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**Patterns and Causes of Attrition of English
as a Foreign Language**

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Abstract

Foreign language attrition refers to the loss of language skills by those who have studied and then discontinued the use of a foreign language. As a very common phenomenon, foreign language attrition is an important issue because it occurs in every corner of the world, taking its toll among young and old alike. It was not until the 1980s that experts in circles of foreign language teaching and acquisition began to systematically investigate the nature of attrition, the precise conditions under which it occurs, and the factors that might affect foreign language attrition. After thirty years of research, foreign language attrition study abroad is now "reaching puberty". Notwithstanding recent significant developments, language attrition study is not yet extensive or theoretically sophisticated enough, and it is mainly descriptively oriented. In China, a handful of professionals from psychology and foreign language circles, aware of the importance of attrition study in foreign language teaching and learning, began to introduce language attrition study into China at the beginning of the new millennium. However, they have not begun any systematic empirical study of English language attrition with Chinese English learners as subjects.

This dissertation, aimed at studying English attrition exhibited in Chinese college English major graduates, endeavors to answer the following four questions: (1) Does attrition occur in English majors after certain period of disuse, and, if so, to what degree and in what kind of pattern? (2) Are different language skills affected by attrition to the same degree, and if so, do they exhibit the same pattern of development over time? (3) Is there a mirror effect in language attrition, or is the order of attrition in opposition to the order of acquisition? (4) Is the rate of attrition related to the English language use situation in China and/or to the graduates' attitudes towards the English language, and, if so, to what degree?

A cross-sectional method is employed in this study because it is economical and time-saving and can be conducted with more variables on a larger number of participants to produce a general profile of a population at a given time.

Two instruments were used in this study: an English language test and a questionnaire. Since this research is mainly limited to the measurement of the participants' receptive skills,

namely, their listening comprehension skills, lexical knowledge, and reading comprehension skills, the language test is composed of a five-item dictation subtest, a forty-item multiple-choice vocabulary subtest, and a twenty-item multiple-choice reading comprehension subtest. Both the vocabulary and the reading comprehension subtests are composed of "Very Easy Items", "Easy Items", "Difficult Items", and "Very Difficult Items". The questionnaire, mainly adapted from Gardner's classic Attitude/Motivation Test Battery, is composed of 42 items and was used to investigate the relationship between the participants' language attitudes and their language maintenance.

The participants of this study were divided into five groups: Group A (newly-enrolled first-year students), Group B (second-year students), Group C (fourth-year students), Group D (English major graduates with two years of disuse of English), and Group E (English major graduates with four years of disuse of English). The participants of Groups A ($N = 240$), B ($N = 240$) and C ($N = 240$) are from 12 universities or colleges of different tiers in both economically developed and underdeveloped areas. The participants of Groups D ($N = 238$) and E ($N = 240$) are even more diverse in nature. They are from 7 provinces or municipalities. They graduated from 186 universities or colleges of different tiers in different areas. Among the participants of Group D, 144 are females and 94 are males, aged between 22 and 27, and among those of Group E, 154 are females and 86 are males, aged between 24 and 30.

Because of the inclusion of the newly-enrolled first-year students in the sample, the investigations were conducted in two sessions: the first on the participants of Groups B, C, D and E in May 2009 and the second on the newly-enrolled first-year students in the middle of October 2009.

The analysis of the participants' scores on both the test and the questionnaire, with SPSS 13.0 as the analytical tool, indicates the following: (1) The graduates' general language skills have suffered systematic attrition. (2) The graduates' specific language skills (listening comprehension skills, lexical knowledge and reading comprehension skills) have been seriously eroded by the time of disuse. What is regrettably significant is that the lexical knowledge attrition of the participants of Group E has even regressed to what they had learned in their high school days. (3) English attrition develops in the following order: What is learned first will be retained last and what is learned last will be lost first. In other words,

the order of attrition is in opposition to the order of acquisition. (4) The participants' language maintenance is substantially influenced by their overall language attitudes ($r = 0.713$), and, specifically, by their attitudes towards English language learning and use in China, their attitudes towards the English language, their attitudes towards other English language learners, their interest in the English language, their attitudes towards English language learning ($0.705 \leq r \leq 0.761$), and any item of the questionnaire about the participants' English language attitudes ($0.313 \leq r \leq 0.759$). Furthermore, the participants' overall language attitudes influence their maintenance of listening comprehension skills, lexical knowledge and reading comprehension skills ($0.604 \leq r \leq 0.872$).

This study, aimed at revealing the pattern and causes of attrition of English as a foreign language, contributes a lot to the study of foreign language attrition. First, this study has found a pattern of attrition of English learned as a foreign language by Chinese college students, and that the pattern is fairly consistent with the "Forgetting Curve Theory". Second, the findings of the causes of attrition might help produce measures to curb attrition or at least to slow down its rate. Third, this study, as the first systematic empirical study of English attrition done in China, has enriched the international studies of foreign language attrition. Finally, this study, though far from perfect, has put forward a tentative theoretical framework for future English attrition study in China.

Keywords: pattern and causes, English attrition, receptive skills, English major graduates

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Chapter One Introduction

Language development is not necessarily unidirectional and there may be gains and losses at different stages. The loss of a first or second language or a portion of that language by an individual is called language attrition. Foreign language attrition refers to the loss of language skills by those who have studied and then discontinued the use of a foreign language. There is much evidence that some or even many acquired English skills have been lost by Chinese college English majors after graduation.

1.1 Research Background

This study is aimed at exploring English attrition exhibited in Chinese college English major graduates. The author's choice of such a research topic is closely related to the English learning, use and maintenance situation in China. In the past three decades, English has been gaining ever increasing importance in China. The language is not only an irreplaceable resource for China's modernization and rejuvenation drive, but also a great influence on Chinese people's pursuit of personal welfare. China's rapid economic development and its increase of commercial, technological, and cultural exchange with other parts of the world have been ascribed to a variety of factors. English, as a link between China and the outside world, has played a vital role in these developments and exchanges. With China's increasing presence in international affairs after its entry into WTO and its growing importance in global economy, there has been an unprecedented demand for proficient English language users in China. Proficiency in English is also regarded as a valuable asset to individuals. It is a key to a host of opportunities, such as college education at home or abroad, a desirable job in public or private sectors, eligibility for professional promotion and more.

Because of the superior national, social and economic prestige that proficiency in English has accrued, English language teaching has received a great deal of attention from the government, the educational sector, students, parents and society at large. It was reported at the Second International Conference on Foreign Language Teaching

Methodology in China in 2006 that there were 300 million English language learners in China, approximately a quarter of the country's population. More than 80 million of them were students of primary and secondary schools, while another 20 million were university or college students. Gordon Brown, former UK Prime Minister, even predicted that "In 20 years time, the number of English speakers in China is likely to exceed the number of speakers of English as a first language in all the rest of the world" (Yeh, 2005). In fact, almost all college students learn English as a foreign language in China. The investment, both public and individual, in English language teaching and learning is definitely massive.

1.2 Statement of the Problems

It seems that the massive investment gets favorable reward. Almost all the colleges and universities can fulfill the requirements of *Syllabus for English Majors* developed and issued by the Ministry of Education and almost all the college English major graduates, bestowed with solid English language skills and extensive cultural knowledge, are qualified for translation, teaching, management, and academic research in foreign affairs, education, economy, trade, culture, science and technology, military and other professions (English Section of the Advisory Committee of Foreign Languages Programs in Higher Education in China, 2000, p. 1).

However, the reward is rather slim in the long run. Most of the college English major graduates, except for those who further their study in college or become an English teacher or pay frequent visits to English-speaking countries, find that their English is of little use and unwillingly drop it after graduation. As a consequence, they report that they have lost almost all of the English language skills acquired in college after several years of disuse of the language.

The author of this dissertation searched the internet with the key words "English", "forgetting", "college", and "graduation" with the Google search engine. More than 219,000 items were shown (Nov. 8, 2010). A large portion of these items were relevant to the topic that college graduates complained that their loss of the English language skills set in immediately after graduation. Moreover, it is a persistent and universal belief that once

English language skills have been lost, it would be a very difficult and time-consuming job to relearn them when these graduates want to further their study, or live and work in an English-speaking country.

Such a pessimistic situation of English language loss or attrition means an urgent demand that English attrition research should be done to find its pattern and causes and methods should be found to curb attrition or at least to slow down its rate. However, little effort has been devoted to research on foreign language attrition, which is as important as that on foreign language acquisition in improving the effectiveness of language learning, and is even more important than that on foreign language acquisition in preventing graduates from forgetting their once-acquired language skills.

1.3 Purposes of the Research

The author of this dissertation is interested in finding a way to help Chinese English learners fight against the loss. However, he knows that it would be more economical to help learners learn the language in the way that could make the knowledge resistant to attrition than just to try various means to fight against attrition, and that a better understanding of the pattern and causes of English attrition of Chinese graduates should always precede the suggestion of ways that may help make students' language skills immune to the erosion of time. So the author decided to conduct an empirical study of English attrition of Chinese college English major graduates with the purpose of finding out:

- (1) Whether attrition occurs in English majors after certain period of disuse, and, if so, to what degree and in what kind of pattern,
- (2) Whether different language skills are affected by attrition to the same degree, and whether attrition of different language skills develops in the same pattern over time,
- (3) Whether language attrition is the mirror image of language acquisition, or whether the order of attrition is in opposition to the order of acquisition, and
- (4) Whether the rate of attrition is related to the English language use situation in China and/or to the graduates' attitudes towards the English language, and, if so, to what degree.

The author of this dissertation is of the opinion that answers to these questions will

directly or indirectly, but assuredly, contribute to the effectiveness of English language teaching and learning in college and, in light of the backwash effect of language attrition study, may help find a better way of English teaching and learning that may make English learners' language immune to attrition.

1.4 Organization of This Dissertation

This dissertation is composed of six chapters.

The first chapter serves as the introduction of this dissertation. This chapter presents the research background, the statement of the problems, the purposes of this research, and the organization of this dissertation.

The second chapter is a detailed review of the studies that have been done in the past thirty years in the West. This chapter offers a diachronic review of previous language attrition studies, which are divided into three periods, each with a ten-year interval. After the diachronic review, the chapter presents the nature and factors of language attrition that have been suggested by the studies of the professionals in the field.

The third chapter describes the methodology of this study. It states the research questions, justifies the cross-sectional research method, clarifies the language skills to be tested and the development or adaption of the instruments (the test and the questionnaire) employed in this study, reports the arrangement and the results of the pilot study, provides the criteria for the selection of the subjects, outlines the procedures of the administration of the test and the questionnaire, and in the end validates both the test, and the questionnaire.

The fourth chapter is the most important part of this dissertation. This chapter reveals both the results of the whole test, along with those of its subtests, and the results of the questionnaire, together with those of its component parts and the component sections of Part II (Participants' attitudes towards the English language).

The fifth chapter discusses the findings of this study. It presents the pattern of English attrition, and the relationship between the participants' language attitudes and their language maintenance.

The sixth chapter summarizes the major findings, states the contributions, provides implications for both English major graduates and educational institutions, points out the

limitations of this study, and puts forward some suggestions for future language attrition research.

Chapter Two Literature Review

Compared with research on language acquisition, research on language attrition is a relatively recent development. The work in the field of attrition really started in the United States in the 1980s. Since then, research on language attrition has grown rapidly in the West, especially in Europe.

Language attrition study can be roughly divided into three periods, with each period of study being characterized by its own particular research focus. After thirty years of development, language attrition study is now "reaching puberty". The nature of language attrition has partially been exposed and some factors of language attrition have been found by studies of professionals in the field.

2.1 Language Attrition Revealed through Intuition and Observation

Human beings, especially children, have an unusual and unique capacity for language acquisition or learning. Language skills, once acquired or learned, are tenacious, typically growing more elaborate and more robust over people's lifespan. Learners' vocabulary, for instance, increases as they grow older, and many pragmatic and stylistic skills, such abilities as to know when to speak, what to talk about with whom, where, and in what manner, may be acquired or learned beyond the childhood years (Berko-Gleason, 1982; Hymes, 1972, p. 277). It seems that language skill development is on a one-way track of perfection.

However, there are conditions under which people's language skills may become weaker rather than stronger and may even disappear. Neurological impairment leading to aphasia is one condition under which language skill attrition takes place. Aphasia, an extreme case of language attrition resulting from brain damage, has long been recognized and documented. Paracelsus (1493-1541) recorded the language loss caused by brain damage. In the past 170 years, linguists, psychologists, and neurolinguists have managed to document evidence that various types of brain damage result in language skill loss (Googlass, Berko-Gleason & Hyde, 1970; Hecaen & de Ajuriaguerra, 1963; Luria, 1970). Today, specialists' interest in aphasia is

still increasing. This increase of interest is evidenced by *Journal of Neurolinguistics* that devoted the entirety of the fourth issue of 2005 to the study of aphasia, in addition to its sporadic publication of articles on this topic.

Nevertheless, brain damage is only an exceptional and dramatic condition, and aphasia an extreme case of language attrition. What is more noteworthy is the common occurrence of language attrition resulting from the discontinuity of acquisition or learning or dominantly from the disuse of a second or foreign language.

Although language depends on an intact neurological and physical system, it is also an interactive skill, and in the absence of a supportive social environment it becomes surprisingly vulnerable. This is especially true with the presence of and in competition with a more socially useful language. An individual who moves to a new language community may acquire a second language while losing skills of the first language, even one that has been spoken fluently for a number of years (Hansen, 2001a). And one who has acquired or learned a second language in another country is likely to lose it even after many years of study unless he continues to use it (Hansen & Reetz-Kurashige, 1999; Hansen, 1983). It is the same case with foreign language learning (Al-Hazemi, 2000; Bahrack, 1993; Cohen, 1986; de Bot & Weltens, 1995; Ecke, 1996; Hedgcock, 1991; Lowe, 1982).

A massive body of research has been carried out in the field of foreign language teaching and learning. A captivating question in this field which has hardly attracted much attention is how many of those acquired skills are maintained over a long period of time when they are not being used. This question may be especially relevant within a foreign language learning context where the exposure to the foreign language is very often mainly and in some cases even entirely confined to the classroom. Because of low exposure or even nonexposure, these skills decline over time. Many foreign language learners and teachers would rather say that the language has “dwindle[d] away” (Weltens, 1987, p. 22).

Apart from a few isolated efforts (Cohen, 1974, 1975; Flaugher & Spencer, 1967; Geoghegan, 1950; Kennedy, 1932; McMahon, 1946; Pratella, 1969; Scherer, 1957), language attrition, or the loss of language skills, did not attract much serious academic attention until the early 1980s.

2.2 Definition of Language Attrition

Lambert and Freed are among the first linguists who have been attracted to the serious academic study of language attrition.

“To a considerable extent, the large amount of time spent learning an Indian language was wasted. And this problem was not limited to students of Indian languages, but was more widespread throughout the field of area studies. I had conducted two major national surveys of university-based language and area studies [...]. The survey showed that the problem of language skill loss was endemic to African, East European, Far East, Middle East, South Asian, and South East Asian studies as well.” (as cited in Köpke & Schmid, 2004, p. 2)

This observation, coupled with a paucity of published literature, inspired Lambert to organize a national stocktaking conference at the University of Pennsylvania in 1980 which was supposed to “turn up more information and perhaps help establish an area for future research in the field” (as cited in Köpke & Schmid, 2004, p. 2). The study of language attrition was commenced in a very conscious way. *The Loss of Language Skills* (Lambert & Freed, 1982), a collection of papers submitted to the conference, became a milestone work that, even nearly thirty years later, has not lost any importance or relevance to today’s language attrition research (Köpke & Schmid, 2004, p. 3). The collection not only deals with the issue of the first and second language loss from every conceivable perspective, taking into consideration such issues as language shift/death, pathological language loss, social and political factors, but it also includes, in the methodological section, the trendsetting papers by Andersen, Oxford and Clark. Of these, Andersen’s paper, in particular, is worthy of far more attention than it has so far received in language attrition study in that the paper presents an outline of a set of preliminary assumptions and testable hypotheses and thus draws up a blueprint for future language attrition study. Both the conference and the collection have provided an emerging and promising discipline with theoretical and methodological frameworks as well as background information from neighboring disciplines (Köpke & Schmid, 2004, p. 3).

It is after the University of Pennsylvania Conference and the publication of *The Loss of Language Skills* that language attrition has become a source of real scientific interest. After

the conference, language attrition, previously known as language loss and considered as a sub-field of applied linguistics, became an independent discipline. In the year of the University of Pennsylvania Conference, two dissertations were written on second language attrition in children (Allendorff, 1980; Hansen, 1980), and one on foreign language attrition in former foreign language students the next year (Godsall-Myers, 1981). Since then, the field has expanded. Language attrition in its manifold manifestations has become a primary focus of research for language teaching staff, linguists and specialists in relevant academic areas. What is more encouraging is that frequent contacts among language attrition researchers have been established all over the world (Köpke & Schmid, 2004, pp. 3-4).

After the University of Pennsylvania Conference, many attempts have been made in the following decade to provide a precise terminological framework upon which language attrition research could be based. The best known and most frequently quoted definition of language attrition comes from Freed (1982, p. 1):

Broadly defined, language attrition may refer to the loss of any language or any portion of a language by an individual or a speech community. It may refer to the declining use of mother tongue skills by those in bilingual situations or among ethnic minorities in (some) language contact situations where one language, for political or social reasons, comes to replace another. Language attrition also refers to the deterioration of language skills in neurologically impaired patients and to the decline of certain types of language usage by the elderly. Likewise, language attrition may be used to describe the death of an entire language. There is yet another sense in which the term language skill attrition is used which has received considerably less attention. That is the loss of language skills by those who have studied and then discontinued the use of a second language.

The first distinction made by Freed is that of natural and pathological language attrition. The former refers to the natural process of language skill loss, for example, a first language being replaced by a second, while the latter refers to aphasia (the deterioration of language skills as a result of brain damage) or dementia (the pathological loss of language skills as a result of an organic brain disorder).

A second distinction is made between inter-generational and intra-generational language attrition: the former refers to language attrition across generations of certain groups of people, while the latter is more concerned with attrition exhibited in individuals. Stevens (1982) calls these two different types of attrition, in a first language setting, "mother tongue shift" and "language displacement" respectively (as cited in Weltens, 1987, p. 24), even though it is evident that attrition across generations of people probably also involves some attrition within each generation. It should be noted that attrition of English as a foreign language, the object of the present study, is, by definition, an intragenerational phenomenon, since it is confined to English major graduates with two or four years of disuse of English.

The third distinction, also the best known and most extensively quoted one, is made between the types of language attrition according to *what language* (L1 or L2) is lost and in *what linguistic environment* (L1 or L2) the attrition takes place. This distinction was first made by de Bot and Weltens (1985), but is usually ascribed to van Els (1986, p. 4). The distinction of these two categories results in four types of attrition (see Figure 1):

1. Loss of L1 in an L1-environment, e.g. dialect loss within the dialect community;
2. Loss of L1 in an L2-environment, e.g. loss of native languages by immigrant workers;
3. Loss of L2 in an L1-environment, e.g. foreign language loss;
4. Loss of L2 in an L2-environment, e.g. second language loss by aged immigrants.

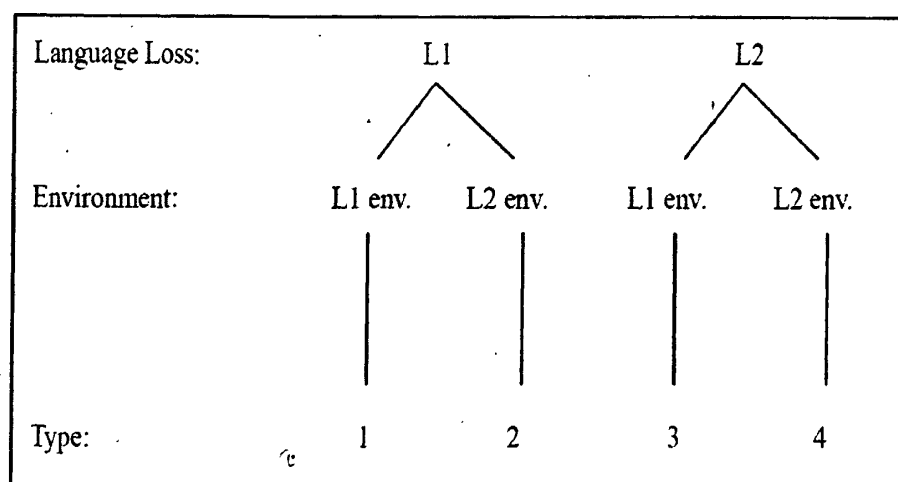


Figure 1. Types of language attrition (adapted from van Els, 1986, p. 4)

The first type of attrition is concerned with attrition of a first language in the first language environment, that is, first language attrition by aged people (de Bot & Lintsen, 1986; Nicholas, Obler & Albert, 1982; Nyssen & Crahay, 1960). It may also refer to the total extinction of a particular language or language variety (Dorian, 1977; Dorian, 1981; Dressler & Wodak-Leodolter, 1977). This type of attrition also includes the attrition of a dialect within a community when the first language is interpreted as a dialect (Hagen & Münstermann, 1985; Hoppenbrouwers, 1982; Münstermann & Hagen, 1986; Schlieben-Lange, 1977; Tabouret-Keller & Luckel, 1981; Trudgill, 1983; Tsitsipis, 1981). This type of attrition is not the subject of the present research, and no additional effort will be made to elaborate upon it. A detailed review of the research on this type of attrition could be found in Coupland, Coupland, Giles and Henwood (1991).

The second type is concerned with attrition of a first language in a second language environment, involving attrition of the native language of immigrants (Boyd, 1986; Davies, 1986; de Bot, Gommans & Rossing, 1988; Py, 1986; Sawaie, 1986; Sharwood-Smith, 1983a), attrition of the native languages of indigenous minorities (Fuller, 1982; Haugen, McClure & Thomson, 1981; Hill & Hill, 1977), and dialect loss outside the dialect community (Daan, 1969, 1971; Pauwels, 1986).

The third type, attrition of a second language in a first language environment, refers to attrition of a foreign language learned at school and also to the less well-documented phenomenon of a second language attrition due to remigration (Berman & Olshtain, 1983; Cohen, 1989; Hansen-Strain, 1990; Olshtain, 1986).

The fourth type focuses on attrition of a second language in the second language environment, for example, second language attrition by aged immigrants, resulting in first language reversion (de Bot & Clyne, 1989; Hyltenstam & Stroud, 1985).

It should be noted that each of these four types of language attrition thus distinguished may be further divided into a variety of sub-types that may differ considerably in a number of aspects (van Els, 1986, p. 4). For example, foreign language attrition, the third type, may differ a lot as to the causes, the variety of language, and the identity of the language users.

Hansen (2001a) modified van Els's classic taxonomy of language attrition in order to relate to Japanese contexts. She defined eight areas of possible language attrition, the first

four of which are possible first language attrition:

1. L1 Japanese (e.g. dementia and aphasia),
2. L1 minorities in Japan (e.g. Ainu, Okinawans, Koreans, Chinese and Nikkei),
3. L1 Japanese emigrants living abroad,
4. L1 foreigners living in Japan.

The other four of these areas are possible second language attrition:

5. L1 Japanese foreign language learners,
6. L1 Non-Japanese studying Japanese outside of Japan,
7. L1 Japanese who lived abroad and returned to Japan,
8. L1 Japanese learning and attrition abroad. (Hansen, 2001a, pp. 363-364)

While Hansen's detailed taxonomy refers to Japan and Japanese contexts, it could easily be adapted to other countries and languages as well.

However, van Els's four-way taxonomy is employed in almost every study on attrition, perhaps because it is such a clear milestone in the development of the field, and such a neat and symmetrical way of classifying language attrition. Taking into consideration the overwhelming focus of language attrition study, the author of this dissertation is to follow this taxonomy and confine his research to the study of attrition of English learned as a foreign language by Chinese college English majors.

2.3 A Diachronic Review of Language Attrition Studies

The University of Pennsylvania Conference of 1980 is the first conference that has ever been organized on the theme of language attrition and that, along with the publication of *The Loss of Language Skills*, the proceedings of the conference, has been recognized as the very witness to the establishment of language attrition study as an independent discipline. Language attrition study in the past three decades can be roughly divided into three periods and the study in each period has its own concerns. This section identifies these concerns and points out developments and changes in language attrition study.

2.3.1 The First Period (1980-1988)

Language attrition study in this period was mainly concerned with the typology and the

nature of language attrition, and helped establish the study of language attrition as an independent discipline. At the same time, some experts attempted to propose theoretical frameworks for language attrition study.

The first landmark of language attrition study is unanimously attributed to the University of Pennsylvania Conference on the Attrition of Language Skills (1980) and to the subsequent publication of *The Loss of Language Skills* (1982). The University of Pennsylvania Conference was one phase of an ongoing multifaceted project devoted to the study of attrition of language skills. The project was divided into the following stages: identification of work previously done in the field, the national conference, the design and funding of further research, and ultimately, suggestions for national language policy. The purpose of the conference was to assemble scholars, practitioners, and administrators (1) to review what knowledge exists in the small literature on language skill loss, (2) to identify useful hypotheses and methodologies from relevant subfields of linguistics and language pedagogy, (3) to determine what kinds of research and experimentation need to be undertaken, and (4) to consider what policy decisions are affected and what purposes and clientele are ultimately to be served (Lambert & Freed, 1982, p. iii).

The Loss of Language Skills was the first effort to integrate data, hypotheses, and methodology from several related subfields into an emerging area of inquiry of language skill loss. At this stage, language attrition was recognized with certainty as “a genuine phenomenon and genuine problem” (Freed, 1982, p. 5), one about which relatively little had ever been known. With the problem identified and several possible areas to investigate outlined, large-scale further research could be conducted to find the solution to the problem (Freed, 1982, p. 5). Ever since its publication, *The Loss of Language Skills* has been regarded as a benchmark in language attrition study so much so that the collection, about three decades later, has lost no importance or relevance to current research (Köpke & Schmid, 2004, p. 3).

The second most influential conference on language attrition study is the Language Loss Symposium held at the Rolduc Conference Center, Kerkrade, the Netherlands in March 1986. The event was aimed at bringing together researchers from Europe, Israel, and the United States who were engaged in language attrition research or planning to do so in the near future.

Some papers contributed to the conference were mainly interim reports of ongoing research, while others focused on aspects of a more general nature (Weltens, de Bot & van Els, 1986, p. v).

Some proceedings of the conference were collected in its subsequent publication, *Language Attrition in Progress* (Weltens, de Bot & van Els, 1986). Just as the volume's title suggests, language attrition was a common but heretofore little-studied phenomenon. Three areas of language attrition were treated in the collection: first language attrition, dialect loss, and attrition of a second or foreign language. These areas were being studied extensively on a variety of languages. The collection presented an up-to-date overview of a rapidly expanding field of applied linguistic research. What is fairly worth mentioning is van Els's "An Overview of European Research on Language Attrition". In this article, the author, and co-editor of the collection as well, classified language attrition in terms of what language is lost and the environment in which it is lost, resulting in a four-way taxonomy of language attrition. Another contribution of the article to language attrition study is that van Els outlined the general aspects of and future plans for language attrition research.

During this period, two professional journals also recognized the importance of language attrition study, a newly sprouting and rapidly expanding discipline. The first issue of *Applied Psycholinguistics* (1986) was dedicated to language attrition study. The Language Loss Symposium of the Eighth World Congress of Applied Linguistics, focusing on the theme of language attrition, was hosted by the University of Sydney, Australia in 1987 and in the following year, *International Review of Applied Linguistics* (1988) published the papers delivered at the symposium.

The Loss of Language Skills, together with *Language Attrition in Progress* and special issues of *Applied Psycholinguistics* and *International Review of Applied Linguistics*, succeeded in placing language attrition study on a sound, scientific theoretical foundation. Moreover, these publications included a lot of works, such as re-analysis of data that had been collected for other purposes, project plans, and preliminary results of the projects that had really just started. All this made good theoretical and material preparation for the second period of language attrition study, a period marked by a surge of publications of experimental reports.

2.3.2 The Second Period (1989-1999)

The first period of study not only provided a theoretical basis for language attrition study, but also made empirical investigations of language attrition possible. The second period began in 1989 and ran through to the end of the 20th century. With the maturation of the methodology of language attrition study, many experiments were carried out in both Europe and the United States, and many of the findings were published.

The most important and noteworthy publication during this period and also a milestone of language attrition study is the special issue of *Studies in Second Language Acquisition* (1989, 11 (2)). The issue took advantage of the increasing availability of empirical studies of language attrition that had been done in the past period, especially useful materials and preliminary results that had been provided by *The Loss of Language Skills*, *Language Attrition in Progress*, and the special issue of *Applied Psycholinguistics* (1986). The collection witnessed an obvious shift from exclusively theoretical to applied study of language attrition. Moreover, the issue was the first collection of papers that concentrated exclusively on natural second or foreign language attrition, an area that — as had been stressed repeatedly (Valdman, 1982, p. 155; van Els, 1986, p. 13) — was to yield insights with far-reaching consequences for areas such as language policy, curriculum design, and other matters concerning methods for language teaching in general.

Another collection of equal importance during this period was *First Language Attrition* edited by Seliger and Vago in 1991. This collection examined linguistic aspects of attrition or loss of language skills in bilinguals through a variety of studies in various language groups. The phenomena of attrition were examined both in bilingual societies and in bilingual individuals. The articles in this collection dealt with first language attrition from diverse angles. The articles in Part I (Survey Studies) surveyed different aspects of attrition through empirical evidence presented in the literature and came to a theoretical conclusion about language attrition while articles in Parts II (Group Studies) and III (Case Studies) approached specific properties of first language attrition through the analysis of data they presented. Specifically, the group studies of Part II investigated attrition in societal bilingualism or in groups of bilingual individuals, while the case studies of Part III were mainly concerned with

single bilingual participants, both children and adults. The articles in Parts II and III employed a wide range of data-gathering methods.

First Language Attrition was claimed by its editors to be the first work to study the influences of acquisition of a second language on attrition of the first language. It provided, just as the editors hoped, “an answer to the question: What is first language attrition, and why is it important to understand it?” (Seliger & Vago, 1991, p. 14) This book is the first collection of papers to use the term “attrition” in its title, but few of the reported studies actually dealt with this phenomenon in the strict sense of the term — the non-pathological decrease in proficiency of a language that has previously been acquired by an individual, *i.e.* intragenerational loss.

While the first period had helped develop language attrition study into an independent discipline and provided a theoretical basis for future study, the second period witnessed an increase of empirical experimentations on attrition of different languages, especially on those languages learned as a foreign language. However, the results and the findings of these experiments were not all in complete consistency with theories borrowed from more established sciences or put forward by professionals in the field during the first period. The inconsistency made it necessary for previous theories, both borrowed and proposed ones, to be reviewed, modified and improved. All this helped usher in the third period in which language attrition theories would be improved and the causes of language attrition would be explored.

2.3.3 The Third Period (2000-2010)

The third period of language attrition study began with the coming of the new millennium and continues into today. Language attrition study, though a young and ambitious science, is now “reaching puberty” (de Bot, 2004, p. 233). Accordingly, it needs to be taken more seriously. There are at least two ways to achieve that at the time. One is to continue to adapt theories and methods from other relatively old and established fields that have proven their practical value; the other is to show that language attrition study could in its own turn contribute to those fields itself (de Bot, 2004, p. 233). Among the publications in this period, the special issue of *International Journal of Bilingualism* (2004 (3)), and two collections,

First Language Attrition: Interdisciplinary Perspectives on Methodological Issues, co-edited by Schmid, Köpke, Keijzer and Weilemar (2004) and *Language Attrition: Theoretical Perspectives*, co-edited by Köpke, Schmid, Keijzer and Dostert (2007), are the most remarkable in the latest language attrition study.

International Journal of Bilingualism devoted an entire issue (2004 (3)) to language attrition study. Papers in this special issue showed every sign of the increasing ambition and self-confidence and the potential for attrition research to both make use of theories and findings from other fields, and, in return, to contribute to those fields.

One improvement of theories of the special issue was to borrow the Dynamic Systems Theory (DST) from mathematics¹. The link between the theoretical underpinnings of research in language acquisition and DST was first pointed out by Herdina and Jessner in their *A Dynamic Model of Multilingualism: Perspective of Change in Psycholinguistics* (2002), and then DST was further elaborated upon and transferred to language attrition study by Peter Ecke (2004) in his *Language Attrition and Theories of Forgetting: A Cross-disciplinary Review*, an article contributed to *International Journal of Bilingualism*. The importance of the introduction of DST into language attrition study lies in the fact that "it provides a fresh and promising perspective on language attrition as a normal part of language development and not as a lamentable loss of what once was" (de Bot, 2004, p. 233). The model for language development was based on DST should in principle be applicable to language attrition, with the main factors being a lack of input for a given language and a weakening of connections between elements of that language and other languages in a connectionist kind of network (de

¹ Dynamic Systems Theory is an area of applied mathematics used to describe the behavior of complex dynamic systems, usually by employing differential equations or difference equations. The focus is not on finding precise solutions to the equations defining the dynamic system, but rather to answer questions like "Will the system settle down to a steady state in the long term, and if so, what are the possible steady states?", or "Does the long-term behavior of the system depend on its initial condition?"

Dynamic Systems Theory has witnessed application in language acquisition/attrition studies in recent years. De Bot, Lowie and Verspoor (2007, p. 7) argued that language can be seen as a dynamic system, i.e. a set of variables that interact over time, and that language development can be seen as a dynamic process. Language development shows some of the core characteristics of dynamic systems: sensitive dependence on initial conditions, complete interconnectedness of subsystems, the emergence of attractor states in development over time and variation both in and among individuals. The application of tools and instruments developed for the study of dynamic systems in other disciplines calls for different approaches to research, which allow for the inclusion of both the social and the cognitive, and the interaction between systems. There is also a need for dense data bases on first and second language development to enhance our understanding of the fine-grained patterns of change over time. Dynamic Systems Theory is proposed as a candidate for an overall theory of language development.

Bot, 2004, p. 233). All this means that in accordance with DST, attrition of one language cannot be seen as an isolated effect in some remote corner of the linguistic system, but as a change that affects the whole system. Thanks to its recent link with DST, language attrition study now has a more stable and solid foundation and it could be done within the same framework as the study of language acquisition. Unfortunately, there is now a quickly developing line of research on the development of language as a dynamic system, but how that methodology can be applied to language attrition is still not clear (de Bot, 2004, p. 233).

First Language Attrition: Interdisciplinary Perspectives on Methodological Issues is a collection of papers submitted to the International Conference on Language Attrition: Interdisciplinary Perspectives on Methodological Issues hosted by Vrije University, Amsterdam, the Netherlands in 2002. This volume provided a state-of-the-art treatment of research on language attrition, the non-pathological loss of a language through lack of exposure. It combined a review of past and present research with in-depth treatment of specific theoretical and methodological issues and reports on individual studies. Special prominence was given to the identification of problematic areas in language attrition research, with a view of finding possible solutions.

The unique importance of the collection lies in the following three aspects: First, it is the first work that managed to find the causes of language attrition from the perspective of a second language interference (Pavlenko, 2004), learners' language attitudes, motivations (Dewaele, 2004; Jiménez, 2004) and language use, as well as pure linguistic issues (Altenberg & Vago, 2004). Next, the collection dealt with the methods of observing and describing the process of attrition of a variety of languages in a great range of settings. Thanks to the introduction of new theories, the methodologies adopted in the first and the second periods were reassessed and revised for more scientific study of language attrition (Ben-Rafael, 2004; Hutz, 2004; Ventureyra & Pallier, 2004; Yağmur, 2004). Finally, several papers in this collection reported tentative but promising studies which interpreted their data within a range of established theoretical frameworks, in order to find evidence substantiating the relevant model. A number of studies (Gürel, 2004; McCormack, 2004; Montrul, 2004a) were carried out from the point of view of Universal Grammar. Two papers (Gross, 2004; Schmitt, 2004)

dealt with studies carried out within Abstract Level Model¹ and 4-M model², with very insightful findings that language attrition is selective, affecting some levels of abstract lexical structure before others. The tentative introduction of Universal Grammar and Abstract Level and 4-M models has complemented the theoretical frameworks of language attrition study. Moreover, the introduction has suggested a possible and practical direction for future language attrition research.

The latest effort that has been made to improve the theoretical basis of language attrition study is *Language Attrition: Theoretical Perspectives* (2007). This collection argued for the study of language attrition from a more integrated perspective than had previously been taken. It began with three papers that considered the impact of determining factors for the process of language attrition. Köpke (2007) gave an overview of the impact of neurobiological and cognitive processes as well as extralinguistic factors, such as language use and attitudes, on language acquisition and attrition. Sharwood-Smith (2007) presented the Modular On-line Growth and Use of Language (MOGUL), a new model for understanding the relationship between language acquisition and attrition. Accordingly, language acquisition involves building up a bank of (permissible) structures in long-term memory, with language attrition arising from the lesser availability of structures as a result of disuse. De Bot (2007) introduced the Dynamic Systems Theory in light of which language could be viewed as a Dynamic System in constant flux.

Another significant contribution of the collection is that it introduced more established linguistic frameworks and theories, such as the 4-M models (Myers-Scotton, 2007), the minimalist approach (Tsimpili, 2007), Government and Binding Theory (Gürel, 2007), to name a few, and a psycholinguistic framework in the context of Activation Threshold (Paradis,

¹ Abstract Level Model is the claim that there are three levels of abstract grammatical structure in any lexical item: (i) the level of lexical-conceptual structure (semantic/pragmatic features), critical in the semantic/pragmatic feature bundle that is matched at the conceptual level with an intention that the speaker wishes to convey; (ii) the level of predicate-argument structure (relations between thematic role assigners—verbs and some prepositions—and the arguments they map onto phrase-structure units); (iii) the level of morphological realization patterns (elements and constituent orders required by well-formedness constraints for surface-level realizations). Lexical-conceptual structure is more susceptible to change than the level of morphological realization patterns, which in turn is more likely to change than the level of predicate-argument structure (Myers-Scotton, 2002, p. 96).

² The 4-M Model of Myers-Scotton and Jake (2000, p. 1062) distinguishes four types of morphemes: (i) content morphemes, (ii) early system morphemes, (iii) bridge late system morphemes, and (iv) late outsider system morphemes.

2007; Schmid, 2007), and demonstrated how they could be applied and interpreted with respect to language attrition study.

The third contribution, also the most promising one, is that the collection suggested that part of the “hidden” language¹ could be recalled either through hypnosis (Footnick, 2007) or the Stimulated Recall Protocol² (Jiménez, 2007). The suggestion provided a new direction for language learning and maintenance study, and thus pushed language attrition research a big step forward. Footnick (2007, p. 169) argued that attrition of a “hidden language”, one that has not been forgotten but rather has become inaccessible to the speaker, was different from the traditionally studied attrition of a “forgotten language” or one that is being forgotten. The speaker’s inaccessibility to the “hidden language” was supposed to be caused by the conflict between the attrited language and another frequently used language (Footnick, 2007, p. 181). Hypnosis and the Stimulated Recall Protocol could help decrease the conflict and thus might allow blocked information to become accessible to the speaker (Footnick, 2007; Jiménez, 2007). The findings in this area might mean not only a bright future for the relearning of the attrited language but also some useful suggestions for future language teaching and learning.

So far, the route of language attrition study abroad, mainly in the Continent and in the United States in the past three decades, becomes clear. In the first period (1980-1988), language attrition was defined and classified, and that helped make language attrition study an independent discipline. Preliminary experiments of language attrition were conducted by making use of the methodology adapted from other more established disciplines. In the second period (1989-1999), with the maturation of the methodology of language attrition study, many experiments were carried out on a great variety of languages in both Europe and

¹ Footnick (2007, p. 169) made a distinction between the hidden language and the forgotten language. A “hidden language” is one that has not been forgotten but rather has become inaccessible to the speaker, while a “forgotten language” refers to one that is being forgotten.

² Stimulated recall is one of the introspective methods for obtaining data in second and foreign language research. In the recalls, learners are prompted to recall and verbalize their thoughts during a event. The recall prompts generally include a stimulus such as a video or audio-tape or written drafts of a composition. For example, immediately after completing an oral communicative task with a native speaker, learners might be asked to verbalize what they were thinking during the original interaction. An audio-tape of the interaction and a picture of the task might be used as a stimulus (Gass & Mackey, 2000, p. x).

Jiménez (2007, pp. 227-231) introduced the methodology into language attrition research. Specifically, he focused on the use of compensatory strategies (*i.e.*, self-regulatory strategies, object-regulatory strategies, and other-regulatory strategies) by a group of attriting speakers of Spanish during an oral narration task.

the United States. In the third period (2000-2010), theoretical frameworks of language attrition study were expanded through the continuous introduction of theories from other more established fields, and efforts were made to find the reasons for the attriters' inability to access the attrited language.

2.4 The Nature of Language Attrition

At first sight, language attrition seems to be merely the loss of language skills. However, it is not as simple as it seems if one is asked to answer the following questions: What kinds of language skills are more likely to be lost? Is language attrition related to learners' language proficiency? How fast does language attrition develop? Does language attrition develop in a predictable pattern? If yes, what is the pattern like? To answer these questions and others, one has to study the nature of language attrition.

2.4.1 Proficiency

A question that has intrigued language attrition researchers is whether language attrition is related to the learners' original language proficiency level. A number of hypotheses have been put forward so far to tackle the question.

The traditional psychological view of forgetting holds that forgetting is proportional to the total amount of knowledge (Ebbinghaus, 1885; Nelson, 1985). The higher-proficiency participants lose more because they "have more to lose": "The more you know, the more you forget." This kind of relation between language proficiency and attrition, however attractive it may seem to be, has not yet gained any ground among foreign language attrition researchers. Apart from two references to this possibility in earlier attrition studies (Kennedy, 1932; Scherer, 1957), it has hardly ever been considered seriously.

Godsall-Myers (1981) argued in her dissertation that a high German language proficiency level means a long retention. That is, the attrition rate is negatively correlated with language proficiency. Bahrck (1984a, p. 116) found that the amount of attrition "becomes a progressively smaller portion of total knowledge with higher levels of training". Similar findings were reported by Smythe, Jutras, Bramwell and Gardner (1973) and Weltens, van Els and E. Schils (1989). All these findings could be accounted for by the Inverse

Hypothesis put forward by Vechter, Lapkin and Argue (1990). The hypothesis postulates that there is an inverse relationship between proficiency level prior to the onset of attrition and the rate and/or amount of loss. High levels of proficiency predict better survival of second language skills over time. In the words of Vechter, Lapkin and Argue (1990), "The higher the degree of attainment, the lower the degree of attrition." In other words, the more one learns, the less one loses.

However, language attrition researchers were not so ready to accept the Inverse Hypothesis. Instead, some of them made an attempt to find out whether there is a dividing line or a point beyond which learners' language will become stable and immune to attrition. The attempt resulted in the proposition of critical threshold theory.

In response to Bahrick (1984a) and others, Neisser (1984) provided a different interpretation from a cognitive psychological perspective. He postulated that Bahrick's subjects had discovered a structured mental representation (a schema) of complex information consisting of a system of relationships of Spanish words. The recall of a word was not just to reproduce a previously memorized item, but, rather, it was like a problem-solving response that involved deeper and more complex processes of memory retrieval. Thus, information tied into this extensive and redundant cognitive structure was resistant to forgetting, while isolated pieces of information were vulnerable to loss. Neisser (1984, p. 33) proposed that "some response strengths reach a critical threshold during learning; beyond that threshold they become immune to interference or decay."

Several studies (Grendel, 1993; Weltens, 1989; Weltens & Grendel, 1993; Weltens, van Els & Schils, 1989) lent support to Neisser's proposal. For example, the research done by Weltens and others (Weltens, 1989; Weltens, van Els & Schils, 1989) on French as a second language learned in Dutch schools found little attrition of recognition skills among the competent participants.

When the critical threshold hypothesis is applied to language attrition, one might hypothesize that, beyond a certain level of mastery, language skills will be relatively resistant to forgetting. What is more recommendable is to find out the "critical point in overall language proficiency below which attrition is rapid and extensive, but at and above which, a large proportion of the initially acquired material is retained" (Clark & Jorden, 1984, p. 58).

2.4.2 Skills

Earlier researchers had suggested, just as our intuition informs us, that there must be a possibility that attrition may affect different types of language skills differently. Some earlier studies (Cohen, 1989) had concluded that receptive skills (*i.e.*, listening, reading) seem to be more resistant to language attrition than productive ones (*i.e.*, speaking, writing). Unfortunately, no systematic research has ever been done on the attrition difference between productive and receptive language skills.

Another point about language attrition touched upon by earlier researchers is whether general skills resist forgetting differently from lower-level skills. Some studies (Weltens & van Els, 1986; Weltens, van Els & Schils, 1989) showed that general skills are more resistant to language attrition than lower-level ones. What is more encouraging is that several earlier reports (Moorcroft & Gardner, 1987; Weltens, van Els & Schils, 1989) indicated that there were improvements of general skills instead of attrition or retention over time, but at the same time there were significant decreases in lower-level skills. The improvement of general skills rather than attrition or retention is fairly contrary to our intuition, and that makes it quite natural and understandable for other researchers to doubt the validity of the measures that these researchers had employed. However, one should always be very careful in questioning the results whenever they are not in agreement with one's intuition. When trying to account for the counter-intuitional findings, one should take into consideration alternative explanations such as linguistic similarities, continued learning of other languages (including L1), or increased testpertime¹ (de Bot & Weltens, 1995, p. 154).

The third important point is the relationship between reading and writing skills and general language skills. Olshtain (1986, p. 200) concluded in his interim study of the attrition of English as a second language with speakers of Hebrew that good performance in reading and writing could help curb attrition of general language skills. This conclusion gained support from other specialists. The investigations of both Hansen-Strain (1990) and Olshtain (1989) showed that the participants' pro-attrition reading and writing skills were negatively correlated with the attrition of their general language skills. In a series of studies, Hansen and others succeeded in separating the literacy variable in a population of adult attriters. Three

¹ Testpertime means that some testees are well experienced in testing, sometimes, so much so that their performance in a test is above their actual competence.

disparate writing systems were chosen from among the attriting languages: Japanese (Hansen & Newbold, 1997), Chinese (Hansen & Chantril, 1998), and Korean (Shewell & Hansen, 1999). The participants in this population had attained high levels of oral competence during two years of daily interaction in the target culture; at the same time, they varied considerably in the extent to which they learned to read and write in their second language. In these three cross-sectional studies, however, the reading and writing effect was highly potent, and a large number of logographs that had been learned stood out consistently as a robust predictor of language retention over periods spanning forty years. Olshtain (1989) found that language learners with native-like reading proficiency might be motivated and encouraged to maintain that proficiency and, as a result, their general language skills did not undergo any considerable loss. Consequently, Olshtain suggested that a high level of reading proficiency be taken as a predictor of the maintenance of participants' general language skills.

2.4.3 Rate of Attrition

It is well accepted that the extent and rate of language attrition is decisively determined by periods of disuse of or nonexposure to the target language. However, the extent and the rate of attrition in different periods of time must be different and thus are worth studying. Since the end of the 19th century, psychologists have been investigating forgetting curves. The experiments conducted by Ebbinghaus (1885) led to what is called the traditional forgetting curve. It argued that attrition sets in immediately after the learning process stops, slows down after a few years, and then proficiency remains relatively stable for a very long time and forgetting levels off. Several investigations of language attrition reported results that were more or less consistent with this view of forgetting. Notably, Bahrick (1984a) found that, for American students of Spanish, the attrition of language skills was heavy during the first five or six years following the training, but after that the remaining skills were prone to remain stable for at least another 20 years. Moreover, the forgetting of L2 structures was more pronounced immediately after training and levelled off with time.

A similar pattern was also reported by Weltens, van Els, and Schils (1989). They investigated the retention of school-learned French language skills in Dutch students after a period of four years following the training. They found that the attrition followed a

remarkably consistent pattern: It always occurred in the first two years, and then levelled off. In other words, their results confirm those obtained by, for example, Bahrick (1984a) and are consistent with the forgetting curve (Ebbinghaus, 1885): Attrition sets in rather quickly and then levels off.

Seemingly contrary to the forgetting curve theory about the rate of attrition is the so-called initial plateau hypothesis, which argues that participants' language proficiency remains stable up to six or seven months or even a few years after the end of exposure to the target language. The initial plateau refers to a period of time during which skills are relatively unaffected before attrition actually sets in (Kaufman & Aronoff, 1991; Kuhberg, 1992; Tomiyama, 1999; van Ginkel & van der Linden, 1996; Weltens & Cohen, 1989).

At first sight, the initial plateau hypothesis seems to be contradictory to the forgetting curve theory. However, the high level of initial language maintenance of the participants reported in these studies could be adequately accounted for by the combination of the fact that they had a high or very high proficiency level in the target language, and the Inverse Hypothesis that the more one knows, the less one loses. But it is certain that after a relatively long and stable period, what followed is expected to be "normal" forgetting (Weltens & Cohen, 1989), when the initial plateau was regarded as an extension of learning or acquisition of a language.

Bahrick's study (1984c) was a good example to account for the findings of Weltens and Cohen (1989). Bahrick conducted a fifty-year-long study on 773 subjects who had learned Spanish as a foreign language. It was found that the rate of attrition followed a fast-slow-fast pattern, that is to say, during the initial five years of disuse of Spanish, attrition developed fast; in the next twenty-year period, the subjects' language proficiency remained stable or showed insignificant attrition; in the third period from twenty-five to fifty years, attrition developed fast again. If the third period of rapid attrition is ignored, the first and the second periods would just agree with the normal forgetting curve theory.

2.4.4 Order of Attrition

An important issue as regards language attrition is whether an order or a sequence of language attrition can be predicted. By analogy with the assumptions of stages of first

language development (R. Brown, 1973) and second language acquisition (Dulay & Burt, 1974), experts from aphasics and language attrition study circles (Cohen, 1975; Jakobson, 1941; Olshtain, 1989) expected to know whether language attrition would proceed in predictable stages reverse to acquisition. Jakobson (1941) integrated and improved the regression hypothesis and made a proposition about the order of language attrition:

The pattern of language dissolution in aphasics is similar, but in reverse order, to the pattern of language acquisition in children. Those aspects of language competence acquired last, or, more precisely, those that are most dependent on other linguistic developments, are likely to be the first to be disrupted consequent to brain damage; those aspects of language competence that are acquired earliest and are thus "independent" of later developments are likely to be most resistant to effects of the ending of brain damage. (as cited in Caramazza & Zurif, 1978, p. 145)

While some researchers were not so optimistic about finding evidence that language attrition is reverse to acquisition (de Bot & Weltens, 1991; Håkansson, 1995; Hedgecock, 1991; Holmes, 1978), others claimed to have found some solid support for the regression hypothesis with respect to a number of morphosyntactic structures. Cohen (1975) studied the patterns of second language loss in three second-grade students after the summer recess from an intensive Spanish immersion program. He found that some of the structures learned last were also among the first to be forgotten, and he reported evidence for regression in the children's use of the simple present tense distinction and the definite article. Hansen (1980, 1999) and Hayashi (1999) demonstrated that attrition of negative morphemes in American learners of Hindi-Urdu (L2) and American and Micronesian learners of Japanese (L2) proceeded in an order reverse to acquisition. Pfaff (1991) and Slobin (1977) found more complex or more difficult-to-process structures, which were acquired late, were lost first, while Bailey (1973) and Hyltenstam and Viberg (1993) showed that the less complex and easier-to-process structures, which were acquired early, were largely more prone to resist attrition. Hansen and Chen (2001) discovered the regression patterns in the syntax and semantics of numeral classifier systems in second language learners of Chinese and Japanese. Berman and Olshtain (1983) and Olshtain (1989) detected signs of regression in young bilingual children who

over-regularized English past-tense morphology after their return to a Hebrew-speaking environment. Olshtain (1989), however, found that the unstable acquisition of verb morphology might result in its loss in the five-to-eight-year old children. Anderson (2001) reported that the two Spanish-English bilingual children regressed to an earlier developmental stage in which the third person singular form served as a default form for Spanish verb use. Kuhberg (1992) interpreted his findings of German attrition of two Turkish children aged 7 and 9 as support for the regression hypothesis. He claimed that lexical loss and attrition of the morphological system largely proceeded in an order reverse to the stages of acquisition.

In summary, language attrition is a complex phenomenon of various essential characteristics, which overlap and interact collectively in the complex cognitive systems of the bi- or multilingual speakers. It is likely that just one of these theories and hypotheses about the nature of language attrition cannot account for certain types of language attrition. Only when all the theories and hypotheses are integrated into a complete whole can we acquire, at most, part of the nature of language attrition.

2.5 Factors Affecting Language Attrition

Finding out the nature of attrition is an important purpose of language attrition study, but not the only one. Another purpose of language attrition study is to find out factors that contribute to attrition. The second purpose is even more important than the first one in that the discovery of factors affecting language attrition can help find out means to curb or at least slow down the process of attrition. The factors affecting language attrition can be roughly, and to a certain degree, arbitrarily, grouped into seven categories: contact, teaching methods, age, attitudes and motivations, literacy, cultural contexts, and linguistic interference.

2.5.1 Contact

Language learners' manner and time of contact with the target language play one of the key roles in the rate and extent of language attrition. Generally speaking, attrition sets in if a language learner has no or very limited contact with the target language after his language learning comes to an end. The literature given above (*see* 2.4) might as well demonstrate that attrition is inevitable if language learners have no contact with the target language.

A number of experiments have been carried out to study the effect that learners' natural contact with the target language exerts upon the rate and extent of attrition. Edwards (1977) conducted a study on listening, speaking, reading and writing skill maintenance of 455 subjects who served in Canadian public agencies and used either English or French as a foreign language. No traces of attrition were shown in those subjects who had studied and had been using English as a foreign language but noticeable attrition progressed in the subjects who learned French as a foreign language. The difference between these two groups of subjects in their foreign language maintenance and attrition could be accounted for by the difference in the manner and the time of their contact with the language concerned. French is acquired and used as mother tongue in certain provinces in Canada, but English is the mother tongue of the overwhelming majority of people in the country. That means the subjects whose foreign language was English had much more contact with their target language than those whose foreign language was French. So it is quite understandable that the former had better retention of their target language than the latter.

Clark and Jorden (1984) demonstrated that those having no or very limited contact with the foreign language lost their speaking and reading skills fast but at the same time their listening comprehension remained stable. A similar conclusion had been drawn by Gardner, Lalonde & MacPherson (1985) when they were investigating the effect of attitudes and motivations of participants' upon their foreign language maintenance. They found that the participants who had more contact with their target language showed a slower rate and a smaller extent of listening comprehension skill attrition than those who had very limited contact.

The study of the effect of artificially-intervened contact, for example, the effect of an anti-attrition program, upon language attrition was mainly based upon theoretical inference. The best and also the most convincing examples came from some US government agencies that had regulations or programs which encouraged the maintenance of foreign language skills. For example, for those employees engaged in the Army Linguist Program, the Department of the Army had a regulation requiring retesting of their language skills every two years by the *Defense Language Proficiency Test* (DLPT) suitable for a given foreign language. The army linguists were required to maintain at least Level 2 Skills in either reading or listening. The

same concern for maintaining foreign language skills was evident at the Central Intelligence Agency whose language program covered not only use, but also achievement and maintenance as well. If an employee was in a Unit Language Requirement (ULR) position, which by definition was a position where language use was deemed essential for the performance of his job, he would be paid a use-award. These measures taken by the US government agencies had helped produce expected and positive results (Lowe, 1982). Civilian groups in Japan also developed a language maintenance program based on the belief of the necessity that Japanese returnees from English-speaking countries should be given an opportunity to interact intensively with a native speaker on a one-to-one basis. Promoters of the program believed that even a couple of hours of such an opportunity per month would be very effective in maintaining, or slowing down the attrition of the returnees' second language (Yoshitomi, 1999). In short, language learners' frequency of contact with the target language plays a key role in their language maintenance.

2.5.2 Teaching Methods

One of the primary and at the same time the most elusive and complicated questions in language attrition research is whether a particular teaching method is better than others in terms of the long-term retention of learned or acquired language skills. The research as regards this issue was traditionally based upon van Els's distinction between explicit teaching methods, and immersion (direct) ones. Van Els pointed out that "there is no empirical evidence to support any specific claim as to the greater persistence of FL competence acquired under particular instructional conditions." However his solitary voice was immersed in the massive literature almost unanimously claiming that different teaching methods have different effects on language retention and attrition.

A well-known conclusion is that explicit teaching methods engender more durable skills than immersion or direct methods. One source of evidence with respect to children's language attrition was their rapid and apparently total loss of L2 skills acquired under natural circumstances in the L2 environment once the learners returned to the L1 language environment (Burling, 1978; Hansen, 1980; Weltens & Cohen, 1989). One possible reason suggested to account for the rapid and total loss was that those children did not learn grammar

explicitly in their pre-school age. Nagasawa (1999), in order to find out whether different teaching methods resulted in different rate of attrition, conducted an investigation of seven Japanese language learners of a university in the United States and found that the university students who initially had had explicit classroom instructions had experienced less language attrition than those who had had no or little explicit instructions in the initial stage of their Japanese learning.

The role that teaching methods play in language maintenance and attrition is sure to continue to be a heated topic in language attrition study, for if one wants to make any claims concerning the promotion of retention or the curbing of forgetting, it is of great necessity that the conditions under which learners' language skills have been learned or acquired should be taken into account.

2.5.3 Age

A sharp difference between child and adult language attrition has been noted in numerous anecdotal accounts in the literature. For example, Hansen (1980) conducted a longitudinal study of two-preschool American children during three holiday trips with their family on the Indian Subcontinent. In South Asia the subjects of the study used to be judged as native speakers of Hindi-Urdu while their mother was much less proficient in it. Back to their home country, the United States, both children seemed to have lost all their Hindi-Urdu, while the mother showed no decline in her second language skills. Twenty years after the family's final departure from South Asia, the children now in their mid-twenties could not understand a word from recordings of their own animated Hindi-Urdu conversations, while the mother still understood many of them (Hansen & Reetz-Kurashige, 1999).

The age variable in child language attrition has also been substantiated in some longitudinal case studies (Cohen, 1989; Hansen-Strain, 1990; Kaufman & Aronoff, 1991; Koike, 1990; Yukawa, 1996). Cohen (1989), Hansen-Strain (1990), and Yukawa (1996), having studied child language loss in the same linguistic environment, found that the younger a child is, the more rapid the pace of his language attrition will be. The only exception to the rule is Kuhberg's study (1992) of L2 German attrition of two Turkish children, aged seven and nine. The relatively rapid pace of German attrition of the nine-year-old was accounted for

by the researcher as due to the “stronger pressure for the older child to give absolute priority to Turkish” (Kuhberg, 1992, p. 145).

At the same time, there was an accumulation of literature of group studies of child language attrition. In a study of Israeli children who had learned English abroad, Olshtain (1986, 1989) demonstrated that the younger children, aged five to seven, had suffered more attrition of their second language than the older ones, aged eight to fourteen. In a cross-sectional study of L2 English loss, Yoshida and Arai (1990) measured the listening comprehension of Japanese returnee children and reported that the younger groups of participants made significantly more errors in such tasks as the repetition of increasingly complex sentences.

Almost all these findings, whether of anecdotal accounts, case studies, or group studies, are consistent with the Inverse Hypothesis, which holds that the more you know, the less you lose. Generally speaking, older children usually have a higher proficiency of the target language than their younger counterparts and they are likely to perform better in curbing attrition of language skills. It is the same with the distinction between adults and children, for adults usually have a better command of the language than children, and naturally their language is much more resistant to attrition.

2.5.4 Attitudes and Motivations

Attitudinal factors include a complex variety of values attributed by the community or social environment to the languages (L1 and L2) as well as issues like bilingualism, immigration, integration, etc. (Ben-Rafael & Schmid, 2007; Gardner, 1985). These values may or may not be identical with the internal values the subjects subscribe to (Köpke, 2007; Schumann, 1997), but they will in all cases have some influence on these internal values and on bilingual subjects' motivation to learn one language and, at the same time, to maintain the other.

Motivation usually arises from external factors such as socio-economic or ideological contexts. One example illustrating how integrative or instrumental motivation (Gardner & Lambert, 1972) is dependent on this kind of context was given by Ben-Rafael and Schmid (2007). Their study of different groups of immigrants in Israel showed that different

socio-economic or ideological contexts had different effect upon first language attrition: The Francophone immigrants, who arrived in Israel during a period when the exclusive use of Hebrew was an ideological imperative, had a lower maintenance of their first languages. But the first language maintenance was much higher among more recent Russian immigrants who had a more economic and hence instrumental motivation, allowing for the maintenance of Russian as a family language.

Another type of attitude and motivation may depend upon the immigrants' view of their immigration situation, and will be directly linked to cultural contexts. It includes the immigrants' attitudes towards language competence and bilingualism, their origins, and their integration into the L2 community: Is there a need to be a perfect speaker of each language? Does the speaker accept codeswitching as a bilingual communication mode or is he opposed to language mixing? Is L1 attrition seen as a logical consequence of integration into the L2 community or is it felt as the loss of some aspect of an immigrant's personality? These and other questions contribute to a very complex picture of the immigrants' relation with their languages, and determine their language embodiment.

Various language attrition studies suggested that negative attitudes towards, or the repression of, a language would accelerate the loss of the language (Pavlenko & Lantolf, 2000). Cases that seem consistent with language repression were reported in studies of children who moved from their native country to an environment where their L1 was not spoken. Three studies (Isurin, 2000; Nicoladis & Grabois, 2002; Saville-Troike *et al.*, 1995) were conducted to investigate L2 acquisition and L1 attrition in orphan children from Russia, the Ukraine, and China who had been adopted by U.S. families. After a short time of initial resistance to the L2, the children had progressed rapidly not only in the acquisition of English, but also in the loss of their L1. The children began to refuse to speak in the L1, possibly because of their desire to "acculturate" themselves (Schumann, 1978, p. 78), that is, to assimilate themselves into the dominant American culture, or simply because they associated the new language with the new people and places and stubbornly used the L2 accordingly (Slobin, Dasinger, Küntay & Toupin, 1993, p. 192). It is also conceivable that they wanted to forget about their traumatic experiences and their past life as orphans that were related with their L1 (Tits, 1948). Kouritzin (1999, p. 158) reported a related case of L1 loss by a girl who

had been abandoned by her family after the death of her mother and who asserted in retrospect that the loss of her L1 had been extremely beneficial to her. The girl seemed to have distanced herself deliberately from past memories, identities, and the language associated with them as well.

However, positive attitude towards a language could, on the contrary, help curb the loss of the target language, and sometimes even result in the revitalization of the language. De Bot and Clyne (1989, 1994) reported a related phenomenon of language development in elderly immigrants, a group of Australian Dutch-English bilinguals who had been investigated by Clyne some 16 years before. The findings of the study were not an increase of Dutch attrition, but a revitalization of and a reversion back to the L1. The shift back to the L1 was reflected in the preferred use of the L1, better recall in the L1, a decrease in L2 fluency, and an increased foreign (L1) accent in L2 speech. These findings raised interesting questions about the dynamics of language growth and decline, the temporal nature of language suppression, the possible degrees and limits of individuals' attempts to assimilate into another group, and the likelihood of ultimate reversion to (or recovery of) the L1.

So far it appears that external factors, such as contact frequency, learners' age and attitudes and motivations, are of crucial importance in language attrition. Although attrition, as a process, is based upon brain mechanisms and cognitive processes, external factors are likely to play a larger role in determining whether there will be attrition, to what extent, and what type of attrition will occur.

2.5.5 Literacy

According to Köpke (2007, pp. 20-21), language attrition of an individual is determined by his literacy. Literacy is a variable that may work with other variables, such as brain plasticity¹ and type of memory involved in language learning and maintenance (Köpke, 2004a, p. 12). Literacy can be seen as a factor which might curb and prevent language attrition in several ways (Köpke, 2007, p. 20). First, on the sociolinguistic level, literacy allows the language users to maintain the target language by reading, which might be an

¹ Brain plasticity refers to the ability of the human brain to change as a result of one's experience. The brain is plastic and malleable. The discovery of this feature of the brain is rather modern; the previous belief among scientists was that the brain does not change after the critical period of infancy (Begley, 2007).

important source of confirming evidence for the target language (Sharwood-Smith & van Buren, 1991, p. 28; Köpke, 2007, p. 20). Next, also on the sociolinguistic level, the wish to have access to written input may enhance the motivation of maintaining the target language and thus prevent its attrition (Köpke, 2007, pp. 25-26). Finally and most importantly, from the neurolinguistic and psycholinguistic perspective, since literacy adds orthographic representations and new synaptic connections in memory, literacy is likely to contribute to the grounding of the language (Köpke, 2007, p. 21).

From these advantages of literacy, it can be argued that less attrition is to be expected in an individual who has had the opportunity to become literate in the target language, especially when he frequently uses that skill. Olshtain (1986, p. 188) once attempted to employ literacy as a variable to account for her findings of second language attrition. The study showed that the Israeli participants who had reached a native-like literacy in English performed much better than those who had not mastered reading and writing in English. Their ability to continue reading in English provided them with constant exposure to the language, and, therefore, attrition was curbed or prevented, and further development in the language was possible in spite of the more limited use. Moreover, these English-literate participants were usually motivated to maintain their high level of English proficiency, and in most cases they hoped to go back to the United States for a brief period of time. It seems that literacy is quite a good predictor of language maintenance. However, to distinguish the factors of literacy and age in experiments raises methodological problems that might be impossible to overcome because literacy is closely related to age. This aspect should nevertheless be kept in mind in language attrition study.

Another cognitive factor which may be relevant to language attrition but has not so far been investigated is language aptitude. In the second language acquisition, language aptitude has been defined as the talent or potential that one has for learning a foreign language (Krashen, 1981, p. 19). The four components of language aptitude identified as particularly important are (1) phonetic/phonemic coding ability, that is, the capacity to identify speech sounds and to make sound-symbol associations; (2) grammatical sensitivity, that is, the capacity to identify the grammatical functions of words in a sentence; (3) rote learning ability, that is, the capacity to in a rapid and efficient way associate lexical forms with meaning; and

(4) inductive learning ability, that is, the capacity to infer grammatical rules of a set of previously unknown language materials (Bylund, Abrahamsson & Hyltenstam, 2009, pp. 447-448). These four constituents were supposed to correlate with success in language learning and retention (Köpke, 2007, p. 20). Recently, Abrahamsson and Hyltenstam (2005) investigated whether language aptitude could account for exceptional L2 achievement in adult learners by correlating it to grammaticality judgement scores in Swedish L2 learners from Spain who were carefully screened for a native-like command of L2 Swedish. The results showed that a high level of language aptitude was a necessary condition for near-native L2 attainment in adulthood.

Thus, it could be predicted that higher literacy and higher language aptitude might help curb language attrition and at least slow down its rate.

2.5.6 Cultural Contexts

Language attrition, as well as language acquisition, is linked to the learners' brain mechanisms and cognitive process, which, however, just provide potential for language development and maintenance. Nevertheless, whether that potential may or may not be realized is conditioned by the learners' cultural contexts and linguistic environments.

The relationship between language acquisition and culture was well demonstrated in Sperber and Hirschfeld's theory about the relationship between culture and modularity (2007). The theory argues that culture arises from the Social Cognitive Causal Chains (SCCCs) that help establish semantic relationships between people. These SCCC's can allow for representations and practice within a given community or environment. These representations are related to, among many other things, linguistic and pragmatic norms as well as language status. It can be claimed, from Sperber and Hirschfeld's point of view, that foreign language learners, who are cut off from the SCCC's of the foreign language learning environment, can no longer have any support in stabilizing their foreign language representations and practice. This belief is quite in agreement with Sharwood-Smith and van Buren's argument (1991, pp. 22-24) that the learners' language changes not because of lack of use but because of lack of confirming evidence which the foreign language needs to keep its stability. So the lack of input of the target language from the community is the critical factor in language attrition,

especially the attrition of pragmatic norms.

The importance of SCCCs brings foreign language learners' cultural and language contexts to the focus. The contexts may take at least two forms. First, foreign language learners have no access to the use of the target language in his language community and cannot get any confirming evidence from that community. In this case, foreign language is reduced to a limited amount of contact with the target language speakers in his study, work and life probably only through books, TV, newspapers and the internet. The SCCCs with the language will become weaker and weaker and the foreign language will become more and more difficult to access for its activation level will decrease as a foreign language becomes dormant (Green, 1986). Hence, in this case, attrition of language skills, at least the productive skills, seems inevitable. Second, foreign language learners have many opportunities to use the target language, and confirming evidence of new SCCCs is always at his avail. In this case, foreign language learners, even after the termination of language study, will continue to be exposed to different kinds of target language input. Besides everyday sources such as books, newspapers, TV and Internet, institutions (like clubs, churches) and contact with other foreign language learners may offer them opportunities for face-to-face communication, and these opportunities guarantee much more structural variation of communication, and learners' foreign language skills will be in a better position to be maintained (Grosjean & Py, 1991; Montrul, 2004a; Silva-Corvalan, 1991).

2.5.7 Linguistic Interference

Language interference theory argues that the mutual competition of prior and posterior information learning, information retention, and processing of segments of information results in the forgetting of target information. On one hand, information learned late can block or inhibit the recall of information that is learned earlier. On the other hand, information that is learned in the past can interfere with the learning and recall of more recent or novel information (Anderson, Björk & Björk, 1994; Keppel, 1968; Postman & Underwood, 1973).

Language interference (Weinreich, 1953, p. 1), also termed as language transfer (Færch & Kasper, 1989, p. xi; Singleton, 1987, p. 27) and cross-linguistic influence (Sharwood-Smith & Kellerman, 1986, p. 1), depending on how researchers perceive its scope and its positive or

negative effects, has received much attention in the circles of the research of L1 and L2 acquisition, use, and loss. The phenomenon was documented primarily in studies of L1 influence on L2 learning (Gass & Selinker, 1992; Ivanov, 1990; Ringbom, 1987), recently in studies of L1 and L2 influence on L3 learning (Cenoz, Hufeisen & Jessner, 2001), but also in studies of L1 attrition (Py, 1986; Sharwood-Smith, 1989) and language change (Yang, 2000). The great majority of cases of language attrition were embedded in contexts of language change for a bilingual individual and more often a bilingual community (Hyltenstam & Viberg, 1993, pp. 3-36) in which generally two or more languages competed for cognitive resources in individual speakers. As a consequence of competition and limited available resources (Bates & MacWhinney, 1987), one language or language structure gained importance and frequency of use at the cost of another (Herdina & Jessner, 2002; Kohnert, Bates & Hernandez, 1999; Seliger & Vago, 1991).

Studies of L1 forgetting under the influence of a dominant L2 reported evidence for retroactive interference, mostly in the vocabulary (Ammerlaan, 1996; Köpke & Nespoulous, 2001; Schaufeli, 1992). The interference of recently learned and that of increasingly dominant L2 structures were demonstrated by examples of borrowing/codeswitching (Clyne, 1987; Myers-Scotton, 1998; Saville-Troike, Pan & Dutkova-Cope, 1995; Yağmur, de Bot & Korzilius, 1999), loan translation, meaning extension, and meaning-related substitution (Boyd, 1993; de Bot & Clyne, 1994; Olshtain & Barzilay, 1991; Pavlenko, 2003; Romaine, 1995; Turian & Altenberg, 1991), and a decrease in lexical diversity, lexical variation, and accuracy of collocation in attriters' speech or writing (Andersen, 1982; Laufer, 2003; Olshtain & Barzilay, 1991).

Retroactive interference was found instrumental in the loss of vocabulary in a learning and recall experiment (Isurin & McDonald, 2001) in which subjects memorized and recalled the names of pictures in an L2, and later in an L3. A third recall test of the initially learned L2 words showed evidence of retroactive interference (L2 word loss), which was particularly strong if semantically similar L3 words (translation equivalents) had been learned compared to words of other concepts. In addition to similarity, also amount of exposure to the L3 affected the extent of loss. The authors noted that the results resembled the loss patterns found in a naturalistic study of child L1 attrition (Isurin, 2000).

Morphological structures of first language were also subject to interference from second language. First language structures could be simplified, abandoned or replaced by “free, regular and invariant morphemes” that are modeled on similar structures of the dominant language (Andersen, 1982, p. 109). One good example was the loss of nominal inflections for grammatical gender and/or gender agreement under the influence of a language that does not possess gender markings. The lack of gender agreement and assignment were reported in speakers of Czech and English (Saville-Troike, Pan & Dutkova-Cope, 1995), Yiddish and English (Levine, 1996), German and English (Schmid, 2002), Hebrew and English (Kaufman & Aronoff, 1989) and in speakers of Spanish in various contact situations (Toribio, 2001). Another case was the simplification of verbal morphology in the L1 (Spanish) of Spanish-English bilinguals (Anderson, 2001; Montrul, 2002; Silva-Corvalán, 1991; Toribio, 2001). It is important to point out that the simplification might also be attributed to other factors, for example, the cognitive complexity of structures and their processing (Pfaff, 1991; Slobin, 1977), the reduction of redundancy in grammar in order to create a more parsimonious system (Seliger, 1989), and the sequence of their acquisition (Hansen, 1999).

In general, compared with lexical and morphological structures, the first language syntax was more resistant to the influence of second language structures, and thus more resistant to attrition (Andersen, 1982; Haugen, 1953; Köpke & Nespoulous, 2001; Pavlenko & Jarvis, 2002; Prince, 1997; Reetz-Kurashige, 1999; Sorace, 2000; Tomiyama, 1999; Toribio, 2001). However, other studies reported changes in syntactic structures of first language under the long-term influence of a second language (Altenberg, 1991; Boyd & Andersson, 1991; Clyne, 1987; Myers-Scotton, 1998; Py, 1986; Schaufeli, 1996; Schmid, 2002; Sharwood-Smith, 1983; Yağmur, de Bot & Korzilius, 1999; Yukawa, 1998). Larmouth (1974), for example, reported the reduction of word order variation in Finnish as a consequence of loss of inflectional morphology in an environment that was dominated by English (L2) use. Extreme changes on the syntactic level were also reported in speakers of languages close to extinction (Schmidt, 1991) and dying languages that were revitalized subsequently by their speakers (Vakhtin, 1998).

The review of different kinds of factors (contact, teaching methods, age, attitudes and motivations, literacy, cultural contexts, and linguistic interference) of language attrition

allows for a tentative summary. First, this is not an exhaustive list of factors that may affect language attrition, and there must be other factors that have not been found yet. Next, almost all these factors discussed in this section are interrelated and interdependent. There is no clear-cut demarcation between them. Third, some factors (*e.g.*, age and cultural contexts) involved in language attrition are more central and complex and play a more important role than others due to their multiple links with other factors. Whatever their role in language attrition, there is no one individual factor capable of accounting for attrition phenomenon on its own. Finally, some factors (*e.g.*, literacy, cultural contexts, and linguistic interference) determine what kind of language skills may be lost, whereas others (*e.g.*, contact, teaching methods, age, attitudes and motivations) affect the extent of the loss of these skills.

2.6 Language Attrition Study in China

Scholars in China did not begin their language attrition study until the beginning of the new millennium. Aware of the importance of language attrition study in foreign language or second language teaching and learning, some professionals from psychological and foreign language teaching circles (Cai & Zhou, 2004; Ni & Yan, 2006; Ni, 2007; Yang, Pan & Liu 2009; Zhong, 2003) began to introduce language attrition study into China. Unfortunately, what they have done or are doing is nothing but the introduction of language attrition theories or the survey of the developments of language attrition study in the West. No empirical studies of the English language attrition in Chinese college graduates have ever been conducted (Yang, Pan & Liu, 2009, pp. 45). Therefore, work done by these professionals can be regarded as a meaningful footnote to language attrition study. China's language attrition study is just at its beginning stage, and still has a long way to go.

2.7 Concluding Remarks

Language attrition is the loss of a first or second language or a portion of that language by individuals. In terms of what language is lost, and in terms of the environment in which it is lost, language attrition is divided into four major categories: (1) Loss of L1 in an L1 environment; (2) Loss of L1 in an L2 environment; (3) Loss of L2/FL in an L1 environment;

and (4) Loss of L2/FL in an L2 environment. Most of the research carried out in Europe falls into categories (1) and (2), while there is also a large body of research outside Europe, notably on minority languages in the United States. There is also some research on the attrition of second and foreign language skills, and most of the research was done in America, as well.

Language attrition study in the West is divided roughly into three periods, each with a ten-year interval. In the first period (1980-1988), language attrition study became an independent discipline after language attrition had been defined and classified, and after research methodologies had been adapted from other more established disciplines. Some preliminary experiments were conducted within either borrowed or devised theoretical frameworks. In the second period (1989-1999), many language attrition experiments were carried out on a great variety of languages both in Europe and the United States. Some problematic findings of these experiments required the improvement of the methodology and a continuous introduction of theories from other more established disciplines. In the third period (2000-2010), theoretical frameworks of language attrition study were expanded through the continued introduction of theories from other fields, and the causes of language attrition were extensively investigated and summarized.

Findings of the studies in the past thirty years helped draw a picture of language attrition that shows (1) The higher the degree of attainment, the lower the degree of attrition; (2) Receptive skills seem to be more resistant to attrition than productive ones. Attrition of listening, speaking, reading and writing skills develop in different patterns and at different rates; (3) Attrition sets in rather quickly and then levels off, and that is consistent with the traditional Forgetting Curve Theory; and (4) The order of attrition is in opposition to the order of acquisition: That which is learned first is retained last.

The studies concerning why attrition occurs show (1) Those who have more contact with their target language show a slower rate and a smaller extent of attrition than those who have very limited contact; (2) Explicit teaching methods engender more durable skills than immersion or direct teaching methods; (3) Older children with a higher proficiency of the target language perform better in curbing language attrition than their younger counterparts, and adults, usually with a better language command, have better language maintenance; (4) A positive language attitude and a high motivation of language use help curb the loss of the

target language, and sometimes even result in a revitalization of the language; (5) Higher literacy, along with higher language aptitude, is a good predictor of language maintenance; (6) Favorable cultural contexts result in positive Social Cognitive Causal Chains that help establish semantic relationships between people and can help prevent language attrition; and (7) With the presence of and in competition with a more socially useful language, the language at a disadvantage is more likely to attrite.

Language attrition study in the West provides this research with a sound theoretical framework and a practical methodology.

Chapter Three Methodology

The decision for an appropriate methodology for any research project is usually made on the basis of relevant research questions, to which the issue of deciding on the appropriate data collection methods, instruments and informants is critical. It is the same case with language attrition research (Yağmur, 2004, p. 137). As discussed in detail in much of the literature review, the methodology of attrition study is not only important, but also troublesome, and in some cases, problematic, for it involves designing appropriate tests and questionnaires, finding suitable participants and deciding on the procedures to be taken for a survey. Moreover, clearly-defined categories and a comprehensive scientific analysis of quantitative data are needed in order to make valid and reliable generalizations. All these factors may affect the final findings and determine the success or failure of the experiment, and thus should be addressed with great care.

3.1 Research Questions

The situation where students learn a foreign language and then most of them do not use it after they have graduated from college is actually inherent to Chinese educational system. College English major graduates have initially learned English as a major for four years and taken Tests for English Majors (Grades Four and Eight). Unfortunately, most of those graduates reported to have lost some or most of their once strenuously acquired knowledge of English just a few years after graduation either as a consequence of the drop of English or for lack of exposure to the language (Yang, Pan & Liu, 2009, p. 46). It is of great importance that research should be done to help students to learn a foreign language more rapidly and effectively, but it is of greater and more urgent necessity that foreign language attrition, the opposite of acquisition, should be studied systematically and ways should be found to help college graduates fight against the loss of their previously acquired language skills. To the author's disappointment, compared to the massive literature of research to help college

students to learn a foreign language¹, no systematic research has ever been done to find ways to help college graduates fight against attrition of their foreign language. In order to fill in this blank, the author is determined to find the patterns and the causes of English language attrition exhibited in Chinese college English major graduates, and then find ways to help these graduates to curb attrition or provide students with a good command of the language skills that could be immune to erosion of the time of disuse.

The first step to fight against language attrition is to know what is lost and how much is lost. Thus, the aim of this study should be to find out whether the language skills of those college English major graduates have been lost, and, if any, to what degree, and then try to investigate the reasons for the attrition and in the end to put forward suggestions to help graduates to fight against attrition and help undergraduates to acquire the language skills in a way that the skills might be resistant to erosion of time. This study, with college English major graduates as the target population, is based upon the following key constructs: the actuality of attrition, the degree of attrition, the language skills that are more likely to attrite, and the reasons for the attrition. Thus, the author is to answer the following four research questions:

- (1) Does attrition occur in English majors after certain period of disuse, and, if so, to what degree and in what kind of pattern?
- (2) Are different language skills affected by attrition to the same degree, and if so, do they exhibit the same pattern of attrition over time?
- (3) Is language attrition the mirror image of language acquisition, or is the order of attrition in opposition to the order of acquisition?
- (4) Is the rate of attrition related to the English language use situation in China and/or to the graduates' attitudes towards the English language, and, if so, to what degree?

3.2 Design of the Research

The level of English proficiency to be investigated and the time interval of this study more

¹ CNKI (China National Knowledge Infrastructure) offers 87,319 journal articles with the key words "English teaching" and 2,694 articles with "second language acquisition" between 2000 and 2009. NLC (National Library of China) has a stock of 111 monographs and 931 theses/dissertations with the key words "second language acquisition" between 2000 and 2009.

or less agree with Chinese educational system, in which the four-year program of English majors is usually divided into two two-year periods: the basic period and the advanced one. Quite contrary to the fact that most foreign studies have dealt with only one period of disuse, the author decided to include at least four periods in this study, two periods of continued study at college and another two of disuse. Consequently, a total of eight years are to be covered in this study (see Table 1), and all these periods are to be studied cross-sectionally.

Table 1

Four Periods of the Research

Groups of participants	A	→	B	→	C	→	D	→	E
Periods of study	1		2		3		4		
Years of college English study	0	→*	2	→	4	→	-2**	→	-4

* Where, "→" indicates the direction of language development and/or language attrition.

** Where, "-" refers to the number of years in which English of the participants was no longer in use.

The decision on the inclusion of undergraduate participants in this study and the preference for two-year intervals were made for the following two reasons.

First, fourth-year students (Group C) are included in this study because their' language skills are at their peak and can thus be employed as a reference with which English attrition exhibited in the graduate participants can be compared. The purpose of the inclusion of freshmen who just entered college when this study was conducted (Group A) and second-year students (Group B) is to find out the order of their language acquisition and then to compare this order with the order of attrition exhibited in graduate participants in Groups D and E. The comparison is supposed to help verify whether language attrition is the mirror image of language acquisition, or to verify the regression hypothesis (Jakobson, 1941, p. 93) that what is learned first is retained last.

Second, the time interval is confined to two years out of the following two considerations. If the time interval is too short, the attrition would not be so noticeable and such variables as intermittent study of English may affect the results of investigation to a great extent. If the

time interval is too long, although variables like intermittent study may become negligible; it is rather difficult to carry out the investigation. On one hand, it would be much more difficult to find enough participants for the investigation; on the other, it would mean that no group of participants could be chosen as the reference against which the mirror effect in attrition or regression hypothesis might be verified.

3.2.1 Justifications for the Use of the Cross-Sectional Research Method

The two frequently-used research methods in language acquisition and attrition study are longitudinal method and cross-sectional method, each of which has its own advantages and disadvantages in language attrition study.

The longitudinal method is defined by Baltes (1968, p. 146) as follows: "One sample (S_1) is observed several times ($O_1 - O_n$) on the same dependent variable at different age levels ($A_1 - A_n$), and therefore by definition at different times of measurements ($T_1 - T_n$).". In other words, a longitudinal study is a correlation study that involves repeated observations of the same items over long periods of time, often a couple of decades.

The longitudinal method, employing time as the most important variable, is preferred by some language attrition experts (de Bot & Clyne, 1994; Hutz, 2004; Kuhberg, 1992; Murtagh & van der Slik, 2004; Tomiyama, 2000) for, first, it enables researchers to track the same group of people to find the order of change, and second, it is useful for studying individual-level change over time.

A cross-sectional study, on the other hand, takes a snapshot of a population at a certain time, allowing conclusions to be drawn about phenomena across a wide population. The cross-sectional method has been defined by Baltes (1968, p. 146) as: "Samples ($S_1 - S_n$) of different ages ($A_1 - A_n$) are observed on the same dependent variable once (O_1) at the same time of measurement (T_1).". In other words, two or more age cohorts (individuals born at roughly the same time, or being at the same stage in the development of a certain kind of skills) are tested at one time to see whether differences exist across ages or stages. Thus, at one point in time, individuals of different ages or at different stages of development can be tested and compared.

The decision on the cross-sectional method is made because of the following five practical

considerations. First, a cross-sectional study is economical and time-saving compared with a longitudinal study. An investigation based upon the cross-sectional research method can be done once. And it is just this particular advantage that makes the cross-sectional method outweigh the longitudinal one in practicability for a PhD program. Second, also because the cross-sectional method is more economical and takes up less time, the investigation can be conducted on a comparatively large scale. When a sample size is large enough, the representativeness of the population can be to a large extent guaranteed, a relatively high reliability can be achieved (Heaton, 2000, p. 162), and some variables, which would otherwise greatly affect the final results of the investigation, can be ignored (Rogers, Fisk & Walker, 1996, p. 50). Third, the cross-sectional method can help the author to obtain a general profile of each group of participants about their foreign language use situation and their maintenance of English language skills and, after that, to find the reasons for the retention/attrition of the language. Fourth, the cross-sectional method enables the author to employ more measurement variables to account for participants' language retention/attrition. Fifth, the author has some countermeasures to eliminate the deficiency of the method and to overcome the drawbacks of the cross-sectional study.

3.2.2 Skills to Be Tested

The research is confined mainly to the measurement of attrition or maintenance of participants' receptive skills. The decision has been made for the following reasons.

First, testing productive skills, *i.e.*, speaking and writing skills, would involve laborious and not-so-reliable analysis (van Weerenm, 1982; Yorojuja & Oller, 1980). However, the measurement of receptive skills can be conducted in a comparatively easy way, for standardized tests are available to be adapted to measure participants' listening comprehension skills, lexical knowledge and reading comprehension skills. Senior High School Entrance English Tests (SHSEETs) developed by various municipal testing committees, National Matriculation English Tests (NMETs) by different provincial testing committees and Tests for English Majors both Grades Four and Eight (TEM-4 and TEM-8) by National Testing Board for English Majors can all be adapted to measure participants' language proficiency.

Next, although the national syllabus for English majors lays equal emphasis on the five (listening, speaking, reading, writing and translation) language skills, the teaching of receptive skills, especially those of listening and reading skills, has been receiving much more attention in China where English is taught and learned as a foreign language. In addition, the receptive skills are believed to be more useful in learners' future careers and a good command of receptive skills might as well help develop better productive skills (Schouten-van Parreren, 1983). Thus, it may be concluded that the proficiency of students' receptive skills is, in a certain sense, a fairly good predictor of students' general language proficiency, with the proficiency of productive skills included.

Finally, it has been suggested that if one's receptive language skills attrite, his productive skills will inevitably be affected to the same degree (Snow, Padilla & Campbell, 1988, p. 195). Thus, the study of the attrition of participants' receptive skills might mean the same as the study of their productive and receptive skills.

For the above mentioned three reasons, a dictation subtest, a vocabulary subtest, and a reading comprehension subtest are employed in this study to measure participants' listening comprehension skills, lexical knowledge, and reading comprehension skills respectively.

Though aimed at measuring participants' receptive skills, this research can, at the same time, measure their productive skills owing to the use of the dictation subtest, for more and more evidence shows that the general language skills, both receptive and productive, can be measured efficiently by dictation tests, and participants' scores on dictation tests can be viewed as a predictor of their overall language skills (Hughes, 2000; Natalicio, 1979; Oller, 1972b; Stansfield, 1985; Zou, 2005).

3.3 Instrument One: A Diagnostic English Test

In light of English teaching and learning in China and in accordance with the purpose of this research, the author, in developing the subtests and the specific items, endeavors to guarantee that the whole test can provide a good measurement of participants' language skills, have a beneficial implication for future English teaching and learning, and be economical in terms of time and money. In this section, the construction of the subtests and even specific items used as the instruments in this study is to be discussed.

The author always keeps in mind that the participants that he is to study are heterogeneous due to their different educational and professional backgrounds. Of the participants of Groups D and E, some graduated from key state universities directly under the Ministry of Education, others from second-tier universities, and still others from third-tier universities or colleges. The difference results in participants' different performances on the test. Moreover, of all the participants, some are undergraduates who continue their English study and use, and others are graduates who have not been exposed, at least not much, to the English language since they graduated from college.

In accordance with participants' heterogeneity, the author, in constructing the test, paid special attention to the discriminating function of the instrument. Items in the test are to have a wide range of facility values, which should be able to discriminate the varying performances of participants of different groups.

3.3.1 Proficiency Levels to Be Tested

The first and third research questions (*see* 3.1) are aimed at finding what is lost in the graduate participants' English language and whether the order of their English attrition is opposite the order of acquisition. Consequently, it is necessary to identify language strengths and weaknesses of college English major graduates. That identification can be done through a diagnostic test with items of a spreading scale of difficulty.

The author divided the items in the vocabulary subtest and the reading comprehension subtest into four groups based on their levels of difficulty: "Very Easy Items", "Easy Items", "Difficult Items" and "Very Difficult Items". The very easy items were from SHSEETs developed by various municipal testing committees, the easy items were adapted from NMETs by different provincial testing committees, the difficult items were from TEM-4 by National Testing Board for English Majors, and the very difficult items in the reading comprehension subtest were from TEM-8 by National Testing Board for English Majors. This kind of conceptualization and categorization of range of difficulty was built upon Chinese educational system where the easiest is learned first while the most difficult last (*see* Table 2).

No exams could be adapted to test participants' lexical knowledge at the highest level, that is to say, the author has no access to any widely used exams, whose difficulty level is the

same as Test for English Majors (Grade Eight) and which could be adapted to test participants' lexical knowledge. The author turned to a couple of testing experts for advice, and was advised to use sentences of reading comprehension passages of TEM-8 as the source of stems of vocabulary questions and words of *Lexicon for English Majors* (2008) as the target words and distractor words.

Table 2

Range of Difficulty of Vocabulary and Reading Comprehension Subtests

Test Types	Vocabulary Subtest				Reading Comprehension Subtest			
Item Groups	V-1	V-2	V-3	V-4	R-1	R-2	R-3	R-4
Item No.'s	1-10	11-20	21-30	31-40	41-45	46-50	51-55	56-60
Sources	SHSEET	NMET	TEM-4	TEM-8 (based-on)	SHSEET	NMET	TEM-4	TEM-8

Following their advice, the author of the dissertation selected 10 target words and 30 distractor words from *Lexicon for English Majors*, and presented them, all arranged in alphabetic order and each along with the question "Did you learn the word in and only in your fourth academic year?", to six fourth-year English majors of two universities in Jinan. The six students all gave affirmative answers to each of these 40 questions.

The reason why the author made so much effort to guarantee a wide range of difficulty of lexical items in the test was that he expected to find that the process of attrition mirrors that of acquisition, or in other words, that the early-learned words are more resistant to attrition than those later-learned ones (Cohen 1975, p. 128).

3.3.2 Composition of the Test

The test of this study consists of a five-item dictation subtest, a forty-item multiple-choice vocabulary subtest and a twenty-item multiple-choice reading comprehension subtest to measure participants' listening comprehension skills, lexical knowledge, and reading comprehension skills respectively (see 3.2.2).

(a) Dictation Subtest

Dictation, as one of the oldest testing techniques, had been questioned before the 1960s

(Stansfield, 1985, pp. 124-125). It used to be degraded as hopelessly misleading, for it does not test word order since the order of the words is given; it does not test the vocabulary since the words themselves are given; it does not test aural perception since it is possible to identify words from the context. Yet, since the beginning of the 1970s, some experts have begun to challenge the orthodoxy (Hughes, 2000; Natalicio, 1979; Oller, 1972b; Stansfield, 1985; Zou, 2005). They argued that the examination of students' performance on dictation tests clearly shows that words and word order are not actually given, for the students hear only a stream of sounds which have to be stored, decoded into a succession of words, and recreated on paper. And the ability to identify words from context is seen as a very desirable ability, one that can distinguish between learners of different levels (Hughes, 2000, p. 195). Perhaps the most powerful argument in favour of dictation in language testing was made by Oller (1972a & b), whose experimental studies demonstrated that dictation is an extremely valuable tool for measuring overall language proficiency. Specifically, his correlation analysis revealed that the dictation sub-score of an ESL test is the best single predictor of scores on all other parts of the test ($r = 0.91$). Oller interpreted the results to mean that dictation is "yielding more information about language proficiency than any other part of the test" (Oller, 1972a, p. 318). Dictation, as an integrative language testing technique as opposed to a discrete one, is not only in agreement with the current view of language and its development, but also appears to provide a more accurate sample of learners' competence than the pure language tests advocated by Lado and others in the 1960s (Hughes, 2000, pp. 195-196). Dictation has thus gradually gained acceptability during the past years, primarily because it has been demonstrated to measure effectively and efficiently what a language test is expected to measure (Stansfield, 1985; Zhang, 1998).

In light of the high correlation between the testees' sub-score on the dictation part and their total score on the whole test, and in accordance with the predictability of a dictation test of testees' global language skills, the author included dictation as the central instrument to test participants' language skills.

During the selection of the material employed for the dictation subtest, the author consulted some experts for advice and was referred to many authoritative sources of test development. Five sentences from the passages used in the dictation section of TEM-4 were

selected for the dictation subtest. The reliability and validity of those sentences in measuring participants' global language skills, especially listening comprehension skills, had been verified on the national basis.

In spite of the dictation test's predictability of participants' global language skills, the availability of the passages for dictation of TEM-4, and the relative convenience to administer the test, the dictation test also has its problems. The most outstanding one is how to score or rate the test, the criteria for which are under much debate (Stansfield, 1985). Certainly, dictation tests are not as easy to score as multiple-choice tests. Oller's criteria (1972b, pp. 346-354) to score a dictation test was adapted. The score should be based upon the number of words appearing in their original sequence, misspelt words being regarded as correct as long as no phonological rule is broken. There is no reason to deduct points for errors of grammar or spelling, provided that it is clear that the correct response is intended (Hughes, 2000, pp. 72 & 139).

(b) Vocabulary Subtest

Testing lexical knowledge in a foreign language is not as straightforward an affair as is sometimes thought. In accordance with what exactly they want to know about foreign language lexical knowledge, testers have to select the appropriate materials and adequate procedures to obtain reliable results. As lexical knowledge comes in many forms, there is not one single valid way to measure foreign language vocabulary knowledge. Different types of tests are needed to address different aspects of the lexicon. The author followed the classification of aspects of word sense put forward by Bogaards (2000, pp. 492-493) to measure learners' lexical knowledge about:

- (1) Form: learners' acquaintance with the written form of a lexical unit;
- (2) Meaning: learners' knowledge of the semantic side of a lexical unit that may come in different shapes;
- (3) Morphology: learners' knowledge of the conditions of derivation and compounding of lexical units; and
- (4) Collocates: learners' knowledge of combining lexical units to form a fixed phrase.

Thus, the items in the vocabulary subtest that were based upon the classification of lexical

knowledge were evenly distributed to test participants' lexical knowledge in these four aspects.

The author, in developing the vocabulary subtest, took word frequency (*see* 3.3.1), another linguistic attribute, as a very important variable. He had two reasons for doing this. Firstly, there is evidence that word frequency plays a significant part in foreign language retention and attrition (Ellis, 2002; Schumans, van Os & Weltens, 1985) as well as foreign language acquisition (Gass & Mackey, 2002). Secondly, the author expected to make sure that the words have indeed been learned, or rather, taught at some point in the participants' English study. So the testing items were borrowed from the following three sources: Senior High School Entrance English Tests developed by municipal testing committees of three cities (Shanghai, Beijing and Chongqing), National Matriculation English Tests by the testing committees of four provinces (Shandong, Guangdong, Shaanxi and Liaoning) and a municipal city (Beijing), and Tests for English Majors (Grade Four) by National Testing Board for English Majors. The author's adaptation of those test items was based upon, in addition to their verified reliability and validity of these tests, the principle that what is to be tested should be what has been learned.

After the adaption of lexical items from the three sources, the author attempted to verify the word frequency of both target words and distractor words in order to avoid the inclusion of words into the test that have not been learned or taught at any stage of participants' English learning. The author divided the originally selected 30 target words and 90 distractor words into three groups ("the easier words" "the easy words", "the difficult words") in accordance with their different sources and difficulty levels (*see* 3.3.1), and arranged them in alphabetic order in every group. Then, students from different educational institutions were invited to conjugate word frequency¹: six grade-three students from a junior high school to conjugate word frequency of "the easier words"; four grade-three students from a senior high school to conjugate word frequency of "the easy words"; five second-year English majors from two different universities to conjugate word frequency of "the difficult words". All of these students were required to indicate whether each individual word was learned in and only in their latest academic years. The results of the survey favourably showed that the words were

¹ The verification of the frequency of both the more difficult target words and distracters had been elaborated in 3.3.1.

learned by these students.

(c) Reading Comprehension Subtest

The development of the reading comprehension subtest more or less followed the same principle as that of the vocabulary subtest. For example, the subtest should have a spreading range of difficulty (*see* 3.3.1, Tables 2, Appendix 9, and Figure 2) and the reliability and validity (*see* Appendix 8) of this subtest should be verified in order to get a picture of graduates' global reading skills: What is lost and what is still kept by them.

Prior to the development of the subtest, specific skills involved in the process of reading were identified. These skills, as Zou (2007, pp. 6-7) claims, include abilities to:

- (1) Skim or scan the text quickly for the gist or specific details;
- (2) Read carefully to further understand main ideas;
- (3) Read carefully to further understand important details;
- (4) Interpret what is stated within the text;
- (5) Draw inference;
- (6) Utilize linguistic knowledge; and
- (7) Adopt a flexible approach and various reading strategies according to the type of material being read and the purpose for which it is being read.

In the selection of passages for the subtest, equal emphasis was laid upon all of these seven abilities so that the seven reading skills could be measured as exhaustively and evenly as possible.

Four passages, each with five items, were selected for the subtest. The first passage was adapted from a Shanghai SHSEET test of 2005, the second from NMET test of 2008, the third from TEM-4 test of 2007 and the last from TEM-8 test of 2007.

3.4 Instrument Two: An Attitude and Motivation Questionnaire

The questionnaire serves a number of purposes: (1) to gather participants' personal information as well as the information about participants' English backgrounds, *e.g.*, the number of years of English studies, the number of years of the disuse of the English language, (2) to obtain some idea about participants' attitudes towards the English language, and (3) to

get a picture of participants' attitudes towards other English language users.

In order to design a practicable and effective questionnaire to determine the relationship between language learners' language attitudes and their language maintenance, the author did a thorough literature review of the questionnaires available (Gardner, 1982a, 1982b; Gardner, Lalonde & MacPherson, 1985; Gardner, Moorcroft & Metforda, 1989; Moorcroft & Gardner, 1987; Snow, Padilla & Campbell, 1984). However, some of these instruments just focused on the measurement of isolated variables. Consequently, in order to obtain a comprehensive understanding of participants' attitudes toward English and their motivations in the use of the language, the author developed his own questionnaire through adaption of the classic Attitude/Motivation Test Battery (AMTB) by Gardner (1985, pp. 177-179). There were at least two reasons for the inclusion of social-psychological factors such as attitudes and motivation in this study of foreign language maintenance.

First, considerable research (*e.g.* Muchnick & Wolfe, 1982; Gardner, 1982a; Gardner, 1982b; Gardner, 1985) demonstrated that there is a close relationship between learners' attitudes/motivations and second language proficiency, and that variables that influence acquisition should influence attrition, too (Gardner, Lalonde & MacPherson, 1985, p. 521). It can be concluded that subjects' attitudes/motivations are closely related to their foreign language attrition.

The second reason follows from Gardner's (1981) socio-educational model of second language acquisition. He argued that attitudes and motivation influence the way individuals work to retain their foreign language skills, and thus it is reasonable to expect that "individuals with favorable attitudes would seek out opportunities to maintain their language skills during the incubation period¹" (Gardner, Lalonde & MacPherson, 1985, p. 521).

The author strictly followed the following procedures in the adaptation and translation of AMTB into Chinese.

Adaptation: Attitude/Motivation Test Battery, originally designed by Gardner (1985, pp. 177-179) to investigate French learners in Canada where English is spoken as the first language, was adapted to the specific English learning situation of China before the

¹ Incubation period, a term invented by Gardner *et al.* (1985, pp. 519-520), refers to the period between the termination of language instruction and the assessment of language competence. In other words, it means the same as the period of disuse or nonexposure to the language.

translation.

Forward translation: The questionnaire and the instructions for its completion were translated into Chinese by two college English teachers. The two translated versions were compared by the two translators and another observer, and differences were reviewed until they arrived at a consensus.

Back translation: A third bilingual translated the questionnaire back into English as a process of validity examining. Paying special attention to the disagreements between the back-translated items and the original ones of the AMTB, the author did further revision of the instrument with the help of a college English teacher.

Expert committee: An expert committee, composed of a college English teacher, a teacher of economics, two English-Chinese translators, and an expert and translator in Chinese medicine, met to compare the translated version with the source version to produce a final version for the survey and ensure equivalence between the source and the translated version.

Pretesting: In order to eliminate hidden errors in the final version, and to make sure that both instructions and the questions were understandable and free from ambiguity, a pretest was carried out on 32 English major graduates. The items that 15% of the participants reported to have difficulty in understanding were finally revised.

After having gone through such stages as adaptation, minor changes, forward translation, back-translation, committee scrutinisation and pretesting and dozens of revisions at different stages, the final version of the questionnaire was developed.

The questionnaire, with forty-two items, is divided into two parts. The first part is to make an inquiry about English learning and use situation of the college English major graduates. The second part is to investigate participants' attitudes towards the English language. This part is further divided into three sections. The first section is to investigate participants' attitudes towards other English language learners, especially towards those proficient English users. The second section is to find out whether participants like the English language and, if so, to what degree. And the last section is to investigate participants' attitudes towards English language learning.

The five-point Likert scale was employed and the participants were required to indicate

the level of their agreement or disagreement to statements, in which 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, and 1 = strongly disagree (see Appendices 3 & 4).

3.5 Validating of the Test

Validity refers to the extent to which a test measures what it is supposed to measure and nothing else. Validation studies of language tests are mainly concerned with four types of validity: construct validity, content validity, face validity, and concurrent validity (Heaton, 2000, p. 159).

The test employed in this study is based upon the hypothesis that the pattern of English attrition is similar, but in reverse order, to the pattern of acquisition. The language skills acquired last are more likely to be the first to be lost due to disuse; those language skills that are acquired earliest and are thus "independent" of later development are more likely to be the most resistant to effects of the discontinuation of exposure to the language. The situation of English teaching and learning in China is that the least complex or easiest-to-command language skills are acquired earlier than the most complex or difficult-to-command ones. The test employed in this study, in particular the vocabulary and the reading comprehension subtests, which have a spreading range of difficulty (see 3.3.1 and Table 2), was developed on the basis of the Inverse Hypothesis of language attrition and in light of China's English teaching and learning situation. Such a test was to find whether participants would score higher on the very easy items than on the very difficult ones, with easy and difficult items something in between. In such a case, it could be deduced that the last acquired, and more difficult-to-command language skills attrite first, while the early-acquired and easier-to-command language skills are more resistant to attrition. After the test had been constructed, the author presented the test and the unique constructs of the test to three testing experts for review of the construct validity of the test. The responses were positive and the construct validity of the test was confirmed.

The widely used method suggested by Lawshe (1975) was employed to examine the content validity and the face validity of the test (see Appendix 5). Fourteen college English teachers were invited to form a panel to make a judgment of the content and the face validities of the test. After a detailed explanation of the purposes, the research questions and the

spreading range of difficulty of the items in the vocabulary and the reading comprehension subtests, the author presented the panelists with the test paper, and asked them to make judgments of the content and face validities of these two subtests. The results of this investigation were fairly ideal and both the content validity ($0.714 \leq CVR \leq 1$, $\overline{CVR} = 0.876$) and face validity ($0.714 \leq FVR \leq 1$, $\overline{FVR} = 0.925$) were verified (see Appendices 6 & 7).

The concurrent validity, as a measure of agreement between the results obtained by the given survey instrument and the results obtained from the same population by another instrument acknowledged as the “gold standard”, can be demonstrated when a test correlates well with a measure that has been validated even though the two instruments may be for the same constructs, or for different constructs (Grahn & Gard, 2008, p. 70). On Mar. 9, 2009, this test was administered to a group of 47 fourth-year English majors just two days after they had taken the national TEM-8, which is widely accepted as the gold standard of English language testing in China. When their TEM-8 results came out, the author made a comparison between the scores those students obtained from this test and the scores that they got from TEM-8. The comparison showed a very high concurrent validity of the test ($r = 0.814$, $p < 0.01$).

3.6 Pilot Study

In order to examine appropriateness of the proposed research method, to identify the inappropriate wording in the tests and the questionnaire, and to examine internal reliability and the correlation between the dictation subtest, the vocabulary subtest, and the reading comprehension subtest, and the correlation between any subtest and the whole test, a pilot study was conducted in the middle of April 2009. All the participants were four-year English major graduates who had not been exposed to English for less than four years. After taking the test and the questionnaire, five participants were asked to stay for a short interview about their idea about both the test and the questionnaire.

Ninety seven responses were obtained from the participants. Of the responses, three responses were discarded for incompleteness because the participants were required to go on

business by their bosses. Of the remaining 94 participants, 36 graduated from college two years ago, 40 four years ago, another 18 did not meet the requirements of this study because the number of years of their disuse of English was neither two years nor four years. After identification of valid responses, the author processed the data with SPSS 13.0 and Excel 2007. The results, in spite of the relatively small number of participants, were fairly satisfactory in almost every aspect that was intended to reconfirm with the pilot study (*see* Appendix 8). What was more remarkable was that the correlation coefficients between the participants' scores on the test and their scores on the questionnaire were fairly high for Groups D ($N = 36$) and E ($N = 40$) ($r = 0.597, p < 0.01$ for Group D; $r = 0.647, p < 0.01$ for Group E), which showed that the participants' language retention is closely related to their language attitudes (*see* Appendix 8).

The range of difficulty of the items in the vocabulary and reading comprehension subtests is of great concern of this study. Therefore, in the analysis and interpretation of the results of the pilot study, special attention was paid to the facility value (or the index of difficulty) of every item in the vocabulary and reading comprehension subtests and further of every item in each item group, and at the same time, to the frequency of distractors of each item (*see* Appendix 9).

It is argued that the facility value of any item in a proficiency test should not be too high or too low. If an item is too difficult and almost all the participants score rather low, a floor effect comes into being and the participants' language proficiency cannot be differentiated. On the other hand, if the item is too easy and almost all the participants score fairly high, a ceiling effect will be achieved and the participants' language proficiency cannot be differentiated, either. Therefore, most test constructors are aiming for test items with facility values falling between 0.4 and 0.6, and many may be ready in practice to accept items with facility values between 0.3 and 0.7 (Heaton, 2000, p. 179).

At first sight, the range of the facility value of items in this test was rather wide ($0.227 \leq FV \leq 1$). It seemed that some items were not acceptable and should be discarded for they were either too easy or too difficult (*see* Appendix 8). The reason why the principles and criteria for test development were not followed is that this test is diagnostic in nature and was not aimed at measuring students' achievements in the English language, but rather to find graduates'

linguistic strengths and weaknesses. In this sense, it is a necessity for the test to have items with a very wide range of facility values. Only the items with a high facility value can reveal the participants' strengths, and the strengths might mean that the participants still retain relevant language skills. The items with a low facility value can show the participants' weaknesses, and the weaknesses might suggest that the participants failed to keep the skills and forgot them somewhere between their graduation and the time when the test was taken. It could be argued that the test with items having a wide range of facility value can diagnose the participants' language skills (Heaton, 2000, p. 179). Of course, the test should at the same time have high reliability and validity.

A test with items with a wide range of facility values does not mean at all that the whole test does not need a good discrimination index. In fact, general facility values ranging from very high to very low are of great necessity for this study. For one thing, it could help find where the participants began to lose their language skills. For another, difference in participants' performance on such a kind of test could effectively discriminate between the participants, and categorize them into two different groups: the participants who have done a relatively good job in maintaining their language skills, and the participants who have done poorly in that. And this kind of categorization might help find an answer to the third research question whether language attrition is the mirror image of language acquisition, or whether the order of attrition is in opposition to the order of acquisition.

So an ideal test for this kind of research should be one that has items with a wide range of facility values, and at the same time can discriminate between the participants, separating the more able participants from the less able ones (Heaton, 2000, pp. 179-180). It is expected that such a kind of test employed in this study could help distinguish good participants from poor ones and, at the same time, find where the participants began to lose their language skills.

Figure 2 shows that the average facility values of items in both the vocabulary subtest and the reading comprehension subtest are decreasing and are negatively correlated with the increasing item difficulty. This kind of distribution of facility values is what this study needs (*see* 3.3.1). Furthermore, the average facility values of all the items in the vocabulary subtest (0.593), the reading comprehension subtest (0.587), and the whole diagnostic test (0.591) are only slightly higher than the most "desirable" index of 0.5 (Heaton, 2000, p. 179) and fall

assuredly between 0.4 and 0.6, a range that many test constructors are aiming for (Heaton, 2000, p. 179).

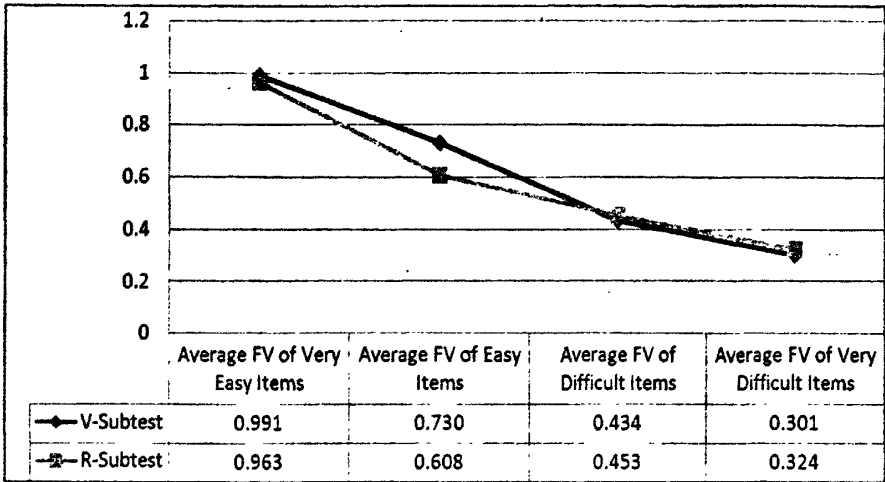


Figure 2. Average facility value of items in terms of difficulty groups

3.7 Sampling

This research was designed to study the English language attrition exhibited in college English major graduates after years of disuse in China. So the population of this study includes all the graduates who had studied English as a major for four years and who had not been exposed to the English language up to the moment of the investigation after graduation. The fact that the number of these English graduates may be millions means that it is not possible at all to conduct an investigation of them. Consequently, the sampling of the participants is necessary.

It is of critical importance and extreme complexity to identify the baseline of language skills with which the graduate participants' attrited language skills can be compared (Bardovi-Harlig & Stringer, 2010, p. 32). In accordance with the theoretical basis for the cross-sectional research method (*see* 3.2.1), the author of the dissertation included into his sample fourth-year students, whose language skills were supposed to be at their peak and could be employed as the baseline. Moreover, the author included newly-enrolled first-year students and second-year students in the sample. Purpose of the selection of these three

groups of undergraduates was to find the order of acquisition in these participants. With the order of acquisition, the order of attrition in the graduate participants could be compared to see whether the order of attrition is in opposition to the order of acquisition.

As a result, all the participants in this study were divided into five groups in accordance with the number of years of disuse of English of the graduates and the academic year of the undergraduates (see Table 3).

Table 3

Five Groups of Participants

Groups of participants	A*	→	B	→	C	→	D	→	E
Years of college English study	0	→	2	→	4	→	-2**	→	-4

* Where, A = newly-enrolled first-year students who were just enrolled in college, right up to the moment of testing; B = second-year students who had studied English as an English major for two years; C = fourth-year students who had studied English for four years; D = English major graduates who graduated from college two years ago and had had two years of disuse; E = English major graduates who graduated from college four years ago and had had four years of disuse.

** Where, “-” refers to the number of years in which English of the participants was no longer in use.

During the attrition period, a number of variables are at play. Subjects’ age, aptitude, language attitudes and motivations were taken as core variables in second language attrition by Bardovi-Harlig and Stringer (2010, pp. 35-36) in developing their general model of variables and requisite schedule of assessment in tracking populations of second language learners. In accordance with the general model of Bardovi-Harlig and Stringer (2010, p. 36) and the specific design of this study (see 3.2), it was intended to control the following variables in the selection procedure:

—Personal information:

—Age

—Sex

—Educational backgrounds:

—The university/college from which participants graduated

—The year when they graduated

—Working experience:

—The profession of the participants

—The number of years of disuse of English

—Whether the participants had prepared for or taken English exams (such as TOEFL, GRE, IELTS, etc.) after graduation.

—Whether the participants had stayed in an English-speaking country for more than three months after graduation.

Because this research was targeted at college English major graduates with two or four years of disuse of English, any participants who did not meet this requirement were excluded from the final analysis. Furthermore, the participants who had had the experience of preparing for or taking English exams such as TOEFL, GRE, IELTS, or other English tests were ruled out from the list of the participants, because, otherwise, the inclusion would have had a confounding effect on the final results. It is for the same reason that the participants who worked as an English-Chinese translator or interpreter and/or who had stayed in an English-speaking country for more than three months after graduation had been excluded from the sample.

3.7.1 English Major Undergraduates

It had been anticipated that the participants of Groups D and E would be rather heterogeneous in the tiers and the locations of universities or colleges from which they had graduated. Consequently, the participants of Groups A, B and C should be selected from universities or colleges of different tiers and different areas. In accordance with the requirement, the author selected one third of the participants from the first-tier (Project 211) universities, another third from second-tier universities or colleges, and still another third from third-tier colleges. Furthermore, one half of the participants were from the economically developed provinces or municipalities and the other half from the less developed ones. (*see* Table 4).

Table 4

Diversity of Educational Backgrounds of Participants in Groups A, B and C

Groups	Tiers of University/College		First-Tier	Second-Tier	Third-Tier	Total
Group A (N = 238)	Developed Area	Number of Institutions	2	2	2	6
		Number of Participants	43	40	39	122
	Underdeveloped Area	Number of Institutions	2	2	2	6
		Number of Participants	37	36	45	118
Group B (N = 240)	Developed Area	Number of Institutions	2	2	2	6
		Number of Participants	41	43	40	124
	Underdeveloped Area	Number of Institutions	2	2	2	6
		Number of Participants	45	37	34	116
Group C (N = 240)	Developed Area	Number of Institutions	2	2	2	6
		Number of Participants	42	45	39	126
	Underdeveloped Area	Number of Institutions	2	2	2	6
		Number of Participants	35	39	40	114

3.7.2 English Major Graduates

College English major graduate participants were selected on the basis of the same criteria as those of undergraduate participants. However, it had been much more difficult to find enough English major graduate participants than to find undergraduate participants. 238 valid responses were managed to be collected from participants of Group D and 240 from participants of Group E. The final sample showed a great diversity of working backgrounds of the participants (*see* Table 5), and a great variety of the universities and colleges from which

those participants had graduated (see Table 6).

Table 5

Diversity of Working Backgrounds of Participants in Groups D and E

Profession	Number of Participants	
	Group D	Group E
Auditors	15	13
Bank clerks	16	30
Computer programmers	11	17
Customs officers	15	15
Hotel receptionists	10	13
Insurance agents	24	34
Journalists	15	14
Marketing managers	19	21
Office secretaries	14	12
Policemen	22	10
Real estate agents	13	13
Shop assistants	16	12
Others	48	36
Total	238	240

Table 6

Diversity of Participants' Educational Backgrounds in Groups D and E

Tier of University/College			First-Tier	Second-Tier	Third-Tier	Total
Group D (N = 238)	Developed Area	Number of Institutions	22	34	27	83
		Number of Participants	53	44	38	135
	Underdeveloped Area	Number of Institutions	14	23	31	68
		Number of Participants	29	33	41	103
	Developed Area	Number of Institutions	25	34	22	81
		Number of Participants	57	45	39	141
Group E (N = 240)	Underdeveloped Area	Number of Institutions	17	19	28	64
		Number of Participants	28	34	37	99

Among the participants of Group D, 144 were females and 94 were males, aged between 22 and 27, and among those of Group E, 154 were females and 86 were males, aged between 24 and 30. The participants graduated from 186 universities or colleges. This diversity of participants' *almae matres* (see Table 6) had further verified the reasonability of the author's deliberate selection of participants of Groups A, B and D in accordance with the tier of educational institutions and their locations (see 3.7.1).

3.8 Procedures for Administration

The survey was conducted in two sessions because of the participants' heterogeneity, especially with the inclusion of the newly-enrolled first-year students in the sample. The first session took place in May 2009, and the test and the survey were conducted on participants of Groups B, C, D and E. The second session took place in the middle of September 2009 when the newly-enrolled first-year students had just begun their college career.

Because of the participants' diverse educational backgrounds (see Tables 4 & 6), most of the tests and surveys had to be administered outside Shandong Province. The author asked his colleague, acquaintances and students in other provinces and municipalities to help with the administration of the test and the questionnaire. All these administrators were college English teachers, who were (1) knowledgeable about language test administration procedures, (2) reliable and capable of attending to details, (3) acquainted with the participants being tested, (4) fluent in both English and Chinese, and (5) able to respond to questions regarding both the test and the questionnaire.

All the administrators were required to read through both the test and the questionnaire at least one day before the administration to familiarize themselves with the contents. They were also required to check all the test papers for misprinted pages or mis-bound copies. All the test administrators were provided with a manual of the test and questionnaire administration procedures (see Appendix 10). They were required to personally inspect the testing rooms, choosing the best rooms in light of overall suitability. They were also suggested to use a language laboratory due to its comfortable conditions and the availability of acoustics. Moreover, since neither the test nor the questionnaire was compulsory, all the administrators were required to try various means to mobilize active cooperation of participants on the day

of the test and the survey, for example, to treat every participant with a chocolate in addition to a ball pen and an eraser as a bonus. Furthermore, all the test administrators were required to read the administration manual carefully before the day of the test to familiarize themselves with the procedures, to check whether they had enough copies of test papers and questionnaires, and enough ball pens, erasers, and chocolates, and to make sure that the computer with MP3 player and earphones in the testing rooms were in good condition.

After all the test papers had been collected, four college English teachers were invited to form a small committee. They were requested to take the test to see whether the keys to the test were right or not. After that an English professor was asked to help the author to rate the papers.

It was fairly easy to score the vocabulary and reading comprehension subtests. After one rater had scored them, another did the checking. But it was quite troublesome with the scoring of the dictation subtest. It had been anticipated that the subjective nature of the subtest was likely to result in disagreement of the scoring of some items between the two raters. However, it was agreed upon that the two raters should score the subtest independently. First, each rater recorded his scorings on a piece of paper. After that, they compared their scorings. Any disagreement of the scoring of any item resulted in a review of the item concerned until a consensus was reached.

After the scoring of the test, all the raw data were put into the computer for statistical analysis, which was done by making use of SPSS 13.0.

3.9 Re-evaluation of the Test and the Questionnaire

In order to avoid the occurrence of such an extreme and rare occasion that some well-developed test or questionnaire with high reliability and validity confirmed by experts and verified by pilot study was not so valid or not so reliable in the field study, the author re-evaluated both the test and the questionnaire.

3.9.1 Re-evaluation of the Test

The re-evaluation of the test was based upon the interpretation of the test scores of the

participants of Group C. The author's concerns with the test were mainly the facility value and the discrimination index of the whole test, its subtests, and the component items in each subtest. The re-evaluation of specific items was mainly based upon the study of the facility value (FV) and the discrimination index (D) of each item, while the re-evaluation of the whole test and the subtests focused on the average facility value (\overline{FV}) and the average discrimination index (\overline{D}).

In the evaluation of the test and the items in it, the author made use of the standard criteria established by Xu and Zhang (1995) for facility value and discrimination index as reference (see Tables 7 & 8).

Table 7

*Criteria for Evaluation of Items: Facility Value and Discrimination Index**

Facility Value	Evaluation	Discrimination Index	Evaluation
$FV > 0.9$	Extremely Easy	$D > 0.4$	Excellent
$0.8 < FV \leq 0.9$	Very Easy	$0.3 < D \leq 0.4$	Good
$0.7 < FV \leq 0.8$	Easy	$0.2 < D \leq 0.3$	Fair
$0.6 < FV \leq 0.7$	Difficult	$D \leq 0.2$	Poor
$0.3 < FV \leq 0.6$	Very Difficult		
$FV \leq 0.3$	Extremely Difficult		

* The table was adopted from Xu and Zhang (1995).

Table 8

*Criteria for Evaluation of a Test: Average Facility Value and Discrimination Index**

Average Facility Value	Evaluation	Average Discrimination Index	Evaluation
$\overline{FV} \leq 0.3$	Very Difficult	$D > 0.4$	Excellent
$0.6 < \overline{FV} \leq 0.7$	Difficult	$0.3 < D \leq 0.4$	Good
$0.7 < \overline{FV} \leq 0.8$	Normal	$0.2 < D \leq 0.3$	Fair
$0.8 < \overline{FV} \leq 0.9$	Easy	$D \leq 0.2$	Poor
$\overline{FV} > 0.9$	Very Easy		

* The table was adopted from Xu and Zhang (1995).

Considering the spreading scale of the difficulty of items in the vocabulary and the reading comprehension subtests and the heterogeneity in the participants, both the facility values and the discrimination indices derived from the results of items with different levels of difficulty or from the results of different groups of participants might deviate significantly from the criteria.

It was decided that the assessment of the test should be based upon the analysis of the responses of the participants of Group C. The decision was made chiefly out of the consideration that the language skills of the participants of this group were at their peak and could be employed as the reference in the study of the language skills of the participants of Groups D and E.

It had been anticipated that the participants of Group C would show excellent performance on the easier and the easy items, very good performance on the difficult items, normal performance on the very difficult items. In other words, with the increase of difficulty of test items, the participants' performance would decrease from excellent to very good, to good and to normal. Thus the facility values obtained from the analysis of the responses of the participants of this group would, in a parallel way, decrease from extremely high to very high, to high and to normal in the end. At the same time, the discrimination indices would increase from poor, to fair, to good and to excellent in the end.

Besides the study of the facility value and the discrimination index, the reliability of the test was re-evaluated, along with the reliability of the subtests and the reliability of the items with the same level of difficulty within a subtest. The standard of the test reliability (*see* Table 9) was from Xu and Zhang (1995).

Table 9

*Criteria for Evaluation of a Test: Reliability Index**

Reliability Index	$\alpha > .90$	$\alpha > .80$	$\alpha < .60$
Evaluation	Excellent	Good	Poor

* The table was adopted from Xu and Zhang (1995).

(a) The Dictation Subtest

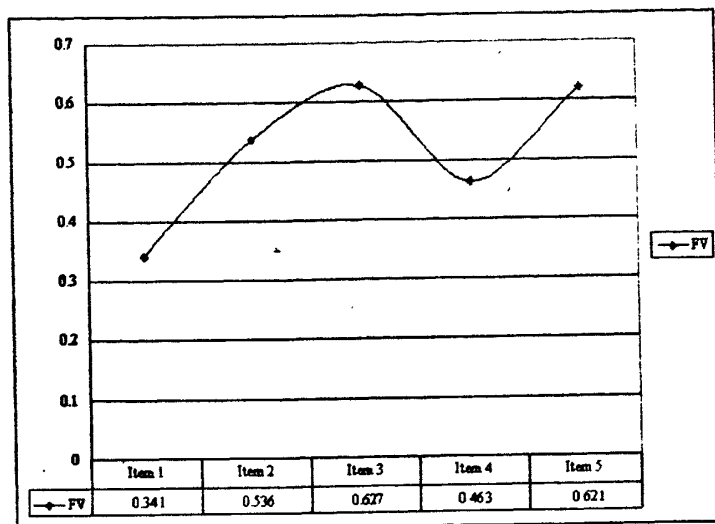


Figure 3. Facility values of items in dictation subtest

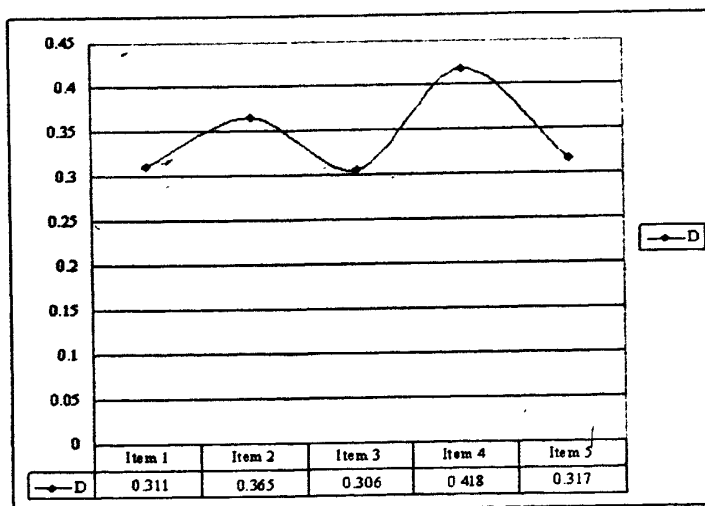


Figure 4. Discrimination indices of items in dictation subtest

Figures 3 and 4 show that Item 1 seems to be too difficult. The low facility value and the low discrimination index of the item might have resulted from the participants' unfamiliarity with the dictation subtest or from anxiety of test-taking. This item might be excluded from subsequent statistic analysis. The exclusion of the first item in a test does not mean that the item is not well constructed, but that the exclusion is an unavoidable and sometimes necessary cost of this lead-in item in the test (Heaton, 2000, p. 179).

Owing to the fact that all the items in the dictation subtest were borrowed from TEM-4, which was taken by the participants two years ago, the facility values ($0.563 \leq FV \leq 0.728$) of the other four items are fairly acceptable, even though higher than the standard value of a proficiency test ($FV = 0.5$). The discrimination indices of the five items, which fall between 0.306 and 0.418, show that the subtest could make a good distinction of the participants. The reliability value ($\alpha = 0.861$) shows that the subtest is very reliable in testing the participants' listening comprehension skills.

Judging from the facility values, the discrimination indices and the reliability of the subtest, and in light of the nature of the participants of Group C and the purposes of the study, the dictation subtest agrees with the design of the research (see Heaton, 2000, pp. 178-182) (see 3.2, and Tables 1 & 3).

(b) The Vocabulary Subtest

Because the vocabulary subtest was grouped into four different sections according to different levels of difficulty (see 3.3.1), the evaluation of the subtest was done in four parts accordingly. Considering the nature of the participants of Group C, the facility values of the items in the subtest will vary from extremely high to very high, to high and to normal in the end, and the discrimination indices from poor to fair, to very good and then to excellent with the rise of the level of difficulty.

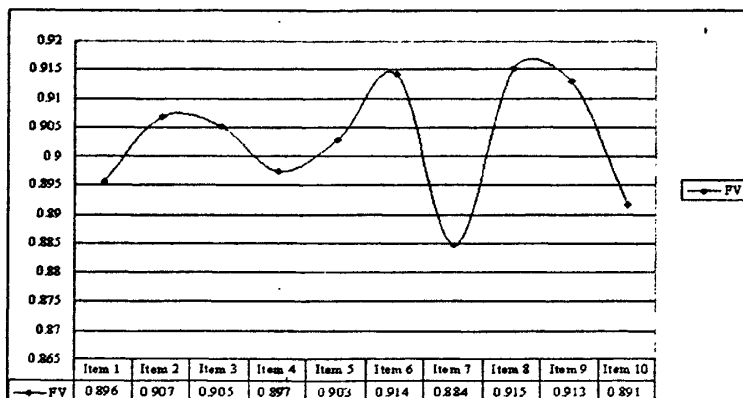


Figure 5. Facility values of very easy items in vocabulary subtest

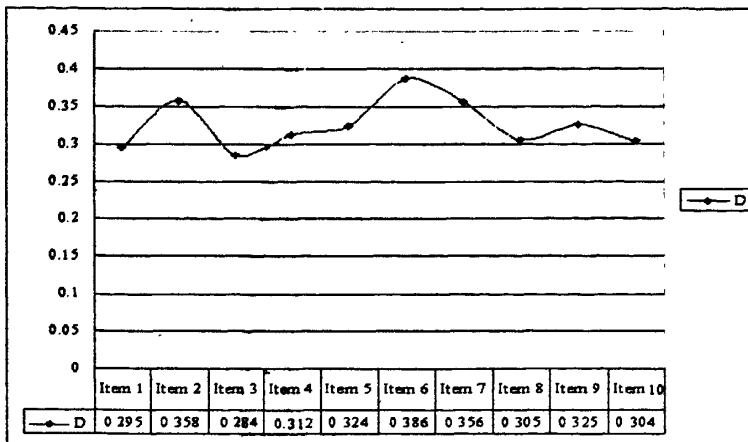


Figure 6. Discrimination indices of very easy items in vocabulary subtest

The extremely high facility values ($0.884 \leq FV \leq 0.915$) of the very easy items show that almost all the participants did very well in answering the items in this section (see Figure 5). In light of the fact that all the items were borrowed from SHSEETs, the extremely high facility values were reasonable and fairly within the author's anticipation.

Because of the extremely high facility values, all the very easy items had extremely low discrimination indices ($0.284 \leq D \leq 0.386$) (see Figure 6).

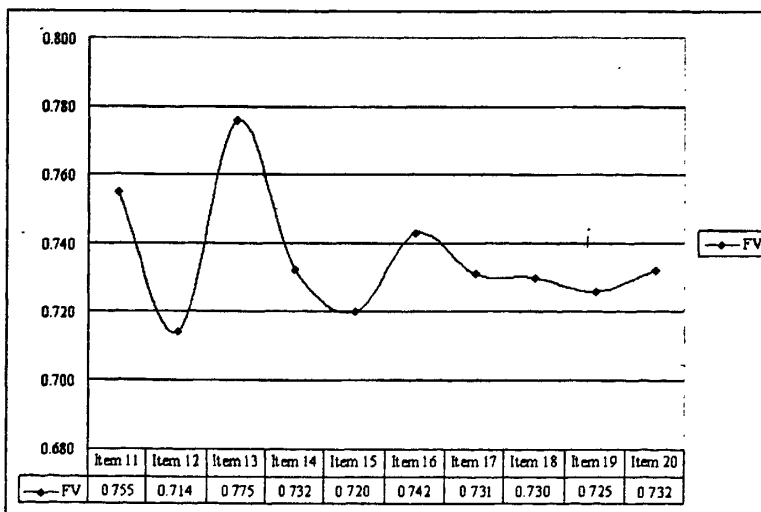


Figure 7. Facility values of easy items in vocabulary subtest

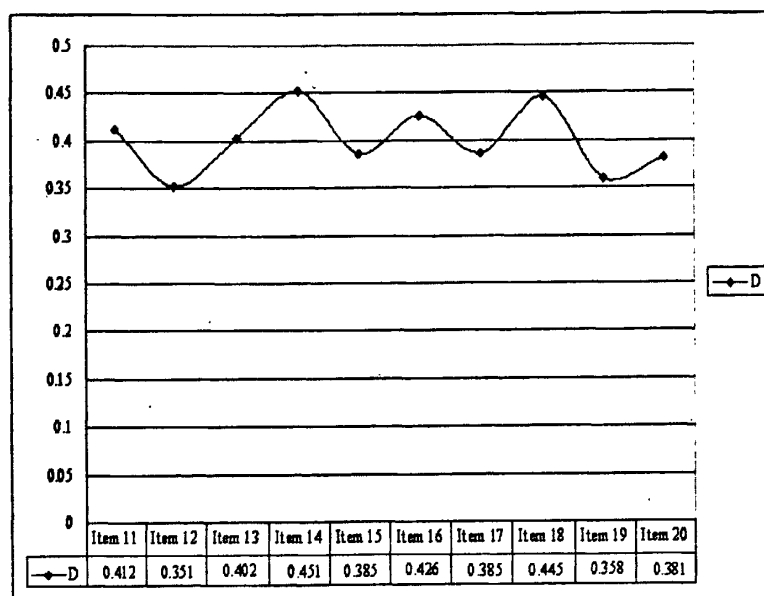


Figure 8. Discrimination indices of easy items in vocabulary subtest

Both the facility values ($0.714 \leq FV \leq 0.775$) and the discrimination indices ($0.351 \leq D \leq 0.451$) of the easy items in the vocabulary subtest are in agreement with the research design (see Figures 7 & 8). Compared with those of the very easy items, the fall of the facility values and the rise of the discrimination indices of the easy items show the rise of the level of difficulty of the items concerned.

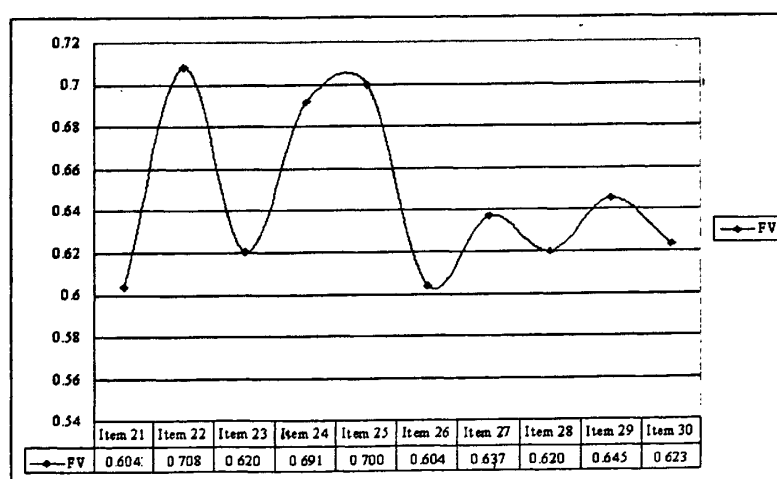


Figure 9. Facility values of difficult items in vocabulary subtest

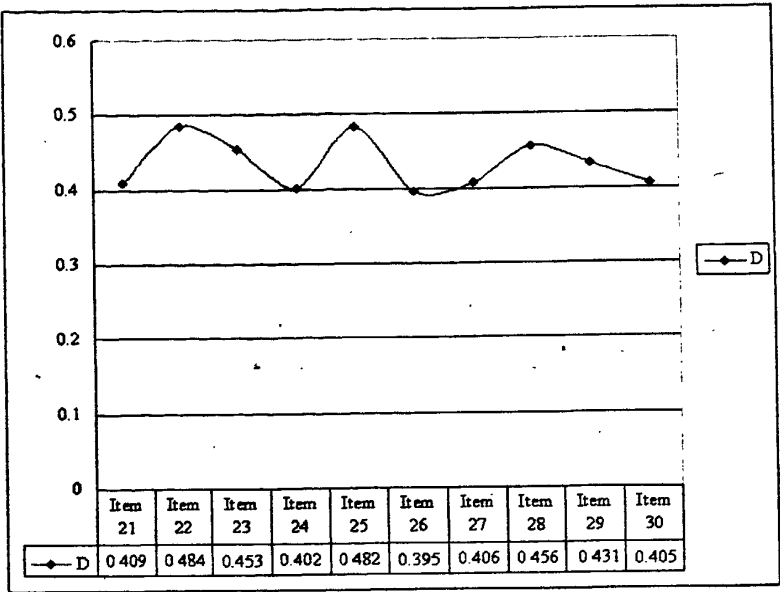


Figure 10. Discrimination indices of difficult items in vocabulary subtest

It can be found from Figures 9 and 10 that the facility values fall further ($0.604 \leq FV \leq 0.708$) and at the same time the discrimination indices continue to rise ($0.395 \leq D \leq 0.484$). Both the rise and the fall can be fairly accounted for by the rise of the level of difficulty of these items.

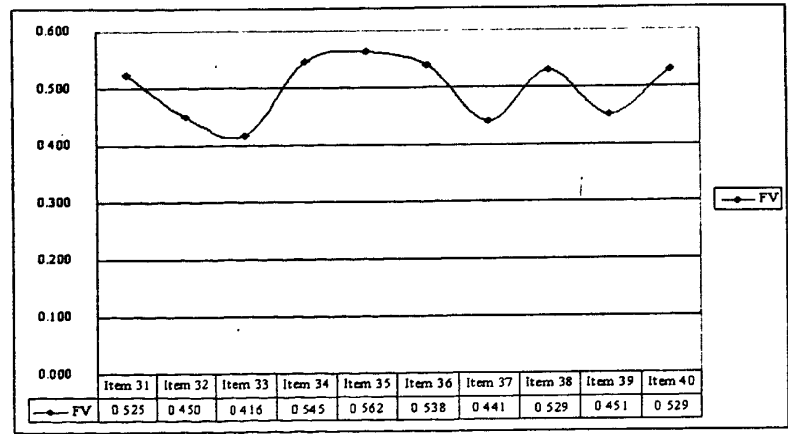


Figure 11. Facility values of very difficult items in vocabulary subtest

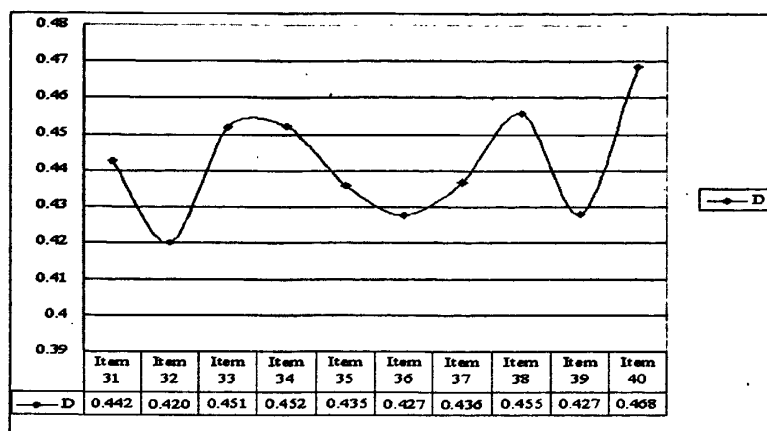


Figure 12. Discrimination indices of very difficult items in vocabulary subtest

All the very difficult items were constructed to test the peak attainment of language proficiency of the participants of Group C (see 3.3.1). The two sets of values and indices involved should be consistent with the standard values of language tests. Thus, the facility values ($0.416 \leq FV \leq 0.562$) vary slightly around the gold standard of 0.5 (see Figure 11). The excellent discrimination indices ($0.420 \leq D \leq 0.468$) mean that these items could successfully discriminate between the participants whose maintenance of lexical knowledge is different (see Figure 12).

(c) The Reading Comprehension Subtest

Because the passages and the items in the reading comprehension subtest were adopted from the same sources and were arranged in the same order of difficulty (see 3.3.2(b), and Table 2) as the items in the vocabulary subtest, the facility values and the discrimination indices were anticipated to be distributed in a similar way to those of the items in the vocabulary subtest (see 3.9.1(b)).

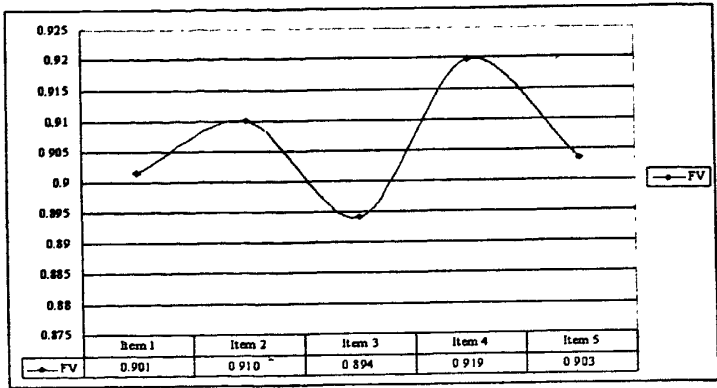


Figure 13. Facility values of very easy items in reading comprehension subtest

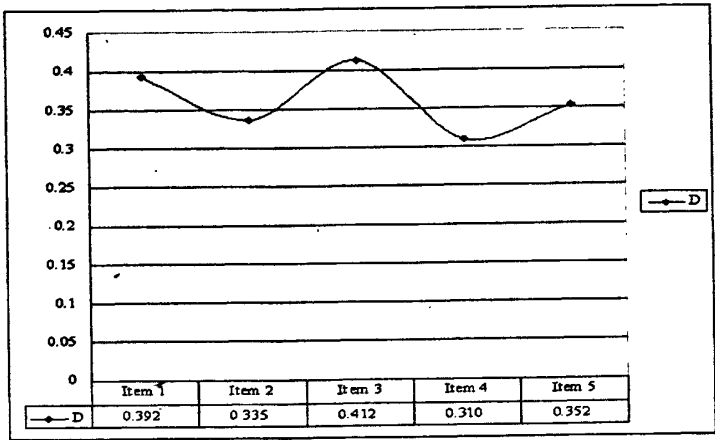


Figure 14. Discrimination indices of very easy items in reading comprehension subtest

The extremely high facility values ($0.894 \leq FV \leq 0.919$) and very poor discrimination indices ($0.310 \leq D \leq 0.412$) show that the first passage is extremely easy for the participants of Group C (see Figure 13). The small range of both the facility values and the discrimination indices mean that almost all the fourth-year students showed excellent maintenance of what they had acquired in their junior high school (see Figure 14).

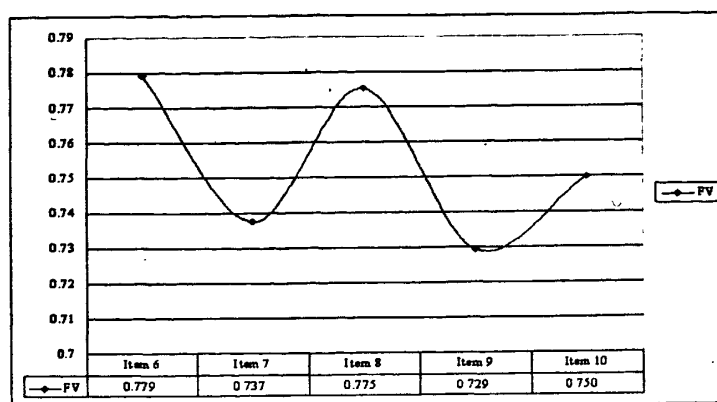


Figure 15. Facility values of easy items in reading comprehension subtest

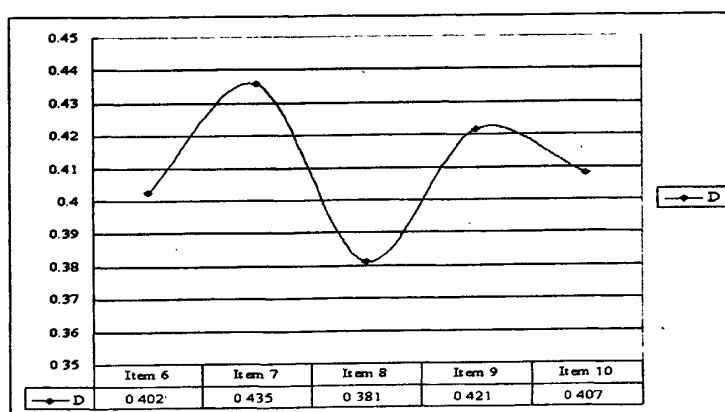


Figure 16. Discrimination indices of easy items in reading comprehension subtest

Compared with those of the first passage, the facility values of items of the second passage fall a little ($0.729 \leq FV \leq 0.779$) (see Figure 15) and the discrimination indices rise a bit ($0.381 \leq D \leq 0.435$) (see Figure 16). This tendency is quite in agreement with the research design (see 3.3.1).

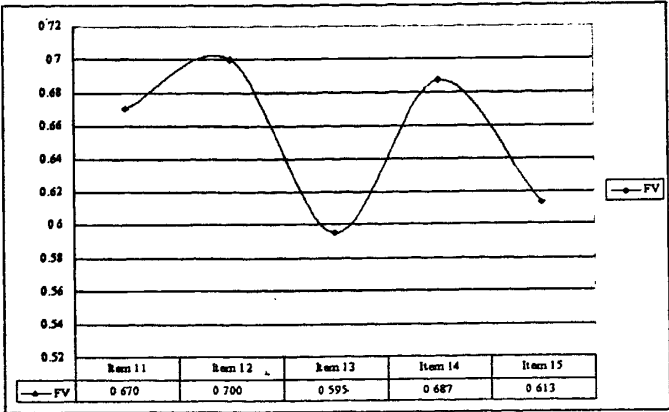


Figure 17. Facility values of difficult items in reading comprehension subtest

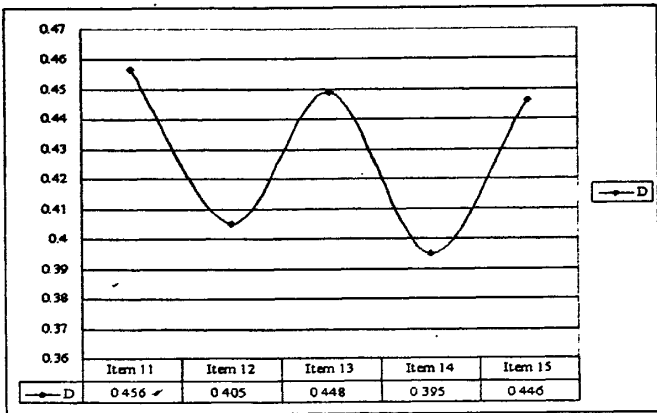


Figure 18. Discrimination indices of difficult items in reading comprehension subtest

The third passage was constructed to test the reading comprehension skills that were acquired by the participants of Group C two years ago. So the facility values ($0.595 \leq FV \leq 0.700$) that are a bit above the standard value ($FV = 0.5$) (see Figure 17) and the discrimination indices ($0.395 \leq D \leq 0.456$) that are good in discriminating the participants (see Figure 18) confirm the rationality of the inclusion of the passage and its items into the subtest.

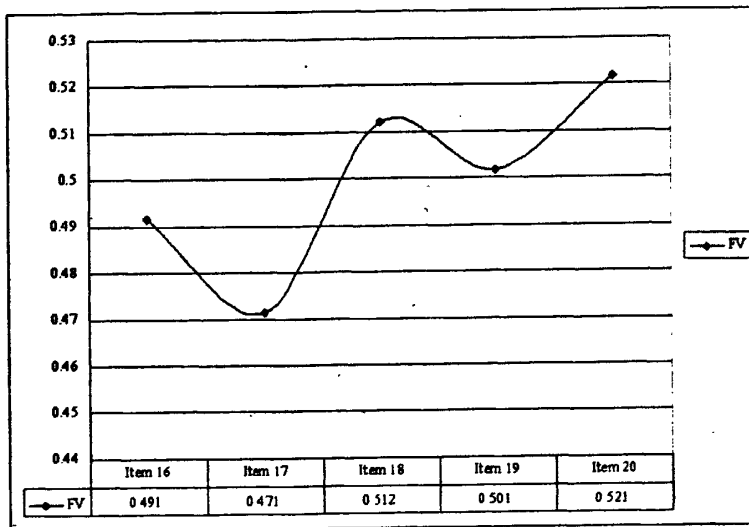


Figure 19. Facility values of very difficult items in reading comprehension subtest

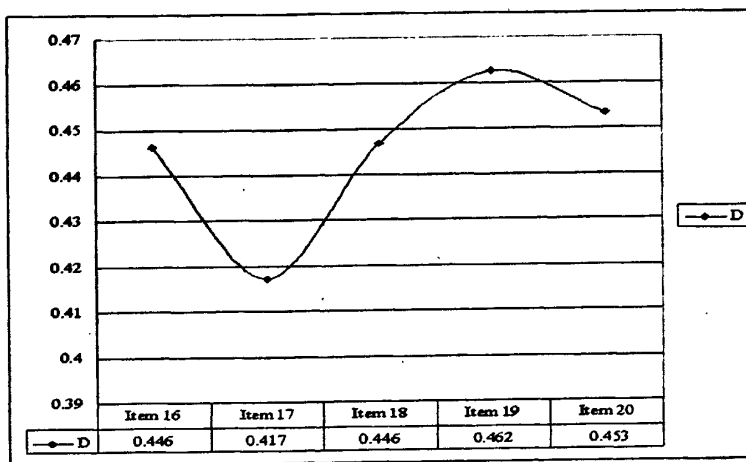


Figure 20. Discrimination indices of very difficult items in reading comprehension subtest

The facility values of the items of the fourth passage vary around the gold standard value from 0.471 to 0.521 (see Figure 19), and the discrimination indices are all above 0.4 (see Figure 20). These two sets of values and indices mean that the passage was perfectly chosen and items were constructed excellently (Heaton, 2000, pp. 179-182).

What is also very remarkable is the relatively small distance range of the facility values and the comparatively small distance range of the discrimination indices between items in the dictation subtest and between items with the same level of difficulty in both the vocabulary and the reading comprehension subtests. The widest distance range of the facility values

occurs with the dictation subtest, and it is only 0.158. The widest range of the discrimination indices also occurs with the dictation subtest, and it is just 0.112. These small ranges suggest that the items in the dictation subtest and the items with the same level of difficulty in the vocabulary subtest and the reading comprehension subtest are rather homogeneous and can help assess participants' language skills in the same effective way. In other words, any item in the dictation subtest or any item with the same level of difficulty in the latter two subtests can function in the same way in measuring participants' language skills as the whole dictation subtest or as the other items with the same level of difficulty in the vocabulary subtest and the reading comprehension subtest.

(d) Falling Tendency of the Facility Values and Rising Tendency of the Discrimination Indices of Items in the Last Two Subtests

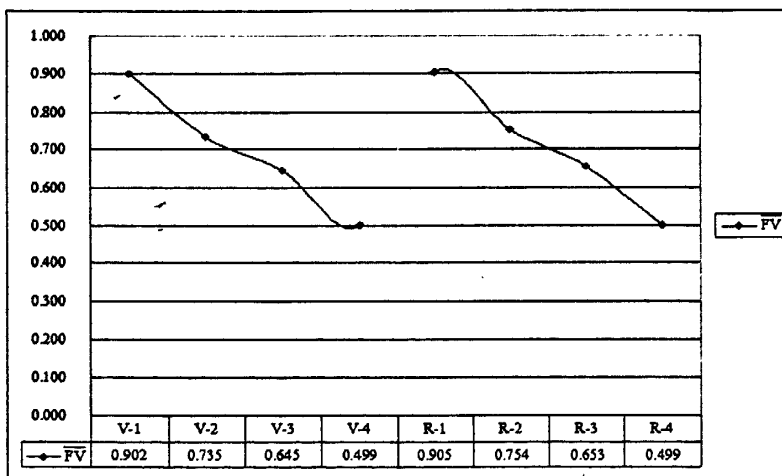


Figure 21. Average facility values of item groups with different levels of difficulty in vocabulary and reading comprehension subtests

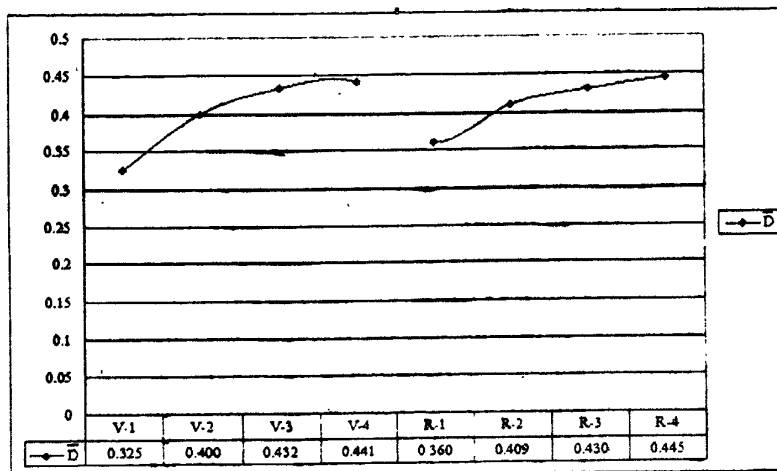


Figure 22. Average discrimination indices of item groups with different difficulty levels in vocabulary and reading comprehension subtests

Figures 21 and 22 show that the average facility values of the four item groups in the two subtests have a noticeable falling tendency with the rise of the level of difficulty of items while the average discrimination indices have a rising tendency. Moreover, Figure 21 shows that the curve formed by the average facility values of different item groups of the vocabulary subtest is parallel to the curve formed by the average facility values of different item groups of the reading comprehension subtest, and it is the same case with the curves formed by the average discrimination indices of different item groups of the two subtests (see Figure 22). These findings mean that the items in the vocabulary subtest might function the same in measuring participants' language skills as the items in the reading comprehension subtest at the same level of difficulty.

In summary, the analyses of the test scores of the participants of Group C, thus far focused on the facility values and the discrimination indices, show that the whole test is in agreement with the research design of this study (see 3.3.1).

(e) Reliability of the Test, the Subtests and Item Groups of the Latter Two Subtests

Table 10

Reliability of the Test, the Subtests and Item Groups of Vocabulary and Reading Comprehension Subtests

Test	Dictation Subtest	Vocabulary Subtest					Reading Comprehension Subtest				
		Total	V-1	V-2	V-3	V-4	Total	R-1	R-2	R-3	R-4
.912	.861	.896	.879	.908	.918	.835	.886	.945	.845	.919	.806

The test scores of the participants of Group C show that the whole test ($\alpha = 0.912$) is excellently reliable in assessing their language skills. Moreover, the three subtests and the item groups of the latter two subtests have good reliability values ranging from 0.806 to 0.945. The relatively low reliability occurs within the very difficult item group of the reading comprehension test. The reason might be that the results might have been obfuscated by poor performances of a small number of participants due to the extreme difficulty of items or their impatience in finishing the last five items.

3.9.2 Re-evaluation of the Questionnaire

The evaluation of the questionnaire was conducted through the analyses of the responses of the participants of Group E, who graduated from college just four years ago.

(a) Factor Analysis of the Questionnaire

The factor analysis of the questionnaire was done for the following two reasons. First, although the construct validity of the questionnaire had been confirmed by a panel of college English teachers (*see* 3.5), it needed to be reconfirmed by examining the factor loading of every item in the test. Second, 42 items included in this questionnaire (*see* 3.4, and Appendix 3) are supposed to have different influences upon the participants' language skill maintenance or attrition. Some must have a greater influence than others. Factor analysis can help make a good distinction of these variables according to their capability of accounting for the participants' language attrition, and reduce these 42 items to a relatively small and

manageable number according to the eigenvector value of every item. Then, the smaller number of items could be analysed in greater detail in the discussion of relationship between participants' language attrition and their attitudes.

Table 11

Eigenvalues, Explained Variances and Cumulative Variances of Factors of the Questionnaire

Factors	Labels	Eigenvalue	Variance	Cumulative Variance (%)
Factor 1	Participants' attitudes towards English language learning and use	9.009	21.451	21.451
Factor 2	Participants' attitudes towards other English language learners	9.296	22.134	43.585
Factor 3	Participants' interest in the English language	7.775	18.511	62.096
Factor 4	Participants' attitudes towards English language learning	5.489	13.068	75.164

Table 11 shows that the eigenvalues of the factors are well above 5, much higher than the acceptable value of 1.000 (Qin, 2003, p. 72), and that the cumulative variances of explained variances of the four factors (75.164%) can well account for the variances of the measuring scale of the instrument.

Table 12

Loadings of Items in the Questionnaire

Factors	Items	Loadings	Communalities
Participants' idea of English language learning and use	Item 11	0.840	0.830
	Item 12	0.827	0.818
	Item 9	0.819	0.749
	Item 1	0.786	0.802
	Item 8	0.728	0.811
	Item 3	0.707	0.706
	Item 6	0.619	0.766
	Item 7	0.616	0.780
	Item 10	0.567	0.694
	Item 5	0.528	0.733

Factors	Items	Loadings	Communalities
Participants' attitudes towards Other English language learners	Item 2	0.500	0.767
	Item 4	0.494	0.554
	Item 21	0.757	0.693
	Item 20	0.629	0.738
	Item 17	0.616	0.799
	Item 15	0.609	0.673
	Item 14	0.549	0.777
	Item 19	0.522	0.711
	Item 16	0.480	0.669
	Item 13	0.478	0.698
Participants' interest in the English language	Item 18	0.459	0.679
	Item 22	0.447	0.678
	Item 23	0.853	0.857
	Item 28	0.834	0.822
	Item 26	0.791	0.818
	Item 24	0.790	0.769
	Item 31	0.768	0.758
	Item 25	0.749	0.794
	Item 30	0.608	0.684
	Item 32	0.596	0.766
Participants' attitudes towards English language learning	Item 27	0.594	0.724
	Item 29	0.475	0.707
	Item 33	0.822	0.611
	Item 39	0.772	0.802
	Item 35	0.695	0.727
	Item 37	0.690	0.797
	Item 42	0.688	0.657
	Item 36	0.644	0.765
	Item 34	0.628	0.739
	Item 41	0.597	0.749
	Item 40	0.484	0.845
	Item 38	0.467	0.820

Table 12 shows that factor loadings of all the items in the questionnaire ranging from 0.447 to 0.853 are much higher than the acceptable value of 0.300 (Qin, 2003, p. 72). Consequently, Tables 11 and 12 show that the construct validity of the questionnaire is very good.

Table 13

Eigenvalues, Explained Variances and Cumulative Variances of Factors of Participants' Idea of English Language Learning and Use

Factors	Eigenvalue	Variance	Cumulative Variance (%)
Factor 1	3.339	27.824	27.824
Factor 2	3.044	25.363	53.187
Factor 3	2.704	14.204	67.391

Table 14

Loadings of Items of Participants' Idea of English Language Learning and Use

Factors	Items	Loadings	Communalities
Factor 1	Item 7	0.794	0.670
	Item 12	0.765	0.785
	Item 3	0.762	0.686
	Item 11	0.678	0.802
	Item 9	0.653	0.765
Factor 2	Item 6	0.791	0.676
	Item 8	0.726	0.808
	Item 10	0.692	0.533
	Item 5	0.617	0.595
Factor 3	Item 1	0.757	0.623
	Item 4	0.663	0.633
	Item 2	0.583	0.511

Table 13 shows that eigenvalues of all the items in Part I of the questionnaire are well above 2, much higher than the acceptable value of 1.000, and that the cumulative variances of explained variances of the four factors (67.391%) can well account for the variance of the measuring scale. Table 14 shows that factor loadings of all the items ranging from 0.583 to 0.794 are higher than the acceptable value of 0.300. The two tables show that Part I of the questionnaire has very high construct validity,

Moreover, it can be found that Items 6 and 7 carry the highest loadings in this part. So more attention needs to be paid to them in later discussion of the relationship between

participants' English language maintenance and their ideas about English learning and use situation in China.

When SPSS 13.0 is employed to do the factor analysis, it automatically classifies all the items into different factor groups according to their interrelationships. This automatic classification of items suggests that the items that are grouped into the same factor group are of the same nature and they should be discussed together in the analysis of the relationship between the participants' language attrition and their language attitudes.

Table 15
Eigenvalues, Explained Variances and Cumulative Variances of Factors of Participants' Attitudes towards the English Language

Factors	Labels	Eigenvalues	Variances	Cumulative Variances (%)
Factor 1	Participants' attitudes towards other English language learners	6.337	21.123	21.123
Factor 2	Participants' interest in the English language	8.058	26.861	47.984
Factor 3	Participants' attitudes towards English language learning	7.793	25.977	73.961

Table 16
Loadings of Items of Participants' Attitudes towards the English Language

Factors	Items	Loadings	Communalities
Participants' attitudes towards other English language learners	Item 21	0.792	0.748
	Item 15	0.674	0.734
	Item 14	0.619	0.776
	Item 17	0.559	0.795
	Item 20	0.528	0.681
	Item 19	0.524	0.679
	Item 18	0.516	0.736
	Item 16	0.509	0.661
	Item 13	0.495	0.709
	Item 22	0.489	0.721

Participants' interest in the English language	Item 28	0.876	0.834
	Item 31	0.847	0.776
	Item 23	0.830	0.830
	Item 24	0.809	0.775
	Item 25	0.733	0.745
	Item 32	0.703	0.761
	Item 26	0.612	0.775
	Item 30	0.580	0.660
	Item 27	0.484	0.691
	Item 29	0.432	0.625
Participants' attitudes towards English language learning	Item 39	0.839	0.829
	Item 37	0.794	0.759
	Item 42	0.787	0.718
	Item 34	0.758	0.765
	Item 33	0.744	0.773
	Item 35	0.699	0.766
	Item 36	0.658	0.616
	Item 40	0.558	0.787
	Item 41	0.508	0.679
	Item 38	0.476	0.785

The eigenvalues of all the items in Part II of the questionnaire are above 6, much higher than the standard value, and the cumulative variances of explained variances of the three factors (73.961%) can well account for the variances of the measuring scale. In addition, the factor loadings of the items in this part range from 0.489 to 0.876. All this means that this part of the questionnaire has very high construct validity.

The questions of this part are composed of three sections, and, accordingly, factor analysis of this part is to be done section by section.

Table 17

Eigenvalues, Explained Variances and Cumulative Variances of Factors of Participants' Attitudes towards Other English Language Learners

Factors	Eigenvalue	Variance	Cumulative Variance (%)
Factor 1	3.396	33.956	33.956
Factor 2	2.164	21.638	55.594
Factor 3	1.942	19.418	75.012

Table 18

Loadings of Items of Participants' Attitudes towards Other English Language Learners

Factors	Items	Loadings	Communalities
Factor 1	Item 14	0.841	0.742
	Item 17	0.829	0.698
	Item 18	0.748	0.603
	Item 16	0.706	0.625
	Item 20	0.673	0.574
	Item 19	0.589	0.691
Factor 2	Item 21	0.815	0.749
	Item 13	0.684	0.561
	Item 15	0.675	0.720
Factor 3	Item 22	0.941	0.889

Table 17 shows that the eigenvalues of the factors for Section I are above 1.5; higher than the acceptable value of 1.000, and that the cumulative variances of explained variances of the three factors (72.512%) can well account for the variance of the measuring scale. Table 18 shows that the loadings of all the items ranging from 0.589 to 0.941 are much higher than the acceptable value of 0.300. The two tables show that Section I (participants' attitudes towards other English language learners) has high construct validity.

The extremely high factor loading (0.941) and the extremely high communality value (0.889) of Item 22 mean that more attention needs to be paid to it in the discussion of the relationship between the participants' language attitudes and their language retention.

Table 19

Eigenvalues, Explained Variances and Cumulative Variances of Factors of Participants' Interest in the English Language

Factors	Eigenvalues	Variances	Cumulative Variances (%)
Factor 1	2.151	21.513	21.513
Factor 2	2.100	20.998	42.511
Factor 3	1.833	18.329	60.840

Table 20

Loadings of Items of Participants' Interest in the English Language

Factors	Items	Loadings	Communalities
Factor 1	Item 32	0.775	0.766
	Item 26	0.741	0.679
	Item 31	0.693	0.577
Factor 2	Item 30	0.713	0.637
	Item 29	0.696	0.556
	Item 28	0.689	0.587
	Item 24	0.472	0.353
Factor 3	Item 25	0.785	0.628
	Item 27	0.726	0.707
	Item 23	0.547	0.594

Table 19 shows that the eigenvalues of the factors for Section II are above 1.8, higher than the acceptable value of 1.000, and that the cumulative variances of explained variances of the three factors (60.840%) can well account for the variance of the measuring scale. Table 20 shows that the factor loadings of all the items ranging from 0.472 to 0.785 are higher than the acceptable value of 0.300. It can therefore be concluded that Section II has high construct validity.

Items 25 and 32 have extremely high factor loadings, and that suggests that more attention should be paid to them in the discussion of the relationship between participants' language attrition and their attitudes towards English language learning.

Table 21

Eigenvalues, Explained Variances and Cumulative Variances of Factors of Participants' Attitudes towards English Language Learning

Factors	Eigenvalues	Variances	Cumulative Variances (%)
Factor 1	3.122	31.224	31.224
Factor 2	1.942	19.421	50.645
Factor 3	1.872	18.724	69.369

Table 22

Loadings of Items of Participants' Attitudes towards English Language Learning

Factors	Items	Loadings	Communalities
Factor 1	Item 37	0.878	0.835
	Item 33	0.839	0.778
	Item 34	0.783	0.744
	Item 36	0.742	0.677
Factor 2	Item 41	0.751	0.649
	Item 39	0.743	0.569
	Item 40	0.515	0.504
Factor 3	Item 42	0.827	0.762
	Item 35	0.739	0.750
	Item 38	0.603	0.670

Table 21 shows that the eigenvalues of the factors for Section III are above 1.8, higher than the acceptable value of 1.000, and that the cumulative variances of explained variances of the three factors (69.369%) can well account for the variance of the measuring scale. Table 22 shows that factor loadings of all the items ranging from 0.515 to 0.878 are much higher than the acceptable value of 0.300. High construct validity of Section III is thus verified. Furthermore, Items 33 and 37 are remarkable with their high factor loadings from among the items in this section and need more attention in the analysis of the relationship between the participants' language attrition and their language attitudes.

So far the factor analysis of the questionnaire has been done at the level of the whole questionnaire, at the level of component parts, and at the level of sections of the second part. The analysis has produced three major useful findings.

First, the factor analysis, be it done at any level, indicates that the questionnaire, along with its component parts, has very high construct validity. This indication is what was expected of the factor analysis.

Second, SPSS 13.0 has automatically classified the items in the same section into different factor groups according to the relationships between the items involved. This automatic grouping of items suggests that the items that are grouped into the same factor group share the same nature and they should be discussed together in the analysis of the relationship between

the participants' language attitudes and their language attrition.

Third, in each part of the questionnaire or in each section of the second part of the questionnaire, a couple of items stick out with their very high factor loadings. The extremely high factor loadings verify the inclusion of these items into the questionnaire and, at the same time, show their strengths in representing the relevant part or the relevant section in the process of the author's interpretation of the relationship between the participants' language attrition and their language attitudes.

(b) Reliability of the Questionnaire

Table 23

Reliability Coefficients of the Questionnaire

Questionnaire	Participants' idea of English language learning and use	Participants' attitudes towards the English language			
		Total	Section I	Section II	Section III
$\alpha = .931$	$\alpha = .903$	$\alpha = .892$	$\alpha = .873$	$\alpha = .894$	$\alpha = .905$

Table 23 shows the questionnaire is very reliable in revealing participants' different language attitudes. The whole questionnaire ($\alpha = 0.931$), Part I ($\alpha = 0.903$) and Section III ($\alpha = 0.905$) of Part II are all very reliable (see Table 9).

To sum up, the findings and analyses of this section (3.9) show that both the test and the questionnaire have high construct validity and high reliability. The results are in agreement with the findings of the pilot study (3.6) and can help exclude unexpected occurrences that might compromise the final results of the investigation.

Chapter Four Results and Findings

In this chapter, all the results of the investigation are to be presented. First, a general profile of attrition exhibited in the participants of Groups D and E is to be shown. Second, attrition of the participants' specific language skills is to be displayed. Third, the order of attrition of the participants' general language skills and specific language skills is to be presented. Finally, the relationships between participants' language attitudes and their language maintenance are to be elaborated upon. The scores of the test and the responses of the questionnaire are all to be analysed by SPSS 13.0.

4.1 Profile of English Attrition

The first research question, which is of primary concern of the dissertation, is whether there is attrition with the English language that was studied as a foreign language by English majors after a certain period of disuse, and, if so, to what degree and in what kind of pattern (see 3.1). For the sake of convenience of study, this question was broken down into three sub-questions:

- (1) Does attrition occur in English majors after two or four years of disuse?
- (2) If English attrition is a fact, to what degree did the attrition develop?
- (3) What is the pattern of attrition?

4.1.1 Actuality of Attrition

The first sub-question is to be answered through the study of the mean scores of the test of the participants of Groups C, D and E, with the mean scores of the participants of Group C as the baseline.

Table 24

Descriptive Statistics: Mean Scores of Groups C, D and E

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Group C	240	79.58	4.29	0.277	78.68	80.48
Group D	238	59.70	3.89	0.252	58.08	60.06
Group E	240	52.30	5.28	0.3405	53.70	51.10
Total	718	63.86	5.73	0.214	63.49	63.88

Table 24 shows that the standard deviations of all of the three participant groups are small, meaning the participants within their own group are homogenous in the maintenance of their language skills.

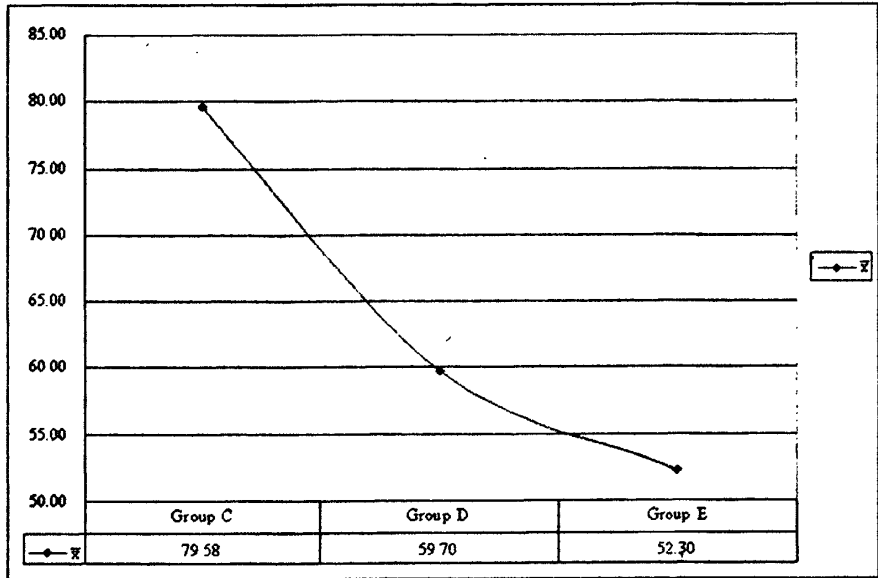


Figure 23. Mean scores of Groups C, D and E

Both Table 24 and Figure 23 show that the general language skills of the participants of Groups D and E attrited.

However, it seems a little contradictory that the biggest standard deviation within the three groups falls upon Group E, while the smallest upon Group D. The seemingly contradictory phenomenon could be accounted for by the fact that after their English language skills had undergone a relatively drastic decline at the end of two years of disuse (*see* 4.1.3), the participants of Group D had become more homogeneous, but the participants of Group E had

become more diverse in their maintenances of language skills owing to further attrition resulting from another two years of disuse of English (see 4.1.3).

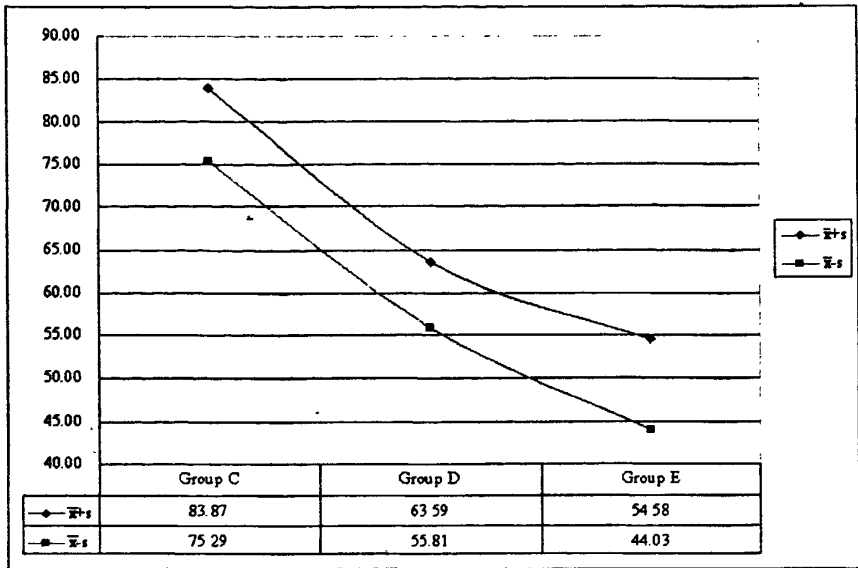


Figure 24. Mean scores of Groups C, D and E ($\bar{x} \pm s$)

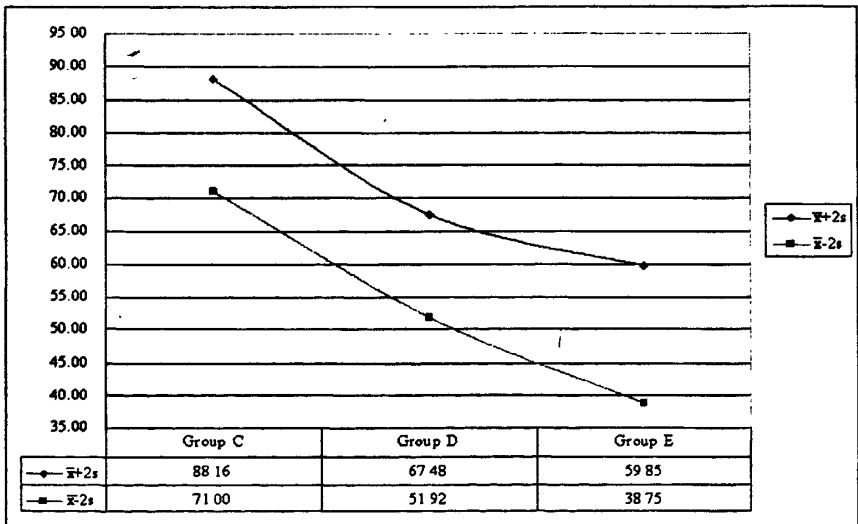


Figure 25. Mean scores of Groups C, D and E ($\bar{x} \pm 2s$)

Figures 24 and 25 show the descriptive statistics of the mean scores of the participants of Groups C, D and E. From the two figures, especially from the latter, it can be concluded that

the English language of more than 95.45% graduates of both Groups D and E showed a significant amount of attrition¹. The tendency of language attrition between Groups D and E is obvious, even though not as drastic as that between Groups C and D (see Table 25).

Table 25

One Way ANOVA: Differences of Scores of Groups C, D and E

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	35695.282	2	17847.641	217.948	.000
Within Groups	58551.051	717	81.890		
Total	94246.333	719			

Table 25 shows that the variation among group means is much more than the differences of the mean scores of participants among Groups C, D and E and that the differences of the means of the results of these three groups are statistically significant, and not due to random sampling ($F = 217.948, p < 0.001$).

Table 26

Post hoc Test: Multiple Comparisons of Differences of Mean Scores between Groups C, D and E

Dependent Variable	(I) group	(J) group	Mean Difference (I-J)	Sig.
Total score	Group C	Group D	7.573	0.000
	Group C	Group E	17.206	0.000
	Group D	Group E	9.633	0.000

* The mean difference is significant at the .05 level.

Table 26 demonstrates that the mean scores are significantly different between any two groups (Groups E and D; Groups E and C; Groups D and C) (Fisher's least significant differences (LSD) *post hoc* test, $p < 0.05$).

From the above analyses, it can be concluded that English language attrition of those college English major graduates is a fact.

¹ If a data distribution is approximately normal, about 68.2% of the data values are within 1 standard deviation of the mean ($\bar{x} \pm s$), about 95.4% are within two standard deviations ($\bar{x} \pm 2s$), and about 99.7% lie within three standard deviations ($\bar{x} \pm 3s$). This is known as the 68-95-99.7 rule, or the empirical rule.

4.1.2 Degree of Attrition

In order to answer the second sub-question, to what degree the language skills of those graduates have been eroded by attrition, a comparison of the mean scores of the participants of the five groups was to be made. Thus, post-attrition residual language skills of the participants of Groups D and E could be projected onto the acquisition curve formed by the scores of the participants of Groups A, B and C. The projected positions can show the degree of the attrition of the graduate participants' English language.

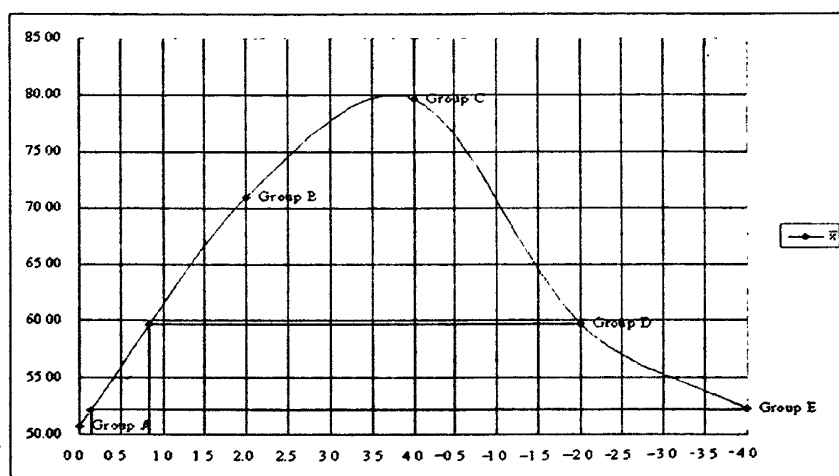


Figure 26. Mean scores of total scores of the five groups

* Where, the positive numbers under the horizontal axis refer to the academic year of those undergraduate participants while the negative numbers the number of years of the disuse of English of those graduate participants.

In Figure 26, when the means of the total scores of Groups D and E were projected horizontally onto the acquisition curve, two points of intersection were left on the curve. After the vertical projection of these two intersection points in the direction of the horizontal axis, another two points of intersection were produced on the horizontal axis. The two points projected on the axis could show the degree of Groups D and E's English maintenance.

As the figure shows, Group D still kept what had been learned before the end of the second semester of their first academic year while Group E maintained what had been acquired before the end of the first semester of their first academic year. Because language attrition and language maintenance are like two sides of the same coin, it might be argued that

the participants of Group D had lost what they had learned after the end of the second semester of their first academic year while the participants of Group E had forgotten what they had learned after the end of the first semester of their first academic year.

It might be concluded, even though somewhat regretfully, from Figure 26 that the participants of Groups D and E lost almost all the English language skills that they had acquired in their college years after two or four years of disuse.

4.1.3 Pattern of Attrition

The third sub-question is to find whether English attrition of Chinese English graduates is consistent with the traditional forgetting curve theory put forward by Ebbinghaus (1885) (*see* 2.4.3). To answer the question, Figure 23 was employed once again.

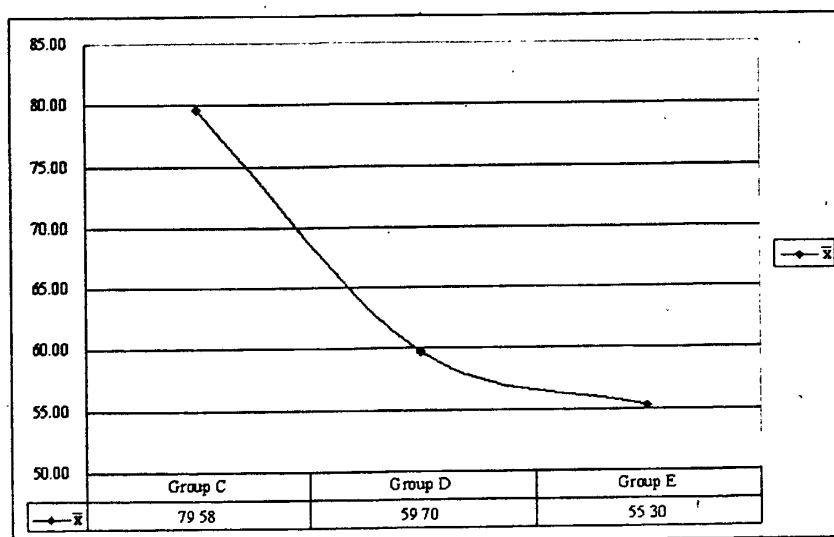


Figure 27. Mean scores of total scores of Groups C, D and E

The attrition curve in Figure 27 shows that the rate of attrition was very remarkable in the first two-year interval, and then slowed down and even levelled off in the fourth year (*see* Figures 24, and 25). The findings verified the forgetting curve theory (Ebbinghaus, 1885) and were consistent with the findings by Weltens, van Els, and Schils (1989) and Bahrck (1984a).

In summary, the results concerning the first research question (*see* 3.1) show:

(1) The English language that was studied as a foreign language by English majors after two or four years of disuse attrites.

(2) The attrition is remarkable. The participants had lost almost all their language skills that had been acquired in the last seven semesters of their college studies.

(3) Attrition sets in immediately after graduates' disuse of the English language and develops very fast in the first two years of disuse. Then, the attrition rate slows down and even levels off in the fourth year.

4.2 Attrition of Different Language Skills

This research was also aimed at studying the attrition of participants' different receptive skills, namely, listening comprehension skills, lexical knowledge and reading comprehension skills (*see* 3.2.2). Thus, a dictation subtest, a vocabulary subtest, and a reading comprehension subtest were constructed to make an assessment of the three kinds of skills respectively. The study of participants' scores of the three subtests is to find answers to the following three sub-questions:

- (1) Does attrition occur in the listening comprehension skills, lexical knowledge and reading comprehension skills of Groups D and E?
- (2) If so, to what degree have these skills attrited?
- (3) What kind of pattern does the attrition of these different language skills follow?

Because the test is composed of three subtests that are assigned different scores, the data of each subtest have different means and different standard deviations, and thus cannot be compared directly. So, for the sake of convenience of the comparison of the mean scores of different subtests of the participants of Groups C, D and E, their original scores of each subtest were converted into a hundred-point system.

4.2.1 Actuality of Attrition of Different Skills

Table 27

Descriptive Statistics: Subtest Mean Scores of Groups C, D and E

				95% Confidence Interval for Mean	
		Group	N	Mean	
				Lower Bound	Upper Bound
Dictation Subtest		Group C	240	76.10	75.15
		Group D	238	69.80	68.66
		Group E	240	60.30	58.42
		Total	718	68.73	67.63
Vocabulary Subtest		Group C	240	74.15	73.48
		Group D	238	67.75	66.82
		Group E	240	65.30	64.58
		Total	718	69.07	69.02
Reading Comprehension Subtest		Group C	240	75.71	75.41
		Group D	238	67.87	67.54
		Group E	240	66.50	66.18
		Total	718	70.03	69.68

Table 27 indicates that language skills of Groups D and E, be they listening comprehension skills, lexical knowledge, or reading comprehension skills, show an obvious tendency of attrition. The table also shows that among the participants of Group D, reading comprehension skills attrite fastest and listening comprehension skills exhibit relatively strong retention, while among the participants of Group E, listening comprehension skills attrite fastest, and lexical knowledge is comparatively well maintained.

Table 28

One Way ANOVA: Differences of Standard Scores of Three Subtests between Groups C, D and E

		Sum of Squares	df	Mean Square	F	Sig.
Dictation Subtest	Between Groups	389.107	2	194.553	373.780	.000
	Within Groups	373.200	717	0.521		
	Total	762.307	719			
Vocabulary Subtest	Between Groups	157.992	2	78.996	107.823	.000
	Within Groups	525.305	717	0.733		
	Total	683.296	719			
Reading Comprehension Subtest	Between Groups	84.498	2	42.249	60.231	.000
	Within Groups	501.538	715	0.701		
	Total	586.036	717			

Table 29

Post hoc Test: Multiple Comparisons of Differences of Standard Scores of Three Subtests between Groups C, D and E

Dependent Variable	(I) group	(J) group	Mean Difference (I-J)	Sig.
Dictation Subtest	Group E	Group D	-1.453	.000
	Group E	Group C	-1.647	.000
	Group D	Group C	-0.194	.003
Vocabulary Subtest	Group E	Group D	-0.151	.049
	Group E	Group C	-0.791	.000
	Group D	Group C	-0.640	.000
Reading Comprehension Subtest	Group E	Group D	-0.333	.000
	Group E	Group C	-0.785	.000
	Group D	Group C	-1.117	.000

* The mean difference is significant at the .05 level.

Table 29 shows that for the dictation, the vocabulary, the reading comprehension subsets, there are significant differences between any two groups (Groups E and D; Groups E and C; Groups D and C) (Fisher's least significant differences (LSD) *post hoc* test, $p < 0.05$). Table 28 shows that these differences are not due to random sampling ($F_D = 373.780$, $p < 0.001$; $F_V = 107.823$, $p < 0.001$; $F_R = 60.231$, $p < 0.001$).

4.2.2 Degree of Attrition of Different Skills

The projection method (see 4.1.2) will be employed again here so as to find to what degree participants' different language skills attrited.

(a) Listening Comprehension Skills

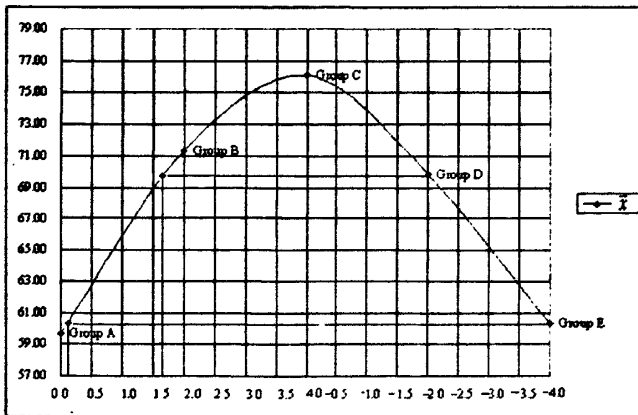


Figure 28. Mean scores of dictation subtest of the five groups

As Figure 28 indicates, the participants of Group D still kept the listening comprehension skills they had acquired in their first two college semesters while the participants of Group E had lost almost all that had been acquired in college.

(b) Lexical Knowledge

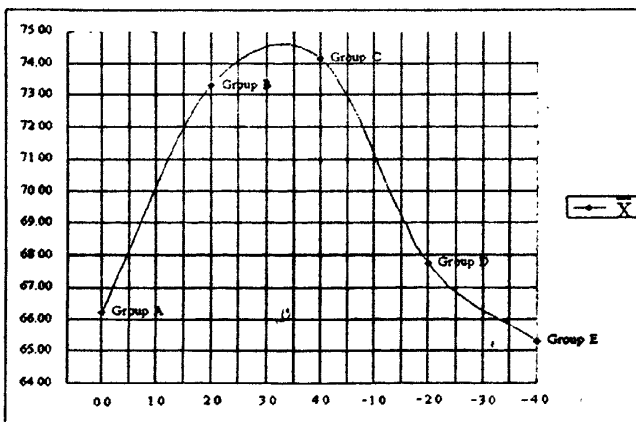


Figure 29. Mean scores of vocabulary subtest of the five groups (1)

Lexical knowledge attrition is more complex and it is more difficult to determine the degree of attrition, for, as indicated by Figure 29, the mean scores of the participants of Group E are even lower than those of the participants of Group A. That means the participants of Group E lost the lexical knowledge that they had acquired in college, and they had lost more. To solve the difficulty in establishing a reference against which to make an assessment of the loss of the lexical knowledge, the parabolic curve was extended in the direction of Group B and Group A, and in this way Figure 30 was developed. This practice of extending the parabolic curve is based upon the assumption that English learning, especially the acquisition of lexical knowledge, develops in the same way in high school as in college.

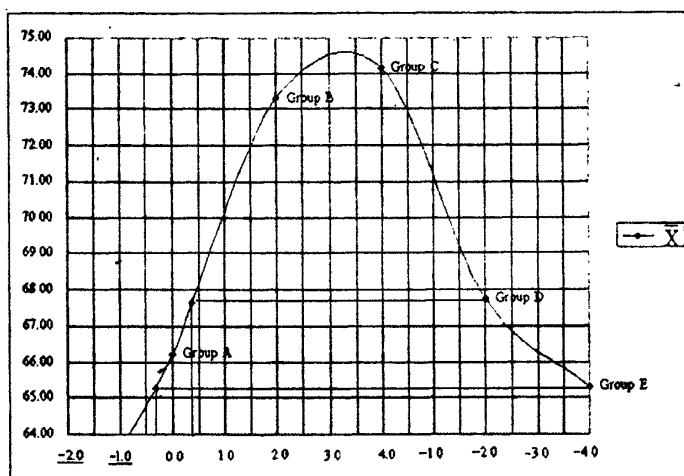


Figure 30. Mean scores of vocabulary subtest of the five groups (2)

* Where, -2.0 and -1.0 refer to the second and the third high school year respectively.

Figure 30 shows that the lexical knowledge of the participants of Group D attrited to such a degree that the lexical knowledge that they had acquired in the last six semesters has been completely lost. From the extended curve in the figure, it can be seen that the participants of Group E lost all the lexical knowledge that had been acquired in college, and they even failed to keep what they had acquired in the last semester of their high school academic years, supposing the acquisition of the lexical knowledge develops in the same way in high school as in college.

(c) Reading Comprehension Skills

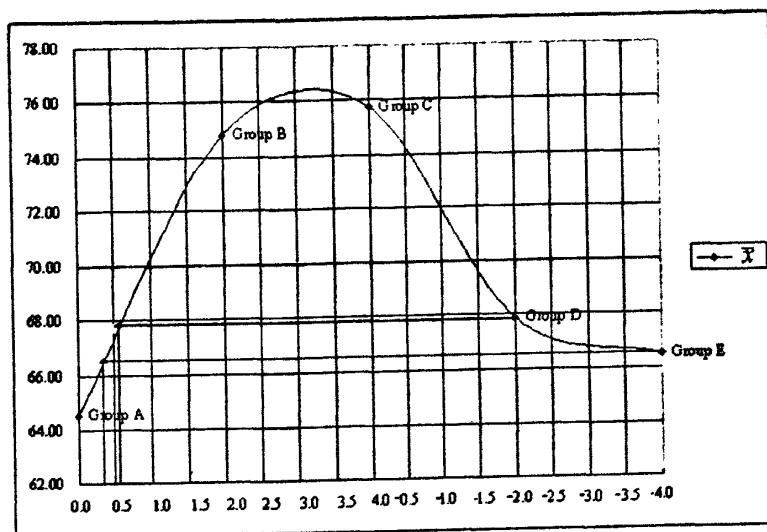


Figure 31. Mean scores of reading comprehension subtest of the five groups

As indicated by Figure 31, the reading comprehension skills of the participants of Group D are only equal to those of the freshmen in their early days of the second semester, while the reading comprehension skills of the participants of Group E amount to those of the freshmen in the second half of the first semester.

4.2.3 Attrition Patterns of Different Skills

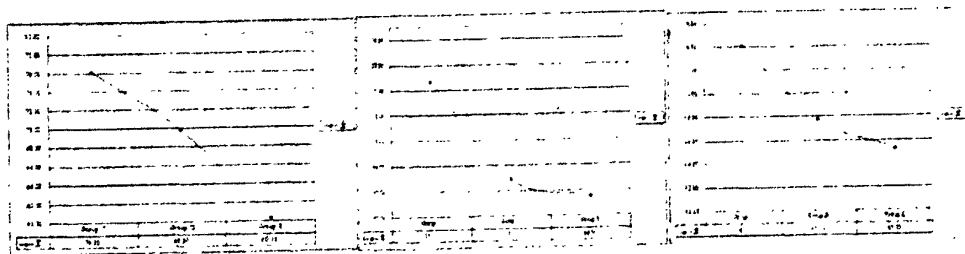


Figure 32. Mean scores of subtests of Groups C, D and E

* Where, from the left to the right: the standard means of the dictation subtest, the vocabulary subtest and the reading comprehension subtest.

From Figure 32, it can be concluded that attrition of listening comprehension skills set in rather late, probably one and a half years after the disuse of English, but after that it developed

drastically. Reading comprehension skill attrition set in earlier and developed very fast in the early years of disuse, but about three years later, attrition of the skills levelled off. Attrition of lexical skills developed at almost the same speed after the ending of English learning. Different attrition patterns of these different language skills can be illustrated better by Figure 33.

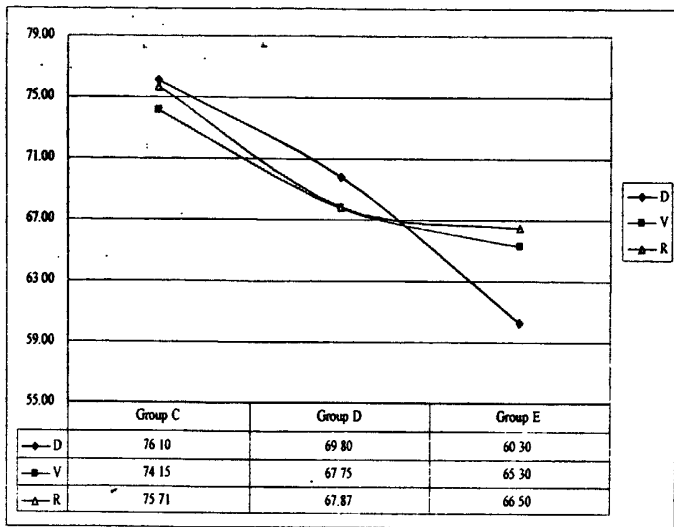


Figure 33. Mean scores of subtests of Groups C, D and E

In summary, the analyses of the results centering upon the second research question (see 3.1) suggest that the listening comprehension skills, the lexical knowledge and the reading comprehension skills of the participants of Groups D and E all show remarkable attrition. As far as attrition of specific language skills is concerned, attrition of lexical knowledge is the most remarkable while the listening comprehension skills is comparatively well retained by the participants of Group E. Attrition of the listening comprehension skills sets in rather late, but once it sets in, it develops drastically. The reading comprehension skill attrition develops very fast in the early years of disuse, but about three years later, the skills levels off. The developmental pattern of attrition of the lexical knowledge is something in between.

4.3 Order of Attrition

The third research question of this study is in what order attrition develops. Does attrition

develop just as our intuition tells us or as the regression hypothesis (Jakobson, 1941, p. 93) predicts? In other words, will what is learned first be retained last, or is the order of attrition reverse to the order of acquisition?

Both the vocabulary and the reading comprehension subtests have a very wide range of difficulty (*see* 3.3.1, and Table 2). The unique subtests were developed in order to find whether graduate participants of Groups D and E had a good performance on the easier and the easy items, and whether they obtained very low scores on the difficult and the very difficult items. If the answers to these questions are affirmative, it can be concluded that English attrition progresses in such an order as is reverse to the order of acquisition.

Before the exploration of the order of attrition, it needs to be clarified that in the specific English teaching and learning situation in China, the least complex and easiest-to-command language skills are acquired earlier than the most complex and most difficult-to-command ones. The understanding of such a situation is to be of great help in revealing the relationship between the order of attrition and the order of acquisition in that before the comparison between these two orders can be made, the order of acquisition should be made clear.

4.3.1 At the Level of Subtests

Table 30

Descriptive Statistics: Items with Different Levels of Difficulty in Vocabulary and Reading Comprehension Subtests

					95% Confidence Interval for Mean		
Difficulty	Groups	N	Mean*	Std. Deviation	Std. Error	Lower Bound	Upper Bound
D-1	Group A	240	17.54	2.07	0.13	17.38	17.90
Easier	Group B	240	18.37	1.07	0.07	18.54	18.82
Items	Group C	240	18.68	1.15	0.07	18.22	18.51
	Group D	238	18.56	1.56	0.10	17.49	17.89
	Group E	240	17.68	2.12	0.14	17.36	17.90
	Total	1198	18.17	1.71	0.05	17.91	18.10
D-2	Group A	240	13.35	3.35	0.22	10.93	11.78
Easy	Group B	237	14.39	2.65	0.17	15.10	15.78
Items	Group C	240	15.44	2.88	0.19	14.03	14.76

					95% Confidence Interval for Mean	
Difficulty Groups	N	Mean*	Std. Deviation	Std. Error	Lower Bound	Upper Bound
D-3	Group D238	14.09	2.87	0.19	10.82	11.56
	Group E240	13.48	3.43	0.22	11.13	12.00
	Total	119514.15	3.52	0.10	12.59	12.99
D-3 Difficult Items	Group A240	9.41	3.62	0.23	8.95	9.87
	Group B240	10.95	3.26	0.21	10.53	11.37
	Group C240	12.36	3.39	0.22	12.46	13.33
	Group D240	10.25	2.99	0.19	9.09	9.85
	Group E240	9.52	3.21	0.21	9.50	10.32
	Total	120010.50	3.55	0.10	10.33	10.73
D-4 More Difficult Items	Group A240	6.12	3.68	0.24	5.65	6.58
	Group B240	9.43	3.24	0.21	6.96	7.79
	Group C240	10.63	2.90	0.19	7.26	8.00
	Group D240	7.11	2.69	0.17	6.03	6.71
	Group E240	6.17	3.17	0.20	6.14	6.94
	Total	12007.89	3.20	0.09	6.63	6.99

* The scores or the means in the table refer to the combined scores or the combined means of the relevant items with the same level of difficulty in both the vocabulary and the reading comprehension subtests.

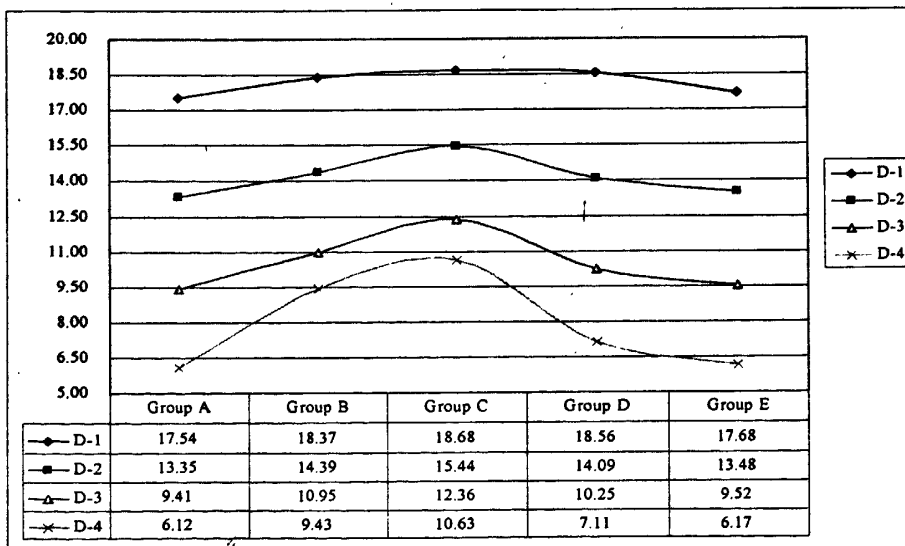


Figure 34. Mean scores of items with different levels of difficulty in vocabulary and reading comprehension subtests*

* Where, D-1, D-2, D-3, and D-4 refer to "Very Easy Items", "Easy Items", "Difficult Items" and "Very Difficult Items" respectively in both the vocabulary and the reading comprehension subtests.

Table 30 and Figure 34 show that among the participants of the five groups, those of Group C scored the highest regardless of the level of difficulty of items. The relatively flat parabolas formed by the means of the easier and the easy items show that the participants had a comparatively good retention of the early-acquired and easy-to-command language skills. That is to say, what is learned first is retained last. The tilted parabolas based upon the means of the difficult and the very difficult items mean that participants had a comparatively poor maintenance of the late-acquired complex and difficult-to-command language skills. In other words, what is learned last is lost first. Therefore, it can be concluded that the order of attrition is precisely opposite to the order of acquisition.

It can also be found from Table 30 and Figure 34 that with the rise of the level of the difficulty of items, the ratio of the maintained language skills falls. This finding might have great implications for foreign language teaching and learning. It would a good pedagogical strategy to raise the level of difficulty of language input because it could help make the otherwise difficult language skills become easier and thus more resistant to attrition.

Table 31

One Way ANOVA: Differences of Scores of Items with Different Levels of Difficulty in Vocabulary and Reading Comprehension Subtests

		Sum of Squares	df	Mean Square	F	Sig.
D-1 Very Easy Items	Between Groups	418.237	4	104.559	10.517	.000
	Within Groups	11860.806	1193	9.942		
	Total	12279.043	1197			
D-2 Easy Items	Between Groups	228.432	4	57.108	20.876	.000
	Within Groups	3255.840	1190	2.736		
	Total	3484.272	1194			
D-3 Difficult Items	Between Groups	2049.472	4	512.368	46.984	.000
	Within Groups	13031.675	1195	10.905		
	Total	15081.147	1199			

		Sum of Squares	df	Mean Square	F	Sig.
D-4	Between Groups	3742.791	4	935.698	100.437	.000
Very	Within Groups	11132.620	1195	9.316		
Difficult	Total	11875.411	1199			
Items						

The differences of scores of items with different levels of difficulty in vocabulary and reading comprehension subtests are significant, and not due to random sampling ($F_{D-1} = 10.517, p < 0.001$; $F_{D-2} = 20.876, p < 0.001$; $F_{D-3} = 46.984, p < 0.001$; $F_{D-4} = 100.437, p < 0.001$).

Table 32

Post hoc Test: Multiple Comparisons of Differences of Scores of Items with Different Levels of Difficulty in Vocabulary and Reading Comprehension Subtests

Dependent Variable	(I) group	(J) group	Mean Difference (I-J)	Sig.
D-1 Very Easy Items	Group E	Group D	-0.690	.000
	Group E	Group A	0.708	.000
	Group E	Group B	-1.046	.000
	Group E	Group C	-0.733	.000
	Group D	Group A	0.652	.000
	Group D	Group B	0.986	.000
	Group D	Group C	-0.673	.000
	Group B	Group C	-0.313	.039
	Group A	Group B	-1.038	.000
D-2 Easy Items	Group A	Group C	-0.725	.000
	Group E	Group D	-1.178	.000
	Group E	Group A	1.208	.000
	Group E	Group B	-3.872	.000
	Group E	Group C	-2.829	.000
	Group D	Group A	1.169	.000
	Group D	Group B	-4.250	.000
	Group D	Group C	-3.207	.000
	Group B	Group C	-1.043	.000
	Group A	Group B	-4.080	.000
	Group A	Group C	-3.038	.000

D-3	Group E	Group D	-1.442	.000
Difficult Items	Group E	Group A	1.496	.000
	Group E	Group B	-1.042	.001
	Group E	Group C	-2.988	.000
	Group D	Group A	1.054	.000
	Group D	Group B	-1.483	.000
	Group D	Group C	-3.429	.000
	Group B	Group C	-1.946	.000
	Group A	Group B	-1.538	.000
	Group A	Group C	-3.483	.000
D-4	Group E	Group D	-1.171	.000
Very Difficult Items	Group E	Group A	1.425	.000
	Group E	Group B	-0.833	.004
	Group E	Group C	-1.092	.000
	Group D	Group A	1.254	.000
	Group D	Group B	-1.004	.001
	Group D	Group C	-1.263	.000
	Group A	Group B	-1.258	.000
	Group A	Group C	-1.517	.000
	Group B	Group C	-1.258	.000

* The mean difference is significant at the .05 level.

In order to identify the source of these significant differences, a *post hoc* test is again performed. The results of this test reveal that there are statistical differences between any two groups in scores of items with different level of difficulty in the vocabulary and the reading comprehension subsets (Fisher's least significant differences (LSD) *post hoc* test, $p < 0.05$).

The rise of F ratios of these four categories of items ($F_{D-1} = 10.517$, $F_{D-2} = 20.876$, $F_{D-3} = 46.984$ and $F_{D-4} = 100.437$) with the rise of the level of difficulty indicates the increase of the heterogeneity or diversity among the language acquisition of Groups A, B and C, and language maintenance and attrition (of Groups C, D and E). The finding can be interpreted as implying that the graduates maintained the lower level language skills acquired in their early college years while the higher level language skills acquired in their late college years had attrited significantly.

4.3.2 At the Level of Items with the Same Difficulty Level

The order of attrition can also be revealed by the study of the items with same level of difficulty.

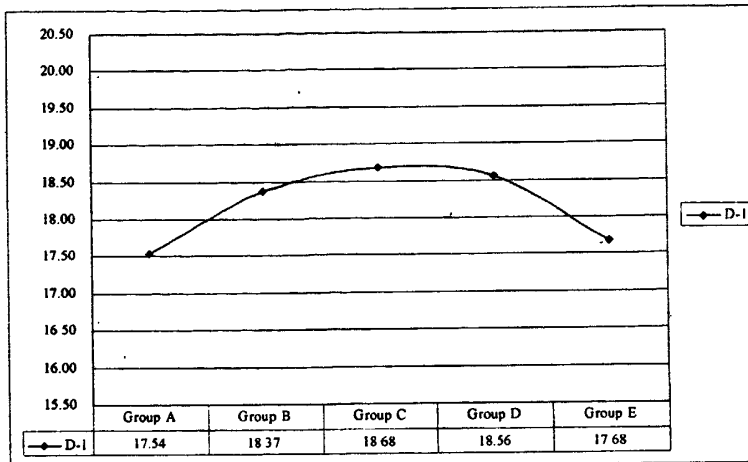


Figure 35. Mean scores of very easy items in vocabulary and reading comprehension subtests

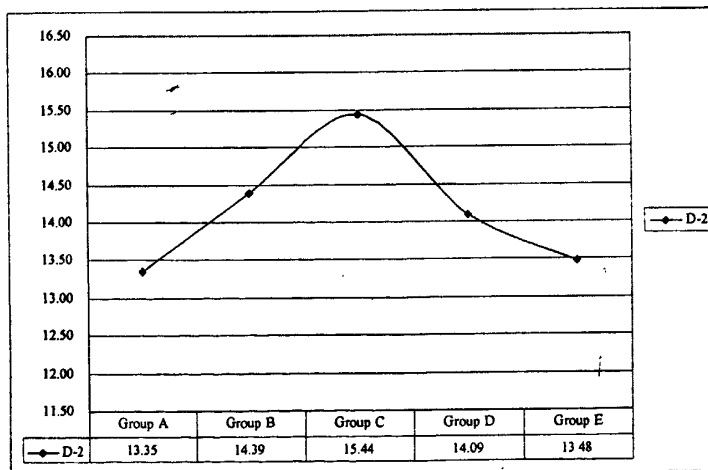


Figure 36. Mean scores of easy items in vocabulary and reading comprehension subtests

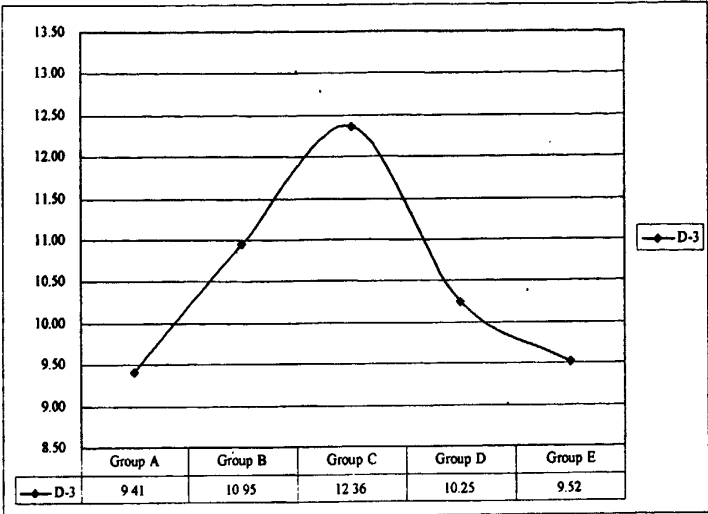


Figure 37. Mean scores of difficult items in vocabulary and reading comprehension subtests

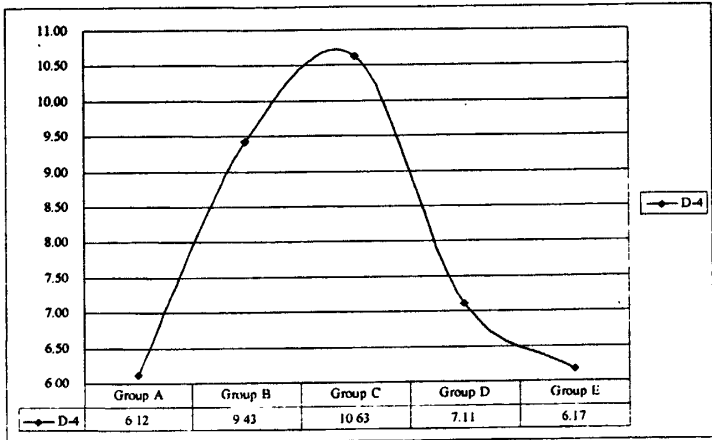


Figure 38. Mean scores of most difficult items in vocabulary and reading comprehension subtests

In Figure 35, the nearly flat parabolic curve suggests that all the participants had a good command of the least complex and easiest-to-command language skills. In Figure 36, the less flat parabolic curve and the increase of the length of the curved line between the two points of Groups C and D over that in Figure 35 both show that with the rise of the level of difficulty of the items, attrition developed further and faster. In Figure 37, the steeper slope of the parabola means that the participants of Groups D and E performed poorly on the difficult items. In Figure 38, the smallest opening of the parabola and the steepest slope of the curved line

demonstrate that the participants of Group E completely lost what they had acquired in college years while the participants of Group D only had a residual of what they had acquired in college.

The remarkable symmetricalness of the parabolic curves in Figures 35, 36, 37 and 38 shows that the order of attrition is in opposition to the order of acquisition and that language attrition is the mirror image of language acquisition.

In summary, the analyses of the results focused on the third research question (*see* 3.1) demonstrate that difficult language skills are more likely to be lost first while the easier ones are more resistant to attrition and that what is learned first will be retained last and what is learned last will be lost first. In other words, the process of language attrition mirrors the process of language acquisition and the order of attrition is precisely in opposition to the order of acquisition.

4.4 Causes of Attrition

The data analysis of this study was conducted by using correlation analysis and multiple or simple regression analysis and analysis of variance (ANOVA).

In the interpretation of the correlation coefficient between the participants' English language attitudes and their language maintenance, the r values were evaluated as against the widely accepted criteria introduced by Qin (2003, pp. 237-238).

4.4.1 Correlation between Total Test Score and Total Questionnaire Score

Table 33

Descriptive Statistics: Groups D and E

	Mean	Std. Deviation	N
Total Test Score	55.27	10.011	478
Total Questionnaire Score	157.07	22.161	478

Table 34

Correlation Analysis between Participants' Language Maintenance and Their Language Attitudes

Pearson Correlation	Total Questionnaire Score
Total Test Score	.713(**)

** Correlation is significant at the 0.01 level (2-tailed).

Table 34 shows that 50.8% ($r^2 = 0.508$) of variation in participants' test performances can be accounted for by the variation of their attitudes and motivations. However, it is too early to conclude that language attitudes of the graduate participants play an important role in the attrition or the maintenance of their English skills. Before that conclusion can be drawn, the regression analysis should be conducted to verify whether there is a close cause-and-effect relation between the participants' language attitudes and language maintenance.

Table 35

Results of the Regression Analysis: Participants' Language Maintenance and Their Language Attitudes

Model	Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	<i>Sig.</i>
	<i>B</i>	Std. Error	β		
1 (Constant)	33.463	3.125		10.707	.000
Total Questionnaire Scores	.307	0.020	.713	7.045	.000

The regression equation for the above data in Table 35 is

$$\text{Total Test Score} = 33.463 + 0.307 \times \text{Total Questionnaire Score}$$

The first term in the prediction equation (33.463) is a constant that represents the predicted criterion value when the predictor equals zero. The value of 0.307 represents regression weight or regression coefficient. Multiplying the total questionnaire score by the

appropriate regression coefficient gives the predictor variable the statistically determined proper amount of weighting in predicting the total test score. The t statistics and associated p value indicate whether the β statistics are significantly different from 0. Only if t statistics are significant should one interpret the corresponding β statistics (Heppner & Heppner, 2009, p. 183).

The total questionnaire score is positively and significantly related to the total test score. And as such, it could be concluded that more positive language attitudes would lead to a better retention of the English language.

This study so far has demonstrated a close relationship between participants' overall language attitudes and their language maintenance. It can be concluded that the more positive their attitudes are, the better the maintenance of their language skills they will have; the more negative their attitudes are, the more likely attrition will occur.

Table 36

One Way ANOVA for Regressions: Total Test Score and Total Questionnaire Score

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4513.964	1	4513.964	49.633	.000
	Residual	43290.277	476	90.946		
	Total	47804.241	477			

The " p " column in Table 36 shows that the observed F -ratio is larger than the F critical value ($p < 0.001$). Therefore, it can be concluded that the regression effect for the total questionnaire score is greater than zero, and thus the total questionnaire score may be a predictor. There is a close cause-and-effect relationship between the participants' total questionnaire score and their language maintenance ($F = 49.633, p < 0.001$).

4.4.2 Correlation between Total Test Score and Score of Component Parts and Component Sections of Part II in the Questionnaire

The language attitude questionnaire is composed of two parts, with the second part further composed of three sections. The regression analysis at the level of component parts or at the

level of component sections was conducted, first, to verify the correlation between the participants' language test and their different language attitudes and, second, to build the regression formulas with which to predict the participants' language maintenance in accordance with their different language attitudes.

(a) Correlation between Total Test Score and Score of the Two Parts of the Questionnaire

Table 37

Correlation Analysis between Participants' Language Maintenance and Their Scores on Two Parts of the Questionnaire

	Total Test Score
Participants' idea of English language learning and use	.705(**)
Participants' attitudes towards the English language	.740(**)

** Correlation is significant at the 0.01 level (2-tailed).

For the score of Part I and the total test score, the bivariate correlation, $r = 0.705$ for the above data. For the score of Part II and the total test score, $r = 0.740$. Both of these relationships are positive.

Table 37 shows that 49.7% ($r^2 = 0.497$) of variation in the participants' language skill maintenance can be accounted for by the variation of their ideas about English language learning and use situation in China while 54.8% ($r^2 = 0.548$) of variation in the participants' language skill maintenance can be explained by the variation of their attitudes towards the English language.

Table 38

Results of the Multiple Regression Analysis: Language Maintenance and the Two Parts of the Questionnaire

Model		Unstandardized		Standardized	<i>t</i>	Sig.
		Coefficients		Coefficients		
		<i>B</i>	Std. Error	β		
1	(Constant)	3.774	0.223		20.478	.000
	Participants' idea of English language learning and use	.196	0.092	.242	11.899	.000
	Participants' attitudes towards the English language	.248	0.044	.275	12.824	.000

The regression equation for the above data in Table 38 is

$$\text{Total Test Score} = 3.774 + 0.196 \times \text{the score of Part I} + 0.248 \times \text{the score of Part II}$$

The first term in the prediction equation (3.774) is a constant that represents the predicted criterion value when both predictors equal zero. The values of 0.196 and 0.248 represent regression weights or regression coefficients. Multiplying an individual's score of Part I and score of Part II by the appropriate regression coefficients gives the predictor variable the statistically determined proper amount of weighting in predicting the total test score. The scores of Part I and Part II are significant predictors of the total test score ($t_1 = 11.899$, $t_2 = 12.824$; $p < 0.001$).

Table 39

One Way ANOVA for Regressions: Total Test Score and the Two Parts of the Questionnaire

Model		Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	Sig.
1	Regression	4528.497	2	2264.248	24.853	.000
	Residual	43275.744	475	91.107		
	Total	47804.241	477			

Table 39 indicates that the regression effect is statistically significant because the observed

F -ratio is greater than the critical value for F , and the p -value for the regression effect is less than .001. In this case, it can be concluded that the regression effect is greater than zero, and that at least one of the predictors accurately predicts the total test score. The table also shows a close cause-and-effect relationship between the score of the two parts of the questionnaire and the language retention of the participants ($F = 24.853, p < 0.001$).

It can be argued that both the score of Part I and that of Part II are positively and significantly correlated with the total test score. It can be interpreted that the more frequently the participants learn and use English, and the more positive their attitudes towards the English language are, the better their language maintenance will be.

(b) Correlation between Total Test Score and Score of Part I of the Questionnaire

Table 40

Correlation Analysis between Participants' Language Maintenance and Their Idea of English Language Learning and Use

	Total Test Score
Participants' idea of English language learning and use	.705(**)

** Correlation is significant at the 0.01 level (2-tailed).

From table 40, it can be seen that the participants' total test score is positively correlated with their idea of English language learning and use. In fact, the correlation coefficient of 0.705 indicates a strong relationship between the participants' total test score and their score of Part I: 49.7% ($r^2 = 0.497$) of variation in the participants' language maintenance can be accounted for by the variation of their idea of the English language learning and use in China ($p < 0.01$).

Table 41

Results of the Regression Analysis: Participants' Language Maintenance and Their Idea of English Language Learning and Use

Model		Unstandardized		Standardized	<i>t</i>	Sig.
		Coefficients		Coefficients		
		<i>B</i>	Std. Error	β		
1	(Constant)	29.683	2.469		26.070	.000
	Participants' idea of English language learning and use	0.826	0.059	0.705	18.413	.000

The regression equation for the above data in Table 41 is

$$\text{Total Test Score} = 29.683 + 0.826 \times \text{Score of Part I}$$

The first term in the prediction equation (29.683) is a constant that represents the predicted criterion value when both predictors equal zero. The value of 0.826 represents regression weight. Multiplying the score of Part I by the appropriate regression coefficient gives the predictor variable the statistically determined proper amount of weighting in predicting the total test score. The score of Part I is a predictor of the total test score ($t = 18.413, p < 0.001$).

Table 42

One Way ANOVA for Regressions: Participants' Total Test Score and Their Idea of English Language Learning and Use

Model		Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	Sig.
1	Regression	3802.161	1	3802.161	41.131	.000
	Residual	44002.080	476	92.441		
	Total	47804.241	477			

The p column in Table 42 shows that the observed F -ratio is larger than the F critical value ($p < 0.001$). Therefore, it can be concluded from the analysis that the regression effect for the participants' idea of English language learning and use situation in China is greater

than zero, and thus the idea may be a predictor.

Table 42 also suggests a very close cause-and-effect relationship between the participants' idea of English language learning and use situation and their language maintenance ($F = 41.131, p < 0.001$).

So far, it can be concluded that the participants' idea about English language learning and use determines the amount of their language skill maintenance. Therefore, it would be worthwhile for college English major graduates to develop a positive idea about the English learning and use.

(c) Correlation between Total Test Score and Score of Part II of the Questionnaire

Table 43

Correlation Analysis between Participants' Language Maintenance and Their Attitudes towards the English Language

	Total Test Score
Participants' attitudes towards the English language	.740(**)

** Correlation is significant at the 0.01 level (2-tailed).

Table 43 indicates a positive correlation between the two variables. The correlation coefficient is 0.740, indicating a strong relationship between the participants' total test score and their attitudes towards the English language. In fact, it is shown by Table 43 that the participants' language maintenance is closely related to their attitudes towards the English language at the level of 54.8% ($r^2 = 0.548, p < 0.01$).

Table 44

Results of the Regression Analysis: Participants' Language Maintenance and Their Attitudes towards the English Language

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	β		
1	(Constant)	33.593	3.231		30.398	.000
	Participants' attitudes towards the English language	0.443	0.028	0.740	18.771	.000

Tables 43 and 44 show that the participants' score of Part II is positively and significantly related to their total test score, and as such, it would probably be worth the time and expense for the participants to develop positive attitudes towards the English language.

The regression equation for the above data in Table 44 is

$$\text{Total Test Score} = 33.593 + 0.443 \times \text{Score of Part II}$$

The first term in the prediction equation (33.593) is a constant that represents the predicted criterion value when the predictor equals zero. The value of 0.443 represents regression weight. Multiplying the score of Part II by the appropriate regression coefficient gives the predictor variable the statistically determined proper amount of weighting in predicting the total test score. The score of Part II is a predictor of the total test score ($t = 18.771, p < 0.001$).

Table 45

One Way ANOVA for Regression: Participants' Language Maintenance and Their Attitudes towards the English Language

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4199.867	1.000	4199.867	45.847	.000
	Residual	43604.374	476.000	91.606		
	Total	47804.241	477.000			

The p column in Table 45 also shows that the observed F -ratio is larger than the F critical value ($p < 0.001$). Therefore, it can be concluded from the analysis that the regression effect for the participants' attitudes towards the English language is greater than zero, and thus those attitudes of the participants may be a predictor.

The table also shows that the participants' attitudes towards the English language have a very close cause-and-effect relationship with their language maintenance ($F = 45.847, p < 0.001$).

Table 46

Correlation Analysis between Participants' Language Maintenance and Their Attitudes towards Other English Language Learners

	Total Test Score
Participants' attitudes towards other English language learners	.729(**)

** Correlation is significant at the 0.01 level (2-tailed).

Table 46 indicates a positive correlation between the two variables. The correlation coefficient is 0.729, indicating a strong relationship between the total test score and the score of Section I of Part II. It can be concluded that the participants' language maintenance is closely related to their attitudes towards English language learners at the level of 53.1% ($r^2 = 0.531, p < 0.01$).

Table 47

Results of the Regression Analysis: Participants' Language Maintenance and Their Attitudes towards Other English Language Learners

Mode 1		Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	<i>Sig.</i>
		<i>B</i>	Std. Error	β		
1	(Constant)	31.652	2.688		25.496	.000
	Participants' attitudes towards other English language learners	0.803	0.073	0.729	15.136	.000

Tables 46 and 47 show that the participants' score of attitudes towards other English language learners is positively and significantly related to their total test score, and as such, it would probably be worth the time and expense for the participants to take a positive attitude towards other English language learners.

The regression equation for the above data in Table 47 is

$$\text{Total Test Score} = 31.752 + 0.803 \times \text{Score of Section I of Part II}$$

The first term in the prediction equation (31.752) is a constant that represents the

predicted criterion value when both predictors equal zero. The value of 0.803 represents regression weight. Multiplying the score of Section I of Part II by the appropriate regression coefficient gives the predictor variable the statistically determined proper amount of weighting in predicting the total test score. The score of Section I of Part II is a predictor of the total test score ($t = 15.136, p < 0.001$).

Table 48

One Way ANOVA for Regressions: Participants' Language Maintenance and Their Attitudes towards Other English Language Learners

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2510.428	1	2510.428	26.382	.000
	Residual	45293.813	476	95.155		
	Total	47804.241	477			

The p column in Table 48 also shows that the observed F -ratio is larger than the F critical value ($p < 0.001$). Therefore, it can be concluded from the analysis that the regression effect for the participants' attitudes towards other English language learners is greater than zero, and those attitudes may be a predictor.

A close cause-and-effect relationship between the participants' attitudes towards other English language learners and their language maintenance is revealed by ANOVA values ($F = 26.382, p < 0.001$).

Table 49

Correlation Analysis between Participants' Language Maintenance and Their Interest in the English Language

	Total Test Score
Participants' interest in the English language	.748(**)

** Correlation is significant at the 0.01 level (2-tailed).

Table 49 indicates a positive correlation between the two variables. The correlation coefficient is 0.748, indicating a strong relationship between the participants' total test score

and their interest in the English language. In fact, the variation in the participants' language maintenance can be accounted for by the variation of the participants' interest in the English language at the level of 56.0% ($r^2 = 0.560, p < 0.01$).

Table 50

Results of the Regression Analysis: Participants' Language Maintenance and Their Interest in the English Language

Model		Unstandardized		Standardized	<i>t</i>	<i>Sig.</i>
		Coefficients		Coefficients		
		<i>B</i>	Std. Error	β		
1	(Constant)	24.219	3.634		21.437	.000
	Participants' interest in the English language	.874	0.088	.748	15.829	.000

Tables 49 and 50 show that the participants' interest in the English language is positively and significantly related to their total test score, and as such, it would probably be worth the time and expense for the participants to produce a strong interest in the English language.

The regression equation for the above data in Table 50 is

$$\text{Total Test Score} = 24.219 + 0.874 \times \text{Score of Section II of Part II}$$

The first term in the prediction equation (24.219) is a constant that represents the predicted criterion value when both predictors equal zero. The value of 0.874 represents regression weight. Multiplying the score of Section II of Part II by the appropriate regression coefficient gives the predictor variable the statistically determined proper amount of weighting in predicting the total test score. The score of Section II of Part II is a predictor of the total test score ($t = 15.829, p < 0.001$).

Table 51

One Way ANOVA for Regressions: Participants' Language Maintenance and Their Interest in the English Language

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3191.893	1	3191.893	34.057	.000
	Residual	44612.348	476	93.723		
	Total	47804.241	477			

The p column in Table 51 also shows that the observed F -ratio is larger than the F critical value ($p < 0.001$). Therefore, it can be concluded from the analysis that the regression effect for the participants' interest in the English language is greater than zero, and thus the participants' interest in the English language may be a predictor.

Table 51 shows that there is a very close cause-and-effect relationship between the participants' interest in the English language and their language maintenance ($F = 34.057, p < 0.01$).

Table 52

Correlation Analysis between Participants' Language Maintenance and Their Attitudes towards English Language Learning

	Total Test Score
Participants' attitudes towards English language learning	.761(**)

** Correlation is significant at the 0.01 level (2-tailed).

Table 52 indicates a positive correlation between the two variables. The correlation coefficient is 0.761, indicating a strong relationship between the participants' total test score and their attitudes towards English language learning. It can be concluded that the variation in the participants' language maintenance can be accounted for by the variation of their interest in the English language at the level of 57.9% ($r^2 = 0.579, p < 0.01$).

Table 53

Results of the Regression Analysis: Participants' Language Maintenance and Their Attitudes towards English Language Learning

Model		Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	Sig.
		<i>B</i>	Std. Error	β		
1	(Constant)	21.051	2.803		19.162	.000
	Participants' attitudes towards English language learning	0.857	0.072	.761	14.670	.000

It can be seen from Tables 52 and 53 that the participants' total test score is positively related to their attitudes towards English language learning, but also significantly, and as such, it would probably be worth the time and expense for the participants to develop a positive attitude towards English learning.

The regression equation for the above data in Table 53 is

$$\text{Total Test Score} = 21.051 + 0.857 \times \text{Score of Section III of Part II}$$

The first term in the prediction equation (21.051) is a constant that represents the predicted criterion value when predictor equals zero. The value of 0.857 represents regression weight. Multiplying the score of Section III of Part II by the appropriate regression coefficient gives the predictor variable the statistically determined proper amount of weighting in predicting the total test score. The score of Section II of Part II is a predictor of the total test score ($t = 14.670, p < 0.001$).

Table 54

One Way ANOVA for Regressions: Participants' Language Maintenance and Their Attitudes towards English Language Learning

Model		Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	Sig.
1	Regression	5257.799	1	5257.799	58.823	.000
	Residual	42546.442	476	89.383		
	Total	47804.241	477			

The p column in Table 54 also shows that the observed F -ratio is larger than the F critical value ($p < 0.001$). Therefore, it can be concluded from the analysis that the regression effect for the participants' attitudes towards English language learning is greater than zero, and thus those attitudes may be a predictor. It can be found from Table 54 that the participants' attitudes towards English language learning have a very close cause-and-effect relationship with their language maintenance ($F = 58.823, p < 0.001$).

4.4.3 Correlation between Total Test Score and Score of Each Item of the Questionnaire

Table 55

Correlation Analysis between Total Test Score and Each Item of the Questionnaire

Item	r	Sig.
Item 1	.654	.000
Item 2	.403	.000
Item 3	.364	.001
Item 4	.428	.000
Item 5	.442	.000
Item 6	.508	.000
Item 7	.475	.000
Item 8	.532	.000
Item 9	.548	.000
Item 10	.470	.000
Item 11	.582	.000
Item 12	.533	.000
Item 13	.386	.001
Item 14	.504	.000
Item 15	.462	.000
Item 16	.549	.000
Item 17	.526	.000
Item 18	.457	.000
Item 19	.572	.000
Item 20	.511	.000
Item 21	.369	.001
Item 22	.338	.003

Item	<i>r</i>	<i>Sig.</i>
Item 23	.547	.000
Item 24	.406	.000
Item 25	.486	.000
Item 26	.523	.000
Item 27	.438	.000
Item 28	.759	.001
Item 29	.396	.001
Item 30	.313	.001
Item 31	.594	.000
Item 32	.593	.000
Item 33	.546	.000
Item 34	.645	.000
Item 35	.624	.000
Item 36	.480	.000
Item 37	.593	.000
Item 38	.594	.000
Item 39	.393	.001
Item 40	.509	.000
Item 41	.381	.000
Item 42	.444	.000

Correlation coefficients between any item of the questionnaire and the total test score range from 0.313 to 0.654 ($p < 0.01$). Most of them (33 out of 42 items) have a value of more than 0.400 and even the smallest value occurring with Item 30 ($r = 0.313$, $p < 0.01$) is still of statistical significance. Thus, the participants' responses to the majority of items in the questionnaire could be regarded as a good, at least not a poor, predictor of their language maintenance.

In Table 55, there are 42 variables which can be employed to predict the participants' language skills. That number is too large and may result in a sizable residual variance. It was decided to use only those variables with a higher correlation with the dependent variable, since it can ensure that the residual variance will be as small as possible. So the stepwise regression was employed to help reduce the number of variables. After the treatment of these 42 items with stepwise regression, 13 items were generated (see Table 56).

Table 56

One Way ANOVA for Regressions: Total Test Score and Score of Fitted Item of the Questionnaire

Model		Sum of Squares	df	Mean Square	F	Sig.
Item 23	Regression	7358.128	1	7358.128	78.019	.000
	Residual	44892.395	476	94.312		
	Total	52250.529	477			
Item 11	Regression	5893.295	1	5893.295	63.763	.000
	Residual	43994.218	476	92.425		
	Total	49887.513	477			
Item 28	Regression	5144.275	1	5144.275	51.223	.000
	Residual	47804.227	476	100.429		
	Total	52948.502	477			
Item 12	Regression	4395.234	1	4395.234	46.270	.000
	Residual	45215.705	476	94.991		
	Total	49610.939	477			
Item 33	Regression	4329.407	1	4329.407	45.875	.000
	Residual	44921.893	476	94.374		
	Total	49251.300	477			
Item 9	Regression	4290.091	1	4290.091	45.542	.000
	Residual	44857.413	476	94.238		
	Total	49147.504	477			
Item 26	Regression	4031.622	1	4031.622	42.250	.000
	Residual	45421.211	476	95.423		
	Total	49452.833	477			
Item 24	Regression	3965.664	1	3965.664	39.973	.001
	Residual	47265.791	476	99.298		
	Total	51231.455	477			
Item 1	Regression	3253.872	1	3253.872	37.029	.000
	Residual	41827.220	476	87.872		
	Total	45081.092	477			
Item 39	Regression	3228.865	1	3228.865	32.423	.000
	Residual	47389.492	476	99.558		
	Total	50618.357	477			
Item 31	Regression	2812.326	1	2812.326	31.166	.000
	Residual	42952.838	476	90.237		

Model		Sum of Squares	df	Mean Square	F	Sig.
	Total	45765.164	477			
Item 21	Regression	2927.206	1	2927.206	29.287	.000
	Residual	47575.644	476	99.949		
	Total	50502.850	477			
Item 25	Regression	2620.759	1	2620.759	27.029	.000
	Residual	46153.144	476	96.961		
	Total	48773.903	477			

The p column in Table 56 also shows that the observed F -ratio is larger than the F critical value ($p < 0.001$). Therefore, it can be concluded from the analysis that the regression effect for these thirteen items is greater than zero, and thus these thirteen items may be good predictors.

All these 13 variables, carrying high factor loadings (see Table 12), are good predictors ($F > 27$, $p < 0.001$). And it means that there is a close cause-and-effect relationship between these thirteen variables and the participants' language maintenance:

First, the graduate participants' English maintenance is influenced by their positive idea about the importance of the command of the English language in their work (Item 1) ($r = 0.654$, $p < 0.01$; $F = 37.029$, $p < 0.001$), and their frequent contact with English, for example, reading English newspapers and magazines (Item 9) ($r = 0.548$, $p < 0.01$; $F = 45.542$, $p < 0.001$), watching English TV programs (Item 11) ($r = 0.582$, $p < 0.01$; $F = 63.763$, $p < 0.001$) and visiting English websites (Item 12) ($r = 0.533$, $p < 0.01$; $F = 46.270$, $p < 0.001$).

Second, the graduate participants believe that the proficient English users play a key role in the introduction into China of the folk customs from English-speaking countries. This belief with a high factor loading (0.757) is found to be correlated with the participants' maintenance of English (Item 21) ($r = 0.369$, $p < 0.01$; $F = 29.287$, $p < 0.001$).

Third, the graduate participants' English retention is closely related to their interests, such as their interest in visiting an English-speaking country (Item 23) ($r = 0.547$, $p < 0.01$; $F = 78.019$, $p < 0.001$), their wish to speak English perfectly (Item 25) ($r = 0.486$, $p < 0.01$; $F = 27.029$, $p < 0.001$), to read English newspapers and magazines (Item 26) ($r = 0.523$, $p < 0.01$; $F = 45.250$, $p < 0.001$), to learn a lot of foreign languages (Item 28) ($r = 0.759$, $p < 0.01$; $F =$

52.223, $p < 0.001$), and to meet and listen to people who speak English (Item 31) ($r = 0.594$, $p < 0.01$; $F = 31.166$, $p < 0.001$).

Fourth, those participants who believe that learning English is great fun (Item 33) ($r = 0.546$, $p < 0.01$; $F = 45.875$, $p < 0.001$) and that studying English can be important for them because it will allow them to be more at ease with English-speakers (Item 39) ($r = 0.393$, $p < 0.01$; $F = 32.423$, $p < 0.001$) are more likely to maintain their English language.

Table 57

Results of the Regression Analysis: Language Maintenance and Fitted Item of Language Attitudes and Motivations of Graduate Participants

Model	Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	Sig.
	<i>B</i>	Std. Error	β		
(Constant)	39.056	2.951		13.235	.000
Item 23	6.270	0.602	0.549	10.836	.000
(Constant)	45.342	1.607		28.213	.000
Item 11	6.320	0.600	0.582	10.032	.000
(Constant)	55.295	2.428		22.773	.000
Item 28	3.490	0.531	0.297	11.671	.000
(Constant)	47.545	1.545		30.773	.000
Item 12	5.830	0.586	0.534	10.131	.000
(Constant)	44.329	2.028		21.854	.000
Item 33	6.260	0.734	0.546	11.201	.000
(Constant)	46.317	1.661		27.886	.000
Item 9	5.980	0.521	0.548	10.291	.000
(Constant)	45.115	2.080		21.691	.000
Item 26	6.030	0.647	0.523	9.878	.000
(Constant)	47.987	3.159		15.188	.000
Item 24	4.860	0.718	0.408	9.554	.000
(Constant)	39.579	1.950		20.298	.000
Item 1	6.640	0.464	0.651	8.792	.000
(Constant)	48.568	3.314		14.657	.000
Item 39	4.620	0.595	0.392	10.244	.000
(Constant)	42.626	1.778		23.975	.000
Item 31	6.440	0.548	0.594	9.269	.000
(Constant)	52.710	1.751		30.101	.000
Item 21	3.700	0.461	0.366	8.950	.000
(Constant)	43.443	2.900		14.978	.000
Item 25	5.650	0.606	0.485	8.474	.000

The t -values for these thirteen items all exceed the t -critical value at .01; therefore, the null hypothesis that the regression coefficient for these thirteen items is equal to zero can be rejected.

The first term in any of the prediction equations is a constant that represents the predicted criterion value when the predictor equals zero. The value of B represents regression weight. Multiplying these thirteen items respectively by the appropriate regression coefficient gives the predictor variable the statistically determined proper amount of weighting in predicting the total test score.

According to Table 57, thirteen predicting formulas can be built as shown in Table 58.

Table 58

Predicting Formulas of Language Maintenance

Model	Total Test Score
Item 23	$TTS^* = 39.056 + 6.270 \times \text{Score of Item 23}$
Item 11	$TTS = 45.342 + 6.320 \times \text{Score of Item 11}$
Item 28	$TTS = 55.295 + 3.490 \times \text{Score of Item 28}$
Item 12	$TTS = 47.545 + 5.830 \times \text{Score of Item 12}$
Item 33	$TTS = 44.329 + 6.260 \times \text{Score of Item 33}$
Item 9	$TTS = 46.317 + 5.980 \times \text{Score of Item 9}$
Item 26	$TTS = 45.115 + 6.030 \times \text{Score of Item 26}$
Item 24	$TTS = 47.987 + 4.860 \times \text{Score of Item 24}$
Item 1	$TTS = 39.579 + 6.640 \times \text{Score of Item 1}$
Item 39	$TTS = 48.568 + 4.620 \times \text{Score of Item 39}$
Item 31	$TTS = 42.626 + 6.440 \times \text{Score of Item 31}$
Item 21	$TTS = 52.710 + 3.700 \times \text{Score of Item 21}$
Item 25	$TTS = 43.443 + 5.650 \times \text{Score of Item 25}$

* Where, TTS means the total test score.

Any of these thirteen formulas can be employed to predict the participants' language maintenance in light of their response to any of these items.

4.4.4 Correlation between Subtest Score and Total Questionnaire Score

In this part, the correlations are to be shown between the participants' total test score and

the score of each subtest.

(a) Correlation between Dictation Subtest Score and Total Questionnaire Score

Table 59

Correlation Analysis between Dictation Subtest and the Questionnaire

	Dictation Subtest
Questionnaire	.872(**)

** Correlation is significant at the 0.01 level (2-tailed).

Table 59 shows that a close relationship between the participants' general language attitudes and their maintenance of listening comprehension skills ($r = 0.872$). It can be concluded that the variation in the participants' maintenance of listening comprehension skills can be accounted for at the level of 76.0% ($r^2 = 0.760$) by the variation in their attitudes and motivations ($p < 0.01$).

Table 60

Results of the Regression Analysis: Listening Comprehension Skill Maintenance and Total Questionnaire Score

Model		Unstandardized		Standardized	<i>t</i>	<i>Sig.</i>
		Coefficients		Coefficients		
		<i>B</i>	Std. Error	β		
1	(Constant)	-23.891	9.583		-19.614	.000
	Questionnaire	.530	0.060	.872	28.771	.000

Tables 59 and 60 show that the participants' total dictation score is positively and significantly related to their total questionnaire score.

The regression equation for the above data in Table 60 is

$$\text{Total Dictation Score} = -23.891 + 0.530 \times \text{Total Questionnaire Score}$$

The first term in the prediction equation (-23.891) is a constant that represents the predicted criterion value when the predictor equals zero. The value of 0.530 represents regression weight. Multiplying the total questionnaire score by the appropriate regression coefficient gives the predictor variable the statistically determined proper amount of weighting in predicting the total dictation score. The score of the total questionnaire is a predictor of the score of the dictation subtest ($t = 28.771, p < 0.001$).

Table 61

One Way ANOVA for Regressions: Listening Comprehension Skills and Total Questionnaire Scores

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	65772.005	1	65772.005	76.907	.000
	Residual	408795.019	478	885.220		
	Total	474567.024	479			

The p column in Table 61 also shows that the observed F -ratio is larger than the F critical value ($p < 0.001$). Therefore, it can be concluded from the analysis that the regression effect for the total questionnaire score is greater than zero, and thus the total questionnaire score may be a predictor ($F = 76.907, p < 0.001$).

(b) Correlation between Vocabulary Subtest Score and Total Questionnaire Score

Table 62

Correlation Analysis between Vocabulary Subtest and the Questionnaire

	Vocabulary Subtest
Questionnaire	.730(**)

** Correlation is significant at the 0.01 level (2-tailed).)

Table 62 indicates a positive correlation between the two variables. The correlation coefficient is 0.730, indicating a strong relationship between the total vocabulary score and the total questionnaire score. It can be argued that the variation in the participants' maintenance of lexical knowledge can be accounted for at the level of 53.3% ($r^2 = 0.533$) by

the variation in their language attitudes and motivations ($p < 0.01$).

Table 63

Results of the Regression Analysis: Lexical Knowledge Maintenance and Total Questionnaire Score

Model		Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	Sig.
		<i>B</i>	Std. Error	β		
1	(Constant)	-21.873	3.348		-18.927	.000
	Questionnaire	.405	.021	.730	27.896	.000

Tables 62 and 63 show that the participants' total vocabulary score is positively and significantly related to their total questionnaire score.

The regression equation for the above data in Table 63 is

$$\text{Total Vocabulary Score} = -21.873 + 0.405 \times \text{Total Questionnaire Score}$$

The first term in the prediction equation (-21.873) is a constant that represents the predicted criterion value when the predictor equals zero. The value of 0.405 represents regression weight. Multiplying the total questionnaire score by the appropriate regression coefficient gives the predictor variable the statistically determined proper amount of weighting in predicting the total vocabulary score. The score of the total questionnaire is a predictor of the score of the vocabulary score ($t = 27.896$, $p < 0.001$).

Table 64

One Way ANOVA for Regressions: Lexical Knowledge and Total Questionnaire Scores

Model		Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	Sig.
1	Regression	8581.142	1	8581.142	82.240	.000
	Residual	496693.053	478	1043.472		
	Total	505274.195	479			

The p column in Table 64 also shows that the observed F -ratio is larger than the F critical value ($p < 0.001$). Therefore, it can be concluded from the analysis that the regression effect

for the total questionnaire score is greater than zero, and thus the total questionnaire score may be a predictor ($F = 82.240, p < 0.001$).

(c) Correlation between Reading Comprehension Subtest Score and Total Questionnaire Score

Table 65

Correlation Analysis between Reading Comprehension Subtest and the Questionnaire

	Reading Comprehension Subtest
Questionnaire	.604(**)

** Correlation is significant at the 0.01 level (2-tailed).

Table 65 indicates a positive correlation between the two variables. The correlation coefficient is 0.604, indicating a strong relationship between the total reading comprehension score and the total questionnaire score. In fact, the variation in the participants' language attitudes can be employed to account for the variation in their reading skill maintenance at the level of 36.5% ($r^2 = 0.365, p < 0.01$).

Table 66

Results of the Regression Analysis: Reading Comprehension Skill Maintenance and Total Questionnaire Score

Model	Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	Sig.
	<i>B</i>	Std. Error	β		
1 (Constant)	-20.416	2.91		-18.254	.000
Questionnaire	.367	0.023	.604	26.943	.000

Tables 65 and 66 show that the participants' total reading comprehension score is positively and significantly related to their total questionnaire score.

The regression equation for the above data in Table 66 is

$$\text{Total Reading Comprehension Score} = -20.416 + 0.367 \times \text{Total Questionnaire Score}$$

The first term in the prediction equation (-20.416) is a constant that represents the predicted criterion value when the predictor equals zero. The value of 0.367 represents regression weight. Multiplying the total questionnaire score by the appropriate regression coefficient gives the predictor variable the statistically determined proper amount of weighting in predicting the total reading comprehension score. The score of the total questionnaire is a predictor of the score of the reading comprehension score ($t = 26.943$, $p < 0.001$).

Table 67

One Way ANOVA for Regressions: Reading Comprehension Skills and Total Questionnaire Scores

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8986.705	1	8986.705	71.085	.000
	Residual	37809.812	478	79.100		
	Total	46796.517	479			

The p column in Table 67 also shows that the observed F -ratio is larger than the F critical value ($p < 0.001$). Therefore, it can be concluded from the analysis that the regression effect for the total questionnaire score is greater than zero, and thus the total questionnaire score may be a predictor ($F = 71.085$, $p < 0.001$).

The study of the correlations between the participants' language maintenance and their language attitudes and motivations in this section (4.4) shows the following results

(1) The variation of the participants' language maintenance can be accounted for by the variation of their general language attitudes ($r = 0.713$, $p < 0.01$), their idea of English language learning and use situation in China ($r = 0.705$, $p < 0.01$), their attitudes towards the English language ($r = 0.740$, $p < 0.01$), their attitudes towards English language learners ($r = 0.729$, $p < 0.01$), their interest in the English language ($r = 0.748$, $p < 0.01$) and their attitudes towards English language learning ($r = 0.761$, $p < 0.01$).

(2) Correlation coefficients between the participants' language maintenance and their response to each item of the questionnaire range from 0.313 to 0.759 ($p < 0.005$). Most of them (33 out of 42 items) have a value of more than 0.400, and even the smallest value (Item 30,

$r = 0.313, p < 0.001$) is still of statistical significance.

(3) In accordance with the factor loadings of all the items in the questionnaire and by making use of stepwise regression analysis, the number of the items in the questionnaire has been reduced to a smaller manageable number ($N = 13$). These items are closely related to the participants' language maintenance ($0.369 \leq r \leq 0.759, p < 0.05$).

(4) The graduate participants' maintenance of listening comprehension skills, lexical knowledge, and reading comprehension skills are closely related to their general attitudes towards English language and use ($0.604 \leq r \leq 0.872, p < 0.01$).

Based upon a constant and one or more β values, many predicting formulas can be established. All these established formulas can be employed to predict the participants' language attrition according to their responses to the questionnaire. All this favourably confirmed Gardner's repeatedly stressed speculation (1982, p. 32) of the important role that attitudes and motivation play in language attrition: "Attitudinal/motivational variables could also influence second language retention by orienting the individual to take every opportunity to maintain proficiency in the language."

Chapter Five Discussion

This chapter is to interpret what has been found with this study. First of all, the actuality of English attrition, both at the level of the participants' general receptive language skills and at the level of their listening comprehension skills, the lexical knowledge and the reading comprehension skills, is to be discussed in order to reveal that English attrition is a fact, not just our intuition or imagination. Secondly, the degree of attrition is to be interpreted. The discussion shows how many general language skills or how many particular language skills have been lost by college English major graduates. Thirdly, the pattern of attrition is to be discussed in order to find that the attrition pattern of those graduates is in agreement with the traditional forgetting curve theory or the regression hypothesis about language attrition. Finally, the relationships between the participants' language maintenance and their language attitudes and motivations are to be discussed. The discussion focuses on the correlation among language maintenance and the participants' general language attitudes, their idea about English language learning and use, their attitudes towards the English language, their attitudes towards the English language learners, and their interest in the English language.

5.1 Actuality of English Attrition

Language, as a dynamic system, is featured by the wholeness and interactions among such factors as language acquisition, language maintenance effort, language transfer/interference, and language loss. The ever-changing features of and the mutual interaction among these factors make the language change between stable and unstable states and, sometimes, lead to a qualitative change. Thus, one's language system is in a dynamic state. It begins with acquisition and ends with attrition (Briggs & Peat, 1989). It is the same case with English learned as a foreign language by Chinese English major graduates. The termination of exposure to English and the dominance of Chinese in China affect graduates' maintenance of English language skills over time, resulting in attrition.

As far as the actuality of English attrition is concerned, quite a number of aspects still

deserve further discussion at this point. In the following sections, attrition of the participants' general language skills and specific language skills (listening comprehension skills, lexical knowledge, reading comprehension skills) is to be elaborated upon.

5.1.1 Attrition of General Language Skills

In order to find whether college English major graduates exhibit any amount of attrition of English that had been learned as a foreign language, the author makes a comparative study of the total test scores of the participants of Groups C, D and E, with the total test scores of the participants of Group C serving as the baseline of peak attainment of the participants of Groups D and E.

The standard deviations (*see* Table 24) of the means of total test scores within any group of participants are rather small. That suggests that the participants within any group are fairly homogeneous as far as their language acquisition (of Group C) or maintenance (Groups D and E) is concerned.

The comparison of the mean total test scores of the participants of these three groups shows that the graduates exhibit a remarkable amount of attrition ($\bar{X}_C = 79.58$, $\bar{X}_D = 59.70$, $\bar{X}_E = 52.30$, $F = 217.948$, $p < 0.001$), especially in the first two-year interval (*see* Figure 23). Even after one and two standard deviations are both added to or deducted from the means of the total test scores ($\bar{X} \pm s$ or $\bar{X} \pm 2s$) of the participants of the three groups respectively, the means within one or two standard deviations still show attrition (*see* Figures 24 & 25).

Nevertheless, in Figure 25, the means of the participants of Groups C and D within two standard deviations still demonstrate obvious attrition at the level of 95.4%. However, the tendency of attrition between the participants of Groups D and E is a little complicated. The means of the participants of Groups D and E within one standard deviation show obvious further attrition at the level of 68.2% (*see* Figure 24). However, the means within two standard deviations show a general tendency of further attrition, but can not definitely show further attrition at the level of 95.4%, for in Figure 25, the lower point of Group D falls between the upper and lower points of Group E and the opening formed by the two parabolic curves at the two points of Group E is wider. There might be two reasons to account for this

phenomenon.

First, the participants of Group E are more heterogeneous than those of Group D in their language maintenance, and this heterogeneity can be fairly accounted for by the standard deviations of these two groups ($s_D = 5.28$, $s_E = 5.73$). Second, the participants of Group E have a good maintenance of the earliest acquired, least complex and easiest-to-command language skills. So, after a period of two years of relatively drastic attrition of the last acquired, most complex and difficult-to-command language skills (see Figure 23), the participants' language becomes stable, and the rate of language attrition slows and even levels off (see Figure 27).

The findings of the early setting-in of attrition and the drastic attrition rate in this study are quite different from those of some Western language attrition specialists (Bahrick, 1984a; Weltens, 1989; Weltens, van Els & Schils, 1989; Wood, 1980). Weltens (1989) found that French learned as a foreign language in Dutch schools shows little attrition in the participants. The difference between the findings of this study and the findings of others can be accounted for by the different relationships between the attrited language and the language in dominant use. Up to now, in most second or foreign language attrition studies conducted in the West, the participants' second or foreign language, be it French, English, Dutch or any other language, is of the Indo-European language family, and more often than not, the second or foreign language is of the same language family as the participants' mother tongue. This situation means the participants' mother tongue might beneficially retard or even stem the attrition of the disused second or foreign language. However, Chinese, the mother tongue of the participants in this study, can not provide them with any favorable support in retarding or stabilizing their English language skills because Chinese and English are of different language families.

5.1.2 Attrition of Different Language Skills

This research is also aimed at studying attrition of three kinds of language skills of the participants, that is, listening comprehension skills, lexical knowledge, and reading comprehension skills.

The comparison of the standardized means of the dictation subtest scores of the

participants of Groups C, D and E ($\bar{X}_C = 76.10$, $\bar{X}_D = 69.80$, $\bar{X}_E = 60.30$, $F_D = 373.780$, $p < 0.001$) shows obvious attrition of the listening comprehension skills of the participants of Groups D and E (see Tables 27 & 28, and Figure 28). Moreover, the high correlation between participants' performances on the whole test and the dictation subtest ($r = 0.786$, $p < 0.01$) means that the participants' scores in the dictation subtest are a predictor of maintenance of general language skills.

Another two comparisons of the standardized means of the vocabulary subtest scores ($\bar{X}_C = 74.15$, $\bar{X}_D = 67.75$, $\bar{X}_E = 65.30$, $F_D = 107.823$, $p < 0.001$) and the reading comprehension subtest scores ($\bar{X}_C = 75.71$, $\bar{X}_D = 67.87$, $\bar{X}_E = 66.50$, $F_D = 60.231$, $p < 0.001$) show a tendency of attrition of both lexical knowledge and reading comprehension skills of the graduate participants (see Table 27, and Figure 28). This study also shows that the attrition of different language skills of different groups of participants develops at different speeds: in the participants of Group D, the reading comprehension skills attrite fastest and the listening comprehension skills have a relatively good retention, while among the participants of Group E, the listening comprehension skills attrite fastest, and the lexical knowledge is comparatively well maintained.

Figures 29, 30 and 31 show that the undergraduate participants' peak attainment of lexical knowledge and reading comprehension skills does not occur at the end of their fourth academic years. Instead, it occurs at the end of their third academic year. This kind of occurrence can be well accounted for by the fact that most of the fourth year undergraduates, except for those who continue their intensive study of English in order to be accepted to an MA program, are busy hunting for jobs instead of concentrating on their English study.

To sum up, whatever the reasons may be, the English language of the graduate participants suffers systematic attrition. In addition, the attrition found by this study verifies the dynamic systems theory that one's language system begins with acquisition and ends with attrition (Briggs & Peat, 1989).

5.2 Degree of Attrition

In deciding to what degree the language skills of those graduates have been eroded by attrition or how many of their language skills have been lost, the test results of the participants of Groups A, B and C are included in the study, in the expectation that their test results can be employed as reference against which the maintenance of language skills of the participants of Groups D and E can be compared.

5.2.1 Attrition of General Language Skills

This study finds that the participants of Group D maintain what had been learned before the end of the second semester of their first academic year, and the participants of Group E keep what had been acquired before the end of the first semester of their first academic year. This means that the participants of Group D have forgot what they had learned after the end of the second semester of their first academic year, while the participants of Group E have lost what they had learned after the end of the first semester of their first academic year (see Figure 26).

The great degrees of English attrition suggest somewhat regretfully that the combined effort of English teachers, students, and even the whole society to teach and learn English as a foreign language is made in vain. Faced with such a serious situation of English attrition, all the parties involved in English teaching and learning in China should make more effort to seek for the methods to teach and learn English in a way that the acquired language could be immune to attrition, and to find the ways to help college graduates to prevent attrition or at least to slow down the process of attrition.

5.2.2 Attrition of Different Language Skills

As far as attrition of different language skills is concerned, the participants' lexical knowledge is the most vulnerable. This study shows that the lexical knowledge of the participants of Group D attrites to such a degree that the lexical knowledge that they had acquired in the last seven semesters has been completely lost. The study predicts that the participants of Group E have lost all the lexical knowledge that had been obtained after the last semester of their high school academic years, supposing that the acquisition of the lexical

knowledge develops in the same way in high school as in college. The drastic attrition of lexical knowledge might have many reasons, such as the disuse of and nonexposure to it. However, a widely-accepted reason is that most of the lexical knowledge is not acquired in an interconnected way. The knowledge that is not acquired in the interconnected way is usually "isolated" and less-connected to a "structured system of relationships" and is easily forgotten (Neisser, 1984, p. 34). Thus, it can be argued that the better connected the knowledge is, the longer it will be retained. This argument complements the "best learned, last forgotten" hypothesis because the best learned knowledge is more likely to be better connected with other knowledge or information.

This study finds that of the three language skills, the listening comprehension skills perform relatively well in the resisting attrition. The participants of Group D still keep the listening comprehension skills they had acquired in their first two college semesters and the participants of Group E still retain traces of their listening comprehension skills acquired at the beginning of their first college semester. The reason might be that listening comprehension is not a one-way bottom-up process but instead a more complex combination of top-down and bottom-up processes. In other words, listening is the consecutive processing not just of subskills starting from the lowest level to the highest (the discerning of the phonemes, morphemes, lexis and syntax of the language), but also of listener's knowledge of the outside world and how it relates to the topic at hand, as well as his interpretation of what has been said so far. In a word, listening involves listeners' interconnected "redundant and systematic" knowledge that, according to Neisser (1984, p. 34), is more resistant to attrition and can be retained longer.

Figure 35 shows that the vertex of the parabolic curve formed by the means of the very easy items in the vocabulary and the reading comprehension subtests does not fall upon the supposed peak attainment of language skills of the participants of Group C, but instead, falls between points of Groups C and D. This means that in the very first year of disuse of English, the participants' command of lexical knowledge of the lowest level has improved instead of having attrited. It seems that this finding is not in agreement with our intuition. But it can be accounted for by alternative explanations such as the participants' continued learning of other languages (including L1), or their increased testpertise.

To sum up, the graduate participants' language skills, be they general skills or specific skills, have been eroded seriously by disuse over time. The participants of both Groups D and E fail to keep the skills that they had acquired in the last three college academic years. What is regrettably significant is that the lexical knowledge attrition of the participants of Group E has even regressed into their high school learning.

5.3 Patterns of English Attrition

The study of the order of attrition and the particular attrition development track in the years of disuse of English shows the pattern of English attrition exhibited in the graduate participants.

5.3.1 Order of English Attrition

In the construction of the test, the items in both the vocabulary subtest and the reading comprehension subtest are deliberately divided into four groups in accordance with their different levels of difficulty: Very Easy Items, Easy Items, Difficult Items, and Very Difficult Items.

This study finds that the graduate participants have a good command of the least complex and the easiest-to-command language skills, and that means that these skills are more resistant to attrition. But the graduate participants have a very poor performance on the difficult and the very difficult items, and that suggests that their language skills at these two levels have almost been lost completely. Consequently, it can be concluded that the more difficult the language skills, the earlier to be lost; the easier, the more resistant to attrition.

In accordance with the fact that the least complex and the easiest-to-command language skills are acquired earlier than the most complex and difficult-to-command ones, another conclusion can be drawn from the above conclusion that what is learned first will be retained last, and what is learned last will be lost first. In a word, the order of attrition is in exact opposition to the order of acquisition.

5.3.2 Patterns of Specific Language Skill Attrition

This study finds that the rate of attrition is very remarkable for the participants of Group D, and the rate slows down and even levels off in the participants of Group E. This finding is consistent with the traditional forgetting curve theory put forward by Ebbinghaus (1885) and is in agreement with the findings of Weltens, van Els, and Schils (1989) and Bahrick (1984a). The leveling off of attrition in the third and fourth years of the disuse of English can be interpreted in two ways. On one hand, the first-acquired and best-commanded skills are immune to attrition. On the other hand, linguistic knowledge of the participants of Group E has been eroded by attrition to such a degree that they have almost nothing to lose. The second interpretation is only theoretically true and should be discarded just because this study shows that these participants still have a good command of the language skills acquired in their pre-college years even though they have lost most of the language skills that have been acquired in their college years.

However, the attrition patterns of specific language skills are slightly different. The first one and a half years of disuse witness good maintenance of the listening comprehension skills. The good maintenance can be accounted for by the fact that the participants frequently watch English TV programs in their spare time ($L = 0.840$; $r = 0.582$, $p < 0.01$; $F = 63.763$, $p < 0.001$). However, after one and a half years of disuse, attrition of the listening comprehension skills develops drastically.

The reading comprehension skill attrition sets in rather early, and develops rather quickly in the first three years of disuse, and then levels off. The lexical knowledge attrition sets in shortly after the ending of English learning, and develops at almost the same speed. Consequently, the early onset of attrition suggests that measures should be taken to curb or prevent the attrition immediately after students' graduation from college.

5.4 Causes of Attrition

The systematic study of the relationship between the participants' language attitudes and language attrition shows the graduate participants' maintenance of their language skills is systematically related to their language attitudes.

(1) The high correlations between the participants' maintenance of general language skills

and their general language attitudes and motivations, their idea of English language learning and use in China, their attitudes towards the English language, their attitudes towards the English language learners, their interest in the English language, their attitudes towards English language learning ($0.705 \leq r \leq 0.761$, $p < 0.01$; $F > 26$, $p < 0.001$) and any item of the questionnaire about their English language attitudes ($0.313 \leq r \leq 0.759$, $p < 0.05$; $F > 27$, $p < 0.001$) show that the participants' good performances on the language test can be accounted for by their favourable attitudes and motivations at any level while their poor performances can be explained by their less favourable or negative attitudes.

(2) Of the three language skills, the participants' listening comprehension skills are most highly correlated with their overall language attitudes and motivations ($r = 0.872$, $p < 0.01$; $F = 76.907$, $p < 0.001$). This finding can be accounted for by motivation-driven frequent exposure to English TV programs ($r = 0.582$, $p < 0.01$; $F = 63.763$, $p < 0.001$) and English websites ($r = 0.533$, $p < 0.01$; $F = 46.270$, $p < 0.001$).

(3) The high correlations between the participants' overall language attitudes and their maintenance of listening comprehension skills ($r = 0.872$, $p < 0.01$; $F = 76.907$, $p < 0.001$), lexical knowledge ($r = 0.730$, $p < 0.01$; $F = 82.240$, $p < 0.001$), and reading comprehension skills ($r = 0.604$, $p < 0.01$; $F = 79.100$, $p < 0.001$) suggest that the participants' language attitudes play an important role in their maintenance of different language skills.

(4) The factor analysis of the questionnaire reduces the number of items to a manageable number of 13. These 13 items carry high factor loadings and show a close cause-and-effect relationship with the participants' language skill maintenance ($0.369 \leq r \leq 0.759$, $p < 0.05$). This finding not only shows the important role that these variables in the questionnaire play in the participants' maintenance of their language skills, but also justifies the author's inclusion of these items into the questionnaire.

The systematic study so far exhibits the cause-and-effect relationships between participants' overall language attitudes and their language maintenance. It can be concluded that the more positive their attitudes are, the better maintenance their language skills will be, while the more negative their attitudes are, the more likely the attrition of their language skills will occur.

When the factor analysis of the questionnaire is done, the following items stand out with

high factor loadings, high correlation coefficients, and large F ratios: Item 1 ($L = 0.786$; $r = 0.654$, $p < 0.01$; $F = 37.029$, $p < 0.001$), Item 9 ($L = 0.819$; $r = 0.548$, $p < 0.01$; $F = 45.542$, $p < 0.001$), Item 11 ($L = 0.840$; $r = 0.582$, $p < 0.01$; $F = 63.763$, $p < 0.001$), Item 12 ($L = 0.827$; $r = 0.533$, $p < 0.01$; $F = 46.270$, $p < 0.001$), Item 21 ($L = 0.757$; $r = 0.369$, $p < 0.01$; $F = 29.287$, $p < 0.001$), Item 23 ($L = 0.853$; $r = 0.547$, $p < 0.01$; $F = 78.019$, $p < 0.001$), Item 25 ($L = 0.749$; $r = 0.486$, $p < 0.01$; $F = 27.029$, $p < 0.001$), Item 26 ($L = 0.791$; $r = 0.523$, $p < 0.01$; $F = 45.250$, $p < 0.001$), Item 28 ($L = 0.834$; $r = 0.759$, $p < 0.01$; $F = 52.223$, $p < 0.001$), Item 31 ($L = 0.7681$; $r = 0.594$, $p < 0.01$; $F = 31.166$, $p < 0.001$), Item 33 ($L = 0.822$; $r = 0.546$, $p < 0.01$; $F = 45.875$, $p < 0.001$), and Item 39 ($L = 0.772$; $r = 0.393$, $p < 0.01$; $F = 32.423$, $p < 0.001$). The high factor loadings suggest the importance of the variable in accounting for participants' maintenance of language skills, the high correlation coefficients mean a close relationship of the variable with other variables in the questionnaire, and the large F ratios show a close cause-and-effect relationship between participants' language attitudes and their language maintenance. The prominence of these items in the questionnaire suggests that it will be a good policy for graduates to develop positive language attitudes in order to fight against language attrition. Special attention should be paid to the following aspects in the development of positive language attitudes: (1) Developing a positive idea about the importance of the command of the English language in their work; (2) Increasing their everyday contact with English, for example, reading English newspapers and magazines, watching English TV programs, and visiting English websites; (3) Developing a positive attitude towards the role played by the proficient English users in the introduction of the folk customs from English-speaking countries to China; (4) Developing their interests, such as interest in paying visits to English-speaking countries; (5) Highlighting their wish to speak English perfectly, to read English newspapers and magazines, to learn another foreign language, and to meet and listen to people who speak English well; and (6) Forming a positive attitude towards English learning.

Chapter Six Conclusion

In this concluding chapter of this dissertation, first of all, major findings of this research are to be presented. Next, the contributions of this study are to be reported. Finally, the limitations of this research are to be pointed out and suggestions for future research are to be made.

6.1 Summary of Major Findings

In accordance with what is found in this study (*see* Chapters Four and Five), the research questions posed in Chapter Three (*see* 3.1) can now be answered as follows:

(1) With regard to actuality of attrition, the English language of the college English major graduates has undergone systematic attrition. Both the general language skills and the specific language skills, namely, listening comprehension skills, lexical knowledge, and reading comprehension skills, of English major graduates with two or four years of disuse show remarkable signs of attrition.

(2) As to the degrees of attrition, the graduates with two years of disuse have forgotten the general language skills they had learned after the end of the second semester of their first academic year, while the graduates with four years of disuse have lost what they had learned after the end of the first semester of their first academic year. As far as the three specific language skills are concerned, lexical knowledge has undergone the heaviest loss. Listening comprehension skills have been comparatively well retained, especially by the graduates with two years of disuse. The maintenance of reading comprehension skills is something in between: better than that of the lexical knowledge but worse than that of the listening comprehension skills.

(3) As regards the order of attrition, the most complex and difficult-to-command language skills are lost earlier than the least complex and easiest-to-command ones. This order of attrition is in opposition to the order of acquisition that the least complex and easiest-to-command language skills are learned earlier than the most complex and

difficult-to-command ones.

(4) With respect to the role of language attitudes, the participants' language attitudes greatly affect their language maintenance: The more positive their attitudes are, the better the maintenance of their language skills will be, while the more negative their attitudes, the more likely the attrition of their language skills will be to occur.

6.2 Implications

Based upon the literature of language attrition studies and the findings of this study, this section is to present major implications for individual graduates and educational institutions.

6.3.1 Implications for Graduates

It is of the greatest necessity that individual graduates should shoulder their responsibility in the maintenance of their own English language skills.

First, because their manner and time of contact with the target language play one of the key roles in the rate and extent of their English attrition, college graduates should find various opportunities to use the target language. English salons, English corners, English theaters, English clubs, etc. may be ideal places to provide that kind of contact.

Second, because graduates' language maintenance is significantly correlated with their language attitudes, it is of utmost importance for them to develop positive language attitudes, specifically, positive attitudes towards other English language learners, intense interest in the English language, and positive attitudes towards English language learning.

6.3.2 Implications for Educational Institutions

Educational institutions have their share of responsibility in helping graduates fight against English attrition. As a guideline, they should be aware of language attrition and pay due attention to the study.

First, because the knowledge that is acquired in an interconnected way can form a structured system of relationships with the existing knowledge and is more resistant to attrition, it is advisable that schema theory should be introduced into language teaching, especially into the vocabulary teaching. The to-be-learned knowledge should be integrated

into many kinds of existing knowledge so that the newly-learned and the already-learned knowledge can be incorporated into a complete whole to build up a consolidated system of knowledge which is more resistant to attrition.

Second, because the easy language skills are more resistant to attrition, it is recommendable that foreign language teachers should raise the level of difficulty of language input to make the difficult language skills become easier and thus more resistant to attrition.

Third, because the explicit teaching method can engender more durable language skills, much emphasis should be laid on this method rather than only on the communicative teaching method. Language teachers should manage to make learners not only know what but also know why and how.

Fourth, because cultural atmosphere is of utmost importance to help students resist language attrition, educational institutions should increase cultural programs in the curriculum to provide students with an access to foreign cultures. Foreign politics, economy, religion, literature, folklore, and customs should be introduced into English classrooms. Students should be encouraged to watch English TV programs, see English movies, read English novels, and communicate with native English speakers.

6.3 Contributions of This Study

As an empirical study, the dissertation is not exempt from limitations. But it still has its own contributions.

First, a rough picture of English attrition exhibited in college English major graduates in China has been obtained in this study. The degree and the pattern of English attrition, and the correlations between the participants' language attitudes and their language skill maintenance have all been revealed by the study.

Second, some of the causes of English attrition have been found by this study. The questionnaire adapted from Gardner's classic Attitude/Motivation Test Battery has helped show the role that different language attitudes play in English attrition. The conclusion that the positive language attitudes predict a better retention of language skills has been borne out by this study. And the conclusion may have a very meaningful implication that it is a good pedagogical strategy for graduates to develop positive language attitudes in order to fight

against English attrition.

Thirdly, most Western language attrition studies focused on the attrition of a language that is from the same language family as the language that is in dominant use in the attriters' linguistic environment. However, this study is carried out upon attrition of English whose language family is rather different from that of Chinese, the language in dominant use in China. As a result, the findings of the study can be taken as a meaningful complement to the findings of the international language attrition studies.

Finally, the cross-sectional method which is widely used in epidemiological studies has been adopted for this study. This adoption has succeeded in showing a general profile of English attrition of college English major graduates. The successful adoption of the research method might imply that the method can also be employed in future study of language acquisition on a large scale with a large number of variables.

6.4 Limitations of This Study and Suggestions for Future Research

This research is one of the first empirical studies of English language skill attrition exhibited in college English major graduates after certain periods of disuse in China. As an attempt, though it has produced some meaningful findings, this study has its own limitations and its results still need to be interpreted with caution and complemented with further research.

In the first place, this research aimed at studying attrition of the participants' receptive skills can only reveal part of the picture of English attrition exhibited in college English major graduates. Although the inclusion of the dictation subtest may, to a great degree, show the participants' maintenance of both receptive and productive skills (Oller, 1972b, pp. 346-354), the general language proficiency can be more accurately and precisely revealed by a reliable and valid test composed of items to test both the productive and the receptive skills of the participants.

Second, the newly-enrolled freshmen, the second-year and the fourth-year students are included into the sample as the reference against which to study the degree of English attrition of college graduates. Most of the results of the investigation have justified the inclusion of the undergraduate participants. But the results of the participants' lexical knowledge maintenance

show that the participants with four years of disuse of English have lost all their lexical knowledge that they had acquired in their college days and thus no reference group of participants is available to study the degree of their language attrition. In such a situation, the author was forced to assume that English acquisition develops in the same pattern and at the same speed in high school as in college, and in accordance with the assumption the author found the degree of the lexical knowledge attrition of the participants with four years of disuse. Thus, it is suggested that any similar future studies should include one or two groups of high school students as the participants in case any attrited language skills should have no reference to make a comparison to find the degree of attrition.

Third, the study is successful in showing the general profile of English attrition: Attrition develops rather quickly in the participants of Group D, and then it slows down and even levels off in the participants of Group E. If the choice of participants is based upon one-year intervals or even on half-a-year intervals, the results will disclose more accurately at what stage attrition sets in, at what stage it slows down, and at what stage it levels off. Thus, the author suggests that future study should include participants with shortened intervals of disuse of English and increase the number of subject groups.

The author does hope that this study might usher in more in-depth and systematic studies of attrition of English as a foreign language in China and that the studies might discover attrition principles which might help produce methods to slow down or even curb the attrition.

Appendices

Appendix 1

试卷编号

英语测试卷

第一部分 听写测试 (共 5 小题)

请听写下面 5 个英语句子, 每个句子读 4 遍, 每一遍开始有一个提示音, 每遍结束后都有 10 秒钟的停顿, 下面开始听写测试。

1. _____

2. _____

3. _____

4. _____

5. _____

第二部分 词汇知识 (共 40 小题)

请从[A], [B], [C]和[D]四个选项中, 选出可以填入空白处的最佳选项。

1. Betty likes _____ very much. She draws pictures every day.
[A] art
[B] music
[C] sport
[D] science
2. —Would you like something to drink, _____ or coffee?
—Coffee, please.
[A] tea
[B] fruit
[C] bread
[D] meat
3. —Why are you walking to school?
—Because my _____ is broken.
[A] radio
[B] pen
[C] bike
[D] bag
4. I can't _____ which pair of jeans to buy. They both look nice on me.
[A] like
[B] prefer
[C] decide
[D] follow
5. Thousands of spectators came to Shanghai to _____ the 48th World Table Tennis Championship.
[A] see
[B] notice

- [C] watch
[D] look
6. How long can I _____ this magazine?
[A] borrow
[B] return
[C] buy
[D] keep
7. How magnificent the Bund looks at night when all the lights are _____!
[A] turned over
[B] turned off
[C] turned down
[D] turned on
8. Mary is _____ and she often makes her classmates laugh.
[A] shy
[B] pretty
[C] busy
[D] funny
9. Everyone likes Kevin because he talks to others _____.
[A] friendly
[B] lovely
[C] politely
[D] luckily
10. The Oriental Pearl TV Tower is _____ all Shanghai citizens.
[A] famous for
[B] familiar to
[C] pleased with
[D] interested in
11. In our class, when the bell rang and the teacher closed his book, it was a _____ for everyone to

stand up.

[A] signal

[B] chance

[C] mark

[D] measure

12. I'm trying to break the _____ of getting up too late.

[A] tradition

[B] convenience

[C] habit

[D] leisure

13. From their _____ on the top of the TV Tower, visitors can have a better view of the city.

[A] stage

[B] position

[C] condition

[D] situation

14. Encourage your children to try new things, but try not to _____ them too hard.

[A] draw

[B] strike

[C] rush

[D] push

15. Little Johnny felt the bag, curious to know what it _____.

[A] collected

[B] contained

[C] loaded

[D] saved

16. Don't worry if you don't understand everything. The teacher will _____ the main points at the end.

[A] recover

[B] review

[C] require

[D] remember

17. I tried phoning her office, but I couldn't _____.

[A] get along

[B] get on

[C] get to

[D] get through

18. I'm sure that your letter will get _____ attention. They know you're waiting for the reply.

[A] continuous

[B] immediate

[C] careful

[D] general

19. John is very _____—if he promises to do something he'll do it.

[A] independent

[B] confident

[C] reliable

[D] flexible

20. Jack is late again. It is _____ of him to keep others waiting.

[A] normal

[B] ordinary

[C] common

[D] typical

21. I'm surprised they are no longer on speaking terms. It's not like either of them to bear a _____.

[A] disgust

[B] curse

[C] grudge

[D] hatred

22. The book gives a brief _____ of the course of his research up till now.

[A] outline

[B] reference

[C] frame

[D] outlook

23. We stood still, gazing out over the limitless _____ of the desert.

[A] space

[B] expanse

[C] stretch

[D] land

24. After the heavy rain, a builder was called to repair the roof, which was _____.

[A] leaking

[B] trickling

[C] dripping

[D] floating

25. Hotel rooms must be _____ by noon, but luggage may be left with the porter.

[A] departed

[B] abandoned

[C] vacated

[D] displaced

26. The tone of the article _____ the writer's mood at the time.

[A] reproduced

[B] reflected

[C] imagined

[D] imitated

27. Mr. Brown's condition looks very serious and it is doubtful if he will _____.

[A] pull back

[B] pull up

[C] pull through

[D] pull out

28. Obviously, the Chairman's remarks at the conference were _____ and not planned.
- [A] substantial
 - [B] spontaneous
 - [C] simultaneous
 - [D] synthetic
29. The reception was attended by _____ members of the local community.
- [A] excellent
 - [B] conspicuous
 - [C] prominent
 - [D] noticeable
30. We should always bear in mind that _____ decisions often result in serious consequences.
- [A] urgent
 - [B] instant
 - [C] prompt
 - [D] hasty
31. And I will give the missionary my energies—it is all he wants — but not myself: that would be only adding the husk and shell to the _____. For them he has no use: I retain them.
- [A] kaleidoscope
 - [B] kernel
 - [C] kinetics
 - [D] kinship
32. As to her money, she first hid it in odd corners, wrapped in a rag or an old curl-paper; but some of these _____ having been discovered by her housemaid, Eliza, fearful of one day losing her valued treasure, consented to intrust it to her mother.
- [A] heeds
 - [B] hoards
 - [C] hoaxes
 - [D] hunches
33. Her manner presented a curious combination of shyness and _____. Every pretty smile was

succeeded swiftly by a look of silent, repressed anxiety, as if put to flight by the recollection of some abiding danger.

[A] asceticism

[B] atrophy

[C] audacity

[D] austerity

34. All was ripe for it. His Carrie was beside him. He wanted to plunge in and _____ with her, and yet he found himself fishing for words and feeling for a way.

[A] expedite

[B] expiate

[C] expostulate

[D] expunge

35. He _____ in mud and clothes to produce the ring, and, finding himself suddenly on his back, wondered who had knocked him down.

[A] fomented

[B] fretted

[C] fulminated

[D] fumbled

36. Old Jerome threw his paper down and set both his feet upon it. He took Gilbert's note and fiercely _____ it twice, and then a third time.

[A] perspired

[B] perturbed

[C] perused

[D] pervaded

37. The streets were full of _____ bits of colour like a damaged painting: yellow, green, blue, dazzling white.

[A] jabbered

[B] jeered

[C] jolted

[D] jumbled

38. During the _____ meal of thin soup Jane Eyre stared at the other freshmen, who sat either in small groups looking very ill at ease, or in large groups seeming very much at home.

[A] lethal

[B] limpid

[C] ligneous

[D] limber

39. I saw bronze rivers lapping marble shores, and great birds that soared through the air, parti-colored birds with _____ plumage.

[A] intrepid

[B] irate

[C] iridescent

[D] irksome

40. The washrooms were disagreeable, crude, if not foul places, and the whole atmosphere was _____.

[A] sober

[B] solicitous

[C] somatic

[D] sordid

第三部分 阅读理解 (共 20 小题)

阅读下列短文, 从每题所给的四个选项 ([A], [B], [C]和[D]) 中, 选出最佳选项。

TEXT A

When my family moved to America from a small village in Guangdong, China, we brought not only our luggage, but also our village rules, customs and culture. One of the rules is that young people should always respect elders. Unluckily, this rule led to my very first embarrassment in the United States.

I had a part-time job as a waiter in a Chinese restaurant. One time, when I was serving food to a middle-aged couple, the wife asked me how the food could be served so quickly. I told her that I had made sure they got their food quickly because I always respect the elderly. As soon as I said that, her face showed

great displeasure. My manager, who happened to hear what I said, took me aside and gave me a long lecture about how sensitive Americans are and how they dislike the description "old". I then walked back to the table and apologized to the wife. After the couple heard my reason, they understood that the problem was caused by cultural differences, so they laughed and were no longer angry.

In my village in China, people are proud of being old. Not so many people live to be seventy or eighty, and people who reach such an age have the most knowledge and experience. Young people always respect older people because they know they can learn from their rich experience.

However, in the United States, people think "growing old" is a problem since "old" shows that a person is going to retire or that the body is not working well. Here many people try to keep themselves away from growing old by doing exercises or jogging, and women put on makeup, hoping to look young. When I told the couple in the restaurant that I respect the elderly, they got angry because this caused them to feel they had failed to stay young. I had told them something they didn't want to hear.

After that, I changed the way I had been with older people. It is not that I don't respect them any more; I still respect them, but now I don't show my feelings through words.

Jack

41. Jack brought the couple their food very fast because _____.

- [A] the manager asked him to do so
- [B] he respected the elderly
- [C] the couple wanted him to do so
- [D] he wanted more pay

42. When Jack called the couple "elderly", they became _____.

- [A] nervous
- [B] satisfied
- [C] unhappy
- [D] excited

43. In Jack's hometown, _____.

- [A] people dislike being called "old"
- [B] people are proud of being old
- [C] many people reach the age of seventy or eighty

[D] the elderly are the first to get food in restaurants

44. After this experience, Jack _____.

[A] lost his job in the restaurant

[B] made friends with the couple

[C] no longer respected the elderly

[D] changed his way with older people

45. Which is the best title for this passage?

[A] Different countries, different customs

[B] Old people, old customs

[C] Different restaurants, different services

[D] Differences between old and young

TEXT B

The Queen's English is now sounding less upper-class, a scientific study of the Queen's Christmas broadcasts has found. Researchers have studied each of her messages to the Commonwealth countries since 1952 to find out the change in her pronunciation from the noble Upper Received to the Standard Received.

Jonathan S. Lee, a professor at Germany's University of Munich, wanted to discover whether accent changes recorded over the past half century would take place within one person. "As far as I know, there just is nobody else for whom there is this sort of broadcast records," he said.

He said the noble way of pronouncing vowels had gradually lost ground as the noble upper-class accent over the past years. "Her accent sounds slightly less noble than it did 50 years ago. But these are very, very small and slow changes that we don't notice from year to year."

"We may be able to relate it to changes in the social classes," he told *The Daily Telegraph*, a British newspaper. "In 1952 she would have been heard saying 'thet men in the bleck het'. Now it would be 'that man in the black hat'. Similarly she would have spoken of 'the citay' and 'dutay', rather than 'citee' and 'dutee', and 'hame' rather than 'home'. In the 1950s she would have been 'lorst', but by the 1970s 'lost'."

The Queen's broadcast is a personal message to the Commonwealth countries. Each Christmas, the 10-minute broadcast is put on TV at 3 pm in Britain as many families are recovering from their traditional turkey lunch.

The results were published in the *Journal of Phonetics*.

46. The Queen's broadcasts were chosen for the study mainly because _____.
[A] she has been Queen for many years
[B] she has a less upper-class accent now
[C] her speeches are familiar to many people
[D] her speeches have been recorded for 50 years
47. Which of the following is an example of a less noble accent in English?
[A] "dutay"
[B] "citee"
[C] "hame"
[D] "lorst"
48. We may infer from the text that the *Journal of Phonetics* is a magazine on _____.
[A] speech sounds
[B] Christmas customs
[C] TV broadcasting
[D] personal messages
49. Which of the following is NOT true?
[A] The Queen broadcasts a message every Christmas Day.
[B] The Queen's accent has changed greatly in the past 50 years.
[C] "Home" rather than "hame" sounds like Standard Received.
[D] Turkey is a featured course on the Christmas lunch table.
50. What is the text mainly about?
[A] The relationship between accents and social classes.
[B] The Queen's Christmas speeches on TV.
[C] The changes in a person's accent.
[D] The recent development of the English language.

TEXT C

(1) Travelling through the country a couple of weeks ago on business, I was listening to the talk of the late UK writer Douglas Adams' master work "The Hitchhiker's Guide to the Galaxy" on the radio and

thought—I know, I'll pick up the next hitchhikers I see and ask them what the state of real hitching is today in Britain.

(2) I drove and drove on main roads and side roads for the next few days and never saw a single one.

(3) When I was in my teens and 20s, hitchhiking was a main form of long-distance transport. The kindness or curiosity of strangers took me all over Europe, North America, Asia and southern Africa. Some of the lift-givers became friends, many provided hospitality on the road.

(4) Not only did you find out much more about a country than when traveling by train or plane, but there was that element of excitement about where you would finish up that night. Hitchhiking featured importantly in Western culture. It has books and songs about it. So what has happened to it?

(5) A few years ago, I asked the same question about hitching in a column of a newspaper. Hundreds of people from all over the world responded with their view on the state of hitchhiking.

(6) Rural Ireland was recommended as a friendly place for hitching, as was Quebec, Canada “if you don't mind being criticized for not speaking French”.

(7) But while hitchhiking was clearly still alive and well in some places, the general feeling was that throughout much of the west it was doomed.

(8) With so much news about crime in the media, people assumed that anyone on the open road without the money for even a bus ticket must present a danger. But do we need to be so wary both to hitch and to give a lift?

(9) In Poland in the 1960s, according to a Polish woman who e-mailed me, “the authorities introduced the Hitchhiker's Booklet. The booklet contained coupons for drivers, so each time a driver picked somebody, he or she received a coupon. At the end of the season, drivers who had picked up the most hikers were rewarded with various prizes. Everyone was hitchhiking then”.

(10) Surely this is a good idea for society. Hitchhiking would increase respect by breaking down barriers between strangers. It would help fight global warming by cutting down on fuel consumption as hitchhikers would be using existing fuels. It would also improve educational standards by delivering instant lessons in geography, history, politics and sociology.

(11) A century before Douglas Adams wrote his “Hitchhiker's Guide”, another adventure story writer, Robert Louis Stevenson, gave us what should be the hitchhiker's motto: “To travel hopefully is a better thing than to arrive.” What better time than putting a holiday weekend into practice. Either put it to the test yourself, or help out someone who is trying to travel hopefully with thumb outstretched.

51. In which paragraph(s) does the writer comment on his experience of hitchhiking?

[A] (3).

[B] (4).

[C] (3) and (4).

[D] (4) and (5).

52. What is the current situation of hitchhiking?

[A] It's popular in some parts of the world.

[B] It's popular throughout the west.

[C] It's popular only in North America.

[D] It's still popular in Poland.

53. What is the writer's attitude towards the practice in Poland?

[A] Critical.

[B] Unclear.

[C] Somewhat favourable.

[D] Strongly favourable.

54. The writer has mentioned all the following benefits of hitchhiking EXCEPT _____.

[A] promoting mutual respect between strangers

[B] increasing one's confidence in strangers

[C] protecting environment

[D] enriching one's knowledge

55. "Either put it to the test yourself..." in Paragraph (11) means _____.

[A] to experience the hopefulness

[B] to read Adams' book

[C] to offer someone a lift

[D] to be a hitchhiker

TEXT D

Richard, King of England from 1189 to 1199, with all his characteristic virtues and faults cast in a heroic mould, is one of the most fascinating medieval figures. He has been described as the creature and

embodiment of the age of chivalry. In those days the lion was much admired in heraldry, and more than one king sought to link himself with its repute. When Richard's contemporaries called him "Coeur de Lion" (The Lion heart), they paid a lasting compliment to the king of beasts. Little did the English people owe him for his services, and heavily did they pay for his adventures. He was in England only twice for a few short months in his ten years' reign; yet his memory has always stirred English hearts, and seems to present throughout the centuries the pattern of the fighting man. In all deeds of prowess as well as in large schemes of war Richard shone. He was tall and delicately shaped: strong in nerve and sinew, and most dexterous in arms. He rejoiced in personal combat, and regarded his opponents without malice as necessary agents in his fame. He loved war, not so much for the sake of glory or political ends, but as other men love science or poetry, for the excitement of the struggle and the glow of victory. By this his whole temperament was toned; and united with the highest qualities of the military commander, love of war called forth all the powers of his mind and body.

Although a man of blood and violence, Richard was too impetuous to be either treacherous or habitually cruel. He was as ready to forgive as he was hasty to offend; he was open-handed and munificent to profusion; in war circumspect in design and skilful in execution; in political a child, lacking in subtlety and experience. His political alliances were formed upon his likes and dislikes; his political schemes had neither unity nor clearness of purpose. The advantages gained for him by military genius were flung away through diplomatic ineptitude. When, on the journey to the East, Messina in Sicily was won by his arms he was easily persuaded to share with his polished, faithless ally, Philip Augustus, fruits of a victory which more wisely used might have foiled the French King's artful schemes. The rich and tenable acquisition of Cyprus was cast away even more easily than it was won. His life was one magnificent parade, which, when ended, left only an empty plain.

In 1199, when the difficulties of raising revenue for the endless war were at their height, good news was brought to King Richard. It was said there had been dug up near the castle of Chaluz, on the lands of one of his French vassals, a treasure of wonderful quality; a group of golden images of an emperor, his wife, sons and daughters, seated round a table, also of gold, had been unearthed. The King claimed this treasure as lord paramount. The lord of Chaluz resisted the demand, and the King laid siege to his small, weak castle. On the third day, as he rode daringly, near the wall, confident in his hard-earned luck, a bolt from a crossbow struck him in the left shoulder by the neck. The wound, already deep, was aggravated by the necessary cutting out of the arrow-head. Gangrene set in, and Coeur de Lion knew that he must pay a

soldier's debt. He prepared for death with fortitude and calm, and in accordance with the principles he had followed. He arranged his affairs; he divided his personal belongings among his friends or bequeathed them to charity. He declared John to be his heir, and made all present swear fealty to him. He ordered the archer who had shot the fatal bolt, and who was now a prisoner, to be brought before him. He pardoned him, and made him a gift of money. For seven years he had not confessed for fear of being compelled to be reconciled to Philip, but now he received the offices of the Church with sincere and exemplary piety, and died in the forty-second year of his age on April 6, 1199, worthy, by the consent of all men, to sit with King Arthur and Roland and other heroes of martial romance at some Eternal round Table, which we trust the Creator of the Universe in His comprehension will not have forgotten to provide.

The archer was flayed alive.

56. "Little did the English people owe him for his services" (Paragraph One) means that the English

- _____.
- [A] paid few taxes to him
 - [B] gave him little respect
 - [C] received little protection from him
 - [D] had no real cause to feel grateful to him

57. Richard's behaviour as death approached showed _____.

- [A] bravery and self-control
- [B] wisdom and correctness
- [C] devotion and romance
- [D] chivalry and charity

58. The point of the last short paragraph is that Richard was _____.

- [A] cheated by his own successors
- [B] determined to take revenge on his enemies
- [C] more generous to his enemies than his successors
- [D] unable to influence the behavior of his successors

59. Which of the following phrases best describes Richard as seen by the author?

- [A] An aggressive king, too fond of war.
- [B] A brave king with minor faults.

[C] A competent but cunning soldier.

[D] A king with great political skills.

60. The relationship between the first and second paragraphs is that _____.

[A] each presents one side of the picture

[B] the first generalizes, the second gives examples

[C] the second is the logical result of the first

[D] both present Richard's virtues and faults

Appendix 2

英语测试卷参考答案与听力文字材料

第一部分 听力测试 (共 5 小题)

1. Among the Indians of North America, the medicine man was a very important person.
2. Throughout the United States, the legal age for marriage shows some difference.
3. The 24th of October is celebrated as United Nations' Day.
4. Money is accepted across the world as payment for goods or services.
5. The internet is the most significant progress in the field of communications.

第二部分 词汇知识 (共 40 小题)

1. [A] 2. [A] 3. [C] 4. [C] 5. [C] 6. [D] 7. [B] 8. [D] 9. [C] 10. [B]
11. [A] 12. [C] 13. [B] 14. [D] 15. [B] 16. [B] 17. [D] 18. [B] 19. [C] 20. [D]
21. [C] 22. [A] 23. [C] 24. [A] 25. [C] 26. [B] 27. [C] 28. [B] 29. [B] 30. [C]
31. [B] 32. [B] 33. [C] 34. [C] 35. [D] 36. [C] 37. [D] 38. [B] 39. [C] 40. [D]

第三部分 阅读理解 (共 20 小题)

41. [B] 42. [C] 43. [B] 44. [D] 45. [A] 46. [B] 47. [B] 48. [A] 49. [B] 50. [C]
51. [C] 52. [A] 53. [D] 54. [B] 55. [D] 56. [C] 57. [A] 58. [C] 59. [B] 60. [A]

Appendix 3

调查问卷编号

调查问卷¹

尊敬的受访者:

您好!

我是山东大学外国语学院教师王湘云, 目前正在进行一项关于我国英语专业毕业生英语磨蚀现象的实证研究, 该研究将会对我国外语教学政策的制定具有重要参考价值, 而且对我国英语教学具有非常重要的反拨作用。请您实事求是地填写下面的调查问卷, 您提供的信息对我的学术研究非常重要。我保证对您提供的信息绝对保密, 不会将其用于任何非学术之目的, 这些信息不会对您的学习和生活产生任何影响。如果您对我个人的研究过程和预期成果感兴趣, 请直接与我联系。

请仔细阅读调查问卷中的表述, 这些表述主要是关于您对英语语言的看法, 您的英语学习经历以及对英语学习态度的描述, 您可能有过经历, 也可能还没有经历过。但无论如何, 您肯定对这些事情有自己的看法和感受。不同的人对于同样的事情的看法和感受是不一样的, 因此请您针对每一个表述, 表明您自己的看法和感受。请您不要太多的时间揣摩这些表述, 请直接给出您对这些表述的第一反应。当然, 也请您在阅读和填写问卷时仔细认真, 因为您的真实感受对我们的研究至关重要。

请您仔细阅读此调查问卷, 在您认可项目前的“□”内画“×”。

再次感谢您的积极合作!

祝

生活愉快, 工作顺利!

王湘云

sduwxy@sohu.com

250100 山东大学 外国语学院

¹为了确保能够获得受访者对每个表述的真实看法和感受, 研究者故意打乱下列表述的顺序, 以期望受访者不会对某一类问题形成思维定势, 作出相同的但不符合其真实看法和感受的选择。

第一部分 受访者英语学习及使用情况调查 (1-12)

1. 在我的工作中, 英语发挥着重要作用。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
2. 为参加职称或其他考试, 我仍然坚持自学英语。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
3. 我工作后参加过英语培训班, 进行过系统的英语学习。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
4. 我虽然没有参加过与英语相关的考试, 我仍在坚持学习英语。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
5. 我在工作中经常使用英语。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
6. 我在工作中经常查阅英语资料。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
7. 我平时经常与同事或朋友用英语交谈。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
8. 我平时经常阅读英语书籍。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
9. 我平时经常阅读英语报刊。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
10. 我平时经常看英语电影。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
11. 我平时经常看英语电视节目。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
12. 我平时经常浏览英语网站。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意

第二部分 受访者对英语语言态度的调查

第一节 受访者对待英语学习者的态度 (13-22)

13. 精通英语的人都很友善、热情、有创造力。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
14. 我希望结交更多精通英语的人。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
15. 精通英语的人为我国传统文化添加了一种独特风味。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意

16. 中国人应该更努力地学习英语。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
17. 我越了解精通英语的人, 就越渴望自己能说一口流利的英语。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
18. 我周围的一些成功人士都精通英语。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
19. 精通英语在我国已成为有身份的象征。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
20. 如果中国人不学习英语, 将会是一个巨大损失。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
21. 精通英语的人们成功引进了国家的习俗。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
22. 幸运的是, 我国大多数精通英语的人都很友好, 易相处。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意

第二节 受访者对待英语语言的兴趣 (23-32)

23. 如果我将来万一有机会访问英语国家, 我很希望自己能够说英语。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
24. 尽管中国与英语国家距离比较遥远, 但是对中国人来说学习英语仍很重要。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
25. 我真希望自己能够说一口很棒的英语。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
26. 我希望能够读懂英文原著, 而不是汉译本。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
27. 我渴望自己能够看懂英文报刊。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
28. 我真的非常希望学好多门外语。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
29. 如果计划定居英语国家, 即使我可以在当地用汉语, 我也会尽量学好英语。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意

30. 即使单位没有提出要求, 我也会 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
参加英语补习班。
31. 我很喜欢与说英语的人打交道, ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
听他们讲英语。
32. 学习英语是一个非常令人愉悦的 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
经历。

第三节 受访者对待英语学习的态度 (33-42)

33. 学英语, 太棒了。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
34. 学习英语对我来说是一种享受。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
35. 英语是我工作中的重要工具。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
36. 我计划尽可能多地学英语。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
37. 我爱学英语。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
38. 学好英语可以使我成为一个博学 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
之士。
39. 对我来说, 学好英语很重要, 因 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
为学好英语可以使我在与讲英语
的人交流时更得心应手。
40. 学好英语可以赢得别人的尊敬。 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
41. 学好英语可以为我提供施展自己 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
才华的机会。
42. 学好英语可以帮助我找到更好的 ☐ 非常同意 ☐ 同意 ☐ 中性 ☐ 不同意 ☐ 非常不同意
工作。

问卷结束,

谢谢合作,

祝您快乐!

Appendix 4

The Questionnaire

Part I Participants' idea of English language learning and use (1-12)

1. English plays a very important role in my work. ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
2. I continue to study English by myself in order to sit English exam for a promotion or other purposes. ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
3. I have had systematic study of English by attending English training programs after my graduation. ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
4. I continue my English study, even though I haven't sit any English tests. ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
5. I often use English in my work. ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
6. I often consult English references in my work. ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
7. I often talk with my colleagues or friends in English in my spare time. ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
8. I often read English books in my spare time. ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
9. I often read English newspapers and magazines in my spare time. ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
10. I often watch English movies in ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree

my spare time.

11. I often watch English TV ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
programs in my spare time.
12. I often visit English websites in ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
my spare time.

Part II Participants' attitudes towards the English language

Section I Participants' attitudes towards other English language learners (13-22)

13. Proficient English users are a ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
very sociable, warm-hearted
and creative people.
14. I would like to know more ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
proficient English users.
15. Proficient English users add a ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
distinctive flavour to the
Chinese culture.
16. Chinese should make a great ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
effort to learn the English
language.
17. The more I get to know ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
proficient English users, the
more I want to be fluent in the
language.
18. Some of the most successful ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
people around me are proficient
English users.
19. Being proficient in English has ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
become a symbol of identity in
China.
20. If Chinese should not learn ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree

English, it would indeed be a great loss.

21. Proficient English users have ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
successfully introduced the
folkways of English-speaking
countries into China.
22. Luckily, most of proficient ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
English users in China are so
friendly and easy to get along
with.

Section II Participants' interest in the English language (23-32)

23. If I were visiting an ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
English-speaking country, I
would like to be able to speak
English.
24. Even though China is relatively ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
far from English-speaking
countries, it is important for
Chinese to learn English.
25. I wish I could speak English ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
perfectly.
26. I want to read English literary ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
works in the original language
rather than a Chinese translation.
27. I wish to read English ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
newspapers and magazines.
28. I would really like to learn a lot ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
of foreign languages.
29. If I planned to stay in an ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree

English-speaking country, I
would make a great effort to
learn English even though I could
get along in Chinese.

30. I would attend an English remedial program even if it were not required. ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
31. I enjoy meeting and listening to people who speak English. ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
32. Studying English is an enjoyable experience. ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree

Section III Participants' attitudes towards English language learning (33-42)

33. Learning English is really great. ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
34. I really enjoy learning English. ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
35. English is an important tool in my work. ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
36. I plan to learn as much English as possible. ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
37. I love learning English. ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
38. Studying English can enable me to become a learned person. ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
39. Studying English can be important to me because it will allow me to be more at ease with English-speakers. ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
40. Studying English can help win respect from others. ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
41. Studying English can award me with opportunities to display my ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree

own talents.

42. Studying English can help me get ☐strongly agree ☐agree ☐neutral ☐disagree ☐strongly disagree
a better job.

Appendix 5

Panelists for the Review of Content and Face Validities of the Test

Teacher No.	Academic Degree	Academic Title	Years of College English Teaching
1	Ph. D	Professor	17
2	BA	Associate Professor	25
3	MA	Professor	23
4	Ph. D	Associate Professor	9
5	MA	Lecturer	11
6	Ph. D	Associate Professor	7
7	MA	Professor	28
8	Ph. D	Lecturer	5
9	Ph. D	Associate Professor	8
10	MA	Professor	28
11	Ph. D	Professor	18
12	Ph. D	Associate Professor	19
13	MA	Lecturer	11
14	MA	Associate Professor	14

Appendix 6

Content Validity Ratio and Face Validity Ratio of the Test

Subtest	Item No.	n_c	CVR	n_v	FVR
Dictation Subtest	1	14	1	13	0.857
	2	14	1	14	1
	3	12	0.714	13	0.857
	4	14	1	14	1
	5	13	0.857	13	0.857
Vocabulary Subtest	1	13	0.857	14	1
	2	14	1	14	1
	3	13	0.857	13	0.857
	4	12	0.714	14	1
	5	13	0.857	13	0.857
	6	12	0.714	14	1
	7	13	0.857	13	0.857
	8	13	0.857	13	0.857
	9	14	1	14	1
	10	14	1	14	1
	11	12	0.714	13	0.857
	12	12	0.714	14	1
	13	13	0.857	13	0.857
	14	12	0.714	14	1
	15	12	0.714	14	1
	16	13	0.857	13	0.857
	17	14	1	14	1
	18	14	1	14	1
	19	13	0.857	14	1
	20	14	1	14	1
	21	14	1	13	0.857
	22	14	1	14	1
	23	13	0.857	13	0.857
	24	12	0.714	14	1
	25	14	1	14	1

Subtest	Item No.	n_e	CVR	n_v	FVR
	26	14	1	13	0.857
	27	12	0.714	14	1
	28	14	1	13	0.857
	29	14	1	14	1
	30	13	0.857	13	0.857
	31	13	0.857	14	1
	32	14	1	14	1
	33	13	0.857	14	1
	34	13	0.857	14	1
	35	12	0.714	13	0.857
	36	12	0.714	13	0.857
	37	13	0.857	13	0.857
	38	13	0.857	13	0.857
	39	13	0.857	14	1
	40	13	0.857	14	1
Reading Comprehension Subtest	1	13	0.857	12	0.714
	2	14	1	13	0.857
	3	14	1	13	0.857
	4	14	1	13	0.857
	5	13	0.857	14	1
	6	12	0.714	13	0.857
	7	14	1	13	0.857
	8	14	1	14	1
	9	12	0.714	13	0.857
	10	14	1	13	0.857
	11	14	1	14	1
	12	13	0.857	13	0.857
	13	13	0.857	14	1
	14	14	1	13	0.857
	15	13	0.857	13	0.857
	16	13	0.857	13	0.857
	17	12	0.714	13	0.857
	18	12	0.714	13	0.857

Subtest	Item No.	n_e	CVR	n_v	FVR
	19	13	0.857	14	1
	20	13	0.857	14	1
	Mean**		0.876		0.925

Where CVR (content validity ratio) = $(n_e - N/2)/(N/2)$, n_e = number of panelists indicating "essential", N = total number of panelists; FVR (face validity ratio) = $(n_v - N/2)/(N/2)$, n_v = number of panelists indicating "valid", N = total number of panelists.

* This formula yields values which range from +1 to -1; positive values indicate that at least half the panelists rated the item as essential. The mean CVR across items may be used as an indicator of overall test content validity. And it is the same case with the FVR formula.

** The minimum values of the CVR and the FVR to ensure that agreement is unlikely to be due to chance should the values be more than 0.51 if the number of the panel is 14 (Lawshe, 1975, pp. 563-575).

Appendix 7

CVR and FVR Minimum Values

The minimum values of the CVR and the FVR to ensure that agreement is unlikely to be due to chance can be found in the following table.

Number of Panelists	Minimum Value
5	0.99
6	0.99
7	0.99
8	0.75
9	0.78
10	0.62
11	0.59
12	0.56
13	0.54
14	0.51
15	0.49
20	0.42
25	0.37
30	0.33
35	0.31
40	0.29

Appendix 8

The Reliability of the Test and the Questionnaire

Groups	Test Dictation	Vocabulary Subtest										Reading Comprehension Subtest										Questionnaire			Test-Questionnaire correlation coefficient
		V-total	V-1	V-2	V-3	V-4	R-total	R-1	R-2	R-3	R-4	Total	Part I	Part II											
														Total	Section I	Section II	Section III								
Group D	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$r = .597$						
N = 36	.808	.895	.780	.532	.746	.693	.636	.680	.881	.597	.766	.537	.904	.682	.882	.705	.801		.756						
Group E	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$\alpha =$	$r = .647$						
N = 40	.560	.814	.614	.587	.558	.507	.518	.548	.506	.543	.785	.546	.953	.816	.944	.882	.857		.852						

Appendix 9

Facility Value and Frequency of Distractors

Subtest	Group	Item	Facility Value	Frequency of Distractor 1	Frequency of Distractor 2	Frequency of Distractor 3
Vocabulary Subtest	V-1	1	$FV_{(A)} = 0.987$	$f_{(B)} = 0$	$f_{(C)} = 0.013$	$f_{(D)} = 0$
		2	$FV_{(A)} = 1$	$f_{(B)} = 0$	$f_{(C)} = 0$	$f_{(D)} = 0$
		3	$FV_{(C)} = 1$	$f_{(A)} = 0$	$f_{(B)} = 0$	$f_{(D)} = 0$
		4	$FV_{(C)} = 0.947$	$f_{(A)} = 0.026$	$f_{(B)} = 0.013$	$f_{(D)} = 0.013$
		5	$FV_{(C)} = 0.842$	$f_{(A)} = 0.066$	$f_{(B)} = 0.039$	$f_{(D)} = 0.053$
		6	$FV_{(D)} = 0.842$	$f_{(A)} = 0.026$	$f_{(B)} = 0.079$	$f_{(C)} = 0.053$
		7	$FV_{(B)} = 0.855$	$f_{(A)} = 0.039$	$f_{(C)} = 0.039$	$f_{(D)} = 0.066$
		8	$FV_{(D)} = 1$	$f_{(A)} = 0$	$f_{(B)} = 0$	$f_{(C)} = 0$
		9	$FV_{(C)} = 0.737$	$f_{(A)} = 0.066$	$f_{(B)} = 0.092$	$f_{(D)} = 0.105$
		10	$FV_{(B)} = 0.842$	$f_{(A)} = 0.026$	$f_{(C)} = 0.079$	$f_{(D)} = 0.053$
	V-2	11	$FV_{(A)} = 0.842$	$f_{(B)} = 0.053$	$f_{(C)} = 0.039$	$f_{(D)} = 0.066$
		12	$FV_{(C)} = 0.855$	$f_{(A)} = 0.039$	$f_{(B)} = 0.053$	$f_{(D)} = 0.053$
		13	$FV_{(B)} = 0.776$	$f_{(A)} = 0.079$	$f_{(C)} = 0.079$	$f_{(D)} = 0.066$
		14	$FV_{(D)} = 0.605$	$f_{(A)} = 0.145$	$f_{(B)} = 0.158$	$f_{(C)} = 0.092$
		15	$FV_{(B)} = 0.750$	$f_{(A)} = 0.066$	$f_{(C)} = 0.105$	$f_{(D)} = 0.079$
		16	$FV_{(B)} = 0.711$	$f_{(A)} = 0.105$	$f_{(C)} = 0.066$	$f_{(D)} = 0.118$
		17	$FV_{(D)} = 0.724$	$f_{(A)} = 0.092$	$f_{(B)} = 0.079$	$f_{(C)} = 0.105$
		18	$FV_{(B)} = 0.711$	$f_{(A)} = 0.079$	$f_{(C)} = 0.118$	$f_{(D)} = 0.092$
		19	$FV_{(C)} = 0.855$	$f_{(A)} = 0.066$	$f_{(B)} = 0.039$	$f_{(D)} = 0.039$
		20	$FV_{(D)} = 0.474$	$f_{(A)} = 0.145$	$f_{(B)} = 0.197$	$f_{(C)} = 0.184$
	V-3	21	$FV_{(C)} = 0.382$	$f_{(A)} = 0.197$	$f_{(B)} = 0.250$	$f_{(D)} = 0.171$
		22	$FV_{(A)} = 0.474$	$f_{(B)} = 0.158$	$f_{(C)} = 0.197$	$f_{(D)} = 0.171$
		23	$FV_{(C)} = 0.408$	$f_{(A)} = 0.237$	$f_{(B)} = 0.158$	$f_{(D)} = 0.197$
		24	$FV_{(A)} = 0.434$	$f_{(B)} = 0.145$	$f_{(C)} = 0.227$	$f_{(D)} = 0.197$
		25	$FV_{(C)} = 0.461$	$f_{(A)} = 0.184$	$f_{(B)} = 0.197$	$f_{(D)} = 0.158$
		26	$FV_{(B)} = 0.434$	$f_{(A)} = 0.171$	$f_{(C)} = 0.211$	$f_{(D)} = 0.184$
		27	$FV_{(C)} = 0.395$	$f_{(A)} = 0.237$	$f_{(B)} = 0.145$	$f_{(D)} = 0.227$
		28	$FV_{(B)} = 0.487$	$f_{(A)} = 0.158$	$f_{(C)} = 0.197$	$f_{(D)} = 0.158$
		29	$FV_{(B)} = 0.447$	$f_{(A)} = 0.211$	$f_{(C)} = 0.158$	$f_{(D)} = 0.184$
		30	$FV_{(C)} = 0.421$	$f_{(A)} = 0.197$	$f_{(B)} = 0.171$	$f_{(D)} = 0.211$
	V-4	31	$FV_{(B)} = 0.227$	$f_{(A)} = 0.25$	$f_{(C)} = 0.237$	$f_{(D)} = 0.289$
		32	$FV_{(B)} = 0.303$	$f_{(A)} = 0.263$	$f_{(C)} = 0.197$	$f_{(D)} = 0.237$
		33	$FV_{(C)} = 0.237$	$f_{(A)} = 0.237$	$f_{(B)} = 0.276$	$f_{(D)} = 0.250$

Subtest	Group	Item	Facility Value	Frequency of Distractor 1	Frequency of Distractor 2	Frequency of Distractor 3
Reading Comprehension Subtest		34	$FV_{(C)} = 0.237$	$f_{(A)} = 0.227$	$f_{(B)} = 0.289$	$f_{(D)} = 0.250$
		35	$FV_{(D)} = 0.355$	$f_{(A)} = 0.184$	$f_{(B)} = 0.227$	$f_{(C)} = 0.237$
		36	$FV_{(C)} = 0.382$	$f_{(A)} = 0.197$	$f_{(B)} = 0.237$	$f_{(D)} = 0.184$
		37	$FV_{(D)} = 0.342$	$f_{(A)} = 0.237$	$f_{(B)} = 0.197$	$f_{(C)} = 0.227$
		38	$FV_{(B)} = 0.329$	$f_{(A)} = 0.237$	$f_{(C)} = 0.227$	$f_{(D)} = 0.211$
		39	$FV_{(C)} = 0.329$	$f_{(A)} = 0.197$	$f_{(B)} = 0.250$	$f_{(D)} = 0.227$
		40	$FV_{(D)} = 0.303$	$f_{(A)} = 0.227$	$f_{(B)} = 0.211$	$f_{(C)} = 0.263$
	R-1	41	$FV_{(B)} = 0.961$	$f_{(A)} = 0.013$	$f_{(C)} = 0.013$	$f_{(D)} = 0.013$
		42	$FV_{(C)} = 0.974$	$f_{(A)} = 0$	$f_{(B)} = 0.013$	$f_{(D)} = 0.013$
		43	$FV_{(B)} = 0.908$	$f_{(A)} = 0.026$	$f_{(C)} = 0.039$	$f_{(D)} = 0.026$
		44	$FV_{(D)} = 1$	$f_{(A)} = 0$	$f_{(B)} = 0$	$f_{(C)} = 0$
		45	$FV_{(A)} = 0.974$	$f_{(B)} = 0$	$f_{(C)} = 0.013$	$f_{(D)} = 0.013$
	R-2	46	$FV_{(B)} = 0.632$	$f_{(A)} = 0.105$	$f_{(C)} = 0.145$	$f_{(D)} = 0.118$
		47	$FV_{(B)} = 0.763$	$f_{(A)} = 0.092$	$f_{(C)} = 0.066$	$f_{(D)} = 0.079$
		48	$FV_{(A)} = 0.671$	$f_{(B)} = 0.132$	$f_{(C)} = 0.105$	$f_{(D)} = 0.092$
		49	$FV_{(B)} = 0.434$	$f_{(A)} = 0.211$	$f_{(C)} = 0.171$	$f_{(D)} = 0.184$
		50	$FV_{(C)} = 0.539$	$f_{(A)} = 0.145$	$f_{(B)} = 0.132$	$f_{(D)} = 0.184$
	R-3	51	$FV_{(C)} = 0.355$	$f_{(A)} = 0.184$	$f_{(B)} = 0.237$	$f_{(D)} = 0.227$
		52	$FV_{(A)} = 0.382$	$f_{(B)} = 0.184$	$f_{(C)} = 0.211$	$f_{(D)} = 0.227$
		53	$FV_{(D)} = 0.500$	$f_{(A)} = 0.145$	$f_{(B)} = 0.171$	$f_{(C)} = 0.184$
		54	$FV_{(B)} = 0.539$	$f_{(A)} = 0.132$	$f_{(C)} = 0.171$	$f_{(D)} = 0.158$
		55	$FV_{(D)} = 0.487$	$f_{(A)} = 0.171$	$f_{(B)} = 0.158$	$f_{(C)} = 0.184$
	R-4	56	$FV_{(C)} = 0.303$	$f_{(A)} = 0.211$	$f_{(B)} = 0.263$	$f_{(D)} = 0.227$
		57	$FV_{(A)} = 0.434$	$f_{(B)} = 0.158$	$f_{(C)} = 0.184$	$f_{(D)} = 0.227$
		58	$FV_{(C)} = 0.474$	$f_{(A)} = 0.158$	$f_{(B)} = 0.197$	$f_{(D)} = 0.171$
		59	$FV_{(B)} = 0.227$	$f_{(A)} = 0.250$	$f_{(C)} = 0.237$	$f_{(D)} = 0.289$
		60	$FV_{(A)} = 0.303$	$f_{(B)} = 0.227$	$f_{(C)} = 0.263$	$f_{(D)} = 0.211$

Appendix 10

监考人员须知

一、考场选择

在选择考场时,请你必须亲自实地查看备选考场,根据备选考场的整体状况来决定取舍。在此过程中,请您综合考虑以下几个方面的因素。

- 1、课桌桌面是否平整,座椅是否舒适。
- 2、考场内的温度如何,空调能否正常工作。
- 3、照明是否充分。
- 4、考场是否受来自附近建筑工地、集会、体育赛事、摩托车、公共汽车或其他交通工具的噪音的影响。
- 5、高保真音频播放设备能否正常工作。

我们建议您使用语音室作为考场。一方面,这些教室能为被试提供较为舒适的环境,另一方面,那里的音频播放设备可以方便您的使用。

二、测试资料和考场设备检测

监考人员必须在测试前一天仔细阅读《监考人员须知》,熟悉监考流程,并仔细检查以下材料的准备情况。

- 1、是否有足够的测试卷和问卷。
- 2、考场中的电脑是否安装了能够播放 MP3 的音频播放软件。
- 3、是否有足够的铅笔、橡皮擦和巧克力。
- 4、耳机是否正常。

测试当天,你务必检查一下考场的照明情况、室内温度、通风设备、音箱设备,并根据具体情况作必要的调整。

三、人性化监考

由于本调查对被试来说不是义务的,所以调查成功与否在很大程度上取决于被试的

合作态度,因此调动他们积极性尤为重要。最好的办法就是在测试过程中,人性化监考。请您务必做到以下几点。

- 1、对待被试要彬彬有礼,在表示欢迎的同时,强调他们合作的重要性。
- 2、除了为每位被试提供一支圆珠笔和一块橡皮擦方便他们作答外,还分发每人一块巧克力作为奖励。
- 3、测试开始前,个别被试可能会由于紧张而发出某种噪声,请您务必不要在意。
- 4、测试过程中,耐心回答每位被试的每一个问题。
- 5、及时为被试更换缺页或字迹模糊的试卷/问卷。
- 6、测试过程中,准许被试暂时离开考场。
- 7、及时处理测试过程的其他突发事件。
- 8、灵活掌握测试时间。

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