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The Empirical Study of Factors Affecting Foreign Language Attrition Based on the Structural Equation Model

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Abstract: *The research samples are junior college students who have finished compulsory English study. According to their foreign language learning situation, the thesis is to make an systematically empirical research on the factors affecting college students' foreign language attrition, based on the questionnaire survey and data of language tests and interviews, using the method of data mining and SPSS AMOS structural equation model. Through constructing the model of affecting factors of foreign language attrition and analyzing the paths and intensity between different factors, the thesis is to provide a new perspective for language attrition study and put forward effective strategies for reducing learners' foreign language attrition, in order to promote the theoretical study of foreign language lifelong education.*

Keywords: *Foreign language attrition, Structural equation model, Affecting factors*

1. Introduction

Foreign language attrition is one of the two categories when language attrition is classified according to the affected language. The other category refers to mother language attrition. Foreign language attrition refers to the gradual decline of foreign language competence of foreign language learners over time due to the reduction or cessation of foreign language use. The literature on language attrition was first published in the 1930s and has a history of more than 80 years. In 1980, Lambert proposed the term attrition at the 1980 Conference on the Attrition of Language Skills at the University of Pennsylvania, thus introducing the concept of linguistic attrition into the field of linguistic research. Since then, the theory of language attrition has been constantly established and improved, attracting more and more attention from scholars home and abroad. Among the many factors affecting foreign language attrition, seven have been identified: foreign language level before attrition, foreign language exposure, attrition time, emotional factors, foreign language learning style, age and literacy (Chuanbin Ni, 2007).

Foreign studies on the influence factors of foreign language attrition mainly focus on the analysis of single factors, such as age, literacy, foreign language learning style, etc. In addition, there are a few reports based on multiple factors, which lack in persuasiveness due to the small sample size. In contrast, the study of language attrition in China started relatively late until the 1980s. Such studies are still in the initial stage of "more theoretical, less original". Most of them are descriptive studies, and the related empirical studies are few. There are many factors involved in the study of language attrition. In order to fully and deeply understand the nature of language attrition, it is necessary to adopt an organic combination of various research methods, such as qualitative research and quantitative research. Structural equation model provides a new approach to the data analysis of language attrition. In this paper, 230 juniors who have finished their regular English learning are taken as the research objects. Based on the questionnaire survey of college students in China, SPSS Amos is used to construct a theoretical model of influence factors of foreign language attrition, clarify the acting paths among factors, and analyze the effect intensity among factors. This paper focuses on the empirical research on the relevant factors affecting foreign language attrition of Chinese college students in order to explore the strategies that can help curb attrition or slow down the attrition rate[1-3].

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2. Research Subject

2.1. Research Hypothesis

In order to ensure the representativeness and observability of the research sample, the study objects were limited to college students of the same grade (English was the foreign language they learned in school), and the interaction and intensity of other factors affecting the degree of foreign language attrition were discussed under the condition of the same attrition time. The level before attrition, foreign language exposure and emotional factors all affect the degree of attrition. At the same time, emotional factors and the level before attrition, foreign language exposure, are mutually affected. Aiming at the affecting factors of foreign language attrition, this paper puts forward some specific strategies and suggestions to minimize learners' foreign language attrition, in order to provide some enlightenment for college foreign language education.

2.2. Research Object

The research object of this paper is limited to the junior non-English majors who have finished regular English in the author's university. Of 230 students, there are 135 boys and 95 girls, aged about 22 years old, from five different majors—Civil Engineering (49), Communication Engineering (46), Industrial Engineering (46), Logistics Engineering (21), Japanese (46).

2.3. Research Tools

Structural equation modeling is the only statistical method that can comprehensively test the relationship between complex multidimensional variables at the same time (Ullman, 2006). It integrates confirmatory factor analysis, multiple regression analysis, path analysis and other functions, and has been widely used in the field of linguistic research. The AMOS plug-in of SPSS has a simple and clear page design and is easy to operate, which has received widespread attention and recognition from linguists and other social science scholars.

2.4. Questionnaire Design

The questionnaire includes a test questionnaire and a survey questionnaire. The test questionnaire is a standardized reading paper, which is consistent with the difficulty of the reading section of the last final exam. It is used to compare the foreign language attrition degree of the subjects. The questionnaire included 48 questions in three aspects: basic personal information, English learning experience and the maintenance of English ability. The basic personal information includes the name, gender, grade, etc.; English learning experience includes time to start learning English, the English scores of college entrance examination, the scores of CET-4 or CET-6, and the best level of English before attrition, etc.; the maintenance of English ability mainly includes the current use of English, the status of English maintenance and the analysis of emotional factors. The use of English mainly examines the exposure to target language; The status of English maintenance mainly examines the current English level of the subjects. The analysis of emotional factors included 16 questions, including language attitude, integration motivation and instrumental motivation, which were selected from Gardner's "Attitude and Motivation Inventory: International AMTB Research Project". Subjects were assessed on a five-level Likert-scale[4-6].

2.5. Data Collection and Analysis

At the beginning of the study, tests and questionnaires were conducted on 230 students and 211 papers and questionnaires were collected, 208 of which were valid, with an effective response rate of 98.6%. SPSS 22.0 was used to input the valid questionnaires independently, and the original data database was established after verification. The data were imported into AMOS to analyze the acting path and effect intensity, and the model of acting factors of foreign language attrition was established.

2.6. Questionnaire Evaluation

Cronbach α was used to evaluate the reliability and validity of the questionnaire, as shown in Table 1.

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Table 1: Reliability analysis.

Reliability Analysis	Cronbach Alpha	Cronbach Alpha based on a normalized term	Items
Foreign language level before attrition	0.82	0.83	8
Foreign language exposure	0.84	0.84	8
Language attitude	0.82	0.82	8
Integration motivation	0.76	0.77	4
Instrumental motivation	0.7	0.7	4

The values of α were all above 0.7, indicating that the scale tools used in this study had high reliability, as shown in Table 2.

Table 2: Validity analysis. (KMO and Bartlett tests)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.841
Bartlett's test of Sphericity	Approximate Chi-Square	1202.128
	df	120
	Sig.	0.000

KMO is one of the important indexes for factor correlation test. In the output results, the KMO value of the first row is 0.841 (> 0.7), indicating that the questionnaire has good validity. The Bartlett test reached the significant level (Sig. = 0.000), indicating that there are common factors in this group and it is suitable for factor analysis.

Table 3: Paired sample T test.

Paired sample statistics	Mean value	N	Standard Deviation	Standard Error
Reading score before attrition	24.44	208	4.989	0.346
Reading score after attrition	17.78	208	7.584	0.526

As can be seen from the table 3 above, the average reading score of 208 subjects was 24.44 before foreign language attrition. After stopping regular English learning for one year, the average score of English reading decreased to 17.78, down 27%.

Table 4: Paired Sample Test.

Paired Sample Test	T	df	Sig. (2-tailed)
Reading score before attrition Reading score after attrition	10.855	207	0 .000

The paired sample T test compares the two variables in different periods. Sig. (2-tailed) represents the significance in pairing test, Sig < 0.05, indicating that there is a significant difference between the two variables, that is, students' reading ability is significantly different before and after foreign language attrition, and foreign language attrition occurs one year after they stop formal foreign language learning, but the degree of attrition is different among different subjects, as shown in Table 4.

3. Result Analysis

In the 1970s, Swiss statistician K. G. Joreskog and other scholars integrated a variety of statistical methods such as path analysis and factor analysis, and initially proposed the concept of structural equation. Structural equation model (SEM) is a major linear statistical modeling technique, which analyzes the relationship between variables based on contemporaneous covariance or correlation matrix. At present, many software can deal with structural equation models, including LISREL, AMOS, EQS, Mplus, etc. AMOS is used in this paper to construct a theoretical model to explore the acting path and intensity of foreign language attrition factors on the degree of foreign language attrition and the relationship between each factor.

3.1. Establishment of Structural Model

In view of the fact that all the subjects in this study are junior non-English majors who have finished formal English learning, their differences in foreign language learning style, age, reading and writing ability during foreign language learning and attrition time are relatively small, and their significance is not obvious in modeling, so they are not included. The measurable index of the emotional factors (potential variables) such as language attitude, integration motivation, instrumental motivation, and other

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measurable variables like foreign language exposure, language level before attrition and the degree of attrition, are input into AMOS together, establishing a preliminary theoretical model, and then adjust the paths between the variables according to AMOS MI value, until the GFI of the model reaches an acceptable range, the "structural model of acting factors of foreign language attrition of college students" is finally determined.

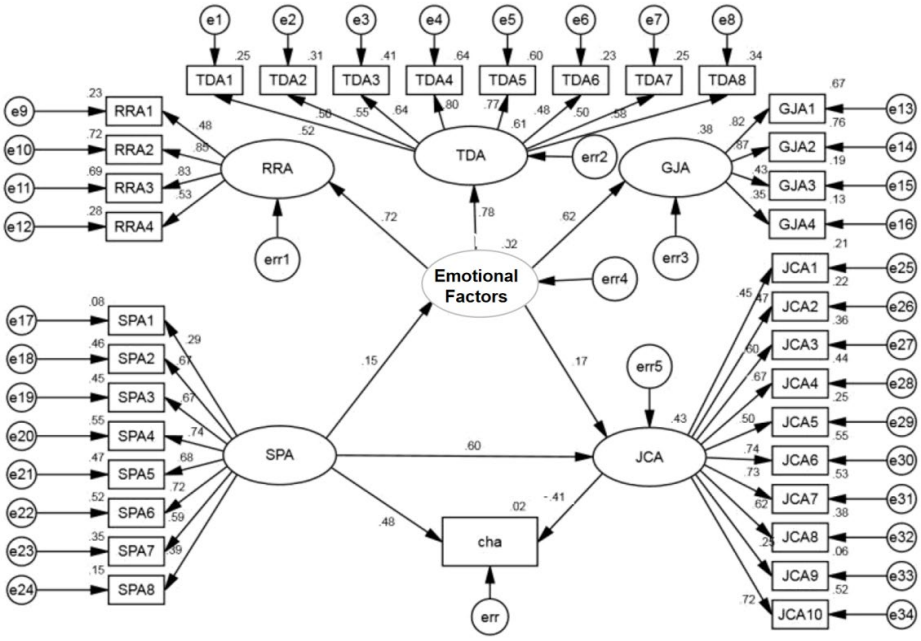

Figure 1: Structural Model of Acting Factors of Foreign Language Attrition of College Students.

In the figure 1 above, RRA represents integration motivation, TDA represents emotional attitude, GJA represents instrumental motivation, SPA represents language level before attrition, JCA target language exposure, CHA represents attrition degree.)

3.2. Fitting Degree of the Model

After statistical test, the model of path analysis is statistically significant, and multiple fitting indexes show that the model fits well and can be used to verify the hypothesis. All the fitness indexes passed the test standard, that is, the model reached the standard of fitness. The adjoint probability of the chi-square value of the measured coefficient was 0.473 (>0.05), and the adjoint probability of the critical ratio was less than 0.05, indicating that the path coefficient was significant, as shown in Table 5.

Table 5: Fitting Degree of the model.

Name of the index	P	GFI	AGFI	NFI	CFI	PGFI	RMR
Value	0.473	0.958	0.935	0.964	1.000	0.626	0.023

3.3. Effect Intensity

According to the modeling parameters provided by Amos, the direct effect, indirect effect and overall effect intensity of emotional factors (QGYS), level before attrition (SPA), target language exposure (JCA), attrition degree (MSCD) and other factors are summarized and sorted out, and the following table 6 is obtained.

Table 6: Effect Intensity.

Variables	Direct Effect	Indirect Effect	Total Effect
QGYS<---SPA	0.147	0.000	0.147
JCA<---QGYS	0.171	0.000	0.171
JCA<---SPA	0.605	0.025	0.630
MSCD<---JCA	-0.407	0.000	-0.407
MSCD<---SPA	0.476	0.127	0.603
MSCD<---QGYS	0.000	-0.034	-0.034

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3.4. Analysis of Affecting Factors Based on Structural Equation Model

3.4.1. Pre-attrition Level

As shown in the table above, the direct effect of pre-attrition level on attrition degree is 0.476, the indirect effect is 0.147, and the total effect is 0.603, indicating that the pre-attrition level has a very obvious influence on attrition degree. The higher the pre-attrition level is, the lower the attrition degree and the attrition speed are. This phenomenon is the "inversion hypothesis", i.e. the pre-attrition level is inversely proportional to the amount or/and speed of attrition. (Vechter & V. Argue 1990)

It can also be seen from the table above that the indirect effect of pre-attrition level on emotional factors is zero, and the direct and total effect is 0.147, indicating that students with higher pre-attrition level have more positive attitude towards foreign language learning. At the same time, the direct effect of pre-attrition level on foreign language exposure is 0.605, and the overall effect is 0.63, indicating that students with higher pre-attrition level have more exposure to foreign language and are willing to contact and learn more foreign language.

3.4.2. Emotional Factors

As shown in the table above, the direct effect of emotional factors on attrition degree is zero, indirect effect is 0.034, suggesting that emotional factors produce certain negative indirect effect on the attrition degree. Although this conclusion is consistent with Gardner’s, namely the emotional factors can indirectly reduce the attrition degree of foreign languages, but from the data analysis of this research, it shows that the effect is very limited. In addition, emotional factors have a positive direct effect on target language exposure (0.171), which is consistent with Gardner's conclusion that positive emotion, attitude and motivation can help students increase target language exposure.

3.4.3. Target Language Exposure

As can be seen from the table above, target language exposure has a significantly negative effect on the attrition degree (-0.407), which indicates that the more foreign language exposure students have, the lower the attrition degree will be. Among many factors affecting foreign language attrition, target language exposure is the most fundamental one. The reduction or stop of target language exposure is regarded as one of the essential attributes of foreign language attrition, namely, "the polarity of the inducible factors of foreign language attrition". (Chuanbin Ni, 2007) According to the data model of this research, the target language exposure only has a direct impact on attrition degree. Therefore, increasing foreign language exposure is an effective means to deal with foreign language attrition[7].

4. Teaching Discussion on Foreign Language Attrition

4.1. Course Setting

In foreign language teaching, teachers should grasp learners' critical period of foreign language attrition, increase target language exposure as much as possible, to reduce learners' foreign language attrition as much as possible. At the same time, schools should vigorously carry out the construction of foreign language courses in the third year and forth year, and help learners maintain their foreign language proficiency and consolidate their early learning achievements through all kinds of activities like the second class, foreign language corner, micro courses, MOOC, and Spoc.

The college English follow-up courses aim at cultivating versatile talents with excellent English application ability. According to the basic requirements of college English teaching and training objectives, and with full consideration to the development needs of learners from different majors, future job requirements and their own interests and hobbies, college English follow-up courses can be divided into the following modules.

a. Discipline English module. Courses of this module should be close to the strong disciplines and provide learners with the necessary and professional English knowledge, like Computer English, Engineering English, Garden English and Business English.

b. English skill module. Courses such as Advanced Oral English, Advanced Translation Practice, English Speech and Debate, Advanced English writing will be included in this module.

c. Language and cultural module. Courses such as British and American Culture, Foreign Etiquette, Intercultural Communication, Foreign Film Appreciation, Greek Mythology and other courses will be

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included in this module. Through language, culture and art, these courses aim to improve learners' comprehensive literacy.

4.2. Teaching Impovement

First, students' foreign language learning enthusiasm and learning motivation should be improved. Good learning atmosphere, lively and active classroom environment, and rich extracurricular activities can improve the interest of foreign language learning, help students to generate positive emotions, reduce resistance, and treat foreign language learning as a lifelong interest, so as to curb foreign language attrition.

Secondly, the role of teachers should be changed and the education concept should be updated. In order to adapt to the new form of foreign language teaching and reduce students' foreign language attrition, teachers should change their roles from knowledge provider to organizer, guide, creator of foreign language environment and atmosphere, developer of teaching materials and evaluator of learning effectiveness. Teachers should be able to master knowledge of one discipline or two, take on the responsibility of constructing college English follow-up courses, and highlight the characteristics of "English + Major". At the same time, it can also focus on the development and progress of the society, closely combine the classroom and practice, and effectively improve students' language ability in teaching.

Thirdly, students' target language exposure and training should be increased. Teachers should pay more attention to increase students' opportunity of language input and output, increase the intensity of various training, keep their foreign language ability above the threshold level. Online learning should supplement the traditional classroom learning, and the online and offline mixed teaching mode should be adopted to immerse students in the target language as much as possible and reduce the students' foreign language attrition to the minimum.

Fourthly, a positive and multiple evaluation system should be set up to affirm students' achievements. Teachers should change the traditional pattern of pure paper evaluation, establish the combination of formative assessment and summative assessment evaluation system, by considering the student's performance in the learning process, such as class devotion, homework completion, participation, online learning, to assess students comprehensively. At the same time, the traditional evaluation subject should be changed to form a three-dimensional evaluation system of teacher evaluation, student evaluation and mutual evaluation between teachers and students. Positive evaluation can improve students' initiative in learning and stimulate their interest in learning, thus effectively reducing foreign language attrition.

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