient with other dimensions, which has good discriminant validity and ensures the scientificity and effectiveness of the social and cultural well-being scale for EFL learners.

4. Research process

4.1 Sample descriptive statistics

A total of 163 valid questionnaires were collected in this study, and 157 valid samples were obtained after data cleaning, with an effective recovery rate of 96.31 %. The demographic characteristics of the sample are shown in Table 1. Among them, 118 (72.39 %) were girls, 22 (13.50 %) were boys, and 23 (14.11 %) did not want to disclose gender; there were 82 undergraduates (50.31 %), 78 postgraduates (47.85 %) and 3 doctoral students (1.84 %). There were 68 people (41.72 %) with more than 12 years of English learning, 54 people (33.13 %) with 9-12 years, 23 people (14.11 %) with 6-8 years, 8 people (4.91 %) with 3-5 years, and 10 people (6.13 %) with 1-3 years. There were 89 students (54.60 %) from comprehensive universities, 46 students (28.22 %) from normal universities, 22 students (13.50 %) from foreign language universities, and 6 students (3.68 %) from other types of universities.

Table 1 Sample Demographic Characteristics (N = 157)

Variable	Category	<i>n</i>	%
Gender	Male	22	13.50
	Female	118	72.39
	Prefer not to say	23	14.11
Education	Undergraduate	82	50.31
	Master's	78	47.85
	Doctoral	3	1.84 [†]
Years of Learning	1–3 years	10	6.13
	3–5 years	8	4.91
	6–8 years	23	14.11
	9–12 years	54	33.13
	>12 years	68	41.72
University Type	Comprehensive	89	54.60
	Normal	46	28.22
	Foreign Studies	22	13.50
	Other	6	3.68

Note. [†] Doctoral students constituted only 1.84% of the sample; results involving this subgroup should be interpreted with caution.

4.2 Basic situation of social and cultural well-being

4.2.1 Social well-being

Social well-being includes three dimensions: social contribution (7 questions), social integration (7 questions) and social recognition (6 questions). All of them are scored by 7-level Likert scale (1 = completely disagree, 7 = completely agree). The higher the score is, the stronger the social well-being is. The descriptive statistical results of each dimension are shown in Table 2. From the perspective of specific items, in the dimension of social contribution, 'My English knowledge can help others' ($M = 5.12$) scored the highest, with 15.95 % of respondents choosing 7 points; the score of 'My English knowledge can promote international cooperation' ($M = 3.89$) was the lowest, and 20.86 % of the respondents chose 1 point. This shows that students have a strong sense of direct interpersonal help in English, while they have a low recognition of the macro social values of English, such as promoting international cooperation and social and economic development. In the dimension of social integration, the average score of each item is between 4.20 and 5.30. The highest score was 'I have a strong sense of belonging to the English learning community' ($M = 5.30$), and the lowest score was 'I have a positive relationship with my family' ($M = 4.20$). Senior and sophomore students in the 'learning community atmosphere' 25.15 % of the choice of 7 points, the score was significantly higher than the lower grade students. In the dimension of social recognition, the average score of each item is between 4.10 and 5.25. The score of 'other members trust me' ($M = 5.25$) was the highest, followed by 'teacher's help in learning' ($M = 5.10$). The proportion of students in foreign language colleges and universities with high scores on 'members are willing to help others' is 21.47 %, which is higher than that of comprehensive colleges and universities (17.79 %). The proportion of those with more than 12 years of study who chose 7 points on 'trust in others' was 16.56 %, which was significantly higher than that of the short-term group.

4.2.2 Cultural Well-being

It can be seen from Table 2 that in the dimension of cultural recognition, 'respect and tolerance of different cultures' ($M = 5.80$) scored the highest, followed by 'maintenance of mother tongue culture' ($M = 5.50$). The proportion of doctoral students choosing 7 points on 'mother tongue cultural self-confidence' (33.33 %) was significantly higher than that of undergraduates (25.15 %) and postgraduates (27.61 %). The high score proportion of students in East China on 'spreading Chinese culture' is 27.61 %, which is higher than 17.79 % in North China. In the dimension of cultural awareness, the average score of each item is between 4.30 and 5.50. The highest score was 'willing to contact different cultural customs' ($M = 5.50$), followed by 'intercultural sensitivity' ($M = 5.40$). The proportion of high scores on "reflecting on mother tongue culture" among students in normal universities is 25.15 %, which is higher than that in foreign language universities (17.18 %).

Table 2 Descriptive Statistics of Sociocultural Well-being Dimensions

Second-order Dimension	First-order Dimension	Items	<i>M</i>	<i>SD</i>
Social Well-being	Social Contribution	7	4.38	0.72
	Social Integration	7	4.68	0.68
	Social Recognition	6	4.52	0.65
	Total Social WB	20	4.53	0.61
Cultural Well-being	Cultural Recognition	9	5.12	0.58
	Cultural Awareness	6	4.85	0.62
	Total Cultural WB	15	4.99	0.56

4.3 Statistical test of group differences

4.3.1 Gender differences

The results of independent sample *t* test showed that in the dimension of social integration, the score of girls ($M = 4.89$, $SD = 0.72$) was significantly higher than that of boys ($M = 4.21$, $SD = 0.85$), $t(138) = 2.98$, $p = 0.003$, Cohen's $d = 0.45$, and the difference was close to the medium effect. Specifically, girls also scored significantly higher than boys in the two items of 'classmate relationship' and 'sense of belonging' ($p < 0.05$), and the proportion of girls choosing 'complete agreement' in the item of 'teacher-student relationship' was 16.56 %, which was also significantly higher than that of boys 9.2 %. In the dimension of cultural recognition, girls' score on 'cultural adaptability' ($M = 5.12$, $SD = 0.68$) was significantly higher than that of boys ($M = 4.56$, $SD = 0.74$), $t(138) = 2.56$, $p = 0.012$, Cohen's $d = 0.39$, and the effect size was medium level. The test results are summarized in Table 3.

Table 3 Gender Differences (Independent-samples *t*-test)

Dimension	Female ($n = 118$) <i>M</i> (<i>SD</i>)	Male ($n = 22$) <i>M</i> (<i>SD</i>)	<i>t</i> (138)	<i>p</i>	Cohen's <i>d</i>
Social Integration (total)	4.89 (0.72)	4.21 (0.85)	2.98	.003	0.45
Peer Relationships	5.02 (0.68)	4.35 (0.82)	2.56	.012	0.39
Sense of Belonging	5.15 (0.70)	4.40 (0.78)	3.12	.002	0.48
Cultural Adaptability	5.12 (0.68)	4.56 (0.74)	2.56	.012	0.39

Note. * $p < .05$, ** $p < .01$.

4.3.2 Differences in educational level

The results of one-way analysis of variance showed that in the dimension of social contribution, the scores of postgraduates ($M = 4.68$, $SD = 0.62$) were significantly higher than those of undergraduates ($M = 4.12$, $SD = 0.71$), $F(2,154) = 4.56$, $p = 0.006$. The post hoc test (LSD) showed that the difference between postgraduates and undergraduates was statistically significant ($p < 0.01$), and there was no significant difference between doctoral students and undergraduates ($p = 0.190$). Specifically, the scores of master's students on the two items of "international cooperation" and "social and economic development" were significantly higher than those of undergraduates ($p < 0.01$). In the dimension of cultural awareness, the score of doctoral students ($M = 5.80$, $SD = 0.45$) was significantly higher than that of master students ($M = 5.10$, $SD = 0.58$) and undergraduates ($M = 4.75$, $SD = 0.63$), $F(2,154) = 6.78$, $p < 0.001$. Post hoc test (LSD) showed that doctoral students were significantly higher than master students ($p < 0.05$) and undergraduates ($p < 0.001$), and there was no significant difference between master students and undergraduates ($p = 0.082$). The test results are shown in Table 4.

Table 4 Education-level Differences (One-way ANOVA)

Dimension	Undergraduate ($n = 82$) M (SD)	Master's ($n = 78$) M (SD)	Doctoral ($n = 3$) M (SD)	$F(2, 154)$	p	η^2	Post-hoc
Social Contribution	4.12 (0.71)	4.68 (0.62)	3.85 (0.55)	4.56	.006	.08	Master's > Undergraduate**
Cultural Awareness	4.75 (0.63)	5.10 (0.58)	5.80 (0.45)	6.78	<.001	.12	Doctoral > Undergraduate** ; Doctoral > Master's

Note. Post-hoc: LSD; † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

4.3.3 Differences in Years of Study

The results of one-way analysis of variance showed that there were significant differences in the dimension of cultural awareness between groups with different learning years, $F(4,152) = 8.23$, $p < 0.001$, $\eta^2 = 0.15$. The post hoc test (LSD) showed that the scores of the group with more than 12 years of study ($M = 5.50$, $SD = 0.55$) were significantly higher than those of the group with 9-12 years of study ($M = 4.90$, $SD = 0.62$, $p = 0.008$) and the group with less than 6 years of study ($M = 4.30$, $SD = 0.68$, $p < 0.001$). There was no significant difference between the group with 9-12 years and the group with less than 6 years of study ($p = 0.067$). Pearson correlation analysis further showed that there was a moderate positive correlation between the length of study and the total score of cultural awareness ($r = 0.52$, $p < 0.001$). The test results are shown in Table 5.

Table 5 Learning Duration Differences in Cultural Awareness (One-way ANOVA)

Years of Learning	n	M	SD	Post-hoc
1–3 years	10	4.25	0.72	a
3–5 years	8	4.30	0.68	a
6–8 years	23	4.45	0.65	a
9–12 years	54	4.90	0.62	b
>12 years	68	5.50	0.55	c
Total	157	4.85	0.62	

Note. Different subscripts indicate significant differences at $p < .05$. Post-hoc comparisons were performed using the LSD method. $F(4, 152) = 8.23$, $p < .001$, $\eta^2 = .15$.

4.4 Correlation analysis between variables

The results of Pearson correlation analysis showed that there was a significant positive correlation between the total score of social well-being and the total score of cultural well-being ($r = 0.68, p < 0.001$), and the coefficient was between 0.6 and 0.8, indicating that the two were interrelated but still distinguished, which was consistent with the theoretical conception of Yang Jiaqi and Xu Jinfen[25] that social and cultural well-being was divided into two second-order factors of society and culture. At the first-order dimension, the correlation coefficient between 'social integration' and 'cultural adaptability' is the highest ($r = 0.72, p < 0.001$), followed by the correlation coefficient between 'social recognition' and 'cultural self-confidence' ($r = 0.65, p < 0.001$), indicating that the corresponding relationship between various aspects of social well-being and cultural well-being is not completely equal. The test results are shown in Table 6.

Table 6 Pearson Correlations among Dimensions

Dimension	1	2	3	4	5	6
1. Social Contribution	1					
2. Social Integration	.62***	1				
3. Social Recognition	.58***	.70***	1			
4. Cultural Recognition	.52***	.61***	.65***	1		
5. Cultural Awareness	.58***	.72***	.60***	.68***	1	
6. Total Social WB	.84***	.86***	.82***	.62***	.68***	1
7. Total Cultural WB	.58***	.68***	.64***	.92***	.90***	.68***

Note.*** $p < .001$.

4.5 Hierarchical regression analysis of social and cultural well-being

This study uses a hierarchical regression strategy that gradually incorporates variables to systematically test the explanatory power of different levels of variables on social and cultural well-being. Model 1 only includes demographic variables such as gender and education level as the benchmark model. On the basis of model 1, model 2 adds learning characteristic variables such as learning years and college types to test the incremental explanatory power of educational experience. Model 3 further incorporates regional variables to examine the impact of the environment.

4.5.1 Hierarchical regression results of social well-being

Table 7 shows the hierarchical regression results of social well-being. In Model 1, the gender difference was significant, and the score of women was significantly higher than that of men ($\beta = 0.661, p = 0.031$). In terms of education level, the score of the master group was significantly higher than that of the undergraduate group ($\beta = 0.416, p = 0.049$). After learning characteristics are included in Model 2, the scores of foreign language college students are higher than those of comprehensive college students ($\beta = 0.661, p = 0.054$, marginally significant). After incorporating regional variables into Model 3, the scores of students in Northeast China are significantly higher than those in North China ($\beta = 1.127, p = 0.003$), and the explanatory power of the model is significantly higher than that of Model 2 ($\Delta R^2 = 0.042, F = 2.94, p = 0.010$), indicating that regional factors have independent incremental explanatory power for social well-being.

Table 7 Hierarchical Regression for Social Well-being (Key Variables Only)

Variable	Model 1 β (SE)	Model 2 β (SE)	Model 3 β (SE)
Gender (ref: Male)			
Female	0.661 (0.303)*	0.683 (0.316)*	0.751 (0.309)*
Education (ref: Undergraduate)			
Master's	0.416 (0.210)*	0.411 (0.214)†	0.408 (0.215)†
University Type (ref: Comprehensive)			
Foreign Studies		0.661 (0.340)†	0.876 (0.355)*
Region (ref: North China)			
Northeast			1.127 (0.373)**
R ²	.052	.073	.115
ΔR^2		.021	.042**
F for ΔR^2		1.41	2.94**

Note. Only significant or marginally significant variables are shown. Full models controlled for all demographic, learning, and regional variables. † $p < .10$, * $p < .05$, ** $p < .01$.

4.5.2 Hierarchical regression results of cultural well-being

Table 8 shows the hierarchical regression results of cultural well-being. In model 1, the gender difference is more prominent, and the score of women is also significantly higher than that of men ($\beta = 0.983$, $p = 0.003$), and the effect is greater than its impact on social well-being. The explanatory power of education level was not significant ($p > 0.05$). After learning characteristics were included in Model 2, the scores of those who had studied for more than 12 years were higher than those who had studied for 1-3 years ($\beta = 0.868$, $p = 0.067$, marginally significant), and the explanatory power of the model was significantly improved ($\Delta R^2 = 0.035$, $F = 2.61$, $p = 0.020$). In the model 3, the effect of the group with more than 12 years of learning was statistically significant ($\beta = 0.966$, $p = 0.047$), but the incremental explanatory power of regional variables was not significant ($\Delta R^2 = 0.013$, $p = 0.434$), indicating that cultural well-being is more affected by individual learning experience, and the role of regional differences is relatively limited.

Table 8 Hierarchical Regression for Cultural Well-being (Key Variables Only)

Variable	Model 1 β (SE)	Model 2 β (SE)	Model 3 β (SE)
Gender (ref: Male)			
Female	0.983 (0.324)**	1.008 (0.330)**	1.060 (0.335)**
Learning Duration (ref: 1–3 years)			
>12 years		0.868 (0.471)†	0.966 (0.481)*
R ²	.062	.097	.110
ΔR^2		.035*	.013
F for ΔR^2		2.61*	0.99

Note. Only significant or marginally significant variables are shown. Full models controlled for all demographic, learning, and regional variables. † $p < .10$, * $p < .05$, ** $p < .01$.

4.6 The interaction effect of education level and learning years

In order to further explore the combined effect of education level and learning years on social and cultural well-being, this study included the interaction term of education level $\times$ learning years in the regression model. The results of regression analysis are shown in Table 9 and Table 10.

4.6.1 The interaction effect on social well-being

In social well-being (see Table 9), the interaction effect between education level and learning years is significant. The two interaction terms of master $\times$ 3-5 years ($\beta = -3.819$, $p = 0.022$) and master $\times$ 6-8 years ($\beta = -2.183$, $p = 0.039$) reached a statistically significant level, and the remaining interaction terms did not reach a significant level. The negative coefficient shows that compared with undergraduates, the social well-being of postgraduates in the 3-5 years and 6-8 years of study has decreased more. The interaction effect diagram (see Fig.1) shows that the social well-being of the undergraduate group shows a steady upward trend with the extension of the study period, while the master group has a significant trough ($M \approx 1.5$) in the 3-5 years, and then gradually rebounds. The doctoral group showed a trend of rising first and then falling, and fell back after reaching a peak in the 6-8 year stage.

Table 9 Interaction Effects on Social Well-being (Key Interaction Terms Only)

Variable	β	SE	t	p	95% CI
Intercept	3.266	0.609	5.366	<.001	[2.062, 4.470]
Gender (Female)	0.743	0.321	2.318	.022*	[0.109, 1.378]
University Type (Foreign Studies)	0.861	0.361	2.387	.018*	[0.148, 1.575]
Region (Northeast)	1.058	0.380	2.786	.006**	[0.307, 1.809]
Master's $\times$ 3–5 years	-3.819	1.643	-2.325	.022*	[-7.069, -0.570]
Master's $\times$ 6–8 years	-2.183	1.048	-2.084	.039*	[-4.255, -0.111]
Master's $\times$ 9–12 years	-1.430	0.965	-1.482	.141	[-3.338, 0.479]
Master's $\times$ >12 years	-1.281	0.949	-1.350	.179	[-3.158, 0.595]

Note. Only significant interaction terms and key controls are shown. Full model included gender, education, learning duration, university type, and region. * $p < .05$, ** $p < .01$. Doctoral interaction terms are omitted due to very small sample size ($n = 3$).

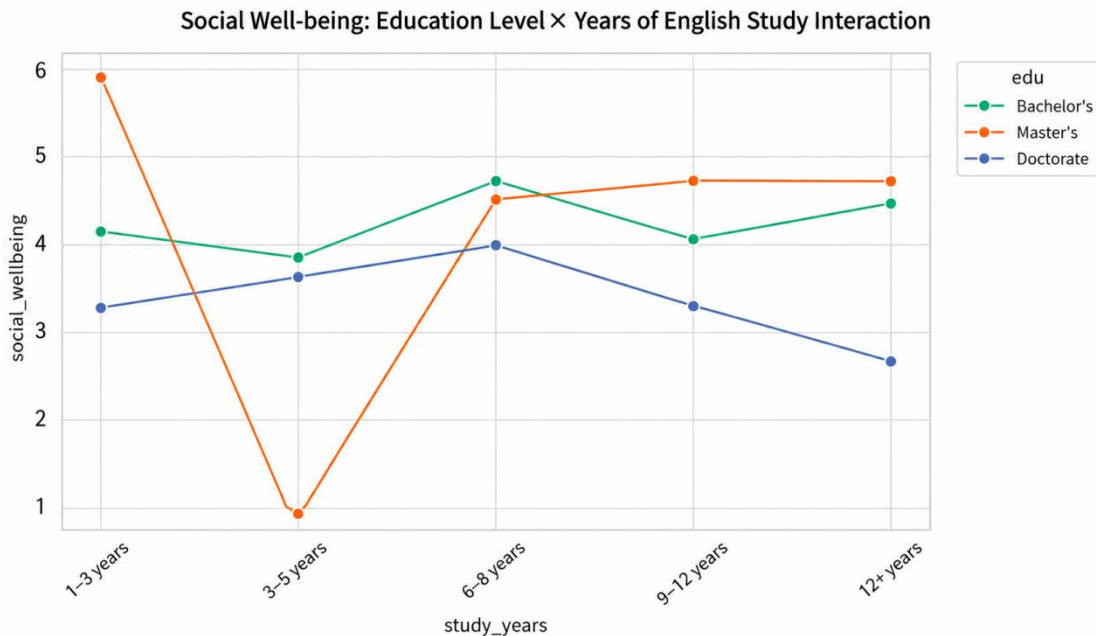


Figure 1: Social well-being : the interaction effect of education level $\times$ English learning years

4.6.2 The interaction effect on cultural well-being

In terms of cultural well-being (see Table 10), there is also a significant interaction effect between education level and learning years. The interaction coefficient of Master $\times$ 3-5 years was negative and reached a statistically significant level ($\beta = -3.789$, $p = 0.037$), and the remaining interaction items did not reach a significant level. The interaction effect diagram (see Fig.2) shows that the cultural well-being of the undergraduate group shows a steady upward trend with the extension of the study period. The master group also shows a significant trough of cultural well-being in the 3-5-year period, while the cultural well-being of the doctoral group continues to rise with the extension of the study period, reaching the highest level in the 12-year period ($M \approx 6.7$).

Table 10 Interaction Effects on Cultural Well-being (Key Interaction Terms Only)

Variable	β	SE	t	p	95% CI
Intercept	3.624	0.665	5.448	<.001	[2.308, 4.939]
Gender (Female)	0.943	0.350	2.691	.008**	[0.250, 1.636]
Learning Duration (>12 years)	1.376	0.627	2.194	.030*	[0.136, 2.617]
Master's $\times$ 3–5 years	-3.789	1.795	-2.111	.037*	[-7.340, -0.239]
Master's $\times$ 6–8 years	-1.566	1.145	-1.368	.174	[-3.830, 0.698]
Master's $\times$ 9–12 years	-1.306	1.054	-1.239	.218	[-3.391, 0.779]
Master's $\times$ >12 years	-1.544	1.037	-1.488	.139	[-3.594, 0.507]

Note.* $p < .05$, ** $p < .01$.

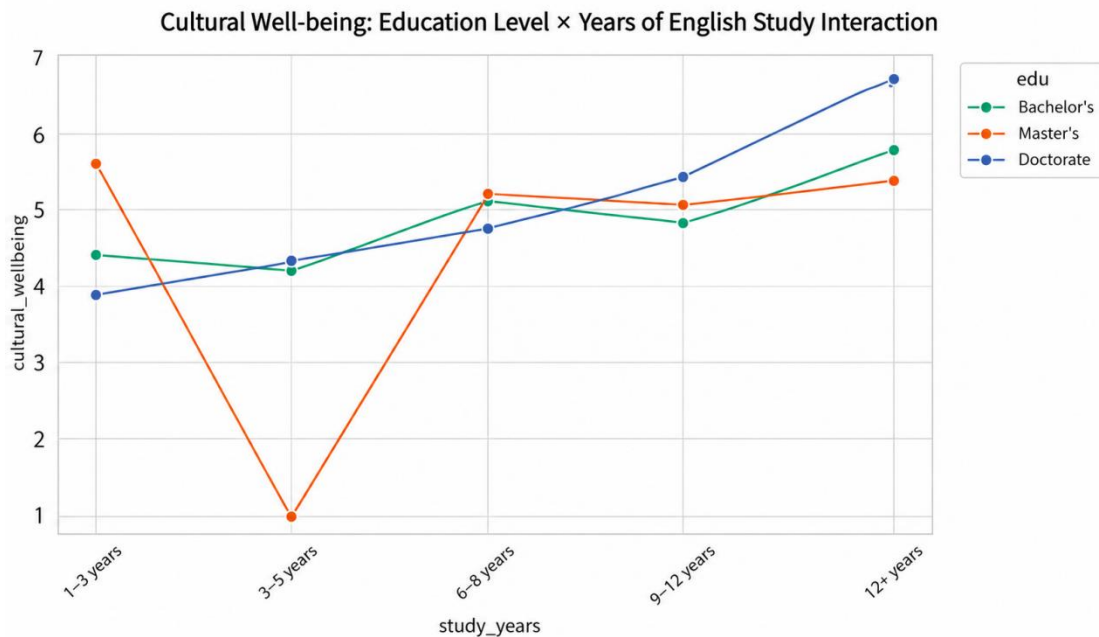


Figure 2: Cultural well-being: the interaction effect of education level $\times$ English learning years

5. Discussion

5.1 The basic situation of English majors ' social and cultural well-being

This study finds that the social and cultural well-being of English majors in China is above the average level, but there are structural differences between social well-being and cultural well-being.

Cultural well-being ($M = 4.99$) is significantly higher than social well-being ($M = 4.53$), indicating that English majors' perception of cultural value in English learning is stronger than social value. This finding echoes the conclusion of Xu Jinfen's [12] qualitative research that the cultural well-being of Chinese EFL learners is an independent dimension that cannot be ignored in the well-being model. However, this study further reveals that the high level of cultural well-being is mainly reflected in the attitude level of 'respect and tolerance of different cultures' and 'maintenance of mother tongue culture', while the initiative dimension score of 'spread Chinese culture' is medium, indicating that there are still obstacles to the transformation from cultural cognition to cultural action. This finding is consistent with Knutson's [26] view that the cultivation of cultural awareness should go beyond the simple cognition of cultural differences.

From the perspective of the internal structure of social well-being, students have a strong perception of English direct interpersonal help, but have a low recognition of English social value. It shows that learners' perception of happiness is hierarchical and situational. The positive experience at the micro level is more easily perceived directly, while the value identity at the macro level needs more systematic education guidance and social practice support. This also suggests that foreign language educators, happiness is not only within the individual, but also has a social context [4]. It is difficult for students to feel the social value of English only by classroom teaching, and it is necessary to link language learning with social contributions through social practice, international exchanges and other projects.

5.2 Influencing factors of social and cultural well-being

5.2.1 The stability and cross-dimensional differences of gender differences

This study found that women scored significantly higher than men in the two dimensions of social integration and cultural recognition, and the effect size of gender on cultural well-being ($\beta = 0.983$) was greater than that on social well-being ($\beta = 0.661$). However, this study further shows that women have more obvious advantages in the dimensions of 'classmate relationship', 'sense of belonging' and 'cultural adaptability' that require emotional engagement, suggesting that gender differences may be related to emotional participation patterns and relationship sensitivity. Oxford (2016b)'s EMPATHICS model also regards emotional participation and empathy as important dimensions of language learning well-being. This study provides empirical support for this theoretical proposition. In terms of educational practice, cooperative learning and cross-cultural interactive tasks may be more suitable for women's emotional participation model, which provides a reference direction for differentiated teaching.

5.2.2 The nonlinear effect of education stage

Education level has a significant main effect on social well-being. Master's social well-being is significantly higher than that of undergraduate, but the main effect on cultural well-being is not significant. This seemingly contradictory result has been clarified in the interaction effect analysis. The effect of education level does not accumulate linearly with the level, but interacts with the learning years, showing stage characteristics. This finding is consistent with the multidimensional and dynamic view of happiness emphasized by Oxford [22] when constructing the EMPATHICS model. The low level of happiness of the master group in the 3-5 years of study may be related to academic pressure, occupational uncertainty and identity change. A study of doctoral students by Zhang Shanshan and Li Changying [28] found that higher calendar learners are vulnerable to the impact of similar pressures on their happiness experience, which may also exist in the master group. From the perspective of development stage, the master's stage happens to be the transition period

from knowledge receiver to knowledge producer. The change of this role may bring cognitive load and identity anxiety, and then impact the experience of happiness.

5.2.3 Cumulative effect of learning years

The effect of learning years on cultural well-being is particularly significant at the stage of more than 12 years ($\beta = 0.966$, $p = 0.047$), but the effect on social well-being is not significant. This shows that the cultivation of cultural awareness has the characteristics of accumulation, and long-term cross-cultural contact and language practice can gradually be internalized into cultural identity and cross-cultural communication ability. Knutson[26] emphasized from the perspective of curriculum and teaching that the cultivation of cultural awareness requires continuous reflective learning, which supports this view. Long-term language practice and cross-cultural contact can promote the internalization of cultural identity. However, the improvement of social well-being may depend more on the quality of social interaction and the support of learning community rather than the simple accumulation of learning time. Social well-being is more dependent on context, and cultural well-being is more dependent on experience.

5.2.4 Types of institutions and regional differences

The social well-being of students in foreign language colleges is significantly higher than that of students in comprehensive colleges ($\beta = 0.876$, $p = 0.015$), and the cultural reflection ability of students in normal colleges is higher than that of students in foreign language colleges. This finding reveals the differentiated influence of cultural atmosphere and training orientation of different universities on students' well-being experience. The professional environment of foreign language universities strengthens students' sense of social integration and professional identity, while the humanistic education tradition of normal universities may be more conducive to cultivating students' critical cultural reflection ability. This result is in line with Bednářová-Gibová's[27] research on the influence of organizational environment on translators' well-being, that is, the immersion and social support of professional environment play an important role in the formation of professional identity.

5.3 The stage development characteristics of the interaction effect between education level and learning years

The core finding of this study is to reveal the interaction effect of education level and learning years on social and cultural well-being, and this interaction effect has stage characteristics. In the undergraduate stage, the social and cultural well-being shows a steady upward trend with the extension of learning years, and there is no obvious fluctuation, which may be related to the relatively clear learning objectives and relatively single social role. This suggests that undergraduate education should systematically integrate cultural literacy training into curriculum design, rather than relying on short-term reinforcement. The biggest feature of the master's stage is the low sense of happiness in the 3-5 year learning stage. This trough is reflected in both social well-being and cultural well-being, and the well-being score is significantly lower than that of the undergraduate group at the same stage. A study of doctoral students by Zhang Shanshan and Li Changying[28] found that higher-level calendar learners are vulnerable to the impact of academic pressure and identity transformation on their happiness experience, which may also exist in the master group. This trough happens to appear in the middle of the master's stage. At this time, students have passed the initial adaptation period, but have not yet entered a stable research state, and are in the awkward position of the intermediate transition. Educators should provide psychological support and academic guidance for students at this stage to help students successfully

pass the academic transition period. The doctoral stage shows a trend of separation between cultural well-being and social well-being. Cultural well-being continues to rise with the length of study and reaches the highest level at the stage of more than 12 years, but social well-being shows a downward trend. This deviation reflects the contradiction between academic deepening and social integration. Long-term academic training has strengthened cross-cultural identity, but high-intensity research investment may weaken social interaction and community belonging. Sadeghi & Abolfazli Khonbi[29] found that among the many factors that affect the well-being of ELT graduate students, the importance of interpersonal relationships is ranked after emotional response, sense of achievement and meaningful engagement. The relatively low pattern of social well-being in the doctoral group in this study is superficially similar to the finding, that is, when personal ability and achievement experience become the main source of well-being, the contribution of social relationship level may be relatively weakened.

6. Conclusion

This study examines the basic situation, influencing factors and interaction effects of social and cultural well-being of English majors in China. The study found that the social and cultural well-being of English majors is above the average level, and the cultural well-being is higher than the social well-being. Gender, education level, length of study, type of college and regional differences have different effects on each dimension. Women score higher in social integration and cultural recognition. Postgraduates' perception of social contribution is higher than that of undergraduates. Long-term learning has the most significant effect on promoting cultural well-being. The social well-being of students in foreign language colleges is higher, and the cultural reflection ability of students in normal colleges is stronger. The social well-being of students in Northeast China is higher than that in other regions. There is an interaction effect between education level and learning years, and the happiness of undergraduate stage shows a steady upward trend. There is a low sense of happiness in the middle of the master's stage. The cultural well-being continues to rise and the social well-being has declined in the doctoral stage. This study verifies the quantifiable social and cultural dimensions of Xu Jinfen's [12] well-being model. It also provides guidance for the cultivation of English majors' social and cultural well-being according to group differences and stage characteristics, pays attention to the mental health of postgraduates in the low well-being period and provides psychological support. Foreign language colleges and universities can strengthen students' cultural communication role to enhance their sense of social value. Doctoral training needs to maintain social interaction in academic cultivation. Curriculum design should enhance students' perception of English social value through international exchanges and social practice. However, there are some limitations in this study. The sample size is small, especially only three doctoral students. The promotion conclusion needs to be cautious. The cross-sectional design is difficult to capture the dynamic changes of happiness. The mediating variables are not included, and the indirect path is not clear. Follow-up studies can expand the sample size and adopt longitudinal tracking design.

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