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DISSERTATION

Titel der Dissertation

Foreign Language Learning and Advanced Age

Age-related aspects and learning results of different adult age groups of autodidactic foreign language learners

An empirical investigation

Verfasserin

Mag. Helga Linhart-Wegschaider

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Live as if you were to die tomorrow.
Learn as if you were to live forever.

Mahatma Gandhi

to
Artemis

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Abstract

Throughout the twentieth century theory formation on foreign language acquisition has primarily focused on young language learners. However, current demographic tendencies and developments along with the concept of *lifelong learning* strongly suggest an expansion of the age spectrum towards a more balanced theoretical approach to and holistic look at the design and modelling of foreign language learning concepts.

The present project addresses this issue by focusing on the question whether and to what extent foreign language learning aptitude is subject to age-related variance. It was to be investigated whether the data analysis will allow us to deduce substantive evidence of a declining capability in learners beyond the age of 45 as regards retentiveness, cognitive abilities as well as brain capacity and plasticity. Apart from the age of acquisition other learning parameters such as an elevated rate of interest, motivation, commitment, diligence, time-management skills and maturity-related aspects were taken into consideration in this investigation. Moreover age-extrinsic factors such as previous language learning experience, level of education and general language learning awareness were included.

30 test persons aged 20 to 69 – split up in three age groups – participated in this empirical study. In order to allow for a homogeneous point of departure as regards previous experience with the foreign language to be learned, Chinese Mandarin was chosen as target language of the project. None of the participants could refer back to previous comprehensive knowledge in the Sino-Tibetan family of languages. After a three-month self-study phase the subjects completed an oral test. The 30 participants were divided into three age groups and the results of the 5 best-performers of each age-group were used for further analysis. The findings reveal that in terms of overall performance, the older learner group

outperformed their younger peers. Data analysis of all relevant aspects supports the hypothesis of an interaction of various powerful factors that influence learner success. Biological, metacognitive and volitional aspects were identified to be substantive predictors of learning outcome. The varying impact of these parameters was elucidated and combined in a new taxonomic model.

The findings of the present study are meant to add to and extend the scientific debate on the “critical period hypothesis” and the “optimal age discussion”. Above that it is intended to contribute to research on individual difference variables and to the role of linguistic awareness both as an essential product and a necessary prerequisite of multilingual proficiency. Most important, the resulting theoretical concept of the 3-Power-Model opens up interesting implications as regards future age-related educational questions and theories. In its whole conception the project is also to be regarded as a strategic orientation guide for the concept of *lifelong learning* that meets the demands of the 21st century.

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Chapter 1
INTRODUCTION

> *Education is to the brain what gardening is to the landscape.*
> (Blakemore & Frith, 2005: 187)

1.1 The Need for Future Oriented Measures in Adult Foreign Language Education

In Western societies recent years have witnessed a considerable shift in demographic structures. The population is getting older, fitter, more ambitious and increasingly demanding. In view of an ever-rising life-expectancy and an ever-falling birth-rate in the so-called "Developed Countries", a growing number of scientists, first and foremost sociologists, have focused on this hot and sensitive topic with all its implications in terms of a changing demographic context and resulting policy measures. In their paper "Trends and Priorities of Ageing Policies in the UN-European Region" Bernd Marin and Asghar Zaidi reflect on the current socio-political deficiencies, criticizing that although goal formation in terms of extending working life has been advanced, policy formation is lagging behind (Marin & Zaidi, 2007: 76). They call attention to the fact that in Europe today

> the single most important group of inactive people of working age are the middle-aged or mature workers 55-64, with social exclusion, drop-out, or exit rates affecting up to 89% of the female population (Marin & Zaidi, 2007: 80),

regretfully pointing to an entire 'lost generation'. At the same time they suggest that this large-scale social exclusion also offers the opportunity to take advantage of an enormous labor force potential, which in their view will, however, necessitate an EU-level reform package without any further delay. Given the enormous shift in social conditions along with the increase of respective know-how throughout the past years, I advocate

that their call for moving from concepts to effective implementation needs to be extended to a variety of other scientific fields, among them the rather neglected field of adult foreign language education[1] - particularly with regard to adults who are in the later years of their vocational and professional careers.

While these and a great many other authors look at the implications of an aging society mainly from an economic point of view, there are others who consider the phenomenon of an aging society from another angle. When in his bestseller *Das Methusalem-Komplott* (2004) Frank Schirrmacher[2] campaigns against the negative stereotypes of the aging process and calls for an "uprising" of the population against discriminatory tendencies and a draft for a new self-perception, he focuses on the topic of aging in a shrill and provocative manner. Though in presentation and style popular rather than scientific and therefore possibly an object of dispute in the scientific community, this book reflects the zeitgeist of modern Western society in light of a spectacularly and alarmingly rising aging process of the masses. He maintains that today's young generation does have and most of all should not miss a historical chance: The historical chance to fight discrimination in advanced age by radically changing long-established attitudes as well as markets, lifestyles and overall patterns of living. In a way, Schirrmacher argues, it is the chance of today's young generation to implement the requirements for their later life in dignity, with a fair chance to fully participate in social life. The author posits that the idea of incapacitation with progressing age needs to be replaced by a positive perception of oneself and he continues that each individual has a grip on upcoming developments and therefore has to take respective responsibility. With this socio-political twist towards direct and immediate

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1 In the mid-80s Malcolm Knowles called attention to this drawback (1984, *The Adult Learner – A Neglected Species*).

2 German journalist, literary critic, essayist, author and since 1994 co-editor of the *Frankfurter Allgemeine Zeitung*.

responsibility he gives the aging process a fresh coat of paint. Although in his book Schirrmacher does not explicitly refer to educational issues, his assessment leads us to the assumption that in terms of personal responsibility there is a backlog demand for learning measures as well.

In his literary review in the 10-04-2004 edition of the *Neue Züricher Zeitung*, cultural correspondent Joachim Güntner critically and quite rightfully comments that although Schirrmacher opens up comforting perspectives, he a priori excludes large parts of the population by focusing on mental and intellectual capacities. Güntner reproaches Schirrmacher for putting his main emphasis on the intellectual part of society which inevitably leads to the exclusion of whole sections of the population. However, the phenomenon of marginalization, I would suggest, will always be a factor of relevance, no matter which socio-political topic we address. Despite these overall constraints in terms of social asymmetry, we have to address the cited topics and respond to the dynamic challenges of future educational needs.

Postulating individual responsibility was also a major theme at the 2007-symposium “Gesünder länger leben” at the Danube University Krems and was reflected and discussed by experts from different disciplines[3]. At this conference Ursula Lehr, a leading German gerontologist and former Federal Minister, elucidated the exigency for self-responsibility when she hinted at the correlation and spiral effect of lack of ambition or even aversion on one hand and eagerness and success on the other[4]. Her credo that explicitly refers to the locomotive system can, I would hold, also be assigned to learning processes. While poor or no learning activity is

[3] The symposium was held from 10 to 11 December 2007. Among the main lecturers were: Prof. Ursula Lehr (former Federal Minister, gerontologist), Prof. Grubeck-Löbenstein (Austrian Academy of Sciences, Director Institute for Biomedical Ageing Research), Prof. Leopold Rosenmayr (Professor Emeritus in empirical social research).

[4] Her credo “Bewegungsarmut erzeugt Bewegungsunlust, Bewegungsunlust verstärkt Bewegungsarmut“ quite evidently also applies to the learning process.

likely to cause a negative downward spiral effect that intensifies the feeling of incapability, active learning may foster a feeling of pleasure with learning and most likely enhance our learning capability and catapult us into an upward-moving spiral. To be effective, active learning should be envisaged as a long-term process. A major concern in Lehr's scientific approach is a change of the traditional image of the aged population ("Altersbild"), and she criticizes that although we are clearly heading towards obsolescence, society in general still clings to youth-centered role models and ideals. With this stance Lehr seems to be in line with Schirrmacher's critique and claims.

Much of what has been said so far about the shift in sociopolitical conditions and the resulting implications for changing policies seems quite obvious. Yet, it is surprising how rarely the phenomenon of changing demands is mentioned with regard to the current educational situation of the elderly generation. It is clear, also, that we have to provide projections for the future on a broad scale. It is clear that we have to consider the link between social requirements and up-to-date educational needs of an increasingly aging society. From the perspective of foreign language education it is time to take an 'up to date' look at theories of second language learning and find appropriate educational solutions also for the elderly. It is time to integrate the individual needs and cognitive abilities of the older foreign language learner into current theories of second language acquisition. It is time to bridge the gap between sociopolitical and educational demands.

In his critical response to Jochen Paulus's article in *DIE ZEIT* of 11 September 2003, which broaches the issue of eligibility and acceptability of neurodidactics in the field of education, German psychiatrist Manfred Spitzer (*DIE ZEIT*, 18/09/2003, No. 39) argues in defense of brain research as an essential basis for the understanding of learning processes. Paulus considers the attempt of scientists to deduce cutting-edge

educational expertise from brain research at best ‘bold’ and at worst ‘harmful’. He argues that evidence is not substantive and compares the advances of neurodidactic scientists to transfer – what he calls ‘sparse knowledge’ on the sensitive phases of language to ‘all sorts of things’ with Paul Möbius’s scientific misapprehension concerning the woman’s brain in his 1900-publication *Über den physiologischen Schwachsinn des Weibes*. In the course of his defensive argumentation Spitzer points out that in view of an expected extension of working life in the near future, it will be especially important to address learning processes and education measures of the elderly population. Within the educational career of a human being, it is the education of the older generation he describes as particularly ineffective and calling for reform. Spitzer postulates that learning is a subject matter of brain research and should not be confined within the domain of educationalists. According to him a teacher who knows how “learning works in the brain” will be a better educationalist. He strongly advocates empirical pedagogical research that corresponds to general standards of today’s medical research. The two differing views of Spitzer and Paulus and the way each one argues to corroborate his hypothesis and position, reflect the topicality of this issue and take us directly to the mission of the present thesis.

The present study is meant to investigate aspects of learning in adult foreign language acquisition with special emphasis on the advanced aged group. Primarily residing in the educationalist as well as linguistic domain, the research questions as posed in this thesis will be principally investigated from a linguistic respectively educationalist perspective. However, as has been outlined, current developments in society and recent trends in scientific research are becoming increasingly relevant. These new tendencies clearly suggest the need for a more holistic and interdisciplinary approach – an approach that links social reality and the latest findings in brain research with the vast body of foreign language acquisition research.

1.2 The Call for an Approach that Crosses Borders

Learning is ageless. People of all age levels are curious and can enjoy the experience of learning something new, expanding their minds, and provide for their personal and career needs. Curricula for many levels of development - from childhood to adolescence into adulthood - have been developed and are marketed around the world. However, for very long, learning something new was predominantly and almost exclusively seen as a building block for the young generation. It was only in the course of a changing demographic structure especially in the second half of the twentieth century that some educators started to shift their focus towards the advanced aged learner.

Different terms for adult education such as *andragogy*, *geragogy*, *gerontological education* or *lifelong learning* reflect the growing interest in this field. Apart from this development, in the past few years, the field of neuroscientific research has shed a great deal of light on how the brain functions, from childhood into old age. Today modern brain imaging techniques make it possible to measure activity in the healthy brain as humans perform certain tasks. Based on these innovative methods, brain scientists can now offer some understanding of how the brain learns and thus allow the breaking of new ground in the field of educational science. This new path of interactions between educators and brain scientists that has been taken only in the past few years, may bring forth promising new insights for those who will set the course for future developmental measures in adult education policy. - An education policy that, as I understand it, is lagging behind and needs to be adapted to a changed and continually changing new world, just as this has been postulated by Marin and Zaidi within the socio-political context (see above).

In the introduction to one of his most recent books sociologist Leopold Rosenmayr makes a good point when he argues:

> Die wissenschaftliche Forschung hat sich historisch, soziologisch und erziehungswissenschaftlich in Europa mit den Aufstiegsprozessen von Generationen beschäftigt. Sie hat aber nicht die ideellen und sozial gestalteten Einstellungen und Verhaltensweisen der Generationen *in ihren späteren Lebensphasen studiert.* (Aner, Karl & Rosenmayr, 2007: 7)

He clearly hints at the necessity of including the implications of an aging society in contemporary research and the resulting demand for interdisciplinary considerations for future scientific projects of any kind.

In their groundbreaking book *The Learning Brain* neuroscientists Blakemore & Frith (2005) take stock of what is now known about how the brain learns, considering the implications of this knowledge for educational policy and practice. Their compelling account of the relevance of brain research to education explores brain development and learning from infancy to adulthood, providing a profound insight into how the brain can change and learn at any age. In their interdisciplinary dialogue they involve cognitive psychology as a mediator that "bridges the gap" between neuroscience and education (Blakemore & Frith, 2005: 9). Their scientific journey in search of the links between brain science and education is an important point of contact for the present thesis. With its focus on the impact of age on the ability of learning a foreign language, the present empirical study aims at supporting Blakemore and Frith's scientific endeavor to cross borders that separate brain science and education science. The study is an attempt to bring together the different scholarly approaches in the genuine hope to contribute valuable insights into future learning and teaching aspects with special emphasis on the advanced age groups. It is also meant to support a chance that Schirrmacher with his insistent call for a change towards a positive image of the older generation refers to in a more general sense. Altogether the present paper aims at giving this general claim a more specific twist towards issues in educational sciences and focusing on the chance of today's educationalists to implement the requirements for effective and forward-

looking learning and teaching methods with a fair chance for the older generation to fully participate in educational life. It is a project that is meant to support the enhancement of *lifelong learning* programs within the academic as well as non-academic community.

1.3 The Need for Action

Having been involved in adult foreign language teaching for a number of years, the investigation and implementation of effective learning methods has eventually become one of my major concerns. I had students of different walks of life at different stages of their lives, from the early 20s to the late 70s. Most of my students were fully integrated in working life, and the larger part of them opted for continuing foreign language education in a proactive manner. In some cases the motivation behind their endeavor to learn a foreign language was the wish to broaden their horizon, however, for the larger part this step was 'career-bound', arising out of the need to set the conditions for professional advancement and personal promotion. To me one of the specifically interesting aspects of this teaching experience was the age factor and its impact on learning success. How would someone having for a long time been out of the classic learning process of the school years be able to internalize new knowledge and cope with memorizing? What was the 'personal toolbox' of adult learners like as compared to the one they had used during their childhood and adolescent years? This interest eventually gave rise to the desire to learn more about the theoretical background of the conditions and mechanisms that underlie learning processes of adults. When working on my literature review I realized that relevant information is sparse. Most of the research on age-related questions of foreign language acquisition refers to young learners – from early infancy comprising the field of bilingual education until up to the different stages of the adolescent years.

Within this domain the *Critical Period Hypothesis* has for decades been one of the most fiercely debated issues in psycholinguistics and cognitive sciences. Initially discussed within the field of first language acquisition, the theory was later on extended to a critical period for second language acquisition. The literature review states all positions from its definite existence to there being no such thing as a critical period for language learning, to the mid point that says *yes* and *no*. Apart from the fact that attitudes and hypotheses are highly controversial, all of them have one thing in common: they do not explicitly refer to the learner beyond his adolescent years, the learner who is not a language student par excellence but who has only limited time to devote to language learning, his main concern lying elsewhere. Studies that do reflect adult language acquisition mainly allude to adults who are exposed to a foreign language in a foreign environment, such as immigrants or expats. In linguistic literature this is very often referred to as *second language acquisition* per se, as opposed to the classic *foreign language learning* in a non-native setting. With reference to various researchers[5], Johnson (2001: 3) explains these terms as follows:

> Second Language Acquisition is generally viewed as a multifaceted process that occurs spontaneously in communicative situations. Second Language Learning is generally considered a conscious, knowledge-accumulating process that usually takes place through formal education. (Johnson, 2001:3)[6]

It turned out that scientific observation and examination of the 'classic foreign language learner' beyond the school and university years still seems to be in its infancy, a void that has been adverted to by very few researchers, such as Johnson (2001) and Mathews-Aydinli (2008).

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5 (Gass & Selinker, 1992; Lalleman, 1996; Yule, G., 1996; Bialystok & Hakuta, 1999)

6 Though strictly speaking the terms 'language learning' and 'language acquisition' are slightly different in connotation, a considerable proportion of linguistic literature, including the present study, uses these terms synonymously.

This is why I decided to embark on investigating this rather virgin territory and conduct a study that would hopefully contribute to the advancement of a deeper insight into a field that so far has only been marginally studied. In this the present paper also aims at filling a gap by extending and adding to the discussion of the *Critical Period Hypothesis*. Against the background of sparse studies and conflicting views regarding the impact of age differences on the foreign language acquisition of adults, I ultimately hope to be able to account for a clarification of this linguistic field. Within the landscape of education and lifelong learning and referring back to the initial quote by Blakemore and Frith, it will be of significant importance to supply tools that make 'gardening' more efficient.

Within the context of a study that contrasts three different groups of adult learners, I chose the term *advanced age* for learners who are 46 and above. I did this in view of the fact that at the age of 46 and beyond, people are generally part of the work force with a growing need to adapt to an increasingly volatile and competitive working environment. It is especially this part of our work force that needs to keep track with the fast-paced development of current and future vocational and educational challenges. While companies and institutions tend to foster the advancement and upgrading of their younger employees, it is very often the age group steering towards retirement that is chronically overlooked. Quite evidently for this group there is need for action at two different levels: the individual and the institutional. As has been shown above (Chapter 1.1), these two levels have in recent times with good cause been spotlighted by a number of scientists and social critics.

One result of the demographic development will be the prolongation of working life. The globalization process will ask for more flexibility and an elevated readiness for lifelong learning. All this will bring on an increasing demand for foreign language skills. It is very likely that the number of qualified and long-serving employees for whom learning a foreign

language will be an indispensable by-product of their future job responsibilities is on the rise.

1.4 Research Questions and Goals of the Study

In the context of this study it will be of great importance to look at the age-factor-related aspects of L2 learning from two different angles: the level of psycholinguistic factors (individual differences and personality) and the level of sociopolitical influences. In addition, the current thesis will consider the two poles of personal and supra-personal layers and aim at filtering out those elements that may further a better understanding of the different driving forces as well as obstacles within the foreign language learning process. This leads us right up to the two umbrella questions of the study:

- Can the aging brain learn?

and

- Is learning a wholly unfamiliar language system with different structures, linguistic features and underlying mental concepts an attainable goal for the older generation?

In pursuit of a profound approach to the investigation of the impact of age on the ability to learn a foreign language, the following detailed research questions were formulated:

- Is there evidence of a declining learning aptitude in terms of memory, cognitive abilities as well as brain capacity and plasticity beyond the age of 45[7] as opposed to younger adult learners?

[7] My argument for this age limit is primarily a social one. For lack of sources, it does not consider neuro-cognitive or any other explanatory approaches. However, with reference to respective comments from among the larger proportion of people in my personal social environment who are beyond this age limit, it may be argued that there is a kind of 'tacit understanding' or 'general folk belief' that foreign language acquisition is effective only at a younger age.

- And if so, do other learning parameters such as an elevated rate of interest, motivation, commitment, diligence and time-management skills make up for such a supposed impairment?

- Do age-extrinsic factors such as previous language learning experience, level of education and pre-study contact with the target language and culture influence success?

- Is there to be detected any evidence for one age-group outperforming the other(s), and if so, what does this evidence look like and can we deduce any scientific implications from it?

Apart from addressing these primary research questions, the current study will also throw light on changing demands and upcoming developments in the field of adult foreign language learning and education. In view of the expected considerable demographic changes paired with a new attitude towards aging as well as socio-political demands for a longer working life and global flexibility, we need to discuss and reconsider the status quo of current language learning programs in terms of general performance and effectiveness. The question is: are learning materials and learning methods available today adequate for meeting the demands of the future? And if not, what are the major flaws and how can things be changed for the better? I contend that educators and designers of learning materials will have to focus on the changing needs and individual specifics of the language learner and help him find the program that best fits him/her. In other words, they need to do justice to a learning population that comprises all age groups. Developments within the last years have given rise to a wholly new adult learner typology. This new learner type who strives to successfully sustain his position in an exceedingly fast-paced and heterogeneous geopolitical web is caught in the crossfire of macro/micro demands (see Chapter 3.5.3). One of the major aspects in terms of adaptation to individual needs will be the time-factor. We have to

consider that the future adult learner has only limited time to devote to language learning. Another important aspect will be his independence in terms of location. Altogether, the present research is meant to contribute to the development of a theoretical basis for the implementation of adequate and future-oriented adult foreign language learning programs and measures.

To put it in a nutshell, the main aim in this thesis is to enquire into the highly diverse aspects that come to the fore when adults set out to learn a new tongue that belongs to a language family they have never or hardly been in contact with before and that represents a wholly different set of cultural and social conceptions. Metaphorically speaking this is to some extent a revival of infancy as it is a complete re-start of linguistic experience and dive into new semantic, syntactic, phonetic and grammatical concepts. The difference, however, is that the learner has at least one set of knowledge for a similar assignment of tasks. In this the research will also contribute to the language instinct debate and may move it forward.

1.5 Structure and Layout of the Thesis

The present thesis is laid out as an empirical study. Primarily qualitative in approach, the work will try to throw light on the most significant and pivotal parameters of adult foreign language learning. Based on a theoretical background that reflects the level of knowledge in the fields of linguistic research on age-related foreign language acquisition and the status quo of findings in the fields of brain and cognitive sciences, I will set out to help deepen our understanding of this issue. Given the topic's inherent diversity, this work will aim at bringing together scientific approaches that generally do not merge. In this it will be interdisciplinary. The focus of my examination being the elaboration of the differences of three age groups of

adult learners, makes it also comparative in design. After the introductory Chapter 1, the thesis will unfold as follows:

Chapter 2 will give an overview of the theoretical background as regards the “primary fields of investigation”, that is language learning theory. It will touch upon the state-of-the art of linguistic research on age-related foreign language acquisition and the correlation of psycholinguistic research on this topic. Relevant established theoretical concepts will be scrutinized and reassessed in terms of applicability to the topic of the present thesis and new theoretical approaches considered. In Chapter 3 the focus will be on the “related fields of investigation”, both neuro-cognitive and sociopolitical. The language-relevant study of the human brain and corresponding neuro-scientific findings will constitute the main body of this chapter. Furthermore implications of demographic change and respective developments will be discussed against the background of new sociopolitical standards and demands in an ever growing globalized world. Drawing on the status-quo of psycholinguistic, neurobiological and sociological research, Chapter 4 develops new conceptual perspectives and introduces a taxonomy that is believed to best account for the specific characteristics and driving forces of the adult foreign language learner. Chapter 5 will explain in detail the design and implementation of the empirical study. This will include the whole process of conceptualizing and structuring - from the preparation of the “hardware” to the data collection method and procedure. Chapter 6 constitutes the fundamental part and bulk of the thesis. Based on the transcriptions of the oral tests, it includes the linguistic analysis, evaluation and interpretation of the collected learner data. The intention in this chapter is to unfold the most significant aspects, properties and attributes of the recorded data, contrast and compare them, with the ultimate goal to generate valuable expertise for the development of adequate and future-oriented adult language learning measures. It also deals with further data types, such as questionnaires and study diaries. These additional resources will allow insight into aspects such as personal background,

expectations, motivation, self-assessment and self-regulation. The thesis concludes in Chapter 7 with the explanation of the major findings and how they tie in with the new conceptual perspective of the *3-Power-Model* as presented in Chapter 4. This chapter will also offer a look at the contributions of the study and discuss its limitations. Finally suggestions for future research will be added.

Chapter 2
PRIMARY FIELDS OF INVESTIGATION

> *Adult second language acquisition sometimes results in the extraordinary achievement of ultimate levels of proficiency comparable to those of native speakers. When this happens, it is the object of much admiration and even astonishment.*
> (Hyltenstam & Abrahamsson, 2003: 539)

Throughout the past five decades the world has changed in many ways. Maybe one of the most epoch-making developments has been the globalization process with all its implications, promising chances and resulting demands in a variety of fields of human life. One of the many consequences of the breaking down of borders and increased cross-cultural contacts is an amplified demand in the field of education, with foreign language learning significantly gaining momentum. Being able to speak foreign languages has been identified as an essential part of the new world culture and has become an important issue in educational processes on a broad national scale and across institutions. Researchers and educationalists are now required to meet these new challenges and conceptualize ways that would render possible new routes of intercultural communication. This impact of globalization on foreign language learning and teaching triggered off the development of a rich body of literature on the mechanisms and nature of foreign language learning processes. In a concerted endeavour to fully understand the intricate web of learner-external and learner-internal factors, empirical researchers started to unfold a multitude of new ways to look at this issue.

This chapter aims at highlighting the most significant developments and strategic concepts of relevant recent literature within the fields of SLA and psycholinguistics. It will focus on four major aspects that presently

dominate the scientific discussion of L2 achievement: the age-question, the discussion of the relevance of universal grammar, the individual difference debate, and the influence of multilingual competencies. First of all, I will provide a selective overview of theoretical issues and empirical findings relating to the concept of a 'critical period' for language learning. From there I will move on to the notion of 'universal grammar' and its assumed correlation to foreign language acquisition. Section three focuses on 'individual differences' providing an insight into current research as regards the psychological momentum of L2 acquisition. Finally I will investigate the impact of meta-linguistic awareness on foreign language acquisition.

2.1 The Critical Period Hypothesis

2.1.1 Introduction

The belief that there is an age factor in language development has long been and continues to be a fervently debated topic. The question whether there is a relationship between age and language learning has been a matter of heated discussion and produced a variety of conceptions about the relative abilities and/or inabilities of language learners. Beyond doubt, within the framework of the present thesis this question is of primary importance deserving in-depth examination and discussion.

Research on age-related effects in language acquisition frequently refers to the concept of the *Critical Period Hypothesis* (henceforth CPH). The notion of a critical period has its origins in the biological sciences. Initially proposed by Penfield in the late 1950s it was implemented as a linguistic theory by Lenneberg in 1967. The concept postulates that there is a specific and limited period of time that favors language acquisition. It purports that outside such an assumed ideal period of time, language acquisition is bound to be constrained. Lenneberg proposed brain lateralization at puberty as the mechanism that closes down the brain's

ability to acquire language, though this has since been widely disputed. In the first place the hypothesis was discussed in the context of first language acquisition (henceforth L1). Its subsequent application to foreign language acquisition (henceforth L2) research eventually triggered a long-standing and controversial debate with a myriad of diverse and competing standpoints. In this chapter I will give account of the beginnings of this linguistic hypothesis and further review some of the manifold attitudes and proposals that have been advocated on the correlation of L2 acquisition and the CPH over the past forty years. With reference to the accumulated underlying empirical evidence I will set out to unfold the differing notions and investigate their relevance and applicability to the present research questions.

2.1.2 The concept of a 'critical period'

Generally speaking, a critical period is a clearly defined time-span which either favors or impedes clearly defined developments or results. The notion has been used both in developmental psychology and developmental biology to describe an elevated sensitivity to certain environmental and/or experience-conditioned stimuli. It is assumed that if an organism does not receive adequate stimulus during this critical time-frame, it may be difficult if not altogether impossible to develop certain functions and capabilities later on in life.

Research in psychology and comparative ethology uses the term "imprinting" to describe this type of phase-sensitive learning. Based on his extensive experiments with greylag geese, Konrad Lorenz (ÖKOL, 1992) used this term along with the concept of a 'critical period' for his scientific proof of how these animals adapted to certain by then unknown behavioral patterns at a certain stage of life[8].

[8] He discovered that ducklings after hatching follow the first moving object that they perceive.

In his paper on “The Critical Period Hypothesis: A coat of many colors” David Singleton introduces a range of similar studies and examples dealing with the notion of a critical period[9] and in reference to these he notes that critical periods “can be characterized as being of limited duration within well-defined and predictable termini and as being related to very specific capacities or behaviors” (Singleton, 2005: 270). Observations and studies like these may be seen in close context to subsequent hypotheses for certain areas of human learning, particularly language acquisition.

When relating the term ‘critical period’ to language acquisition, Singleton pleads for caution and argues that due to the vast amount of variation in which it is understood and used, this term may be misleading and its plausibility be undermined. He argues that “the very fact that there are such manifold and mutually contradictory versions of the CPH of itself calls into serious question the notion of a critical period in this domain” (Singleton, 2005: 269).

2.1.3 The beginnings of the CPH

As cited above, the notion of a critical period in language acquisition initially focused on the explanation of L1 acquisition. One of the earliest advocates of the concept of the *Critical Period Hypothesis* was Wilder Penfield. In cooperation with Lamar Roberts and based on case studies of individuals with brain damage spanning many decades, he was the first to introduce the idea of a time-frame within which language acquisition ought to happen:

> Before the child begins to speak and to perceive, the uncommitted cortex is a blank slate on which nothing has been written. In the ensuing years much is written, and the writing is normally never erased. After the age of ten or twelve, the general functional connexions have been established and fixed for the speech cortex.

[9] E.g.: Wiesel & Huber, 1963; Kasamatsu & Pettigrew, 1979; Almli & Finger, 1987.

(Penfield 1965: 792, cited by Dechert, 1995: 73)

Penfield considers taking up language learning in the second decade of life as "unphysiological" as he regards the brain becoming "progressively stiff and rigid" (Singleton, 2005: 270-271). His "Tabula Rasa Hypothesis" in turn served as the physiological foundation and the logical basis for the *Critical Period Hypothesis* as it was later on developed and formally established by Eric Lenneberg. While Penfield's theory had concentrated on the offset point for the critical period around puberty, Lenneberg (1967) introduced a new perspective suggesting a time of onset at the age of two. Based on his assumption of the specialization of the dominant hemispheres of the brain for language functions to be complete at the age of puberty, he is in line with Penfield's alleged point of offset. For Lenneberg, whose formulation focuses on the attainability of native-like ultimate proficiency from mere exposure to a given language without tutoring, the intervening period purportedly coincides with the lateralization process, which is the specialization of the dominant hemisphere of the brain for language functions.

Lenneberg's position on this issue, which Singleton considers as "based partly on folk wisdom" (Singleton 2001: 77) is, however, undermined by more recent evidence. As regards the onset of a putative critical period for language acquisition, Singleton & Ryan (2004: 33-39) refute Lenneberg's hypothesis of the language acquisition process being 'switched on' around the age of two. On one hand they reveal a clear discrepancy in Lenneberg's argumentation itself, when he refers to the period before the age of two[10]. On the other hand they cite an array of studies that disprove Lenneberg's position[11]. Singleton & Ryan argue that "there is no stage in

[10] The authors state that although in his summary of development between four and twenty months Lenneberg acknowledges a development 'from babbling to words', he fails to consider this as part of the language acquisition process. (Singleton & Ryan, 2004: 34)

[11] Eimas et al., 1971; Streiter, 1976; Crystal, 1986 + 1997; Tomasello & Bates, 2001; Ramus et al., 1999; Stark, 1986; Griffiths, 1986; Halliday, 1975; Bateson, 1975; Harris et al., 1983; etc.

the infant's development when language is not in the process of being acquired" (Singleton & Ryan, 2004: 34).

They furthermore look at this phase from the interactionist perspective (caregiver-infant shared activity) that incontrovertibly holds sufficient evidence for their opposing view and they conclude that

> … there seem no good grounds for believing that there is a particular 'level of physical maturation' in early child development where language suddenly 'emerges' and a critical period for its acquisition begins. (Singleton & Ryan, 2004: 39)

Singleton & Ryan open their critical approach to an assumed upper limit of a critical period for L1 acquisition with the question "is it the case that human beings who have not acquired language before a certain age cannot acquire it thereafter?" (2004: 40). Their subsequent scrutiny makes them summarize that

> All in all, the available evidence does not clearly support the notion of a critical period for L1 acquisition as defined by the criteria used to characterise critical periods in the biological sciences. (Singleton & Ryan, 2004: 60)

Singleton's account of the debate about lateralization and different stances on the multiple critical periods perspective closes with an appellative comment on the state of the evidence regarding CP termini by citing Aram et al. (1997) who purport that it is difficult to determine the end of the critical period for language acquisition in humans (Singleton, 2007: 49-50).

Overall, in recent years a fast-paced progress in the field of neurosciences as well as cognitive sciences has brought to the fore an array of new approaches and promising evidence for reconsideration of the issue. Chapter 3 of this study will focus on this very topic. Along with the ground-breaking examination methods of brain scientists, another approach that is of increasing influence on this controversial topic is that of individual differences and an emphasis on the exploration of the distinctive features

of learner characteristics. Especially with regard to age-related learning ability this approach has gained more and more attention among recent researchers (for a comprehensive coverage see: Dörnyei, 2005; Lightbown & Spada, 2006). The psycholinguistic underpinnings of foreign language acquisition are aspects of high topicality within the framework of the present study and will be dealt with in Chapter 2.3.

2.1.4 A kaleidoscope of viewpoints

As cited in the introductory remarks to this chapter, in its very early stages the concept of a critical period provided a general theory of child first language acquisition. Since its advent in the 1950s and 60s, the CPH was widely accepted as the cardinal reason for foreign language learning impediments among scientists and educators. At the outset it was especially the proposition of an age-related decline in neural plasticity that was considered as the main cause of increasing difficulties in foreign language learning. Later on the theory was also adopted for the elucidation of L2 acquisition, generating a multitude of differing reasoning and conflicting versions. In the past decades, many arguments have been established for a critical period or perhaps multiple critical periods for all aspects of the language acquisition process, both first and second language acquisition. Though in the beginnings the CPH had generally been accepted as an established theory, recent research does not agree on many aspects, especially with regard to the age at which this critical period supposedly ends. Over the years the issue has become the focus of a vast literature[12]. It has produced an amplitude of different views on maturational constraints and their opposing voices and truth claims over the past decades. Beyond doubt there is a wide-spread belief in SLA that says “the younger the better”. It is to a great extent based on two major research approaches. Firstly, research conducted with immigrants who

[12] See among others: Birdsong, 1999; Flege, 1999; La Porta, 2000; Singleton, 2005; Singleton & Lengyel, 1995; Singleton & Ryan, 2004; Marinova-Todd et al., 2000; Muñoz, 2006; Hakuta, 2001; Doughty & Long, 2003.

were exposed to the foreign language in a natural setting (e.g.: Oyama 1976, Patkowski 1980, Snow & Hoefnagel-Hohle 1982, Johnson & Newport 1989, DeKeyser 2000), and secondly studies about the language outcome of children, adolescents or students mostly in school immersion settings (e.g.: Ashor & Price 1967, Olson & Samuels 1973, Burstall 1975). So throughout the past decades theory formation on foreign language acquisition has primarily focused on young learners. It is only a handful of comprehensive empirical studies that additionally involve adults and to the best of my knowledge very few that exclusively refer to the adult foreign language learner (Halladay 1970, Brown C. 1983). However, current demographic tendencies and developments along with the concept of *lifelong learning* strongly suggest an expansion of the age spectrum towards a more balanced theoretical approach to and holistic look at the design and modeling of foreign language learning concepts. In the following I will cite and comment on a selection of research projects that include the adult learner and the resulting controversy in terms of a putatively constrained L2 learning aptitude.

Broadly speaking there are two mainstream positions on the relevance and validity of the CPH with regard to the foreign language learner profile: those who are in support of the hypothesis and those who reject it. Most studies of the relationship between age of acquisition and second language development have focused on pronunciation and have generally come to the conclusion that older learners almost inevitably have a foreign accent (Dunkel & Pillet, 1957; Fathman & Precup, 1983). On the other hand only a small number of researchers have turned their attention to other linguistic features such as syntax or morphology. To illustrate this, I will now refer to a selection of research projects that give account of the grammaticality aspect (since this approach is in line with the present research assignment) and have had a sustainable impact on the scientific discussion of this issue.

Let us first turn to the 1980-Patkowski-Study and his résumé, which gave added support to the CPH for second language acquisition. Patkowski conducted an empirical research with 67 highly educated immigrants of different age-groups, from various backgrounds who had started to learn English at various ages and had lived in the United States for at least five years. A lengthy interview with each person was tape-recorded. As a control group he recruited 15 native-born Americans from a similarly high level of education. The study was to discern if learners who were exposed to second language learning before the age of 15 gained higher syntactic proficiency than older learners. In order to rule out the possibility of the results being affected by accent, he transcribed short samples from the interviews. The transcriptions were then rated by trained native speaker judges on a scale from 0 (no knowledge) to 5 (presumed native speaker level). After the evaluation process, age of arrival was found to be a strong predictor of syntactic proficiency. Based on his findings, Patkowski posited that among all the factors he examined, age was the factor that had the most significant impact on success in L2 acquisition, which renders his position fully consistent with the concept of a critical period for foreign language learning.

In 1989 Johnson & Newport conducted a study of 46 Chinese and Korean students respectively faculty members of an American university who had lived in the US for at least three years and begun to learn English at different ages. The subjects were tested on syntax and morphology and were asked to judge the grammaticality of sentences. Half of the sentences were grammatically correct, half were not[13]. Similar to the Patkowski study, they split the participants in two groups depending on their arrival in the US (group 1: age 3 to 15; group 2: age 17 to 39). Johnson and Newport also set up a comparison group with 23 native speakers of English. Like Patkowski, they arrived at the conclusion that

[13] They heard sentences on a tape and had to indicate whether each sentence was correct; twelve rules of English morphology and syntax were examined.

age of arrival in the US was a significant predictor of success. They claim that their results show a correlation between the age of onset and the variance in language proficiency. While they found few differences in the ultimate performance level in learners who had arrived before the age of 15, those who had arrived later showed much greater individual variance. They finally concluded that these findings strongly suggest a significant impact of the 'individual difference aspect' of older language learners. Overall, Johnson and Newport contend that their findings support the CPH. They claim that the critical period in general ends progressively over a number of years. Up to about seven years of age they posit a specific maturational phase which is particularly favorable to language learning and a second maturational phase until about puberty, during which the language learning capacity gradually deteriorates. Subsequent to this phase they hypothesize that there is an abrupt decline.

Long (1990) approves Johnson & Newport's evidence in relation to an early beginning to the deterioration of the capacity to acquire language, also maintaining that the prerequisite for the acquisition of L2 morphology and syntax to native levels is exposure to the L2 before age fifteen. All in all, he argues that the capacity for language development is maturationally constrained and its decline probably reflects a progressive loss of neural plasticity.

In contrast Hakuta maintains that evidence for a critical period for L2 acquisition is scanty and that "there is no empirically definable end point" and "there are no qualitative differences between child and adult learners" (Hakuta 2001: 203f). Still he does not rule out the possibility of age effects and a gradual decline over age in the ultimate attainment of a foreign language. However, what he regards as primarily relevant are physiological, cognitive and social factors. A subsequent analysis of data (Hakuta et al., 2003) also argues that there is no evidence of a discontinuity in language learning potential.

In their literature review on the specifications of the CPH and maturational constraints Hyltenstam & Abrahamsson indicate that different conceptual interpretations and "the many ways in which the notion of 'language' has been defined and operationalized" (2005: 541) have lead to confusion in the field and left major questions unanswered. When focusing on how such questions have been approached, they conclude that the most reasonable interpretation of the existing data support a maturational constraints hypothesis, a hypothesis that they concede to be incongruent with prevalent formulations of the CPH. In their attempt to resolve the reasons for the existing conflicting theoretical stances, they propose that in order to fully understand the implications of maturational constraints and their interaction with other determining factors, future research ought to focus on the systematic identification and description of social and psychological adult learner characteristics when they ask

> exactly what psychological traits and social circumstances distinguish such learners from the average early starters and other, less successful, late starters?
> (Hyltenstam & Abrahamsson, 2005: 578)

In this context they refer to relevant researchers as for instance Moyer (1999), Bongaerts (1999), Ioup (1994) and DeKeyser (2000) who have begun to investigate such issues and filtered out an array of determining factors for the successful adult language learner. Although they eventually argue that "nativelike proficiency in second language is unattainable" (2005: 578) they concede that in spite of biological constraints L2 learners at all ages can reach "miraculous levels of proficiency". These somewhat contradictory statements may, however, be seen as consistent with their claim that "future research must continue in the direction developed during the 1990s, namely to focus specifically on the question of whether late/adult starters can ever attain nativelike L2 proficiency" (Hyltenstam & Abrahamsson, 2005, 576).

Singleton's summary of a range of proposals for critical period termini clearly depicts the multitude of views and the ambiguity of applicability this issue has encompassed (Singleton, 2005: 273). In his attempt to explore the various studies on this issue and the complexity of arguments and counter-arguments, Singleton points at the dilemma that no consensus has been reached yet and succinctly criticizes the maze of evidence that impedes a clear heuristic explanation. He says:

> My conclusion from this exploration is that the CPH cannot plausibly be regarded as a scientific hypothesis either in the strict Popperian sense of something which can be falsified (…) or indeed in the rather looser logical positivist sense of something that can be clearly confirmed or supported (…). As it stands it is like the mythical hydra, whose multiplicity of heads and capacity to produce new heads rendered it impossible to deal with it (Singleton, 2005: 280).

All in all the question of whether or not there is a critical period for L2 learning is not easily answered, however there seems to be good reason to believe that there is no specific age at which the window of opportunity closes completely. The foregoing survey, though brief and selective, amply indicates that the precise termini proposed for maturational constraints on language acquisition by CP advocates vary across quite a wide range. Above that there is no consensus regarding the particular acquisition capacities that are deemed to be affected by such constraints. It does therefore not come as a surprise to maintain that the controversy about the existence of a critical period remains as intense as ever.

2.1.5 Conclusion: The CPH and the adult learner

As has been shown above, when thinking about age and L2 acquisition, the two major players in this field are young learners versus older learners. While it seems to be quite easy and largely uncontroversial to define 'young learners' in terms of age, research shows that the term 'older learners' is much more difficult to mark and determine. Depending on different research approaches, the latter term has turned out to be rather

'stretchable', ranging from post-puberty to senescence. As the present study investigates three clearly demarcated age groups, it is hoped that the opaqueness that has enveloped most definitions of 'older learners' will be eliminated from the very outset. A more concise age-demarcation method in future studies relating to older age would be a desirable goal and might generate more reliable conclusions and insights.

There is a broad consensus that in general younger learners are better at learning languages in the long run while older learners are better at learning languages in the short run. In this context different researchers accentuate different issues. According to Ehrman & Oxford (1995: 68), "younger learners are more likely to attain fluency and native-like pronunciation, while older learners have an advantage in understanding the grammatical system and in bringing greater 'world knowledge' to the language learning context". Based on her findings in the 'Barcelona Age Factor Project' Carmen Muñoz (2006: 33) suggests that

> age differences in a foreign language context favour older learners in the short term due to their superior cognitive development and probably to the advantages provided by explicit learning mechanisms which also develop with age. That is, in contexts where opportunities for implicit learning and practice are minimal, older learners may be quicker to acquire language aspects that involve above all declarative or explicit learning and memory.[14]

The reasons for apparent differences in both groups are manifold. Various studies and research findings show that adults are better language learners because they have better cognitive skills and better processing capacities. Very often older learners are more efficient in the early stages of the L2 acquisition process and they can make more rapid progress. On the other hand children – although it is very difficult for them to grasp grammatical structures for lack of pragmatic skills – seem to have an advantage in terms of neurolinguistic disposition. Against the background

[14] For a comprehensive account of implicit versus explicit learning see DeKeyser, 2005. Also Cleeremans on implicit learning, 1993, 1996, 2003, 2008.

of the young/old polarity in terms of age factor one of the core questions of research over the past years has been: At what age should L2 instruction begin? In contrast, this study will push the focal question towards the other end of the age curve, asking: At what age are you too old to learn a foreign language?

There is no doubt that the relationship between a learner's age and his/her potential for success in second language learning is complicated. In search of possible influencing factors for success in L2 learning Muñoz hypothesizes it "may be as much a function of exposure as of age" (Muñoz, 2006: 34). Presumably the relationship also needs to take into account the context in which the L2 is learnt. When learning takes place in a formal language learning environment, research findings indicate that adolescents and adults are more efficient in the early stages of the L2 development. Although evidence from foreign language acquisition settings is scarce, Muñoz holds that "the existing evidence also points to an older learner's superiority in morphological (as well as syntactic, semantic and sometimes also phonological) acquisition even after a number of years of instruction" (Muñoz, 2006: 107). If the learning process is embedded in an informal language learning environment, children can eventually speak the L2 with native-like fluency, while it seems comparatively hard for their parents and older learners to achieve such high levels of mastery, especially with reference to pronunciation and accent. But again there are exceptions to the rule.

For example, in the Ioup et al. (1994) case study of successful adult SLA in a naturalistic environment, the subject, Julie, attained native-like proficiency in Egyptian Arabic even though she started learning at the age of 21. On the other hand Flege et al. (1999) who compared native Korean speakers and their age of arrival in the United States, testing their degree of foreign accent and knowledge of morphosyntax, showed that their accent grew stronger with age of arrival, while their morphosyntax scores

increased. This again supports the above mentioned apparent trend concerning age differences: younger learners appear to be better with pronunciation, accent and the phonological aspects of a second language, while older learners seem to be better with grammar.

Also the White study (1998) on second language acquisition and the binding principle B shows that adults have a much easier time dealing with the interpretation of pronouns than children do. After testing adult learners on their knowledge of Principle B (the placement of pronouns), she found that they had only few problems, drawing the conclusion that their performance "is consistent with their already possessing the relevant pragmatic knowledge (possibly from L1) or with having the necessary memory and processing capacity" (White, 1998: 435). A crucial distinction therefore is not only *when* do we learn a language, but also *where* and *how*?

A feature which most of the available studies on age-related aspects share, is their emphasis on native-like-performance. This is an ambitious claim, but is it a claim that goes uncontradicted? When looking at this issue Lightbown & Spada (2006) refer to the studies conducted by Patkowski and Newport & Johnson, pointing out that even though their subjects had spent many years (some of them even twenty years) "living, working, and going to school in the second language environment (…) only those who had had an early start had a high likelihood of being indistinguishable from people who had been born in that environment" (Lightbown & Spada, 2006: 73). They argue that native-like mastery must be seen in context with the foreign language learner's primary goal, which is in most cases the ability to use the L2 for everyday communication.

This leads us to the question: How important is native-likeness? What are the confines of native-likeness? Is it a parameter with clearly defined directives and codes? Do all native speakers share the same performance

level and standards? Is there not an inherent ambivalence in the rating of this linguistic feature? At first sight it seems very clear, but when scrutinizing its common denominator one might detect some kind of opaqueness about it. How can L2 speakers be judged by a rating system that in itself is difficult to specify even within the L1 confines? Above that, why should L2 speakers be judged by that variable if the satisfaction of their needs lies elsewhere? Especially when it comes to the utility factor of adult foreign language use, we must take into account the language learner's true needs and goals. Very often, adult foreign language learners are driven by motivation that is extrinsic in its nature. They learn a foreign language for a very specific reason and with a very specific goal, and native-likeness may not be their target in the first place. What they are primarily trying to achieve is a level of communicative competence that enables them to take part in foreign language social life effectively. This is why the present study does not take native-likeness as the ultimate benchmark. First and foremost this alludes to phonological performance. A further factor that needs to be taken into account when referring to native-likeness is the fact that an L2 learner has an L1 identity that he/she may want to keep (even though this may be unconscious). It is therefore important to keep in mind that in most cases the goal is basic communicative ability in the target language, rather than native-like mastery.

It is my true conviction that the 'leveled' perspective in terms of age-spectrum (from infancy to adult age) along with a plethora of approaches and research methods has an impeding effect on the formulation of an all-embracing explanation regarding critical or sensitive periods with reference to adult language learning aptitude. For this reason I plead for an extension of approaches - approaches that turn away from preceding measures of "lumping together" infants, adolescents and adults, split up the field and shift the focus to adults only. For this reason I set out to conduct this comparative study with adults of different ages and start

exploring a niche within the large field of the age factor discussion. This might eventually open up the chance for a better-targeted look at the issue of adult foreign language learning success and in turn encourage future researchers to refine their research questions and refer to the same or similar specific empirical issues.

2.2 Universal Grammar

> *"Typically, use of language is creative, in the sense that it constantly involves the production and interpretation of new forms, new in the experience of the language user or even in the history of the language. (…) Thus readers of these sentences may not have seen any of them before, or anything like them, yet, they have no difficulty recognizing them as sentences of their language and assigning them a specific meaning."*
> (Chomsky, 1987)

2.2.1 The Theory: UG principles and parameters

Chomsky's introductory citation put in a nutshell by Susanne Carroll runs as follows: "UG is that knowledge of language which humans possess in the absence of exposure to speech" (Carroll, 2001: 71). In its attempts to model linguistic cognition against the backdrop of presumed linguistic universals, the field of generative grammar has produced a variety of theories. In her comprehensive review of what Carroll calls "generative enterprise" (Carroll, 2001: 71) in which she sets out to scrutinize the exact forms of UG, she significantly calls it the "sixty thousand dollar question" to which we all wished we knew the answer. She corroborates this statement when she says:

> Starting with any confidence any particular claim from the

> perspective of the theory of grammar is difficult, especially at the moment, insofar as the various ideas which were commonplace in the 1980s have been modified dramatically in the early 1990s and then even rejected completely as P&P theory[15] has emerged into Minimalism, on the one hand, and Optimality Theory, on the other. (Carroll, 2001: 72).

As a theory of linguistics, Universal Grammar (henceforth UG) postulates that all humans are born with an innate system, a language acquisition device that is based on a set of principles and parameters and makes language learning possible. Just like the concept of a critical period, it was initially and in the first place directed at the language acquisition process of children and adolescents and focused on the L1.

The innate UG-hypothesis that would explain conclusively the way all languages are organized and function was first formulated by Noam Chomsky (1968). Chomsky claims that the human mind contains a limited set of rules from which an unlimited number of speech samples can be generated. The native speaker knows what expressions are acceptable and what expressions are unacceptable. Although he/she is exposed to a finite number of language input, he/she will be able to create an infinite number of complex sentences, even though he/she may not have heard them before. The lack of negative evidence (incorrect input) is the core of Chomsky's 'poverty of stimulus' argument (Chomsky, 1980), that serves as a backbone to the UG. Martohardjono and Flynn sum up Chomsky's arguments in a four level format:

> Firstly, the speech that the child hears does not uniformly consist of complete grammatical sentences, but of utterances replete with pauses, false starts and slips of the tongue. Secondly, the language that the child hears is finite; yet the child comes to be capable of both producing *and* understanding utterances that go far beyond those that were ever heard in childhood. Thirdly, people attain knowledge of the structure of their language for which no evidence is available in the data they are exposed to as children. (…..) And

[15] Principle and Parameter Theory

> finally, the exposure to the language is not uniform for all children; yet children worldwide acquire their first languages with amazing regularity in spite of the differences in background and intelligence. (Martohardjono & Flynn, 1995: 136)

Clearly, the process of learning a language is not unidimensional. The complex system of language acquisition is based on the interaction of several different processes that occur simultaneously. Chomsky's school of thought claims that there is a set of principles which govern all languages and are wired into the human brain already at birth. In other words, principles and parameters do not need to be learned by exposure to language. Rather exposure to language triggers the parameters to adopt the correct setting. The principles as such are universal, but they allow for variation in form of certain parameters that need to be set. The central idea is that the learner's syntactic knowledge can be modelled with two formal mechanisms: Firstly a finite set of principles that are common to all languages, and secondly a finite set of parameters that determine syntactic variability amongst languages. Since its introduction, this issue has been an area of lively debate, especially with regard to its still being accessible in adulthood. Based on their investigation of this area, Martohardjono & Flynn conclude that foreign language learners do have access to principles and parameters, at the same time they, however, concede that due to the fact that they have to deal with two competing grammatical systems, they may have difficulties in mapping the principles and parameters onto the structure of the new language (Martohardjono & Flynn, 1995: 144).

Since their introduction, Chomsky's theories and paradigms have been fiercely debated and have generated many different viewpoints. It must be emphasized that the following short account of relevant research, like that in the previous section, does not claim to be of exhaustive nature, but is meant to provide an overview of the variety of opinions in this field.

2.2.2 UG and the age factor: An ongoing debate

This part of the paper focuses on the question as to how far researchers have progressed in using a UG framework for studying SLA and for determining what still needs to be done in this domain. A selection of studies from some of the leading researchers in this area is meant to address the basic question of whether L2 learners have access to UG and if so to what extent. The question is: is the L2 learner's grammar constrained by UG? Again we can look at a whole range of diverging standpoints and attitudes. A large proportion of research focuses on phonological aspects and native-likeness, drawing on results obtained from subjects embedded in a language immersion setting.

Martohardjono and Flynn identify at least two areas of language that are not affected by a critical period, both deriving from the biologically endowed faculty for language:

> (i) the innate principles and parameters of Universal Grammar (UG) governing the acquisition of syntax; and (ii) the biologically determined sensory abilities for the development of sound systems. (Martohardjono & Flynn, 1995: 135).

Based on her 1993 research Martohardjono (1993) suggests that UG is not affected by a critical period, as her results indicate that syntax-related "UG principles which are not instantiated in the L1 remain available to adult L2 learners" (Martohardjono & Flynn, 1995: 140-141). The language data of the present research support this assumption. A case in point is the question-construction in Chinese Mandarin that represents a totally new syntactic pattern for speakers of the Indo-Germanic language family. Within the learning program it is presented in a brief and random manner, and the learner is continually asked to generate new constructs. Specifics of the question-construction are explained in detail in Chapter 6.2.4 (p. 202ff). Another one is the specific use of particles that, although it is

exemplified in the learning program, needs to be continually transferred to hitherto unknown constructs in a self-regulatory manner[16].

When turning to the impact of the language faculty in the domain of phonology, Martohardjono and Flynn acknowledge the speculative character of *neurological* evidence for a critical period[17], while at the same time they point to *empirical* evidence that suggests "that general phonological abilities are maintained in adulthood and remain available to mature L2 learners" (Martohardjono & Flynn, 1995: 145). With reference to empirical evidence they advocate that there is no such thing as "a loss or change in the abilities to produce and perceive new sound contrasts" (Martohardjono & Flynn, 1995: 149). To them the innate or biologically determined faculty for language as regards aspects of syntax and phonology remains accessible to adult learners, whereas they concede that non-innate aspects of L2 proficiency may be susceptible to age-related degradation. They cite ample empirical evidence[18] that supports their theory that adults retain access to their original sensory abilities and are therefore able to perceive and produce new sounds. (Martohardjono & Flynn, 1995: 148f). Again the findings in the present research militate in favour of this position. The highly intricate sound system of Chinese Mandarin with its four contour tones (see Chapter 5.6.1.1) and an extensive array of distinctive sibilants that are very difficult to distinguish for Indo-Germanic speakers were mastered by most of the test persons in

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16 Examples:
a) wǒ de érzi (my son): Mandarin does not have possessive pronouns. A pronoun + *de* is equivalent in meaning to a possessive pronoun in English (Ross & Ma, 2006: 26, 51, 167)
b) wǒ shuō de bù hǎo (I don't speak well): When *de* is used in a manner adverbial phrase; this construction is used to describe how an action is generally performed or how it was performed in the past (Ross & Ma, 2006: 181, 182).
With good cause this and other features were not included in the linguistic analysis (for reasons see Chapter 6.2.4, p.200)

17 They cite: Walsh & Diller, 1986; Seliger, Krashen & Ladefoged, 1982; Obler & MacNamara, 1991.

18 Snow & Hoefnagel-Höhle 1982, McRoberts & Sithole 1988, Werker & Tees 1983, Neufeld 1977, Flynn & Manuel 1991, Flege & Port 1981, Port & Mitleb 1980, Nathan 1987, Flege 1987.

an amazing manner. However, as this empirical research mainly focuses on retentiveness and listening comprehension, the subjects' intonation was not considered in the transcripts[19].

Although in principle they support UG functionality in adults, in their concluding remarks Martohardjono & Flynn admit that in spite of a solid knowledge of principles and parameters in the area of syntax and the retention of phonemic capabilities, adult second language learners may nonetheless be prone to failure, as "a sweeping biological explanation, (…) fails to answer the more subtle and ultimately more interesting question of what particular aspects of linguistic behaviour are affected by age" (Martohardjono & Flynn, 1995: 151). With this closing statement, they seem to allude to the non-innate aspects or soft factors such as motivation, anxiety, etc. that also play a significant role in second language acquisition.

When Bley-Vroman investigated whether adults acquire an L2 the same way children acquire their L1, he argued that there is a fundamental difference between the two phenomena. On this basis he developed the *Fundamental Difference Hypothesis* (FDH) that set out to explain the difference between child first language acquisition and adult foreign language learning. It purports that whereas children are known to learn language almost completely through implicit mechanisms, adult L2 learners have largely lost the ability to learn a language without reflecting on its structure and have to use alternative mechanisms, drawing especially on their problem solving mechanisms. Contrary to Martohardjono and Flynn he arrives at the conclusion that post-pubertal language learning has no access to UG and argues for general problem solving mechanisms being at work. The hypothesis includes a variety of factors that explain the child-adult difference (e.g. failure of adults to

[19] At this point it may be indicated that the audio-recordings offer an excellent data base for phonological analysis, however this aspect would fill a research volume of its own.

achieve native-like proficiency, fossilisation, the importance of instruction, the necessity of correction and affective influencing variables) and supports his position on this issue. Though he takes a nativist stance in terms of L1 acquisition, he denies this for L2 acquisition, which clearly sets him apart from the Martohardjono & Flynn point of view (Bley-Vroman, 1989).

In her comparison of child L1 and adult L2 acquisition Schachter fully complies with Bley-Vroman's position of there being major differences that evince lesser achievements of adult learners (Schachter, 1996: Chapter 5). Both researchers claim that the differences between L1 and L2 achievements disprove the notion that UG in its original form is available to adult L2 learners and that "what a monolingual individual retains of the principles and parameters of UG are only those principles and parameters instantiated in the individual's L1" (Schachter, 1996: 172). Schachter, who refines this issue to the child L2 versus adult L2 differences, argues for periods of heightened sensitivity and periods of lesser sensitivity that she subsumes under the heading 'Windows of Opportunity' (Schachter, 1996: 185).

DeKeyser's study with 57 adult Hungarian-speaking immigrants that was designed to test Bley-Vroman's *Fundamental Difference Hypothesis*, supports the latter's position in the sense that very few adult immigrants scored within the range of child arrivals on a grammaticality judgement test, and that the few who did, had high levels of verbal analytical ability, which was not a significant predictor for childhood arrivals. DeKeyser's results showed that no adults reached native-like competence in L2 morphosyntax unless they had been able to rely on explicit, analytic, problem-solving capacities. A secondary aim of DeKeyser's study was the replication of Johnson and Newport's (1989) landmark study that had been questioned and challenged by other researchers such as Bialystok & Hakuta (1994) or Kellermann (1995) by focusing on the explanation why

there appear to be exceptions of the critical period effect. DeKeyser states that his study evinces that

> there really is a critical and not just a sensitive or optimal, period for language acquisition, provided that the Critical Period Hypothesis is understood narrowly enough, that is, applying only to implicit learning of abstract structures

and he concludes that

> somewhere between the ages of 6-7 and 16-17, everybody loses the mental equipment required for the implicit induction of the abstract patterns underlying a human language, and the critical period deserves its name" (DeKeyser, 2000: 518).

DeKeyser believes that maturational constraints apply only to implicit language learning mechanisms. For this reason he argues for "full-scale immersion" for children in order to "capitalize on their implicit learning skills" and for "formal rule teaching" that would allow us to draw on the adult's explicit learning skills (DeKeyser, 2005: 335).

When looking at these two investigations, the following positions stand out: Bley-Vroman formulated the *Fundamental Difference Hypothesis* to explain a variety of observed differences in strategy and success between children and adults. DeKeyser used the concept of the implicit/explicit dichotomy to show that children mainly rely on *Universal Grammar*, while adults primarily use their analytical abilities in their language learning process. Though the two researchers use different models to describe their findings, they agree on the fact that children and adults take a different approach.

The variety of propositions to be found under this heading suggest that it is very unlikely that there is *"a"* system that would allow us to conclusively explain how exactly L2 acquisition is organized and functions. Although a number of studies have been conducted, the results do not uniformly support any single conclusion. Carroll, whose experimental results

suggest that adult learners are capable of learning abstract linguistic generalisations on the basis of explicit and implicit feedback and are not restricted to instance-based learning (Carroll, 2001: Chapter 8), maintains that “basically what the SLA P&P literature has offered us is a metaphor and not a transitional theory” and she suggests that this metaphor “has outlived its usefulness” (Carroll, 2001: 112). As yet, the question whether the principles of *Universal Grammar* apply to adult learners has not been satisfactorily answered. Quite to the contrary - the different UG-SLA-related viewpoints reveal very clearly that much more research in this area needs to be done.

2.2.3 Final remarks: UG and the adult learner

As has been shown, underlying the dispute within the UG framework over the existence of a critical phase for foreign language acquisition is an ongoing debate among L1 and L2 acquisition theorists. The outcome of L2 acquisition among adults is in many respects seen to be different from the outcome of L1 acquisition among children. It has also been pointed out that the literature review on age differences in second language learning shows a broad consensus on the attitude that while children perform better in the long run, adults learn faster. DeKeyser suggests that adults learn faster because “their capacities for explicit learning let them take short cuts” (DeKeyser, 2005: 335). Also other researchers have argued that due to greater cognitive maturity older learners may have an ability to learn at least some aspects of an L2 more efficiently than younger learners. This facet is undeniably connected to the ultimate question of whether adult language learners have access to *Universal Grammar* and if so, to what extent it is in operation.

With respect to the question of the mediating role of UG in L2 acquisition, Birdsong, with his focus on the final state (also: ultimate attainment) of L2 acquisition, argues that “nativelikeness at the L2A end state does not always imply access to UG”, adding that “it is also clear that nonnativelike

linguistic behaviours are not necessarily evidence of lack of access to UG" (Birdsong, 2006: 10). Birdsong's statement reveals the delicate and volatile nature of the issue.

A further aspect that merits examination is the fact that adult L2 learners, with their fully installed mother tongue grammar, already possess a means of representing language which makes it very difficult to reliably assess the true source of the different output patterns. In other words, it will always be difficult to determine, whether the L2 learner is drawing on the L1 grammar or on UG or on both. This is probably very much so in cases of a high degree of similarity in the L1 and L2 structures. If, however, the L2 shows a big-scale differentiation both in grammatical structure and underlying unheard-of mental concepts (as is the case in the present research project), it may be easier to deduce reliable evidence. This consideration seems to be consistent with Lydia White's position that

> the strongest case for the operation of principles of UG in interlanguage grammars can be made if learners demonstrate knowledge of subtle and abstract linguistic properties which could neither have been learned from L2 input alone nor derived from the grammar of the mother tongue (White, 2003: 22).

As White states, L2 acquisition research that had initially focused on L2 English has recently been expanded to other languages, such as L2 Spanish, Japanese, French or Chinese and thus brought new insights. She concludes that "results from several experiments suggest that learners of a variety of L2s demonstrate unconscious knowledge of subtle distinctions that are unlikely to have come from the L2 input (including instruction) or from the L1" and sees this consistent with the claim that principles of UG constrain interlanguage grammar.

As the present study is built on a kind of bipolarity of language concepts, with the source and target languages representing two diametrically opposed systems both in terms of grammatical structure and mental

concepts, it is hoped that the data evaluation will allow solid and credible conclusions that may eventually help clarify this controversial topic and boost its transparency.

2.3 Individual Differences

Human beings are complex.
No two are alike.
(Ehrman, 1996: xiv)

Learning a foreign language is a demanding and generally labor-intensive task. If the language is not acquired in a natural setting over a long period of time, learners – no matter how old they are - have to sit down and work. Research on factors affecting foreign language learner outcome has identified two major fields of relevance that are intrinsically tied to the individual per se. One is the age factor, as discussed in the first section of this chapter. The other one is based on human diversity. A diversity that is first and foremost biologically and genetically conditioned. In the second instance it is shaped and refined by cultural and social variation. So each individual is equipped with a very specific set of characteristics that make him or her infallibly distinctive and unique. SLA has referred to these language learner specifics under the heading *individual differences*.

When Segalowitz ponders over the question of the diversity of individual success in second language attainment, he rightfully connects it to the fact, that “after all, every healthy human being in an intact social environment masters a first language to a degree of fluency that in other skill domains would be recognized as elite of near elite levels” (Segalowitz, 1997: 85). Why then would foreign language acquisition spawn so many different versions of success?

2.3.1 Individual differences within a foreign language learning context

Research on variation between individual foreign language learners is essentially connected to the question “why do some learners do better than others?” Why do some learners progress rapidly, while others struggle along making very slow progress, although all of them are exposed to the same set of learning conditions? How can we identify the different mechanisms that influence learning success? A case in point for the topicality of these questions is Dörnyei’s recent book length coverage of this issue (Dörnyei, 2005). In his quest to understand the general principles of the various learner characteristics and to explore the uniqueness of individual variables Dörnyei looks into the rich trove of relevant language learning theories and research. His findings prompt him to point to the urgency for further research, when he concludes:

> …this overview made it clear to me that all the variables (….) are either in the process of, or in desperate need of theoretical ‘restructuring’ (Dörnyei, 2005: 218).

He refers to Ellis’s claim of considering the ‘situated’ nature of L2 learning, which suggests an approach that takes into account “the specific settings in which learning takes place and the kinds of tasks learners are asked to perform in the L2”. (Ellis, 2006: 547). Dörnyei’s critique of the long-time negligence of this aspect that in his view had arisen from a primarily isolated and content-independent approach to the different variables, results in his recognition that this issue calls for a change in ID research approach. In order to be able to effectively investigate the dynamic and situated nature of ID variables he argues for a shift from quantitative research measures to qualitative approaches that would complement “traditional questionnaire and test-based research design with qualitative components” (Dörnyei, 2005: 218). With the present research I intend to respond to Dörnyei’s methodological call for an advancement of this issue.

Perhaps the best way to approach the discussion of ID-relevance is to look at the issue from the following methodological perspective, which - though it does borrow from cutting-edge suggestions by researchers such

as Ellis and Dörnyei and is substantially consistent with their views – develops its own specific path. There are several driving forces that come into play when learning targets are focused. Apparently the two major forces are the ones that lie 'within' learner control and the ones that lie 'beyond' learner control. To illustrate this psychologically-conditioned concept I would suggest to set up the following individual-variables-taxonomy: Individual learning success is channelled along two separate ducts:

1. the genetically-conditioned duct, which relates to natural endowments and allows us to do things on the basis of our biological disposition, and
2. the environmentally-conditioned duct, which has been furrowed into each individual by external influences and allows us to do things on the basis of accumulated knowledge.

While the first set of variables largely determines 'why and what we want to learn and how we consciously go about learning, the second set of variables is a kind of unconscious navigation system that can either enhance or inhibit the learning process. If we look at learner success from the psychological point of view, it is via these two main channels that the learning process is steered. These two umbrella variables with their different subdivisions must, however, – as will be illustrated further below (Chapter 2.3.3) – be seen not as constant and independent parameters, but as continually changing and interacting indicators.

2.3.2 A brief overview of individual difference research in the L2 domain

Over the past five decades the observed diversity in L2 learner success has encouraged researchers to explore the complex field of psychological processes that have an impact on and govern foreign language learning. While in the 1960s 'language aptitude' and 'language learning motivation' had been the focal research targets[20], individual difference (ID) studies in

[20] For reviews see: Cornwell & Robinson, 2000; Cohen & Dörnyei, 2002; Dörnyei & Skehan, 2003; Ellis, 2004.

the 1970s extended their perspective towards the 'good language learner'[21]. The new aspect in these later studies was the consideration of the learner's own active and creative participation in the learning process by applying individualised 'language learning strategies'. This was a step further that would augment the inventory of significant learner characteristics with the language learner strategy component. In the late 1980s Skehan (1989, 1991) added 'learning styles' to this seminal list of individual learner differences. What seems to be clear is that when it comes to psychological attributes, it lies in the nature of things that many of the characteristics cannot be assigned to one category. There is overlapping in content and interpretation. Putative borderlines along the different properties that prima facie seem to be clearly distinguishable often intertwine and merge. Lightbown & Spada point to this delicate issue when they say:

> One problem is that, unlike variables such as height or age, it is not possible to directly observe and measure variables such as motivation, extroversion, or even intelligence. These are just labels for an entire range of behaviours and characteristics. Furthermore characteristics such as these are not independent of each other, and researchers have sometimes used the same label to describe different sets of behavioural traits." (Lightbown & Spada, 2006: 55)

They corroborate their statement with ample and clear-cut exemplification (for details see Lightbown & Spada, 2006, 54-57). When Gass & Selinker (2008) touch upon the scope of this field, they also hint at the cross-influential quality of certain indicators and the resulting precariousness. When they look at aspects of 'personality' and 'learning styles' they concede that

> the term *learning style* is often used interchangeably with *personality,* although the former is undoubtedly more variable, whereas the latter refers to a stable trait of an individual (…). Constructs that some refer to as learning style, others refer to as part of personality. Unfortunately there has not been much effort to separate these". (Gass & Selinker, 2008: 432)

[21] For review see: Norton & Toohey, 2001.

The same applies to their scrutinizing look at the motivation factor that makes them state

> the exact nature of motivation is not so clear. Everyone agrees that it has something to do with drive, but when various definitions are compared, it becomes clear that these definitions differ in significant ways. (Gass & Selinker, 2008: 426)

This picture of the state-of-the-art of the individual difference issue is shared by other researchers in the field. A comprehensive outline of the wide scope of definitions and specifications can be found in Dörnyei (2005) in his seminal book on language learner psychology, where he summarizes that "the concept of 'individual differences' is rather loose, containing certain core variables and many optional ones" (Dörnyei, 2005: 7). From among the palette of proposals and in accordance with traditional approaches, he classifies *personality*, *aptitude*, *motivation*, *learning styles* and *learning strategies* as principal learner variables. In the respective chapters he either fine-tunes these main traits with related concepts (e.g. personality + temperament + mood) or he pools those that "for one reason or the other" (Dörnyei, 2005: 8) remain kind of left over in what seems to be a random conglomerate or collecting pond in the final chapter, subsumed under the title 'other learner characteristics'. What distinguishes his approach from most other investigations of language learner success is the fact that he, similar to Ellis (2004), deliberately excludes the age factor, as he feels this would have gone beyond the scope of his book, both in length and coherence. Though his book, just like a number of other research approaches supplies a long list of relevant distinctive features with an in-depth exploration of each aspect, it does not refer to one decisive factor that in my view is of utmost relevance when it comes to learning success of adult language learners: The assignment of effective learner characteristics such as motivation, attitude, self-management and self-regulatory skills, problem solving abilities, meta-cognitive knowledge, meta-linguistic awareness, the genetic disposition and evolution of the human brain to distinctive categories of individual strengths. In view of this

void I introduced the terms *willpower*, *brainpower* and *instrumental power* as the three main branches of determining factors for adult L2 learners. With the classification and a clear breakdown of learner variables, this new concept, which will be presented in Chapter 4.3, allows an extensive coverage of the impact of learner specifics in due consideration of progressing age. Admittedly, the 'lack' of categorization of these learner characteristics in previous approaches may in the first place be due to the fact that they have been governed by different research questions and primarily focused on younger age groups. At this point it must be added that young learners are certainly also subject to these powers, but it seems that they may either have been taken for granted (e.g. brain power) or simply ignored (e.g. willpower).

2.3.3 The problem of isolation and complexity of individual variables

A further issue that deserves due notice is the ambiguity of isolation and complexity in ID research approaches. A theme that has recently been put added focus on is that of the relationship and interaction among the various individual difference factors. In consideration of the latest publications by Ellis and Dörnyei, it may be concluded that we are witnessing a shift from a predominantly linear view of the issues at stake to a more overarching theoretical approach. According to Ellis, future research ought to focus on

> how a learner's *abilities* and *propensities* help shape their *cognitions* about language and language learning, and how these, in turn, affect their choice of learning strategies. The theory will need to grapple with what is perhaps the overriding issue in SLA today – *the role of consciousness.* It will need to specify for example, whether the influence of individual difference factors such as motivation and language aptitude is mediated by learner cognitions and learning strategies, which by definition are conscious actions performed by the learner, or whether they have a more direct effect on opportunities to learn and acquisitional processes that arise without awareness on the part of the learner. (Ellis, 2004: 547).

At this point it may be argued that Ellis's view of the *role of consciousness* as an essential overriding issue in contemporary foreign language acquisition research may in a broader sense be linked to the concept of *willpower* within this study, as meta-cognitive and strategic consciousness is a decisive pre-requisite of conscious actions that favour learner progress. In any case, what seems to be evident is that Ellis, just like Dörnyei, is striking a new note that due to its interrelating approach promises novel and revealing insights into the nature of this complex and intricate field of research.

In his consideration of the existing disparate literature on the diverse ID variables, Dörnyei (2006) unfolds three aspects that have rightfully received enhanced attendance in latest research endeavours. First of all he mentions the fact that there has been a move away from a strictly context-independent and absolute notion of ID variables towards a more dynamic conceptualisation that accounts for a certain amount of interaction of ID factors with situational parameters. Secondly he argues for a step away from interpreting IDs and their corresponding outcome variables as regards their linear relationships in favour of a more concerted approach that does justice to the fact that ID factors interact and that "combinations of traits have more predictive power than traits in isolation" (Dörnyei, 2006: 62). Finally he cites first promising traces with regard to a balanced and complementary approach of linguistics and psycho-linguistics.

So, all in all, it may be stated, that to date we are confronted with a plethora of views on the properties and idiosyncracies of certain core ID variables such as motivation, personality, aptitude, learning styles, cognitive styles, learning strategies, student self-regulation and their relevance to L2 acquisition. In the following I will provide a short overview of the definitions of the afore-mentioned characteristics as they were scrutinized and assessed by Dörnyei and relate them to my views on the

issue of individual differences and their correlation to language learner success that combine with the findings of the present study.

2.3.4 Dörnyei's investigation of mainstream ID concepts

2.3.4.1 Personality

The first main issue that comes up when Dörnyei asks "what is *personality*?" is that different scholars have explained this term in a variety of ways, however, their explanations share one common denominator: the consistency claim. They postulate that "there is a certain constancy about the way in which an individual behaves, regardless of the actual situation" (Dörnyei, 2005: 11). In Dörnyei's view this does not seem to be an all-embracing and satisfactory way to look at the issue. For this reason he sets the term *personality* apart from its inherent concepts of *temperament* (as the stable and enduring component) and *mood* (as the volatile component). While the first notion seems to describe a *trait*, the second one is more likely to qualify as a *state*. However, as states are per definitionem not long-lasting or pervasive, how would the concept of *mood* fit into this pattern and correlate with the consistency notion? With the introduction of this interesting perspective Dörnyei points to the volatile and equivocal nature of the concept of personality, and opens up new theoretical horizons. However, he unfortunately does not elaborate on this topic any further (Dörnyei, 2005: 11-12). In turn, he proceeds with the different approaches to what he calls 'personality proper' with special focus on three taxonomies of personality traits that currently dominate research. First, Eyseneck's three-component construct (Eyseneck & Eyseneck, 1985) that contrasts extraversion><introversion, neuroticism and emotionality><emotional stability, and psychotiscism and toughmindedness><tender-mindedness. Second, the *Big Five Model* (e.g. Goldberg 1992, 1993; McCrae & Costa, 2003) that goes back to research conducted by Allport, Odbert and Catell in the 1930s and 1940s with its final breakthrough and implementation in the early 1990s, which seems to

be gaining momentum in current literature. This construct retains Eyseneck's first two dimensions, and replaces the third one by adding three extra dimensions: conscientiousness, agreeableness, and openness (Dörnyei, 2005: 14-18). Finally Dörnyei adverts to the *Myers-Briggs Type Indicator* (MBTI), the world's most widely employed personality test that is rooted in Carl Jung's theory of three specific dichotomies and was extended by a fourth by the daughter/mother team Myers and Briggs (Dörnyei, 2005: 18-20).[22]

The second main issue Dörnyei addresses, is the question to what extent personality variables and types affect learning, especially L2 learning and use. (Dörnyei, 2005: 24-30). Overall he does not see a powerful direct link between personality traits and learning outcomes, and he relates this insight to inconsistent and inadequate research approaches and methodologies, eventually tying it to the hope "that future research designs in L2 studies will increasingly include personality traits as independent variables". (Dörnyei, 2005: 30).

In conclusion, one might postulate that although a number of personality characteristics have been proposed as likely to affect L2 learning, it is not easy to demonstrate their effects in empirical studies. From among the number of indicative personal properties such as the extrovert/introvert dichotomy, self-consciousness, self-esteem, empathy, talkativeness, responsiveness, dominance, inhibition, anxiety, nervousness, and stress we have good reason to assume that they somehow affect the foreign language learning process. However, it must be admitted that not only are these traits difficult to assess in concrete terms, but they also come up in a variety of mixtures that are first of all very unique compounds in each individual and secondly subject to situational aspects. In other words, an individual is the product of his or her fairly stable genetically conditioned

[22] For an overall account of different approaches to the study of personality see Dörnyei, 2005: 12-20.

qualities which are during the learning process exposed to highly volatile environmental influences. The outcome is always one-of-a-kind and therefore in terms of quantitative empirical research difficult to grasp. Lightbown and Spada have therefore good reason to purport that “in general the available research does not show a single clearly-defined relationship between personality traits and second language acquisition” (Ligthbown & Spada, 2006: 62).

Within the framework of the present study the effect of personality traits as cited above will not be included for two very specific reasons: First of all, as has been delineated, to date research has produced contradictory results that do not allow us to infer reliable informative value. Secondly, the language learning setting underlying this research is self-centered and a priori minimizes the effectiveness of human traits that are relevant in human interaction. The learners learn on their own, and there is no physical human interference of any kind. The only ‘person’ they interact with is an impersonalized instructor with whom they easily set up an atmosphere of mutual trust. This is why it can be argued, and perhaps rightly, that interpersonal inhibitive factors are largely eliminated.

2.3.4.2 Language aptitude

In terms of definition, Dörnyei describes the concept of language aptitude as being “related to the broader concept of human abilities, covering a variety of cognitively-based learner differences” (Dörnyei, 2005: 30), a concept that he says, has traditionally been regarded as a key factor in the domain of L2 learning. But is this really the case, and if so, what is the evidence? In the field of psychology the term ‘mental abilities’ generally refers to a variety of human traits that are involved in thinking, reasoning, processing information, and acquiring new knowledge or skills, and Dörnyei points out that these traits are referred to by different experts under different headings such as *ability*, *aptitude* or *intelligence*. In other words, he states that these terms are used synonymously and there is no

universally accepted theory, nor is there "a canonical list of *real* abilities" (Dörnyei, 2005: 33). How do we cope with the interchangeable use of these terms that quite obviously reflect a certain amount of diversity and ambiguity in the conceptualization of this feature? Dörnyei advocates that

> …. strictly speaking, there is no such thing as 'language aptitude'. Instead, we have a number of cognitive factors making up a composite measure that can be referred to as the learner's overall capacity to master a foreign language (Dörnyei, 2005: 34)

and he wonders whether in view of this 'composite' quality together with the more recently added concepts of 'working memory' and 'phonological coding/decoding' would not make the umbrella-term of language aptitude altogether obsolete. It seems that the more one engages in the definition of the term, the more obscure it gets. Dörnyei notes that approaches such as the 1959-*Modern Language Aptitude Test* by Carroll & Sapon and the 1966-*Pimsleur Language Aptitude Battery* promise to make this issue approachable. These tests aim at sketching aptitude profiles of learners, and are based on the view that aptitude has several components. The components refer to the ability to identify and memorize new sounds, the ability to understand the function of words and figure out grammatical rules and the ability to remember new words. With reference to "a relative lull in the 1970s and 1980s" (Dörnyei, 2005: 63) and a subsequent recovery of research directions[23], Dörnyei points to the 'transitional' state of this research field[24]. In his concluding remarks Dörnyei names four "directions for language aptitude research that are likely to be productive in the future" (Dörnyei, 2005: 63). These are:

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[23] E.g. Grigorenko et al.'s *Canal-FT*, 2000; Sparks & Ganschow's *Linguistic Coding Difference Hypothesis*, 1991, 1999, 2001; Miykai & Friedman's approach that focuses on the relationship between *working memory* and SLA, 1998; Skehan's approach that relates various aptitude components to the different phases of the SLA process, 1998, 2002; and Robinson's combination of aptitude measures and other ID variables in various trait complexes, 2002a, 2002b.

[24] For a comprehensive overview of language aptitude research from the beginnings to new research directions and perspectives see Dörnyei, 2005: 34-64.

a) the study of aptitude measures in combination with other ID variables in various trait complexes,
b) the continuing exploration of the role of working memory,
c) further examination of the influence of cognitive skills, and
d) the linking of certain aptitude components with specific phases of the SLA process.

If 'aptitude' remains as versatile a term as it is sketched by Dörnyei in his extensive discussion, it remains to be seen whether the line of investigation continues to be a 'success story' within L2-related studies (as Dörnyei formulates it in his concluding chapter) (Dörnyei, 2005: 62). It seems that the inherent diversity and the application of this notion as a clearly marked-off criterion for measuring foreign language learning success bears a strong risk of obscurity. The question we have to ask now is – once a learner profile has been created by one method or the other, does it provide substantive evidence for conclusive testimony of learner success? In face of Dörnyei's position that "the tacit understanding in the L2 research community has been that language aptitude is what language aptitude tests measure" (Dörnyei, 2005: 35), it may be argued that in sum there is no such thing as a conclusive answer.

2.3.4.3 Motivation

Whatever strands of research or relevant literature (e.g. Sprenger's management theory and literature, 1991, 1995) that relate to individual performance throughout the past decades we look at, *motivation* seems to be the buzzword par excellence. In the Oxford Dictionary we read:

a) the (conscious or unconscious) stimulus, incentive, motives, etc, for action towards a goal, esp. as resulting from psychological or social factors: the factors giving purpose or direction to behaviour;
b) the state or condition of being motivated; the degree to which a person is motivated; enthusiasm, drive. (Brown, 1993: 1838)

At first sight the properties of this term seem very clear, but again research in foreign language acquisition has detected a complex web of concepts lying beneath the surface of it. Dörnyei argues that to some extent all factors involved in SLA presuppose motivation, as “it provides the primary impetus to initiate L2 learning and later the driving force to sustain the long and often tedious learning process” (Dörnyei, 2005: 65). I would suggest that this largely applies to the adult foreign language learner group and less so to school children, as adults generally make the choice to learn a certain foreign language, while for the latter it may very often be perceived as one among many other involuntary duties. It may also go uncontested that there is a strong link between motivation on one hand and language aptitude (in the broad sense as sketched above) and learning conditions on the other. Their mutual dependence may even result in the fact that “motivational factors can override the aptitude effect” (Dörnyei, 2005: 65).

The examination of the relationship of motivation and foreign language attainment being one of Dörnyei’s major research concerns made him develop his ‘L2 Motivational Self System’-Theory (Dörnyei, 2005: 105-106) that aims at bridging the gap between two traditional research ‘camps’ that from his point of view had for much too long (except for very few promising recent steps) hampered the integration of the study of L2 motivation and mainstream SLA. Dörnyei deplores that while the majority of applied linguists had primarily “concentrated on the process of language development in learners who have already made a commitment to L2 learning, without being too concerned about what initiated this process” without showing specific interest in motivation, mainstream L2 motivation researchers “were not particularly interested in the process of language learning because for them the focal issues of SLA were rather irrelevant” with a tendency to bypass aspects such as morphological or syntactic development (Dörnyei, 2005: 109).

Dörnyei's new 3-dimensional motivation construct is a synthesis and elaboration of Noels' (2001) construct that suggests three interrelated types of orientations (intrinsic, extrinsic and integrative reasons for language learning) and Ushioda's (2001) concept of eight motivational dimensions (language-related enjoyment/liking, positive learning history, personal satisfaction, external pressure/incentives, personal goals, desired levels of L2 competence, academic interest and reference to L2-cultural aspects). Dörnyei sets the following three notions apart: the 'Ideal L2 Self', the 'Ought-to L2 Self' and 'L2 Learning Experience' and he outlines them as follows:

> (1) *Ideal L2 Self*, referring to the L2-specific target of one's ideal self: If the person we would like to become speaks an L2, the *Ideal Self* is a powerful motivator to learn the L2 because of the desire to reduce the discrepancy between actual and ideal selves.
>
> (2) *Ought-to L2 Self*, referring to the attributes that one believes one *ought to* possess (i.e., various duties, obligations, or responsibilities) in order to *avoid* possible negative outcomes.
>
> (3) *L2 Learning Experience*, which concerns situation-specific motives related to the immediate learning environment and experience. (Dörnyei, 2005: 105f)

With this model Dörnyei is in accordance with Ushioda's proposed *causal* and *teleological* concept of motivational configuration (2001), which maintains that the first derives from the continuum of L2 learning and L2 related experience to date, and the second is directed toward short-term or long-term goals and future perspectives.

As I understand it, Dörnyei's model builds on the conviction that motivation is a dynamic and ever-changing process that is situational and implies self-responsibility and self-determination. In other words, people do not *have* it, but they *create* and *cultivate* it, and this process is subject to chronological variance, depending on learner progress. I would like to extend Dörnyei's notion by adding, that motivation is by nature self-

reinforcing, a perception that ties in with what Sprenger calls the *secret of motivation* when he says “sie erhalten das vom Leben zurück, was sie selbst in jedem Augenblick hineingeben” (Sprenger, 1996). In this, as will be shown later, the model seems to be in accordance with the concept of motivational L2 influence as it has been diagnosed within the present study, which sees motivation as a functional result of time and success.

2.3.4.4 Learning styles and cognitive styles

When surveying Dörnyei’s investigation of the whole learning style issue, it soon becomes clear that the situation is no less controversial than it is with the concepts discussed before. Dörnyei delineates the topic of learning styles as being “underresearched” and for reasons of its confusing multitude of labels and dimensions compares it to “a real quagmire” (Dörnyei, 2005: 120). So how should one approach this basic conceptual issue that at first sight seems to be clear, straightforward and unambiguous?

First of all, Dörnyei approaches the problem by making a clear distinction between learning styles and cognitive styles. While he presents learning styles as being defined by Reid (1995, p. viii) as “an individual’s natural, habitual, and preferred way(s) of absorbing, processing, and retaining new information and skills” (Dörnyei, 2005: 121), he refers to cognitive styles as “an individual’s preferred and habitual modes of perceiving, remembering, organizing, processing and representing information” (Dörnyei, 2005: 124). Although Dörnyei argues that cognitive styles are ‘purer’ by definition as they are not subject to educational and environmental interferences (Dörnyei, 2005: 125), we cannot deny that the two definitions suggest that there are no clear boundaries to be detected, just like there do not seem to be clear ways of setting these concepts apart from others such as learning strategies or certain personality traits. All this seems to justify Dörnyei’s initial question, whether one should talk about learning styles at all.

Secondly, he introduces several established models and tools in relevant literature[25] that have been proposed to minimize the vagueness and conceptual ambiguities and make the whole issue more accessible and practical. However, as Dörnyei concludes, there is not yet any clear picture in sight. Borrowing from Goethe's theory of colors he introduces an appealing metaphor to express the state-of-the-art of the whole learning style discussion:

> I realized that the intricate tapestry of cognitive and learning styles could be compared to the complex patterns of colors around us. We live in a gaudy world with an infinite variety of shades and colors. Yet, we can sense that beneath this seemingly endless color complexity there is a simpler system, and it has indeed been found that all the colors in the spectrum are made up of only three basic primary colors. The quest for cognitive styles is not unlike the initial search for these primary colors. Although some definite progress has been made in identifying certain building blocks in the complex of human style characteristics, we still do not know for certain as to whether we have got the *primary styles* (Dörnyei, 2005: 159f).

When he takes this color metaphor (that is based on the three basic colors red, blue, and yellow with all the other colors being their derivatives) one step further to hold cognitive and learning styles apart, it appears to him, that

> cognitive styles can be seen as equivalents of the colors proper, whereas learning styles are the manifestations of the colors in the real world, involving the texture of the background material and the paint, the size and the format of the colored shape, and the interrelationship of various colors forming color schemes (Dörnyei, 2005: 160).

After a profound depiction of the various positions and steps concerning language learning style research and building on the presentation of the color image he summarizes that despite the development of several intuitively appealing systems that comprise cognitive styles, abilities and

[25] E.g. Kolb's Learning Style Inventory (1999) and Riding's Cognitive Styles Analysis (1991), Reid's Perceptual Learning Style Preference Questionnaire (1995), the Ehrman & Leaver Construct (2003), Skehan's Learning Style Construct (1998); (for detailed description see Dörnyei, 2005:125-159).

personality, there is no such thing as a universal or generally accepted construct (Dörnyei, 2005: 160).

At this point, let us relate Dörnyei's conclusions from this intricate and controversial topic to the present thesis. If we start from the definition that learning styles are personal learner preferences, a kind of "blueprint of the habitual or preferred way the individual perceives, interacts with, and responds to the learning environment" (Dörnyei, 2005: 121), one would reason, that within this project learners approached the learning task in many different ways and thus applied a variety of learning styles. However, as the methodological structure and learning modality of the program in use is based on a fairly strict corset that does – except for time-management aspects and the use of mnemonic devices - not allow for any noteworthy variation in individual preferences, it may be argued that individual learning style was not a decisive factor within this study. In other words, basic parameters as regards the actual learning activities were a priori attached along a *zero line*, from which deviation was largely minimized.

2.3.4.5 Learning strategies and self-regulation

When looking at the notion of learner strategies as part of ID research, it seems that we are again confronted with an inconsistent and elusive situation. Though Dörnyei raises doubts as to the relevancy of this concept within the broader field of individual difference research, he devotes a whole chapter to it, unfolding a diachronic view of how this concept had evolved and what characterizes relevant research. First of all he makes clear that learning styles and strategies are interrelated concepts and secondly for him existing definitions of learning strategies do not seem satisfactory. One of the central questions for him is whether there is a distinction between *normal learning activities* and *learning strategies*, that relates to Riding & Rayner's (1998) proposal which maintains that "an activity becomes strategic when it is particularly *appropriate* for the

individual learner, in contrast to general learning activities which a student may find less helpful" (Dörnyei, 2005: 165). He points to the problem that the relativity of this issue might disqualify prevailing learning strategy inventories and thus make the field even more diffuse.

The simple question that has been lying at the heart of L2-relevant strategy research is to find out of what makes some learners more successful than others. As Dörnyei explains, the answer research literature can provide is that learner success draws on various sources, such as aptitude, motivation and conscious participation in the learning process comprising the application of individualized learner techniques. In his attempt to find a comprehensible way of describing strategy systems, he combines and remodels two well-known approaches introduced by Oxford (1990) and O'Malley & Chamot (1990) to a 4-component typology, which splits up into cognitive, metacognitive, social and affective strategies (Dörnyei, 2005: 169). As will be shown in Chapters 5 and 6, the first two of these components are predominantly operant within the present study. Cognitive strategies such as repetition and summarizing are an integral part of the study methodology and thus a preset learning feature (see Chapter 5.6.1.2, description of the audio program in use). The self-dependent conscious use of images is investigated in the final questionnaire with a selective look at the effectiveness of mnemonic devices (see Chapter 6.3.2.3, analysis of learner strategies). Metacognitive strategies that involve monitoring, planning and organizing one's own learning process, are also examined in Chapter 6.3.2.3.

Though a number of taxonomies have been established and schemes and questionnaires produced (for a comprehensive overview see Dörnyei, 2005: 168-188), there is no clear definition available today, which prompts Dörnyei to pose the logical question "whether or not we need to abandon the concept altogether" (Dörnyei, 2005: 188). However, for him one way out of this dilemma is the incorporation of a related concept, to which

researchers had increasingly turned to in the 1990s: the concept of 'self-regulation'. Dörnyei hints at the new interesting concept of the strategic learner's *proactiveness* and indicates that

> scholars increasingly recognized that the important thing about the proactive strategic learners is not necessarily the exact nature of the strategies, tactics, or techniques they apply, but rather the fact that they do apply them (Dörnyei, 2005: 190).

In other words, it is argued that the most important feature is not *what* strategic learners do, but rather *that* they use some kind of strategy. So what Dörnyei holds to be truly significant within recent learner strategy debate is this paradigmatic shift that makes the learner's self-regulatory mechanisms take center stage. This shift of focus away from the *product* (strategies) to the *process* (self-regulation) emphasizes the degree to which learners actively participate in their learning process. Dörnyei defines this notion as including "cognitive, metacognitive, motivational, behavioural, and environmental processes" (Dörnyei, 2005: 191) which again indicates that the concept is multidimensional, virtually overarching a variety of psychological aspects. This does not seem to make the concept of self-regulation any clearer than the concept of learner strategy. Indeed, the issue seems to leave us behind with fuzzy boundaries and distinctions once again.

However, when Dörnyei supplies the following long list of inherent components of the concept of self-regulation that comprises an enormous body of pivotal learner characteristics, I can detect a battery of learner resources that turned out to be crucial success factors within the present study. He cites the following decisive attributes:

> goal setting, strategic planning, action plans and action schemata, monitoring and metacognition, action control, volitional control mechanisms, strategic tactics and operations, effective time management, self motivational beliefs (self-efficacy, outcome expectations, intrinsic interest, goal orientation, etc.), evaluation and self-reflection, receiving and processing feedback,

> experiencing pride and satisfaction with one's efforts, and establishing a congenial environment. (Dörnyei, 2005: 192)

Interestingly, the analysis of my research data reveals that it is the majority of these learner features that matter in the first place and should be dealt with when investigating and explaining the adult learner success curve. In other words, what Dörnyei proposes as *one* prominent psycholinguistic concept within ID research, (namely self-regulation), in large part recurs in my thesis, though – as will be shown in Chapter 4.3 in a wholly different taxonomic structure.

2.3.5 The applicability of current ID research to the adult foreign language learner

Though in recent years a number of research instruments for learner IDs have been developed and applied (for an overview and brief description see Ellis, 2004: p.528), the state-of-the-art remains controversial and the field leaves more questions open than it has answered. Existing research and theory make it clear that there is a tremendous body of variables that relate to the achievement in the L2, and it seems obvious that the variables do not operate independently of one another.

Within this chapter of ID-related research the focus has been on a number of different classes of variables, directing the attention to the factorial composition underlying the relationship among them. What we can say for sure now is that the interrelationship between ID characteristics such as personality, aptitude, motivation, learning styles and learning strategies, just to name a few, is highly complex. This subsequently implies that dealing with these notions in single and exclusive units would not generate satisfactory and reliable results.

Another important aspect we have to bear in mind is that certain facets of learner characteristics change over time. Moreover there is reason to believe that the driving forces of younger learners tend to be very different

from those of older learners. Learners at an advanced age have different goals and start out from a different mind-set. Their cognitive and meta-cognitive repertoire is generally more developed and sophisticated (see Chapter 2.2.3 and DeKeyser's proposition of the adult learner's ability to take short cuts). So we have to look at the implications of ID relevance to the core issues of applied linguistics from two different angles: The first important aspect is the psychological approach as extensively elaborated by Dörnyei in his seminal volume (Dörnyei, 2005). The second central point to be incorporated is the question of how these findings link to maturity-related aspects across the individual's lifespan, with special regard to its second half. The fact that the adult possesses accumulated world-knowledge paired with a significantly different set of cognitive styles, meta-cognitive knowledge, meta-cognitive awareness and meta-cognitive skills ought to receive attention on a broader scale.

2.3.6 Conclusion: The need of a theoretical reboot

In view of the versatile and inconclusive state-of-the-art of individual difference research, and due to the fact that these learner attributes are considered to be of vital importance within the present study, it seemed essential to develop new concepts that would best explain the determining factors of this study's learner success. These concepts will be presented in Chapter 4.

In order to gain a more profound picture of the unique qualities and the specific requirements for the advanced-aged language learner, it will be essential to briefly direct our attention to those strands of individual properties that relate to maturation, accumulated knowledge and refined skills.

Cognitive psychology has revealed that adults think differently. As compared to children and adolescents, they take a different approach to perceiving, remembering and generating information, making decisions

and solving problems. With reference to the Barcelona Age Factor Project Munoz (2006: 32) indicates that “differences in cognitive development play an important role in explaining why older learners in a formal foreign language situation are faster and more efficient than younger learners”. Obviously when looking at a human’s whole lifespan, this process is in constant flux. From the perspective of added value in terms of world knowledge, this process when visualized, describes a steadily rising curve and promises constant enhancement of learner ability. As opposed to this upward curve we must, however, also consider the neuroscientific aspects of the learning brain. Though the aging brain is believed to remain plastic with an enormous capacity for change (Blakemore & Frith, 2005:123) we must not forget its natural decline. Thus it must be conceded that from the neurobiological perspective the curve tends to take a converse direction, though, as will be shown in Chapter 3.4.1 (Can the aging brain learn?), this curve may not be declining as dramatically as has for a long time been widely assumed among laymen and researchers alike. Also the results of the present study corroborate this hypothesis.

Part of this upward moving cognitive curve is the meta-cognitive string, the string that conveys knowledge about knowledge. What sets meta-cognitive knowledge apart from other knowledge that is stored in people’s long term memory is its specific psychological-philosophical dimension. Since Flavell’s first proposition of the notion in the late 1970s (Flavell, 1979), several researchers (Kluwe, 1982; Brown et al., 1983; Jacobs & Paris, 1987) developed their specific models (for a concise overview of meta-cognitive research and the differentiation of nuances, see Jie Li, 2008: 27-50). Li argues that there does not seem to be consensus on all aspects of meta-cognitive conceptualization with some issues regarding the terminology remaining controversial; however, she concedes that the different views share at least the following two features that are closely related and act recursively:

First, metacognition includes knowledge of one’s knowledge,

> processes, cognitive and affective states. Second, metacognition involves the ability to consciously monitor and regulate one's knowledge, processes and cognitive and affective states.
> (Li, 2008: 34)

While the first definition refers to awareness, reflection and evaluation, the second one transforms these cognitive concepts into skills and strategies. In other words the two concepts encompass self-appraisal and self-management of the process of thought.

As has been indicated above (Chapter 2.3.4.5), Dörnyei attaches these concepts to his understanding of self-regulation. This is exactly from where we can build a bridge to the research questions within the present study. The advanced-aged foreign language learner holds a considerable potential of knowledge about his/her own thinking and probably an even more developed procedural ability that enables him/her to step from thought to action. In face of all these distinct qualities it is time to allocate the adult L2 learner his/her proper status within the field of foreign language research. It is time to draw the adult language learners out of the all-embracing age spectrum and assign them a research space of their own that would open up opportunities for a better understanding of their inherent capabilities as well as insufficiencies. We need to change perspective, we need to re-evaluate long-standing concepts and we need to focus on a group of foreign language learners that have– as Mathews-Aydinli (2008) put it to the point in the headline of her recent article on current trends in adult L2 research – seemingly been "overlooked and understudied" (Mathews-Aydinli, 2008: 198).

2.4 Multilingualism

> *Multilingualism is a growing phenomenon and certainly not an aberration.*
> (Jessner, 2006)

2.4.1 The multilingual individual

In a broad definition the multilingual individual or polyglot, is a person who can communicate in more than one language. The term multilingualism, although it comprises bilingualism and trilingualism, generally goes beyond these concepts. It is mostly used in its broader sense of 'mastery of several languages'. However, what is mastery? Within academic discussion we again encounter various attitudes as to the determination of its properties and "the ability to communicate covers a broad spectrum of proficiencies" (Cenoz, Hufeisen & Jessner 2003, 2). The range of dispute is to be found along the line of a long scale – from profound, sophisticated, adequate or maximal at one end to humble, survival-level, inadequate or minimal knowledge at the other. To precisely define the extent of knowledge that makes a polyglot a polyglot will remain a topic of controversy. But what seems to be uncontroversial at the beginning of the 21st century is the fact that in many societies the monolingual person has become the exception, not the rule. First and foremost economic internationalization, migration and networking via internet-channels may be seen as the propelling forces of this tendency. More and more children grow up learning more than one foreign language. A case in point and resounding proof of this tendency is the growing research interest and support for *Content and Language Integrated Learning* (CLIL) projects at schools across Europe[26]. In addition, more and more adults live and work in multilingual contexts. Jessner states that "the use of more than two languages has become a normal part of daily life for most human beings" (Jessner, 2006: xi), a phenomenon that eventually resulted in increased

[26] CLIL involves teaching a curricular subject through the medium of a language other than that used in everyday life. The subject can be entirely unrelated to language learning, such as geography lessons being taught in English in a school in Austria. CLIL has been found to be effective in all sectors of education from primary through to secondary and tertiary education and has gained overwhelming momentum over the past 10 years. Teachers working with CLIL are not traditional language teachers. They are primarily specialists in their own discipline, but fluent in the target language. The target is that the learner is gaining new knowledge about the 'non-language' subject via the vehicle of the target language, thus simultaneously enhancing foreign language skills. For a comprehensive overview of this research field see: Dalton-Puffer, 2007.

research interest in this field. In his discussion of multilingualism, David Crystal (2005: 409) holds that "there is no such thing as a totally monolingual country" and he argues that about 75 percent of the world population speaks two or more languages (see also Chapter 3.2.5). Though there are a number of densely populated nations (e.g. India, Pakistan, some African countries) with two official languages, Crystal's and Jessner's conclusions[27] must be met with caution, as certainly not all inhabitants of these nations are actually bilingual. On the other hand, we must not forget that English as a lingua franca is spreading all over the world and there is also the phenomenon of diaspora (e.g. large Chinese communities in the US and Canada).

2.4.2 Distinctive approaches in the field of multilingualism

In applied linguistics questions concerning cross-linguistic influence represent a fairly new field of research (except for research in contrastive analysis). To date, research in multilingual matters comprises three acknowledged fields, each of which has its own very specific properties: second language (SLA) research, bilingual research and third language acquisition (TLA) research.

Throughout the past 15 years key proponents in the field of multilingualism (such as Cenoz, Hufeisen, and Jessner, to name but a few) have approached the relevant influencing factors from a very specific perspective which has given rise to the identification of TLA as a research area in its own right. Most of the relevant research projects relate to regions where multilingualism has been anchored in the educational system over several years. Research in this field has extended its focus to cognitive aspects of multilingual proficiency with special regard to metalinguistic awareness and its impact on the acquisition of any additional language. Naturally, research on TLA which, as has been

[27] Jessner's conclusion may be traced back to specific local communities, such as the Austrian/Italian border region.

pointed out, is the most recent of the above mentioned fields can draw on findings both in bilingual research, a field that had gained momentum in the early 1970s and since then produced a plethora of publications[28], and in SLA research which has also been investigated for several decades.

Although the branch of TLA research is very new and it may therefore still be problematic to derive any conclusive statements and generalizations in terms of foreign language instruction and pedagogy, there is broad agreement among researchers that competence in previously learnt languages facilitates the acquisition of any further language. As Jessner rightfully maintains, it seems undisputable that the multilingual individual can refer to a linguistic repertoire that enhances language learning ability and that "all in all, we can definitely talk about an increased tendency in applied linguistics to acknowledge the advantages which the contact with two (or more) languages (and cultures) can provide" (Jessner, 1999: 202). Her special research concern being the field of third language acquisition as opposed to SLA has brought to the fore her assumption that

> both second and third language learning can be seen as acquisitional sub-types of multilingualism that share some characteristics but also show differences which are of particular interest to future research (Jessner, 1999: 202).

These apparent differences make her suggest that it is necessary to clearly distinguish between bilingualism and multilingualism. In other words, TLA is not just a by-product of SLA research, but must be seen as a research field in its own right, with specific meta-linguistic features playing a crucial role. At this point, and in order to do justice to the fact that we must also consider a difference between third and subsequent language acquisition, I would like to add a new facet to the acknowledged terms of SLA and TLA within the field of multilingual research. I would

[28] For a brief overview of the most important issues in bilingualism research, see Jessner, 1999.

suggest that we extend this terminology and introduce *Pluri Language Acquisition* (henceforth PLA) as a novel concept with its own specific features within the whole foreign language learning domain. PLA research must be understood as an extension of TLA research. The concept postulates that the learner who has already been in contact with three language systems develops further skills and abilities with each additionally learned foreign language, the formula being "Lp" (L ≥ 4). In this it is to be regarded as synergetic and interferential. What needs to be mentioned at this stage is that the concept of PLA is by nature in accordance with the *Dynamics Systems Theory* (DST) which, as pointed out by Jessner (2006: 33), accounts for the development of a system in time and has been applied in many other scientific disciplines for several decades. It must also be pointed out that although Jessner's research has particularly focused on the involvement of three languages, her multilingual proficiency concept does give room for additional languages and thus includes the notion of PLA.

There is substantial support for the assumption that all above mentioned multilingual research concepts ought to be seen as dynamic in nature, as introduced by Herdina & Jessner (2002) in the *Dynamic Model of Multilingualism* (DMM). The DMM postulates that multilingualism is an ever-changing and gradual process of language development with existing and installed language systems exerting influence on developing ones. In other words,

> the learner develops skills and qualities that cannot be found in an inexperienced learner and this change of quality in language learning is thus seen in connection with the catalytic effects of third language learning" (Jessner, 2006: 34).

Within the PLA notion, this developmental and dynamic process must be seen as a constantly rising level of metalinguistic awareness. Herdina & Jessner's claim that the dynamic component is an essential part of a holistic view of multilingualism reveals a parallel to the call for a more open

approach in the field of individual difference research that also encompasses the aspect of change over time, as expressed by Ellis and Dörnyei (see Chapter 2.3.1). The variability and the complex interdependencies between cognitive and meta-cognitive factors in the process of language learning can only be seen within such an open system. In order to detect qualitative changes in language learning, it seems important to consider the "synergetic effects provoked by the crosslinguistic interaction between the psycholinguistic systems" (Jessner, 1999: 203). The catalytic effects that are believed to occur with each new language learning activity clearly suggest that multilingualism in its specific PLA-shape must be regarded as a research field with distinctive features, setting itself apart from the fields of bilingualism, SLA research, and TLA research. Taking Jessner's liquid-metaphor, where she equates two languages with two liquids that in combination result in a complete metamorphosis of the substances involved[29] into consideration (Jessner 2003, 49), we might extend the colour spectrum to a "rainbow-variance". For reasons of thematic limitations resulting in the special focus of this thesis, at present the proposed concept of PLA cannot be developed any further, but may be taken up as a specific model for language processing at a later point in time.

2.4.3 Features of cross-linguistic influence and their relevance to the present study

As has been shown, there is general agreement on the fact that the acquisition of new knowledge builds on and correlates with available knowledge[30]. DeAngelis & Selinker assume that "all linguistic systems present in the speaker's mind may be simultaneously interacting and

[29] In this metaphor she uses the colours white and black for the two languages, that when mixed, do not result in the expected *grey*, but rather a shade of *pink*. (Jessner, 2003: 49).

[30] Parallel activation of languages in multilingual speakers has been discussed at length in De Angelis & Selinker, 1998; Williams & Hammarberg, 1998; and Edwards & Dewaele, 2007.

competing in interlanguage production" (2001, 43f). Also, the *Dynamic Model of Multilingualism* postulates that different languages must not be seen as separate systems. Instead they are one large and complex language system, the *multilingual system* that derives its specific features from various sources. Herdina & Jessner's crude formula of multilingual proficiency runs as follows:

$$LS_1 + LS_2 + LS_3 + LS_n + CLIN + M = MP$$ [31]

Consistent with the *Dynamic Model of Multilingualism* which focuses on developed and developing systems at the same time, it seems obvious that in addition to what has been stated so far, the concept of multilingual proficiency must also be viewed from the following two different angles: the *numeric* and the *genetic* aspect. On one hand it will be the number of languages one speaks that essentially determines the quality of the multilingual system. On the other hand, the more varied these language sources are, the more sophisticated the multilingual system will be. The interaction of these aspects determines the amount and quality of cross-linguistic influence. This cross-linguistic influence comes in many nuances and may be split into three categories: first, influences that are strictly linguistic such as code-switching, interference and borrowing; secondly, influences that relate to learner strategies and learner styles; and thirdly, influences that encompass culture-specific attributes such as the introduction of hitherto unknown mental concepts. If, for instance, a person's mother tongue is German and he/she also speaks English, French and Spanish, languages that also belong to the large group of Indo-European languages, his/her multilingual system will be different from the multilingual system of a German-speaker whose foreign language repertoire comprises English, French and Chinese. Although both

[31] LS = language system
CLIN = cross-linguistic influence
M = M(ultilingualism)-factor
MP = multilingual proficiency
For a comprehensive outline see Jessner, 2006: 32-35.

individuals speak the same number of foreign languages, their multilingual systems will probably differ to a considerable degree. In the latter case the Sino-Tibetan component proposes a wholly different world of ideas and concepts and introduces a new set of mental approaches to the world[32]. The first two of the afore-mentioned categories will not be of major significance in the framework of this study as they do not directly influence the present learning process and results. In terms of code-switching, interference and borrowing there do not seem to be direct affinities between the pre-project multilingual system and the target language, as they are totally different both structurally and semantically[33]. The third one certainly must be regarded as having a significant impact on the learner outcome and will therefore be included in the final analysis (see Chapter 6.2.4, yes-no question formation).

Another interesting feature of cross-linguistic influence refers to the mental lexicon and the *Neighbourhood-Effect*[34]. Cedden cites studies conducted by De Bot (2004) and Dijkstra (2003) that seem to prove that access to lexical units in the mental lexicon does not occur selectively. In other words, the polyglot, during the process of retrieving a certain word, uses a kind of search-machine across the languages. According to these studies

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[32] E.g. one special feature of this language family is the use of noun classifiers. In Chinese (and also in Japanese) most nouns are associated with a particular classifier. Classifiers are often not predictable from the noun so they must be memorized. However, there is often a link between the noun classifier and the shape of the object or its special quality or use. Examples:
"zhāng" is used for flat things such as paper, paintings, tables, maps, etc.,
"běn" is used for things that are bound, such as books, magazines, etc.,
"liàng" is used for vehicles,
"wei" is a polite classifier for people.
Another example is the multitude of expressions that specify family relationship. Chinese uses specific terms for younger brother (dìdi) and elder brother (gēge), or younger sister (mèimei) and elder sister (jǐejie).

[33] With reference to learning styles, the absence of impact on learner progress within this study has already been noted in Chapter 2.3.4.4 of the present study.

[34] The term denotes word resemblance across languages with sometimes just one sound (or letter) that is different (Italian "perché", Spanish "porque"), a phenomenon that during the first stages of the acquisition process may have a positive influence; however, at a more advanced level this may have an inhibitory effect on word generation.

the competitive quality of the so-called ‘neighbours’ often results in production delay (Cedden, 2007) and thus hampers speech production. However, as none of the participants in the present research project had any knowledge of the Sino-Tibetan language family when starting out (except for one, who reported to know some words in Chinese Mandarin, which, however does not imply neighbourhood effect), the aspect of overlap and resemblance as an interfering factor can be altogether disregarded.

In conclusion it may be stated, that in recent years trilingualism/multilingualism has become a growth area in research with a multitude of significant dimensions (sociolinguistic, psycholinguistic, social, cultural, political, and educational). It must be emphasized and I do maintain that multilingualism will be of growing significance in future foreign language studies, as the foreign language learner profile of the coming decades will comprise multilingualism and an elevated intercultural awareness. It is therefore hoped that the present project may uncover relevant evidence and thus contribute to a better insight into the field of PLA. Chapter 6.3.1.2 of this study investigates whether data analysis renders affirmative proof of the catalytic effect of multiple foreing language competence.

2.5 Final Remarks

In this chapter, it has been shown that research on individual differences with special regard to adult foreign language learners is highly complex and controversial, and results are not always easy to interpret. This is not only due to the lack of clear definitions and methods for measuring individual variation, but it is also impeded by the fact that individual characteristics are not independent of one another. Learner variables interact in intricate ways. This notion further grows in complexity when we consider that individual learners react to different learning conditions in

different ways. Although over the last years increased importance has been attached to the exploration of the nature of these complex interactions, it remains difficult to predict how a particular learner's characteristics will influence his or her success. All in all, foreign language learning at an advanced age is assumed to be affected by many components. Apart from the age factor, the question of the mediating role of language acquisition devices and the many aspects of individual characteristics as well as the impact of multilingualism make it difficult to draw irrefutable conclusions.

To finish this chapter, the following quotes by Singleton & Ryan were chosen to sketch the uncertainty and complexity that age-related foreign language learning research comprises. The authors argue that

> it is no longer possible to accept the view that younger L2 learners are in all respects and at every stage of learning superior to older learners, nor that older learners are in all respects and at every stage of learning superior to younger learners (Singleton & Ryan, 2004: 226).

With a view on the following chapter that will focus on neurobiological learner aspects and against the backdrop of the multiplicity of causes and different combinations of causes as outlined in this chapter, these words seem to best reflect the state-of-the-art:

> …. decreasing cerebral plasticity and/or other changes in the brain may play a role, but the notion that age effects are exclusively a matter of neurological predetermination, that they are associated with absolute, well-defined maturational limits and that they are particular to language looks less and less plausible. In other words, the idea of a critical period specifically for language development may well have had its day." (Singleton & Ryan, 2004: 227)

Chapter 3
RELATED FIELDS OF INVESTIGATION

The future of research is interdisciplinary, and will take us into areas that today we cannot even foresee …
(Michael Tanner)[35]

3.1 A Quest for Interdisciplinary Research

When we deal with a specific problem, we want to grasp the broader dimensions of it. In the process of exploring and explaining we may encounter questions the answers to which may lie beyond the field of our own scientific domain. The key issue is: what new knowledge outside our core-discipline is required to address the challenge of the specific research questions?

Each single scientific discipline constitutes a vast and highly complex field that is again segmented into numerous sub-divisions and highly differentiated sub-fields and branches. Today the world of sciences is characterized by diversification, complexity and overlap of contents. New technologies have opened up a great many opportunities to resort to and link an abundance of resources and thus take us a step further in our search for scientific truth, validity and reliability.

In this chapter I would like to focus on two fields that reside outside the intrinsic domain of linguistic research – domains, however, that I feel are directly related to the research questions posed in the present study: the field of neurosciences (which will be referred to in more detail) and the field of social sciences. Within these very large domains it will again be two specific areas of expertise that may help illuminate the present

[35] Professor at the Computer Science Department, University of California, Santa Cruz.

linguistic research project: First of all neurobiology, which is the study of the cells of the nervous system and the organization of these cells into functional circuits that process information; secondly the field of demographic research, which has been given increasing attention within the last decades. On the one hand the excursions into the domains of brain sciences and neurobiology as well as demographic transition and changing socio-political standards and demands is meant to provide theoretical background for a comprehensive approach to the present research. In face of the complexity of these fields they will not be covered exhaustively. However, I will try to give a general overview of the latest developments and tendencies as a point of departure for a more comprehensive discussion of the present research questions. On the other hand, this interdisciplinary excursion targets at accentuating the growing need of a holistic approach to scientific research in linguistics. I strongly believe that in order to understand how we cope with foreign language acquisition at different stages in our lives, it will be essential not only to understand the abundance of implications in the field of linguistics. Instead we must venture further.

“If we want to understand how people acquire or learn a second language, we need to know how information – especially in different languages – is processed in the human brain”. – With this opening remark in their investigation of the “multilingual mind”, Kees de Bot et al. argue for the need of interdisciplinary research in the fields of linguistics, brain research and neurosciences (De Bot et al., 2005: 39); a claim that is also one of the corner stones of the present empirical study. Thanks to a wide spectrum of research conducted in all these fields throughout the last decades and the resulting abundance of open questions that have called and still call for further exploration, investigation and explanation, the once independently working scientific disciplines have slowly started approaching each other. Also, other leading experts in the field of brain research and educational

science such as Manfred Spitzer[36], Gerhard Roth[37], Joachim Bauer[38], Christian Fiebach[39] and Elsbeth Stern[40], to name only a few, strongly advocate a linkage of these two fields. So it seems to be evident that brain researchers and neuroscientists are at times and probably increasingly confronted with questions that lie beyond their proper field of investigation and can only be scrutinized and evaluated by means of scientific excursions into other fields, such as for instance linguistics and educational sciences.

Altogether, today a growing number of linguistic researchers realize that in order to be able to profoundly understand certain features and processes of language acquisition and language learning, they need to immerse into the once predominantly secluded fields of neurobiology, neurosciences and brain research. However, as Blakemore & Frith concede, there is good reason for a due amount of cautiousness when including findings in this domain:

> There are many obstacles to interdisciplinary understanding, not least the confusion caused by claims and counterclaims in brain research. One finding about the brain can be contradicted just months later by another scientist's research. But disagreement, findings and counterfindings, are part and parcel of normal scientific progress and integral to the evolution of our understanding about the brain (Blakemore & Frith, 2005: 3).

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36 The German psychiatrist and psychologist, head of ZNL (Transferzentrum für Neurowissenschaft und Lernen) is mainly concerned with neurodidactics. He conducts fundamental research in cognition sciences with particular emphasis on learning research.

37 German biologist and brain researcher with research emphasis on cognitive, emotional and theoretical neurobiology and neurophilosophy.

38 German physician for internal medicine, psychotherapist and psychiatrist.

39 Head of the 'Laboratory for Functional Imaging of the Mind' at the University of Heidelberg that specializes in the study of the neurophysiological bases of higher cognitive functions. Their research involves a broad spectrum – from working memory to language processing.

40 Professor for research on learning and instruction, Max-Planck-Institute, Berlin.

There is no doubt that over the years scientific research has been a battlefield of contradictory achievements as well as of remarkably differing views. But it is only via trial and error, via contradiction and debate that we can move forward and open up pathways for future-oriented developments. In whatever field it may be.

3.2 The Brain: Anatomy, Functions and Processing

> *The brain is an amazing thing. Most of us have no idea what's really going on inside our heads. Yet brain scientists have uncovered details every business leader, parent and teacher should know.* (John Medina, 2008)[41]

The production and understanding of language constitutes one of the most specific functions of the human brain. Learning to speak a language is a gradual process that usually spans a number of years. The linguistic endeavour to understand how the human being perceives and memorizes language must therefore be seen in close context to the field of brain research. Understanding biological fundamentals of language comprehension and production are without doubt an essential prerequisite to understanding the processes of how language and language learning work. As a matter of fact the cradle of brain research of healthy human beings is to be found in the brain research of people with a serious medical condition.

3.2.1 Anatomical and histological principles of the human brain

What we know about the brain comes from biologists who study brain tissue, experimental psychologists who study behaviour, and cognitive

[41] (from the book jacket) Dr. John Medina is a developmental molecular biologist and research consultant. He is Director of the Brain Center for Applied Learning Research at Seattle Pacific University and also teaches at the University of Washington School of Medicine.

neuroscientists who study how the first relates to the second. In order to understand how the human brain works, it is essential to take a close look at these fields, how they interact and what message they convey for other scientific questions, such as the ones the present study is focusing on: How do we learn? Why is it so easy to forget and so important to repeat new knowledge? And how do these questions relate to the aging process?

Until about 120 years ago, the inner life of the human brain was a virtually unknown entity. Those who had to that date investigated and written about it, were confronted with a number of unexplored phenomena of this extremely intricate tissue. In terms of scientific knowledge about this part of the human body, the world of medical and biological sciences had so to speak for a very long time been locked up in the "dark ages". It is all the more surprising that the first person who was able to interpret the capacity and general functions of the human brain and decipher the elementary mechanisms of it, is fairly un-heard of outside the world of neurosciences and neurobiology. In the 1890s Santiago Ramón y Cajal, a Spanish-born histologist, physician and Nobel laureate who had dedicated his life to the study of the fine structure of the central nervous system[42], suggested that neurons communicate with each other via specialised junctions called "synapses"[43] and thus greatly extended our knowledge about the brain that was restricted to the anatomical structure and organisation of the different brain regions until then.

> Based on his analysis of signalling, Cajal conceived of the brain as an organ constructed of specific, predictable circuits, unlike

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[42] He based his studies on the findings of his Italian colleague and contemporary histologist, Camillo Golgi. In 1906 the two scientists shared the Nobel Prize for their work on the structure of the nervous system. It is one of the strange twists of the history of science that Golgi, whose technical developments paved the way for Cajal's brilliant discoveries fiercely rejected Cajal's neural doctrine. (See: Precht, 2007: 40ff; and Kandel, 2006: 53-73). Cajal (1852-1934), Gogli (1843-1926).

[43] This term was coined by British neurophysiologist Charles Scott Sherrington (1857-1952), derived from the Greek word meaning "connection", that was immediately accepted and has since that time been in general use in the field of neurosciences. (See Precht, 2007: 40ff).

> the prevailing view, which saw the brain as a diffuse nerve net in which every imaginable type of interaction occurred everywhere (Kandel, 2006: 66).

Although Cajal did not invent the technical terms that are in use today, he had been the first to meticulously draw and explain neurons, axons and dendrites. Even though his means of scientific research were very basic compared to today's modern methods, much of what Cajal had assumed proved to be correct in the long run. Eric Kandel, acclaimed for his research on the physiological basis of memory storage in neurons, refers to Cajal as "arguably the most important brain scientist who ever lived" (Kandel, 2006: 61), noting that "it was not until 1955 that Cajal's intuitions were borne out conclusively" (Kandel, 2006: 69). Today's neuroscientific research heavily builds on Cajal's principles of neural organization[44].

The human brain is a most complex system of nerve fibres working with electrical and chemical signals, a system that regulates virtually all human activity of both unconscious[45] and conscious[46] nature. It consists of many subsystems that are connected with each other. Weighing about three pounds in an adult human being, it is made up of approximately 100 billion nerve cells or *neurons* which are responsible for the reception and transmission of signals. Neurons[47] communicate with each other via chemical and electrical *synapses,* the process of which is called synaptic transmission. An average of 100 trillion synapses relay signals in-between nerve cells as well as on to muscles and glands[48]. Each of the 100 billion

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44 For a concise description see Kandel, 2006, 53-73.

45 The so-called involuntary actions such as heart rate, respiration and digestion.

46 Complex mental activities such as thought, reason and abstraction.

47 Given the diversity of functions performed by neurons in different parts of the nervous system, there is a wide variety of shape, size and electrochemical properties of neurons.

48 wwwpsy.unimuenster.de/inst3/AEMortensen/Lehre/ViswahrnSS04/Handzettel/Ref1_Folien.pdf

neurons has an average of 7000 synaptic connections to other neurons. All the communication between neurons occurs at the synaptic junctions. According to Blakemore & Frith (2005: 11), “the number of connections in the human brain is much bigger than the whole earth’s population”. When Kandel elucidates the complex process of chemical and electrical synaptic transmission in the brain, he points at the relating interdisciplinary scientific research expansion, a statement that I would in turn like to further relate to the field of linguistics.

> The realization that the workings of the brain – the ability not only to perceive, but to think, learn, and store information – may occur through chemical as well as electrical signals expanded the appeal of brain science from anatomists and electro-physiologists to biochemist. In addition, since biochemistry is a universal language of biology, synaptic transmission piqued the interest of the biological science community as a whole, not to mention students of behaviour and mind, like me. (Kandel, 2006: 101f)

Another class of cells are the so-called *glial cells*[49]*.* They provide support and protection for neurons by surrounding them and holding them in place, by supplying them with nutrients and oxygen and by insulating one neuron from another. They also modulate neurotransmission. In the human brain, glia are estimated to outnumber neurons by about ten to one. (See Figure 3-1, p. 81).

The structure of a neuron comprises the cell body or *soma* (containing the nucleus of the cell), the *dendrites* (tree-like extensions where the majority of input to the neuron occurs) and the *axon* (cable-like projection, generally involved in information outflow, but it can also receive input from other neurons). The synapse is the junction between two neurons. One neuron’s axon connects with a second neuron’s dendritic terminals (see Figure 3-2, p. 81).

[49] Etymologically ‘glia’ goes back to the Greek word ‘glue’.

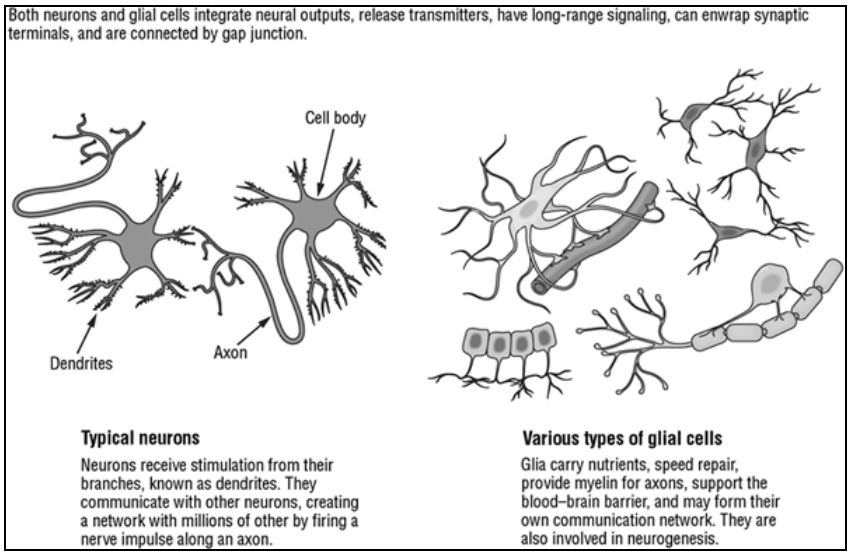

Figure 3-1: Neurons and glial cells
http://www.ascd.org/ASCD/images/publications/books/jensen2005_fig1.2.gif, (retrieved : 11/09/2008)

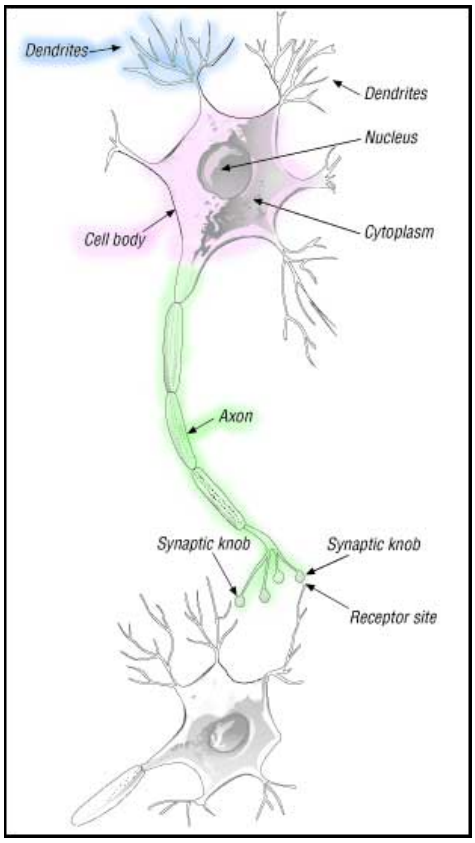

Figure 3-2: Structure of a neuron
http://thedea.org/pictures/grayneuron.jpg
(retrieved : 11/09/2008)

Neurons do not act in isolation. They interact with many other neurons and form neuronal networks. Physicist John Hopfield coined the term “auto-

associative networks" (Spitzer, 2000: 184). According to the *Hopfield-Network-Theory*, each neuron is connected with all the other neurons within the network, except with itself (see Figure 3-3). In discussing relevant functions such as 'learning words', we are never talking about individual nerve cells. Instead it is regions of brain tissue containing millions of neurons that are responsible for higher cognitive functions like these. Connections between neurons are strengthened each time they are used in the same or a similar way. This is why repetition is crucial for long-term storage of knowledge and skills.

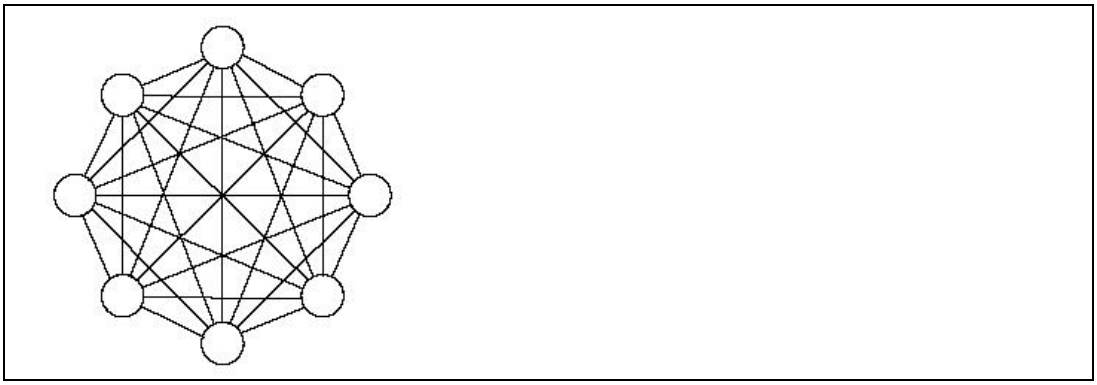

Figure 3-3: Hopfield neural network
http://www.learnartificialneuralnetworks.com/images/hopfig1.JPG
(retrieved : 11/09/2008)

3.2.2 Lateralization and the brain functions

From the outside, the brain appears as three distinct but connected parts: the cerebrum (two large, almost symmetrical hemispheres), the cerebellum (two smaller hemispheres located at the back of the cerebrum) and the brain stem (a central core that gradually becomes the spinal cord). Most high-level brain functions take place in the cerebrum with its two large hemispheres making up approximately 85 percent of the brain's weight. The cerebrum is divided into four lobes: the *frontal*, *parietal*, *temporal* and *occipital lobes* (Herrmann, 2007: 84f) (see Figure 3-4, p. 83).

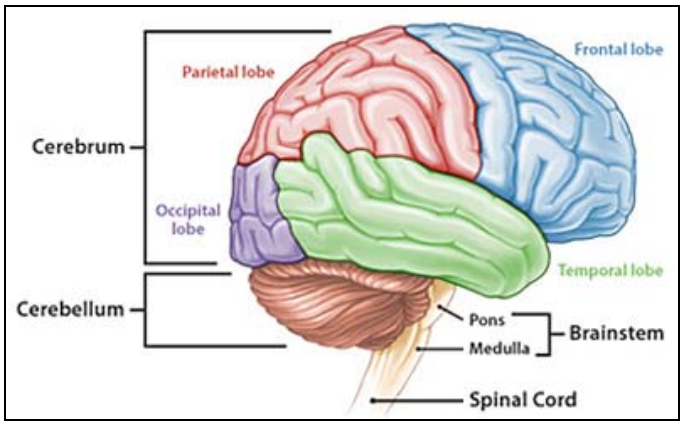

Figure 3-4: The 4 lobes of the cerebrum
http://www.ohsu.edu/health/_resources/uploads/uploads/NewBrainAnatomy.jpg (retrieved : 11/09/2008)

The left frontal lobe is the largest of the five and houses *Broca's area* which is believed to be responsible for the sequencing of language elements for output. In other words: it is the motor speech center. The left temporal lobe houses *Wernicke's area,* which is believed to be related to the understanding of language and thus represents the sensory speech center. These two areas and other cortical circuits that connect them will be referred to in detail in Chapter 3.2.3 of this study section (Language-processing areas of the brain).

Although the brain appears symmetrical, its functions are not. A longitudinal fissure separates the brain in two distinct cerebral hemispheres. Indeed, the two hemispheres are very similar in appearance. Still, scientific research indicates that each hemisphere is specialized and dominates the other in certain functions, with language and speech being predominantly processed in the left hemisphere (see Figure 3-5, p. 84). This pattern of brain organization mainly refers to right-handed people and is more variable with left-handedness. Obler & Gjerlow (1999: 23f) state that the way in which the cerebrum relates to the function of the organism is primarily contralateral in nature. In other words, the left hemisphere is largely responsible for what happens on the right side of the body, and the right hemisphere is mostly responsible for what happens on the left side. Given the contralateral relationship between cerebrum and functions, in

left-handers the right hemisphere is in general dominant. Based on this postulate, it was also for a while hypothesised that in the case of left-handedness the right hemisphere was dominant for language, too. However, as Singleton & Ryan (2004: 131) state, research indicates that most left-handers do have their language functions principally in the left hemisphere.

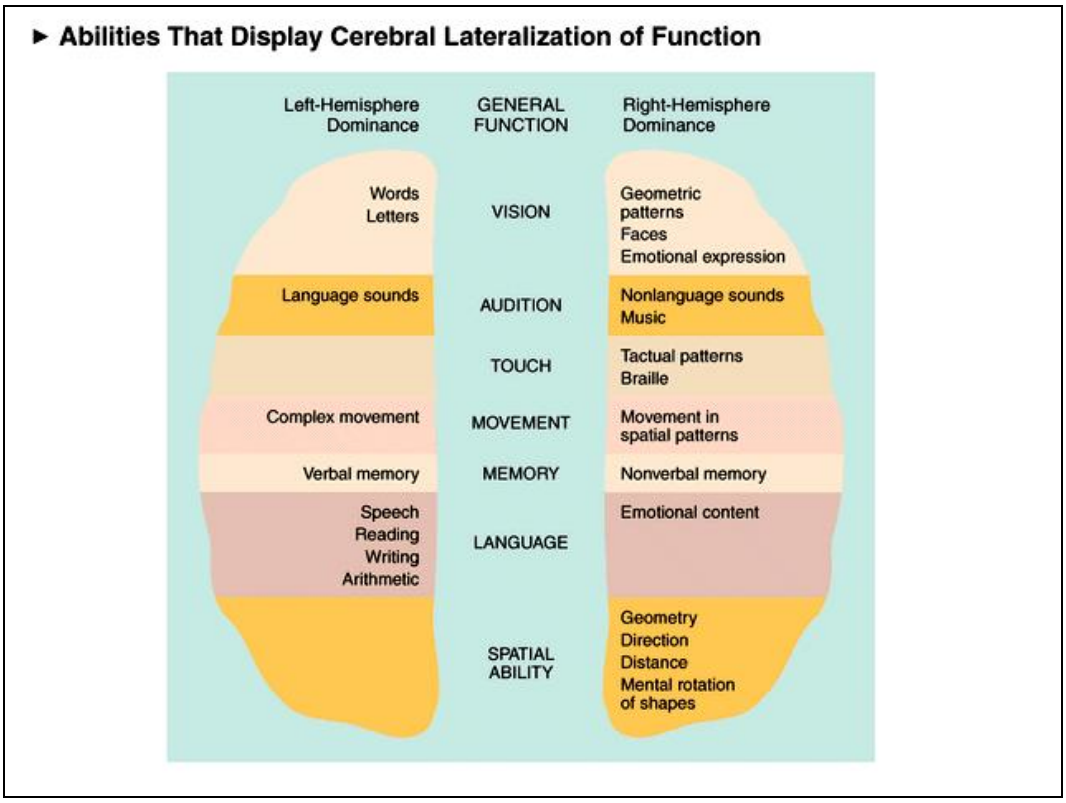

Figure 3-5: Cerebral lateralization
http://lh4ggpht.com/_btjBcGAkFz4/RpPfgT2jcvI/AAAAAAAADF4/VMzMhj1/HP4/lateralfunctions.jpg (retrieved : 11/09/2008)

There is agreement among researchers that the notion of lateralization of the brain, with certain functions being restricted to distinct areas (the so-called 'localisation theory'), is not unproblematic. It seems important to note, that – while there is evidence that certain functions are indeed lateralized – these lateralizations are trends and do not apply to every person in every case. Crystal, who indicates that language and handedness have long been the dominant factors in discussion on cerebral dominance, cautions that categorizations and oversimplifications

such as a clear borderline between the ‘analytical/intellectual’ left part and the ‘creative/emotional’ right part be made, as “several activities usually involve both hemispheres” and there is evidence “that the right hemisphere can handle certain nonverbal tasks that require intellectual capacity (…), and that it has a limited capacity for auditory analysis and comprehension” (Crystal, 2005: 173f).

Singleton & Ryan review a range of studies which deal with the question of lateralization with special regard to its putative onset (Singleton & Ryan, 2004: 134-143) and they conclude that the relevant evidence needs to be looked upon with care and scepticism. First, they argue that the evidence on lateralisation does not support the notion of a starting point of absolute hemispheric equipotentiality as regards language functions. Second, they hold that the available evidence does not clearly favour a developmental position which would postulate a continuing lateralisation process of relatively long duration. They posit that we are

> far from understanding the biological constraints that characterize linguistic development following early hemispheric damage. However, the evidence does seem to suggest that complete acquisition of all aspects of linguistic functioning requires the normal operation of both hemispheres from the earliest point in development. (Singleton & Ryan, 2004: 143)

All this suggests that the notion of the lateralization of the brain, with certain functions being restricted to distinct areas (the so-called “localisation theory”), needs to be treated carefully. Hermann & Fiebach (2007: 107ff) for instance maintain that tests on patients with language deficits have proven that it is lesions in the left hemisphere that generate these deficits more often than lesions in the right hemisphere. Based on proven anatomical asymmetries (e.g. *Broca’s area* in the left frontal lobe being bigger than the corresponding area in the right hemisphere) between the two hemispheres, they assume at least a partial lateralisation of cognitive functions.

In studying hemispheric differences, Mark Jung-Beeman [50] examined differences in the way the right and left hemispheres process information, particularly with regard to complex language comprehension and problem solving. He maintains that based on recent evidence from neuropsychology, neuroimaging, and neuroanatomy "each type of semantic processing occurs bilaterally" [51], but concedes that the right hemisphere "performs relatively coarser semantic coding" as compared to the relatively fine semantic coding in the left hemisphere (Jung-Beeman, 2005: 513). In other words, this new perspective overthrows the long standing consensus of an exclusive involvement of the frontal and temporoparietal regions of the left hemisphere in terms of language processing. Instead, findings suggest an increasing involvement of anterior temporal regions and of right hemisphere homologues to classic left hemisphere language areas. So, in addition to strong neural activity in the left hemisphere during language tasks, neuroimaging studies have also observed weak signals in anatomically equivalent areas of the right hemisphere, especially with regard to higher-level language tasks[52]. With his framework that argues for a combined activation of the two hemispheres (with the left hemisphere allowing for rapid interpretation and tight links, and the right hemisphere catering for maintenance of broader semantic activation and recognition of distant relations), Jung-Beeman introduces a new interesting and promising perspective that calls for further studies that would "specify the precise nature of these putative components" (Jung-Beeman, 2005: 517).

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50 Associate Professor of Psychology, Cognitive Neuroscience Program, Northwestern University, Evanston, USA. He investigates brain, behaviour and cognition.

51 Jung-Beeman uses the term "semantic" in a broad sense, to denote any function pertaining to the extraction and elaboration of meaning from language input. He distinguishes between three distinct but highly interactive components of semantic processing: semantic activation, semantic integration, and semantic selection, each of which occur bilaterally.

52 E.g. understanding metaphors, getting jokes, deriving themes, drawing inferences, mentally repairing grammatical errors, detecting story inconsistencies, and determining narrative event sequences.

Helen Neville and John Bruer also argue that semantic processing activates both the right and the left hemispheres of the brain, whereas grammatical processing usually recruits the left hemisphere only. Their findings indicate that there seems to be a sensitive period for learning grammar but not for learning vocabulary. According to them, the same brain systems are used for learning vocabulary no matter at what age the vocabulary is learned (Neville & Bruer, 2001).

Today it is widely acknowledged that the processing of emotions as well as music is mainly attributed to the right hemisphere, just as are the prosodic features of spoken language. Relating to observations of different scientists, Singleton argues that "the current view is that the right hemisphere plays a role in language-based communication in those of its aspects that extend beyond the literal or surface aspects of words and sentences" (Singleton & Ryan, 2004: 143). As opposed to that, it is the left hemisphere that is more active when it comes to the interpretation of the contents of a sentence (Herrmann, 2007: 114). However, again it must be emphasized, that we cannot speak of an exclusive assignment of just one hemisphere of the brain to certain functions. Clearly, the debate about the right hemisphere's contribution to language processing is set to continue for some time. It seems that based on the accumulated research data there is enough evidence around to call into question Lenneberg's dichotomous representation of mature laterality of functions (see Chapters 2.1.1 and 2.1.3) and to cast doubt on any absolute interpretation of the completion of lateralisation.

As documented above, scientific research in this field is ongoing. In view of the complexity of the field and the fact that is in a constant state of flux, this introduction to the topic is meant to give but a short overview on some of the most important findings and the state-of-the-art of recent research in this field. It does not claim to provide an exhaustive valuation.

3.2.3 Language-processing areas of the brain

To raise new questions, new possibilities, to regard old problems from a new angle, requires creative imagination and marks real advance in science. (Albert Einstein)

The process of identifying the parts of the brain that are involved in language began in 1861. At that time French neurosurgeon Pierre Paul Broca, examined the brain of a deceased patient who had suffered from an unusual disorder. Though he had been able to understand spoken language and did not have any motor impairments of the mouth or tongue that might have affected his ability to speak, he could neither say a complete sentence, nor express his thoughts in writing. The only articulate sound he could make was "tan", which was then used as his name. When Broca autopsied Tan's brain, he found a sizable lesion in the *left inferior frontal cortex*. Following this he discovered similar brain damages in several other patients who had suffered from comparable language deficits (Herrmann & Fiebach, 2007: 6). This led him to the assumption of there being a 'language centre' in the left hemisphere of the human brain. Now known as *Broca's area*, this was in fact the first area of the brain to be associated with 'language'. (See Figure 3-6)

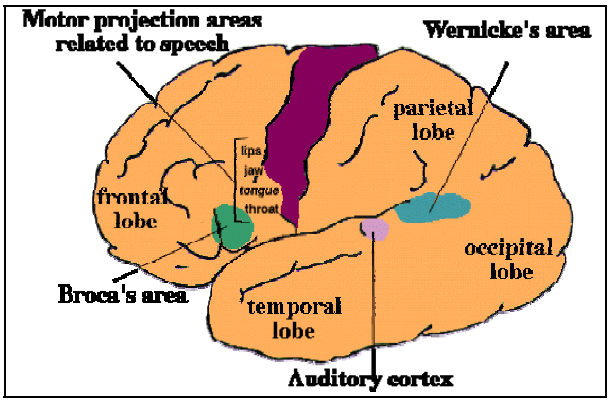

Figure 3-6: Broca's area and Wernicke's area
http://www-rohan.sdsu.edu/~gawron/intro/aphasia_lec_files/b-b-w-area.gif
(retrieved : 11/09/2008)

Broca's area is the area of the brain responsible for speech production, language processing, and language comprehension, as well as controlling facial neurons. People suffering from damage to this area may show a condition called “Broca’s aphasia”, which makes them unable to create grammatically complex sentences. Their speech is often described as “telepathic” and is characterized by word-finding difficulties. Patients are usually aware that they cannot speak properly. Comprehension in Broca’s aphasia is relatively normal, although many studies have demonstrated that Broca’s aphasics have trouble understanding certain kinds of syntactically complex sentences[53].

In the 1870s Karl Wernicke, a Polish-born German neurologist and psychiatrist traced another part of the brain connected to the production of language. He had examined patients who were able to speak, but whose speech was partly incoherent and made no sense. After having examined these patients, he discovered lesions in the *posterior portion of the left temporal lobe*. This region of the brain hence became known as *Wernicke’s area*. *Wernicke's area* helps us understand and comprehend spoken language (see Figure 3-6, p. 88). When *Wernicke’s area* is damaged, speech is preserved, but language content is incorrect. The patient produces intelligible words that appear to be strung together randomly, like in a “word salad”. This may vary from the insertion of a few incorrect or nonexistent words to a profuse outpouring of jargon. Grammar, syntax, rate, intonation and stress are normal. Incorrectly substituted words as for example “telephone” for “television” are common[54].

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53 The following example demonstrates how a Broca’s aphasic is trying to explain how he came to the hospital for dental surgery: “Yes… ah… Monday… er… Dad and Peter H… (his own name), and Dad… er… hospital… and ah… Wednesday… Wednesday, nine o’clock… and oh…Thursday… ten o’clock, ah doctors… two… an’ doctors… and er… teeth… yah.” (see: Goodglass, H. & Geschwind, N.: 1976).

54 Example: “I called my mother on the television and did not understand the door. It was too breakfast, but they came from far to near. My mother is not too old for me to be young”. Source: Wikipedia, the free encyclopedia: “Receptive aphasia”.

Broca's area and *Wernicke's area* are found unilaterally in the left hemisphere of the brain. Both scientists' observations have been confirmed many times since. (Herrmann & Fiebach, 2007: 7-11)

Today neuroscientists agree that in the left hemisphere of the brain there is a sort of 'neural loop' that is involved both in understanding and in producing spoken language. At the frontal end of this loop lies *Broca's area*, which is mainly associated with the production of language, or language output. At the other end of this loop lies *Wernicke's area*, which is associated with the processing of words that we hear being spoken, or language input. The two areas are connected by a large bundle of nerve fibres. So *Broca's are*a is connected to *Wernicke's area* by a neural loop, the *arcuate fasciculus* (see Figure 3-7), which is a pathway made of neurons. With lesions of the fasciculus arcuatus comprehension and spontaneous speech are intact, however, the patient has problems when repeating words, a phenomenon which is called "conduction (commissural) aphasia" (Deutsch & Lutke, 2007: 10).

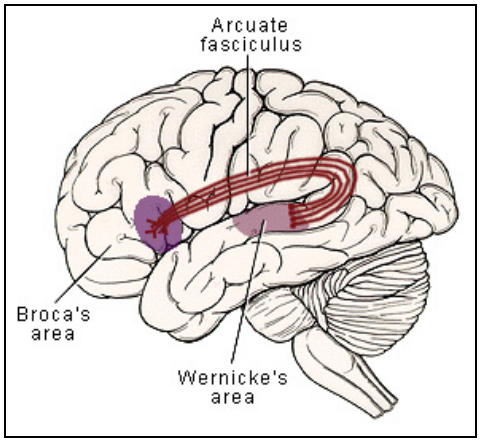

Figure 3-7: Wernicke-Geschwind Model of Language Processing
http:www.lib.mcg.edu/edu/eshuphysio/program/section8/8ch15/8ch15img/page14.jpg
(retrieved : 11/09/2008)

For many years, scientists' perception of how the brain processes language was based on this model. It was widely believed that *Wernicke's area* interpreted the words we hear. This information was then relayed via the bundle of fibres to *Broca's area*, which would then generate the

spoken word. However, subsequent experiments with brain imaging have revealed the existence of a third region of the brain that is also indispensable for language. In addition to *Broca's* and *Wernicke's areas*, this third area of importance for language, also known as *Geschwind's territory*, has been described more recently.

When performing brain imaging studies in the 1960s and 70s - about a hundred years after Wernicke's findings - American neurologist Norman Geschwind discovered the *inferior parietal lobule* (see Figure 3-8) as another significant language processing area in the human brain. Lying at the junction of the auditory, visual and somatosensory cortexes in the left hemisphere, this area is one of the last structures of the human brain to have developed in the course of evolution. This structure appears to exist in rudimentary form in the brains of other primates, which indicates that language may have evolved through changes in existing neural networks, rather than through the emergence of completely new structures in the brain.

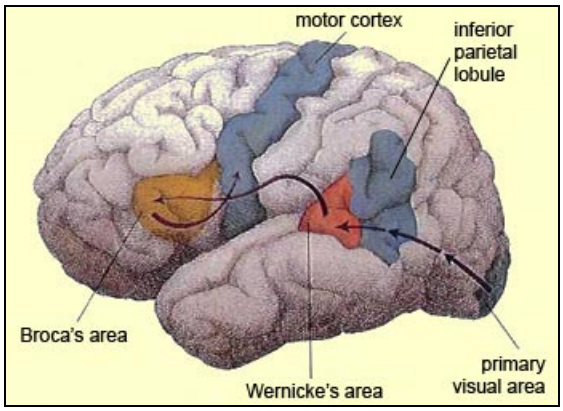

Figure 3-8: Inferior parietal lobule (Geschwind's territory)
http://thebrain.mcgill.ca/flash/i/i_10/i_10_cr/i_10cr_lan/i_10_cr_lan_1a.jpg
(retrieved : 11/09/2008)

The inferior parietal lobule is also one of the last structures to mature in human children, and there are reasons to believe that it may play a key role in the acquisition of language. The late maturation of this structure would explain, among other things, why most children cannot begin to read and write until they are 5 or 6 years old.

Martin Trepel (2008: 260-265) suggests that the *gyrus angularis* is the indispensable switch-board between visual and articulate cortex. According to the *Wernicke-Geschwind-model* the following function is attributed to this area of the brain: keeping in store retained information on the visual form of letters and words and then contributing to the conversion of the visual-orthographic input signal into an auditory form. Blakemore & Frith (2005: 78) argue that the *angular gyrus* is responsible for the association of spoken and seen words. In terms of location, it is directly adjoined to the *Wernicke-area*, where the word as such is recognized and stored in its auditory-phonological form. Accordingly, damage to the gyrus angularis would result in the so-called "angularis-syndrome", comprising alexia (reading impairment), agraphia (inability to write) and acalculia (difficulty in performing mathematical tasks. This medical condition is also called *Gerstmann's syndrome* [55].

Herrmann & Fiebach (2007: 11f) concede that in spite of the broad acceptance of the *Wernicke-Geschwind model*, it is confronted with a number of problems. They indicate that based on recent neurolinguistic and neuropsychological experiments more up-dated cognitive models of language processing reflect a "mental architecture" that is considerably more complicated than originally assumed. Furthermore they argue that frequently the model does not stand the test of modern brain imaging methods such as PET or fMRT [56].

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55 This syndrome was first described by Austrian-born neuropsychiatrist Josef Gerstmann in 1924 and mainly comprises alexia (= word blindness), agraphia (inability to write) and acalculia (disturbance of counting).

56 PET (Positron Emission Tomography) is an imaging method that can show blood flow and oxygen and glucose metabolism in the tissues of the working brain. These measurements reflect the amount of brain activity in the various regions of the brain and allow to learn more about how the brain works. It was the preferred functional brain imaging method before fMRI was discovered.

fMRI (functional Magnetic Resonance Imaging) is one of the most recently developed forms of neuroimaging. It measures the blood flow that is related to neural activity in the brain. With this method it is possible to do research on the functional anatomy of speech production in the brain of healthy test persons. In terms of the future role in understanding the physiological basis for cognitive and perceptual events such as language generation in the human brain, this field will represent one of the most important frontiers in neuroscience. Since its discovery in the 1990s, a number of

Increasingly, results from brain-imaging studies are raising questions about the classic model of localized language functions as proposed by Geschwind. These findings argue instead for zones of convergence and a more distributed concept of language areas. Deutsch, maintains that when scrutinizing Broca's and Wernicke's cases as well as more up-dated diagnostic findings, doubts arise as to the validity of the identification of strictly separable speech functions and their definite localisation in certain brain areas (Deutsch & Lutke, 2007: 17).

A similar point of view is championed by Jeffrey Binder et al. (1997) after having conducted research on language processing areas in the intact human brain in the course of which they obtained functional maps on the entire brain of their 30 subjects. Their findings suggest that cortical activation associated with language processing is strongly lateralized to the left cerebral hemisphere and involves a network of regions in the frontal, temporal, and parietal lobes. Apart from these findings, which are consistent with classical models of language organization based on lesion data, they also point at the existence of less congruent conclusions, namely the fact that there is evidence for the existence of left hemisphere temporoparietal language areas outside the traditional *Wernicke area* as well as of extensive left prefrontal language areas outside the classical *Broca area*.

As has been shown, modern brain imaging techniques (for details see Deutsch & Lutke, 2007: 26ff) have made it possible to study the activation of the brain areas associated with language in healthy subjects while they perform specified language activities. These studies have confirmed the importance of *Broca's* and *Wernicke's areas* for language while also identifying them as part of a wider network of interconnected areas of the brain that contribute to language. This concept has now replaced the

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researchers have worked on this method and investigational programs continue to grow. For an overview of the potential of this technique see: Posner & Raichle (1996), *Bilder des Geistes*, 31-55. (cont. footnote 49: p. 93)

historical notion of language 'centres'. In other words, an area of structure may be a primary centre for a certain process, but the rest of the brain tends to be involved, too. As far as research has revealed to date, the brain tends to function as a whole. Although new revelations based on new scientific methods and techniques may be partly in conflict with the classical model of language localization, they are generally compatible with reported lesion data and without doubt provide additional support for ongoing efforts to refine and extend the classical model.

3.2.4 Neurogenesis

> *Some parts of our adult brains stay malleable as a baby's, so we can create neurons and learn new things throughout our lives.* (John Medina, 2008)

For a long time the brain was viewed as a static organ, without turnover of neurons or significant capacity for self-repair and regeneration. Early neuroanatomists, including Santiago Ramón y Cajal (see also Chapter 3.2.1), considered the nervous system fixed and incapable of regeneration. Many years later, in the 1960s, a handful of biologists[57] started to regard adult neurogenesis a possibility. In the 1960s Joseph Altman discovered adult neurogenesis, the creation of new neurons in the adult brain. Altman, at that time an independent investigator at the Massachusetts Institute of Technology, was largely ignored with his results, and when Pasko Rakic, a leading neuroanatomist at Yale, reported in 1985 that no new neurons were formed in the adult brain, this became the accepted view[58]. Still, Altman's findings helped trigger a new wave of scientific research which questioned the long time conception that new neurons cannot be created, they only die as one ages. Eventually in the late 1990s, the fact that the

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57 Such as Joseph Altman, Shirley Bayer and Michael Kaplan.

58 His doctrine is based in part on experiments on the brain of macaque monkeys.

brain can create new neurons even into adulthood was rediscovered, opening up one of the most challenging fields in the neurosciences.

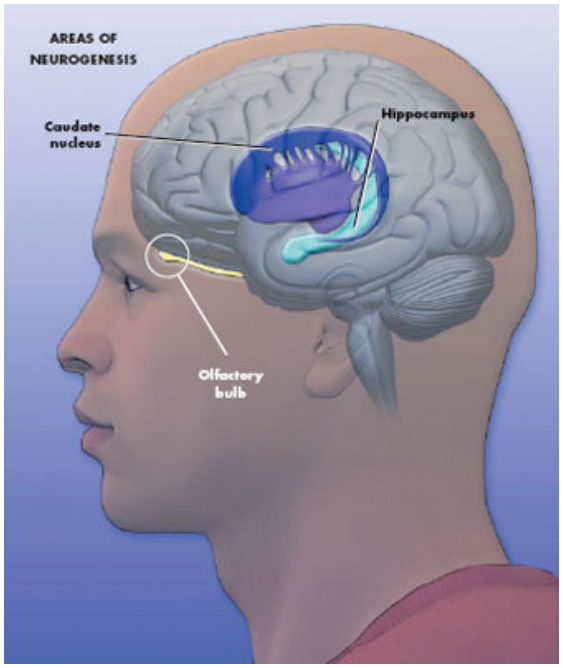

Figure 3-9: Areas of neurogenesis : the hippocampus
http://www.sfn.org/skins/main/images/brainbriefings/bb_June2007_large.jpg

So altogether, starting in the 1990s, research has established that neurons are renewed in certain areas of the human brain throughout life. Scientists such as Eriksson et al. (1998), Gould et al. (1999) or Kempermann (2002) investigated this field and contend that new neurons can grow within the mature adult human brain. This process, known as *neurogenesis*, means that brain function and capabilities can be processed, strengthened and developed throughout life. Gould *et al.* (1999) have demonstrated that the act of learning itself is associated with increased neuronal survival[59]. Based on their study of neurogenesis in the adult human hippocampus, Eriksson et al. (1998: 1313) hold that their results "indicate that the human hippocampus retains its ability to generate neurons throughout life"[60]. In

[59] Elizabeth Gould of Princeton published a challenge to Rakic's doctrine, reporting that she had found newborn neurons in the adult cortex, the region for most higher mental functions.

[60] In their research human brain tissue was obtained post-mortem.

his professorial dissertation Kempermann (2002) maintains that the adult brain contains neuronal, multipotent stem cells that generate new neurons in the hippocampus[61] (see Figure 3-9, p. 95). According to him the subtle regulation of adult neurogenesis by functional stimuli suggests a relevance of adult hippocampal neurogenesis for hippocampal function, in particular learning and memory. In their anthology on adult neurogenesis Gage, Kempermann & Song (2008) point out that to them neurogenesis appears to persist throughout life and they hold that it does not produce great numbers of neurons after early adulthood. They view it not as a mass phenomenon but rather as one that makes a qualitative contribution (Gage, Kempermann & Song, 2008: 3).

Research to date suggests that the most active area of neurogenesis is the hippocampus, a region deep within the brain involved in learning and memory. Also Blakemore & Frith (2005: 187) are convinced that new cells can be grown particularly in the hippocampus of the adult human brain. Quite obviously in the past several years, evidence has emerged that challenges the longstanding belief that humans are born with all the brain cells or neurons they will ever have. Building on the aforementioned pioneering and possibly promising findings, further comprehensive neuroscientific research will be indispensable and is actually in full swing. Gage et al. put this to the point when they describe the current developments as a "fast moving field" in which "new data are being published even as we rush this volume to print" (Gage et al., 2008: 5), so that in a way whoever publishes, he inevitably always somehow lags behind.

At the moment it seems that this field raises many more questions than it supplies answers. If new neurons develop, what encourages their development and how many are there? Do these new neurons

[61] Kempermann, 2002: Chapter 1.3. Neurogenese im adulten Hippocampus. The hippocampus is a part of the forebrain which plays a major role in short term memory and spatial navigation (here memories of faces and places are formed).

cumulatively add to the population of older cells or do they partly replace them? How many of these new neurons extend axons, receive synaptic input and produce action potentials? Scientists face the challenge of further hypothesizing and testing answers to these questions. Without doubt this branch of study is one of the hottest topics to be further explored in the neurosciences.

3.2.5 Multiple languages in the human brain

> *Every language is a vast pattern-system, different from others, in which are culturally ordained the forms and categories by which the personality not only communicates, but also analyzes nature, notices or neglects types of relationship and phenomena, channels his reasoning and builds the house of his consciousness.*
> (Benjamin Lee Whorf)

The introductory quotation by Benjamin Lee Whorf (1956) anticipates and smoothly ties in with David Crystal's reflections on the overall impact of a foreign language on the spectrum of human perception. He says that "if you have lived your life in a monolingual environment, you could easily come to believe that this is the regular way of life around the world and that people who speak more than one language are the exceptions", and continues that exactly the opposite is the case as "speaking two or more languages is the natural way of life for three quarters of the human race" (Crystal, 2005: 409)[62]. No matter, how realistic this estimate (see also Chapter 2.4.1), it is widely assumed that learning a foreign language not

[62] Crystal derives this assumption from the fact that over 6000 languages co-exist in fewer than 200 countries, an assumption that I believe is inaccurate and deceptive in view of the fact that almost twenty percent of the world's population lives in one big country, China. Although the Chinese language is a macrolanguage-system with seven main groups and lots of sub-languages and dialect groups and English as a second language is gaining ground, I would argue that the larger part of this country's inhabitants is still primarily monolingual. Another case in point is India. According to the DSW (Deutsche Stiftung Weltbevölkerung) Datareport 2006 China holds with 1.32 billion 19.84% of the world population and India with 1.13 billion 16.96%.

only promotes understanding, tolerance and respect for foreign cultures and values, but also opens up a multiplicity of opportunities of encountering new and different ways of thinking about things. In this connection the *Sapir-Whorf hypothesis* inevitably moves into view with its claim that different language patterns yield different thought. According to Sapir and Whorf a particular language's nature influences the habitual thought of its speakers. This idea challenges the possibility of representing the world perfectly with language, because it acknowledges that the mechanisms of any language affect its users. The *Sapir-Whorf hypothesis*[63], which has been disputed and supported alike, emerges in strong and weak formulations. Based on Chomsky's innateness-theory and his concept of a *Universal Grammar*, Steven Pinker (2000) generally opposes their view, arguing that thought is independent of language and denying that language contains any thought or culture. Against the background of differing judgements on this matter, the following essence emerges: The existence of successful translations argues against the strong form of the hypothesis, however, as there is an apparent and undisputed evidence of conceptual differences between speakers of different languages, there is no doubt that language does influence the way we perceive, remember and perform mental tasks. Quite obviously learning a foreign language offers a promising perspective for broadening one's mind. But how does the broadening of the mind work? How do we pick up new concepts and their underlying system? How do these new inputs merge and interfere with our established cognitive system and linguistic structures? How does the acquisition process of a newly learnt language relate to the native language in terms of interference? And how are multiple languages represented in the human brain?

63 Along with his teacher Edward Sapir, Whorf is best known for having laid the foundation of the Sapir-Whorf hypothesis, which primarily deals with the way language affects thought. The hypothesis (Sapir 1884-1939, Whorf 1897-1941) postulates that language determines the way we think (linguistic determinism) and that the distinctions encoded in one language are not found in any other language (linguistic relativity).

We have but one brain, however, we may store several languages in it. As we know from our own experience, acquiring the mother tongue seems to be “a piece of cake”. In comparison, learning a foreign language poses a challenge to the cognitive system that is quite evidently different to the acquisition of the mother tongue. This obvious disequilibrium automatically raises questions such as: Is there an analogy as regards the involvement of specific regions of the brain for the acquisition of specific linguistic features between L1 and L2 (here language 1 stands for the mother tongue, whereas language 2 signifies any optional additional language)? Or is there evidence for the activation of different regions for the same or similar tasks? And if so, do these variations show congruence and conformity across different foreign language learning processes? Are first and follow-up language acquisition identical in terms of developmental stages? What do we know about language processing structures and mechanisms of successively learnt languages? Is there any evidence of differing networks for different languages? Just like the corresponding research methods, these questions have come up as a scientific topic only very recently and a broad spectrum of investigation will have to follow in order to get closer to a better understanding of these phenomena.

The new possibility to directly observe brain function with healthy testees opens an array of new opportunities to advance our understanding of brain organization and assessing cognitive processes. In order to understand how people learn a second language, it will be of importance to know how this new information is processed in the human brain. A better understanding of the relevant processes may provide a better insight into language learning parameters and open up opportunities for the development of future language learning methods. In order to obtain conclusive information about foreign language acquisition at different ages, it will be of seminal importance for future research to conduct respective across-the-lifespan investigations.

As far as we know today, there is good reason to assume that the acquisition of phonological, lexical and syntactic knowledge of a new language cannot take place independently from the already established mother tongue, as well as any other foreign languages that had been previously learnt. As our mother tongue is a set of knowledge that is firmly stored in our brains, one might also argue that whenever we learn anything connected to language, our brain may try to build on the respective stock of knowledge. When Bialystok & Hakuta suggest that "learning a new language rarely allows you to set aside all that you have come to know about your first language", citing sounds, accents, errors and "first language structure poking through the structural fabric of the second language" (Bialystok & Hakuta, 1994: 11), they first and foremost address the phenomenon of language-to-language influence as a source of irritation. To this statement I would like to add that the impact of the first language may also have a positive effect on the acquisition process of further languages. The older we get, the fuller becomes our reservoir of intellectual and cognitive experience from which we can derive an invaluable, though probably unconscious potential for reasoning, combining, understanding and creating new sets of rules. In a way, this is an extension of Chomsky's concept of the *Language Acquisition Device* (LAD), a kind of *organ* with an innate faculty for acquiring language[64], based on a genetically innate *Universal Grammar* (see also Chapter 2.2). I would even argue that the notion of the *language-interference factor*, as I would like to coin the concept of influences across languages, is also in line with Chomsky's most recent contribution to linguistics, the minimalist program, which assumes that humans use as economic a system as possible in their innate syntactic knowledge. In addition to the utilisation of conceptions of economy to enhance the search for universal principles and parameters, as pointed out by Chomsky (2005: 11-17), I would

[64] Chomsky, who first proposed this concept in the late 1950s and early 1960s, has gradually abandoned the LAD in favour of a parameter-setting model of language acquisition.

suggest that there may also be a significant influence in terms of the activation and re-organization of so far acquired structures and rules.

In any case, the investigation of how a second, third or fourth (or further) language is organized in the human brain is and will be a question of high topicality in the field of neurosciences in the coming years. Just as it has become an intensively investigated topic in current applied linguistics research that looks at the phenomenon of cross-linguistic influence from a psycholinguistic perspective. Important representatives of this research issue such as Jessner, Herdina, Cenoz and Hufeisen who are currently exploring the multilingualism-factor from the point of view of metalinguistic awareness and metacognitive strategies, have been introduced in Chapter 2.4.

So far our current knowledge heavily relies on the achievements of neurobiological research that is founded on research connected with medical conditions (see Chapter 3.2.3). Herrmann & Fiebach (2007: 70) state that clinical literature of neurologically conditioned language disorders shows that deficits can occur selectively in either the mother tongue or a second language. Some rare cases of subjects with brain damage have revealed that the mother tongue was completely eliminated whereas the second language was not at all affected by aphasia. Diagnostic findings such as these, they continue, have led to the assumption that the first and second languages are not represented as a uniform system in the brain, but are partly based on different networks of the brain.

In their evaluation of results of modern research methods Herrmann & Fiebach look at the issue of the involvement of brain regions in first and second language use from two different angles. First, they focus on the age factor, and second they highlight the language competence level.

With regard to the first perspective, they indicate that initial experimental studies with bilinguals have revealed that in the region of the *Broca Area* the representation of a second language learnt at a later stage in life was different from the representation of the mother tongue, whereas in those subjects who had learnt the second language in their infancy (bilinguals), more or less similar regions of the brain are activated when it comes to speech production. In this context they present a most interesting facet as regards the posterior regions of language production (*Wernicke's area*, where in the first place comprehension of language is located) when stating that comparable differentiation could not be detected in these studies. – Instead, in this region of the brain an overlap of activation areas for the first and second language was diagnosed.

However, they continue, follow-up studies in the field of bilingual *speech production* (the use of two languages with equal or nearly equal fluency) did not result in the same findings. Most of them did not give proof of differences in the organisation of speech between the first and second language. This is where the second aspect, the language competence level, comes in. Herrmann & Fiebach argue that at present it is assumed that in terms of *speech production* neither age of acquisition nor language competence level seem to significantly influence the organisation of networks that are activated for language production. They say:

> Aktuell geht man (…) davon aus, dass das Erwerbsalter oder die in der Zweitsprache erreichte Kompetenz die Organisation der Sprachnetzwerke, welche für die Produktionsaufgaben in der Zweitsprache aktiviert werden, nicht beeinflussen. (Herrmann & Fiebach, 2007: 71)

On the other hand they maintain that in terms of *language perception* there is proof of differences in the activation of language areas for the first and second language. They say that as regards the language processing of the second language, in many cases the activation of a broader and more wide-spread region could be identified than this was the case in the

mother tongue. They continue that these findings might be explained as follows: Language comprehension is a very complex procedure that requires the processing of a huge amount of information within a few hundred milliseconds. It is especially this narrow time frame that might pose major problems for non-native speakers respectively learners of a new language. An increased demand in terms of first decoding and segmenting of acoustically perceived language signals as well as in terms of the identification of words might be responsible for the above mentioned activation of a broader spectrum of the relevant brain areas. Possibly more neuronal resources need to be activated.

With reference to Herrmann & Fiebach's commentaries, the current state of research does not seem to offer a clear-cut picture as regards the activation of brain regions in first and second language use. Strictly speaking one may even say that it is predominantly characterised by vagueness and ambiguity. While in the first place (see previous quote) they dismiss the influence of age and/or competence level on the organization of speech networks, they finally speculate that the organisation of a second language in the brain (as compared to the mother tongue) seems to depend on competence level rather than age:

> Individuen, die eine Zweitsprache nur mäßig beherrschen, zeigen deutlich Unterschiede in den Hirnaktivierungsmustern zwischen der Erst- und Zweitsprache – jedoch nur bei der Wahrnehmung und nicht bei der Sprachproduktion. Im Gegensatz dazu ähneln sich die Aktivitätsmuster von Erst- und Zweitsprache sehr stark, wenn Probanden untersucht werden, die einen sehr hohen Kompetenzgrad in ihrer Zweitsprache erreicht haben. (Herrmann & Fiebach, 2007: 73)

From the perspective of neurobiology, these contradictory statements reveal the ambivalent state-of-the-art and clearly indicate that there is urgent need for further research as regards the involvement of brain regions in first, second, and additional language use.

Blakemore & Frith (2005: 42) hold that the mother tongue is processed in universally similar regions (mainly in the left hemisphere), whereas "the brain areas used for a second language partially overlap, but also occupy additional regions, which differ somewhat from person to person". They argue that this has been demonstrated by brain-imaging studies, however, and unfortunately they do not cite sources.

When conducting research using functional imaging methods in order to show differences in the pattern of cerebral activation associated with the subject's native language (L1) compared with a second language (L2), Perani et al. (1998) traced evidence for differing outcomes when comparing 2 different groups, one with a low proficiency level of L2 and the second with a high proficiency level[65]. When subjects performed a story-listening task, differing cortical responses were observed in the low proficiency group, whereas the high proficiency group showed an overall identical brain activation pattern for L1 and L2. Based on these findings, they suggest that at least for pairs of L1 and L2 languages that are fairly close, attained proficiency is more important than age of acquisition as a determinant of the cortical representation of L2. In other words, it seems that the better one's competence in the L2, the closer the representation to the L1 activation areas.

Reiterer et al. (2009) who studied differently proficient Austrian learners of English as an L2, put to the test the neurolinguistic claim of an increased involvement of the right hemisphere with lower proficiency L2 learners, and they also confirmed this hypothesis.

With Kovelman et al. (2008) another group of researchers offered interesting insights into the unresolved "one fused" versus "two differentiated" linguistic systems debate. They argue that their

[65] They studied a group of Italian-English bilinguals who acquired L2 after the age of 10 (late acquisition group) and a group of Spanish-Catalan bilinguals who acquired L2 before the age of 4 years (early acquisition group).

investigation lends support to the hypothesis that bilinguals can develop two differentiated, monolingual-like, linguistic systems in one brain.

When investigating the fundamental question of how multiple languages are represented in the human brain, Kim et al. (1997) applied fMRI to determine whether early L2 acquisition results in different spatial representations in the brain from late acquisition. Their study revealed little or no age-related separation of activity in *Wernicke's area* (responsible for comprehension and semantic processing). However, in *Broca's area* (associated with output and syntactic processing) they did detect differences. While they found two distinct centres of activation for L1 and L2 among the late bilinguals, they disclosed that in early bilinguals the two languages tend to be represented in one single area. From this Singleton and Ryan (2004) conclude that there is evidence of different kinds of brain organization in early and late bilinguals, however they concede that due to limitations to the methodology of neuroimaging and differing research results, there is reason to treat current evidence with a certain amount of caution. They argue that

> the complexity of the neural networks activated during language tasks has made it extremely difficult for brain imaging to provide specific information about the exact location of specific linguistic skills and processing activities, and methodological problems attaching to brain-imaging studies focused on age effects call into question the conclusions of such studies. (Kim et al., 2004: 153)

"MerGe"[66], another team of experts from different scientific domains that has been engaged in the investigation of the correlates of language change and code-switching in the human brain, which is in close contact with the likewise interdisciplinary research group "multilingualbrain" at the University of Basel (Franceschini et al., 2001), also strives to contribute to an overhaul of linguistic assumptions and hypotheses such as the

[66] Arbeitsgruppe "Mehrsprachigkeit im Gehirn", centered around neuroradiologist Wolfgang Reith and linguist Rita Franceschini. Source: Franceschini et al., 2001.

question of separate or joint processing of one or more languages and the influence of age on language acquisition. When publishing first results of their project (Krick, Reith, Behrent & Franceschini, 2003)[67] they arrive at conclusions similar to those advocated by Herrmann & Fiebach, Blakemore & Frith as well as Perani et al., arguing that subjects with a poor command of the second language show significant differences in the activation of brain areas when using their mother tongue on one hand and the second language on the other.

> Hat man eine geringere Kompetenz, fällt einer Person im allgemeinen eine Aufgabe schwer. So wird denn auch in unseren Daten mehr Aktivität in den sprachrelevanten Hirnzentren beobachtet, wenn in einer Zweitsprache (L2) gelesen wird anstatt in der besser beherrschten Erstsprache. (Krick et al., 2003: 5)

Altogether the above cited research findings suggest that in comparison to the mother tongue, the organisation of a second (or follow-up) language in the brain might not so much depend on the age of acquisition but rather on the level of language competence.

Within the last few years a number of researchers using brain imaging methods (Klein et al., 1995; Yetkin et al., 1996; Dehaene et al., 1997 and 2002; Chee et al., 1999; Illes et al., 1999; Hasegawa et al., 2002; Van den Noort, 2006; Kovelman et al., 2008; Buchweitz et al., 2009; to name a few) have investigated this domain from different angles and extracted different results. However, the pattern that emerges from these neuroimaging studies is far from consistent. There are findings that support the hypothesis that different languages are at least partly represented in distinct brain regions (e.g. Yetkin, Dehaene), while others (e.g. Illes, Hasegawa) do not corroborate this theory. In contrast, other findings (Klein, Van den Noort) argue for shared neural substrates. Van den Noort et al. indicate that on one hand this may be explained by differences in

[67] Project: „Vom Mediziner zum Dolmetscher: Code-Switching und Sprachkompetenz in der funktionellen Bildgebung (fMRI)“. Source: Krick et al., 2003.

experimental set up, on the other hand by the selection of the subjects (Van den Noort et al., 2006a: 2293).

In sum it seems that investigation processes in terms of spatial representation of the different languages in multilinguals offer more questions than answers. Given the diverse, ambiguous and conflicting findings and reasoning, it seems evident that more research needs to be done before any firm conclusions can be drawn. In conclusion it may be suggested that the above cited findings in the field of neurosciences give new dynamics to age-related aspects of foreign language acquisition, calling for a new wave of creative, critical and constructive debate about the critical-period-hypothesis.

3.3 Memory Research

> *Memory is essential not only for the continuity of individual identity, but also for the transmission of culture and for the evolution and continuity of societies over centuries.*
> (Kandel, 2006, 10)

It seems to be clear that linguists, psycholinguists, neuropsychologists as well as neurologists all have an interest in how language is structured in the brain. So far this chapter has provided a basic overview of the neuroanatomical structures of the brain. We have heard about the architecture of neurons and how neurons communicate with each other via electrochemical processes. I have introduced the classic language centers discovered by Broca and Wernicke as well as other language-processing areas in the brain. We have looked at lateralization and we have considered aspects of neurogenesis. Finally the representation of multiple languages in the brain was discussed. If we want to fully understand the biological nature of language learning we also need to address memory research.

3.3.1 Memory location and memory formation

In the neurosciences the advent of neuroimaging techniques has accelerated memory research by providing a wealth of clinical and experimental results. These results have led researchers to abandon topological storage models of the brain, to distinguish several separate memory systems and to adopt a more dynamic and flexible approach to modeling human memory.

When Eric Kandel, whom German philosopher Richard Precht regards as the world's most important memory researcher (Precht, 2007, 97), explores the correlation between memories and brain regions, he gives a thorough account on the historical unfolding of different hypotheses. Starting out with Franz Joseph Gall's phrenology theory that appeared to be totally at odds with Descartes' dualism[68], he proceeds via Broca's and Wernicke's findings to Wilder Penfield's view of memory as being located in the temporal lobes. He then gives account of a surgical intervention conducted by William Scoville on a patient known to science only by his initials H.M. in 1953 with spectacularly revealing results.

> At the age of nine, H.M. was knocked down by someone riding the bicycle. He sustained a head injury that led eventually to epilepsy. Over the years, his seizures worsened ….. By age twenty-seven, he was severely incapacitated. Because H.M.'s epilepsy was thought to have originated within the temporal lobe (…), Scoville decided, as a last resort, to remove the inner surface of that lobe on both sides of the brain, as well as the hippocampus, which lies deep within the temporal lobe. The surgery succeeded in relieving H.M.'s seizures, but it left him with a devastating memory loss from which he never recovered. After his operation (…) H.M. remained the same intelligent, kind, and amusing man he had always been, but he was unable to

[68] Gall (1758-1828), a German physician and neuroanatomist, was the first person to champion the notion that particular mental abilities are located in specific regions of the human cortex and that mental processes are biological. This view put him at odds with the dominant theory of the time, Descartes' thesis (1596-1650) that human nature is split into two components: the 'material' body and the 'immaterial' soul, which was for reasons of power fully supported by the Roman Catholic Church. Gall's theory opened a debate that persisted through the next century – For details see Kandel, 2006, Chapter 8.

> convert any new memories into permanent memory. (Kandel, 2006: 127)

The follow-up studies carried out in co-operation with Brenda Milner[69] took memory research a great step forward. Milner identified the roles of the hippocampus and the medial temporal lobe in explicit (or declarative) memory[70] and provided the first evidence of implicit (or procedural) memory storage. Although H.M. had perfectly good long-term memory for events that had occurred before his surgery and possessed perfect short-term memory (later called working memory and shown to involve the prefrontal cortex), he lacked the ability to convert new short-term memory into new long-term memory.

> He could retain new information as long as his attention was not diverted from it, but a minute or two after his attention was directed to something else, he could not remember the previous subject or anything he thought about it. Less than an hour after eating he could not remember anything he had eaten or even the fact that he had had a meal. Brenda Milner studied H.M. monthly for almost thirty years, and each time she entered the room and greeted him, he failed to recognize her. He didn't recognize himself in recent photographs or in the mirror because he remembered himself only as he was prior to surgery. (Kandel, 2006: 128)

H.M., who according to Milner could not acquire any new knowledge, turned out to be locked up in his past. He forgot events shortly after they happened. Thus her studies revealed that loss of medial temporal lobe structures, in particular loss of the hippocampus, destroys the ability to convert new short-term memory to new long term memory. In other words,

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69 Brenda Milner (born 1918) is a pioneer in the field of neuropsychology and in the study of memory and cognitive functions in humans. She was an associate of Canadian neurosurgeon Wilder Penfield. With her scientific work she contributed significantly to memory research. Using fMRI and PET she eventually expanded her research to the study of brain activity, with special focus on the identification of brain regions associated with spatial memory and language, including the neural substrates of unilingual and bilingual speech processing.

70 Declarative memories are best established by using *active recall* combined with *mnemonic techniques* and *spatial repetition*, features that are of primary importance for (language) learning processes.

Milner's findings suggest the interdependence of *declarative* memory and the medial temporal lobe as well as the hippocampus. However, in the course of her studies she also found that H.M. was able to unconsciously learn and remember certain skills over the long term. From this she concluded that *procedural* memory resides outside this region. In other words, Milner proved the existence of two different types of memory: conscious (explicit or declarative) and unconscious (implicit or procedural) memory with different locations in the brain.

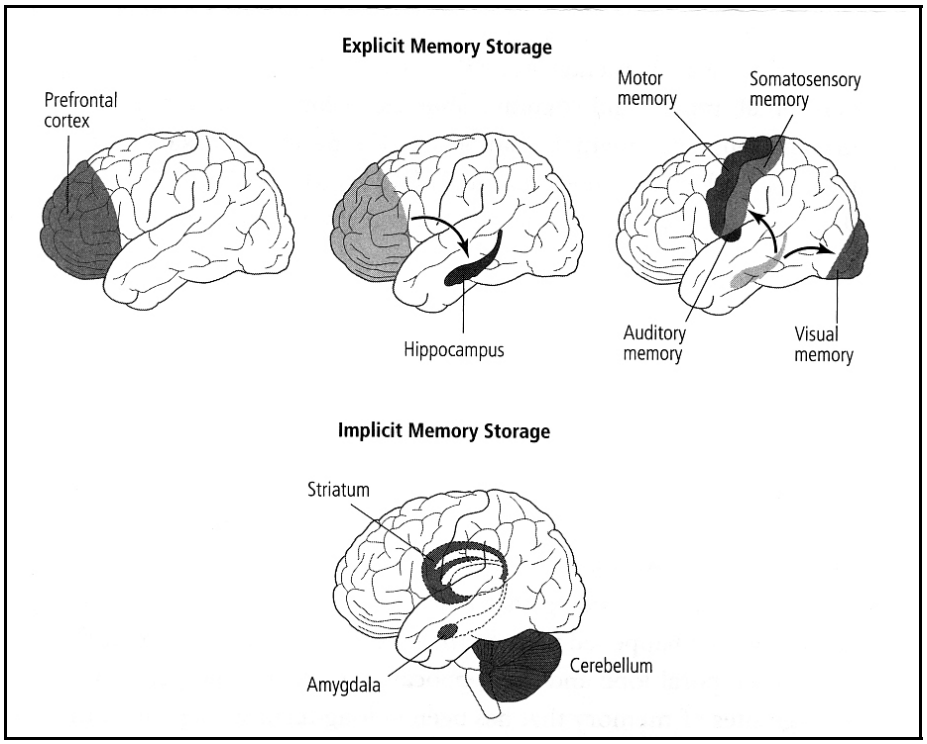

Figure 3-10: Explicit and implicit memory storage
(Kandel, 2006: 130)

Based on Milner's findings, Kandel concludes that explicit (declarative) and implicit (procedural) memories are processed and stored in different regions in the brain (see Figure 3-10).

> In the short term, explicit memory (…) is stored in the prefrontal cortex. These memories are converted to long-term memories in the hippocampus and then stored in the parts of the cortex that correspond to the senses involved – that is, in the same areas that originally processed the information. Implicit memories (…) are stored in the cerebellum, striatum, and amygdala.
> (Kandel, 2006:130)

Relating to the behaviourist notion of automatic and unconscious use of the rules of our mother tongue, Kandel puts forward the assumption that constant repetition can transform explicit memory into implicit memory. This then would mean that in the process of many learning experiences, brain areas such as the cerebellum, the striatum and amygdala, that are believed to store implicit memories, are also involved.

Larry Squire (1992) who contemplates the role of the hippocampus in memory function argues for multiple memory systems with different functions and distinct anatomical organizations. He claims that according to biological research the hippocampus together with anatomically related structures is essential for declarative memory which – as has been pointed out – applies to conscious learning processes.

Memory is composed of different abilities that depend on different brain systems (Squire, 1992; Schacter & Tulving, 1994; Eichenbaum & Cohen, 2001). The fundamental distinction is between *declarative* memory, which depends on the hippocampus and related structures, and a collection of other (*nondeclarative* or *procedural*) memory abilities that support skill and habit learning, and other forms of experience-dependent behavior that are expressed through performance rather than recollection. A characteristic usually attributed to *declarative* memory is that the acquired knowledge is available to awareness (Eichenbaum, 1997; Gabrieli, 1998). This memory feature is therefore of primary importance within the present study.

Although cellular studies have dramatically advanced our knowledge of the brain, we are still far from definite answers to questions such as how short-term memories are transformed into enduring long-term memories or what changes occur in the brain when we learn and whether different types of learning involve different changes. It will be for the future to reveal whether concerted research in cognitive psychology, neuroscience and molecular biology can contribute to the revelation of the ultimate secrets of

memory function and storage. Interweaving such prospective findings with the principles of learning foreign languages will take us a step further in meeting the demands of future educational needs.

3.3.2 Psychological aspects of memory

In an interdisciplinary approach with neuroscience, cognitive psychology has increasingly shifted its focus towards the investigation of memory and learning mechanisms of the elderly generation. Thus memory has become one of the principal pillars within the field of cognitive neuroscience. From the biological point of view, memory is generated in our brain. In a strictly psychological sense it is the ability to store, retain and subsequently retrieve information. A better understanding of the various types of memory suggests certain implications for language learning in older adults. When we talk about memory, our present-day key concern is the experience of memory decline or even loss as we grow older. In order to understand how we can store and retrieve information, it will be essential to look at the multi-faceted classifications and complex characteristics of memory. Memory per se is a fairly broad term that encompasses several distinct functions that in Roediger's words "is almost always most useful when accompanied by a modifier" (Roediger, 2008: 10).

Today it is widely acknowledged that there are several ways to classify memory. A basic and generally accepted classification of memory is based on the duration of memory retention. In principle it identifies three distinct types of memory: *sensory memory*, *short-term memory* and *long-term memory*.

Sensory memory retains impressions of sensory information only momentarily within a short-lived time frame of about one to two seconds. As it is triggered automatically, promptly and without special request, it is

characterized as being outside of conscious control. This type of memory degrades very quickly and can not be prolonged via rehearsal[71].

Short-term-memory that is sometimes referred to as *working memory* (Kandel, 2006: 111) is generally believed to hold information for about 30 seconds. The limited duration of short-term memory suggests that its contents decay over time. According to Lightbown & Spada, some researchers claim that "working memory may be the most important variable in predicting success for learners in many language learning situations" (Lightbown & Spada, 2006: 58). It is believed that this type of memory declines slightly with age. However, older adults seem to be able to compensate for this slight loss of memory capacity if confronted with language learning methods that do not overload the working memory. Stephen Brookfield claims that "adults are able to learn as well in their forties and fifties as in their twenties and thirties, when and if they can control the pace of learning" (Brookfield 1986: 28). His credo may be seen as an important link to the learning method used in the present empirical study as it also builds on the belief of coactive relation between learning method and memory storage. Before new knowledge can be stored in the long-term memory, it must first be processed in the short-term or working memory. According to Alan Baddeley "working memory stands at the crossroads between memory, attention and perception" (Baddeley, 1992: 559). It is involved in language comprehension, vocabulary acquisition, retrieval of previously learned information and other cognitive processes.

Memory that exceeds short-term memory duration limits is known as *long-term memory*. It can last as little as a few days or as long as decades. Biologically, short-term memory is a temporary potentiation of neural connections that can become long-term memory through the process of rehearsal and meaningful association. As long-term memory is subject to fading, spaced repetition that in a biological sense translates into

[71] The two types of sensory memory that have been most explored are the 'iconic memory' (= visual sensory memory) and the 'echoic memory' (= auditory sensory memory).

accumulative synaptic activity between neurons, is an indispensable necessity – especially with regard to storage of learning contents, such as foreign languages.

Long-term memory is typically divided up into two major headings: *declarative memory* and *procedural memory*, based on whether the retrieval of stored information is conscious or unconscious. While *procedural* (or *implicit*) memory applies to skills, *declarative (*or *explicit) memory* is the aspect of human memory that stores facts. The latter applies to conscious learning and can only be established by using active recall processes combined with mnemonic techniques and repetition over time. *Declarative* memory again is believed to subdivide into the categories of *episodic* and *semantic* memory. While the first refers to the memory of events, times and places associated with emotions and experience, the second relates to meaning, understanding and other concept-based knowledge that cannot be traced back to specific experiences or emotion. As such it may be regarded as being of primary importance for foreign language acquisition processes, especially in formal instruction settings.

Lachman defines semantic memory as "…the acquisition and retention of generic facts, knowledge and beliefs" (Lachmann, 2001: 255). For L2 learners it includes the learning of vocabulary, concepts and facts. To date research suggests that semantic memory remains intact and even increases over time. This would imply an important advantage for older adult learners. However, it is generally believed that older adults have problems in the retrieval of previously learned material. According to Leonard Poon et al. studies have found that older adults do have more retrieval failures than younger adults and are slower to retrieve words from the semantic memory (Poon et al., 1989: 254)

Regardless of the above mentioned categories of memory, it must be acknowledged that memory research seems to be a controversial and

highly disputed topic. Today memory studies apparently touch nearly every academic field and are spread over many domains such as anthropology, philosophy, psychology, sociology and education. Accordingly the concept of memory is used by different scholars in a multitude of senses. Henry Roediger, who turns to this topic in search for a dissolution of "the bewildering diversity of uses of the term" (Roediger & Wertsch, 2008: 9) and a more systematic study of the topic, quotes Endel Tulving's essay title "Are There 256 Kinds of Memory?"[72] conjecturing that "certainly the future will see his list expanded" (Roediger & Wertsch, 2008: 10). Although he does not see memory studies as developing into a "science of memory", he argues that the very fact that so many terms exist to describe various kinds of memory calls for unification strategies:

> Scholars from different disciplines may use the term memory (and related concepts) in quite different senses. Memory studies is currently a multidisciplinary field; our hope for the future is that it will become interdisciplinary.
> (Roediger & Wertsch, 2008: 9)

As it appears today, it is for the future to tell whether it will be possible to bring some coherence to the field and assemble the many different approaches to memory classification under one umbrella. This will be especially important in view of a better insight into cognitive aspects of the normal or "healthy" ageing process. Throughout the past years the study of learning and memory has become a central topic in the fields of neuroscience and psychology. Many of the corresponding research findings will presumably be directly applicable in the field of educational theory and praxis, especially as regards aging phenomena.

3.3.3 The aging brain and memory

[72] Tulving is a Canadian neuroscientist and memory researcher. For an overview of his works see: http://alicekim.ca/2000_present.htm. Tulving's essay in honor of Roediger can be found at: http://alicekim.ca/Roediger07_39.pdf
Tulving, E.: 2007. Are There 256 Different Kinds of Memory? (see: References)

In their research on the hippocampus, a major brain center for learning and memory, of adult mice, Shaoyu Ge et al. (2007) found that new adult neurons showed a pattern of changing plasticity very similar to that seen in brain cells in newborn animals. Furthermore, their molecular analysis showed that the plasticity of new adult neurons depended on the function of one of the same types of receptors that is associated with learning-related processes in newborn animals. From this they concluded that "adult neurogenesis may represent not merely a replacement mechanism for lost neurons, but instead an ongoing developmental process that continuously rejuvenates the mature nervous system by offering expanded capacity of plasticity in response to experience throughout life" (Ge et al., 2007: 564). This interesting study seems to indicate that not only do we know today that the adult brain is capable of creating new neurons, but it also suggests that our experience influences what happens to the new neurons. In other words it supports the correlation between lifelong learning and brain capacity.

In conclusion to this chapter it may be added that the dynamics of the demographic structure of society throughout the past years has pushed memory research towards a more interdisciplinary approach. Recent literature (Sossin et al., 2008;) and future projects in this field (Gudehus et al., 2010) may be regarded as proof of the importance that is attributed to the present and foreseeable demographic shift in aging modern society.

3.4 Learning and the Brain

> *Learning and memory are*
> *central to our very identity.*
> *They make us who we are.*
> (Kandel, 2006: 116)

Substantial interest surrounds the question of how age affects second language acquisition. Recent efforts of reputable Austrian educational

institutions[73] in terms of a critical and investigative approach to the question of 'lifelong learning' are proof of the growing importance of the correlation of learning and the brain on an educational-political scale. Holding the view that 'lifelong learning' is the core principle of social and economic progress, they not only stand for the advancement of this question in scientific terms but also call for a respective reformation of the educational system in Europe. Continuing concerted research and education on a national and international level may eventually lead to efficient, future-oriented and age-based learning and teaching methods (see Chapter 7.5 for first advances in this direction by the *Common European Framework of Reference for Languages,* 2007). The promotion of qualified specialists will be of major importance in the field of European educational research.

3.4.1 Can the aging brain learn?

As had been pointed at the beginning of this chapter, until very recently, it was widely believed that the adult brain is not capable of change, let alone of regeneration. For very long, brain scientists had assumed that after the first few years of life the brain is equipped with all the cells it will ever have, and that adulthood accounts for a downward spiral of loss of brain cells and deterioration in learning and memory. All this supported the hypothesis of a 'critical period' as the time-span of best-possible learning aptitude. However, as has been demonstrated in the chapter about neurogenesis (3.2.4), recent research renders more and more evidence that this view of a more or less deadlocked brain is too pessimistic. According to Blakemore & Frith (2005: 8f), "the adult brain is flexible, it can grow new cells and make new connections, at least in some regions such as the hippocampus". The fact that the hippocampus plays a significant

[73] Such as the cooperation of the University of Graz, University of Klagenfurt and Donau-Universität Krems, see press release: "Experten für Europas neue Bildungs-landschaft, 12.07.2005, see: http://www.openpr.de/news/53831/Experten-fuer-Europas-neue-Bildungslandschaft.html

role in long term memory[74] might very well confirm the proposition of there not being such a thing as a strict age limit for learning ability. Based on recent research, Blakemore concludes that "the hippocampus is known to remain plastic well into adult life" and that its size appears "to wax and wane according to how much it is used" (Blakemore & Frith, 2005: 126f). In principle we may say, brain plasticity is a question of *use it, or lose it*. The brain's plasticity depends critically on its usage in terms of frequency and diversity. Using our brains in unfamiliar ways may encourage new connections to form. Even though there is no doubt that the aging brain becomes less malleable and learning new things may take longer, Blakemore and Frith (2005: 9) argue that "research on plasticity suggests that the brain is well set up for lifelong learning" and therefore "well worth investment".

Quite evidently the dynamic course of brain maturation is one of the most fascinating aspects of the human condition. In recent years progress in brain imaging techniques has opened up new perspectives in the interaction of learning processes and brain activation. Today neuroimaging techniques such as Positron Emission Tomography (PET), Functional Magnetic Resonance Imaging (fMRI), Magnetoencephalography (MEG) and Event-Related Potential (ERP)[75] techniques make promising steps towards the investigation and reconstruction of the time-course and anatomical sequence of brain development. As has been pointed out in Chapter 3.2, most of the available research in this respect focuses on language use in brain-damaged patients. However, more recent studies have directed the focus on healthy subjects.

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74 For instance in Alzheimer's disease, the hippocampus is one of the first regions of the brain to suffer damage.

75 MEG is an imaging technique used to measure the magnetic fields produced by electrical activity in the brain; ERP is a type of brain wave that is associated with a response to a specific stimulus; PET and fMRI: see footnote 56 (p. 92).

Interesting insights into the investigation of gradual loss of cognitive functions as a consequence of human aging were given in a series of studies conducted by Buckner and colleagues at the Howard Hughes Medical Institute at Washington University (Logan et. al, 2002). They used fMRI studies to pinpoint cognitive mechanisms behind age-related memory difficulties, with special focus on the frontal cortex, the region of the brain that is responsible for higher-level intellectual processing. A total of 62 subjects were recruited for the study. The younger adults were in their 20s, and the older adults in their 70s and 80s (all of them healthy and free of any signs of dementia disorders). Two kinds of experiments were conducted. In the first study the younger and older adults were shown words and asked to intentionally try to remember them later. At this point they did not receive any strategic support. The study showed that the older adults did not recruit the critical frontal regions as much as the younger adults. In the second experiment, words were presented one at a time and subjects asked to make a decision about what category the word fell in (e.g. whether it was abstract or concrete). During this study the brain measuring images of the older adults showed increased activity in the frontal regions, and their memory performance improved. In other words, the frontal regions were potentially available to participate in solving the tasks, but it seemed that the older adults were under-recruiting them when left to self-initiated memorization strategies. However, with the right stimuli they responded very positively, more fully using left frontal areas to effectively process memories at levels approaching those of young healthy adults.

In sum, these studies provide evidence that the aging process does not physically destroy the cognitive mechanisms responsible for effective memory creation in the frontal lobes. They suggest that aging merely makes it difficult for older adults to spontaneously access and utilize those frontal regions of the brain routinely used by young adults for successful memory processing. In other words, the above results reveal that although

some older adults have the cognitive resources to successfully process memory tasks, they are not using them effectively. However, when provided with an array of support and guidance it may be possible to train older adults to better utilize resources of the left frontal cortex for memory processing at a level almost as efficient as that of young adults. Though the findings represent a promising step forward in the research of older adult cognitive performance, it is yet to be shown exactly what kind of supporting measures would be most effective.

3.4.2 Individual brains in individual bodies

No doubt, individual brains, like individual bodies, are different from each other. On one hand it is likely that genes play a significant role in learning, on the other hand social aspects and previous education have a considerable effect on what Blakemore and Frith (2005: 10) call the "landscaping" of the brain. With respect to genetic evidence, we still lack verifiable information. Nevertheless, ongoing research in the genetics of developmental language disorders gives rise for hope that one day we will, and as Dabrowska points out, we are almost certain to learn a great deal more in the future (Dabrowska 2004: 74).

The previous chapters have shown that research in the past few years has adduced evidence that the adult brain, at least in certain regions, is plastic and can adapt continually to changing circumstances. Of course there are many aspects that influence the malleability of the brain and the capability of learning. Today it is broadly accepted that proper nutrition along with physical exercise may boost brain function and increase learning. Above that the connections of neurons in the adult brain can and do change as a function of use. Accepting new challenges, practicing and repeating also takes an important role within the learning process and I perfectly agree with Blakemore & Frith when they say "there is no resting on your laurels even when you have achieved a high degree of skill" (Blakemore & Frith, 2005: 129). Within the vast neuronal network each time the same group of

neurons is activated, the connections between them are strengthened and skill and knowledge is cumulatively cemented. However, as Markus (2003) indicates, in order to be truly effective, learning has to be linked to meaning and purpose.

Neuroanatomist Marion C. Diamond (2001) identified five basic factors to keep the brain fit and malleable. Her credo for a positive development as regards brain growth is bound to diet, exercise, challenge, newness and human love and she establishes sound scientific evidence for each of these. Especially her treatise on the diet-related aspect deserves special regard. She indicates how diet and the proper function of neurotransmitters are intertwined. Out of the approximately one hundred different neurotransmitters that serve the body's chemical needs, Diamond cites one case in point: the importance of choline[76] that is necessary to form an important neurotransmitter, acetylcholine. She then introduces a number of different foods that contain important substances that are vital for the creation of neurotransmitters.

Another important finding in the course of her experiments was the variance in cortical thickness depending on challenge and stimulation-bound parameters. Diamond maintains that the thicker the cortex the better the general performance and the longer the overall life-span. She extrapolates her research findings derived from experiments with rats to the human species, claiming that "evidently more dendrites, hence, thicker cortices, indicate a greater ability to solve problems" (Diamond, 2001: 7).

[76] Choline is an organic compound, classified as a water-soluble essential nutrient and is usually grouped within the Vitamin B complex. This natural amine is found in the lipids that make up cell membranes and in the neurotransmitter acetylcholine. Adequate intakes for this micronutrient of between 425 to 550 milligrams daily for adults, have been established by the Food and Nutrient Board of the Institute of Medicine of the national Academy of Sciences. Choline was discovered by Andreas Strecker in 1864 and chemically synthesized in 1866. In 1998 choline was classified as an essential nutrient. Other important neurotransmitters are dopamine, serotonin and glutamate.

So coming back to the headline of Chapter 3.4.1 that asks “can the aging brain learn?”, there seems to be abundant evidence that favors the following response: “yes, definitely - if we feed and treat it the proper way”. Overall, it seems to be evident that the functionality of the individual brain over the whole life-span depends on the interaction of a variety of influencing factors, from genetic disposition to proper care, and it will therefore be important to include these considerations in future educational measures.

3.4.3 Lifelong learning and brain capacity

As a result of the huge increase of the elderly population in the post-industrial Western nations, a wholly new research domain, that of gerontology, has become one of the most rapidly growing fields. Today the study of the social, psychological and biological aspects of aging is a key issue for decision-makers on virtually all stages of life, from educators to planners and developers, from administrators to lawmakers. An enhanced conscience in matters of education policy is reflected in symposia such as the recent expert conference at the Gustav-Stresemann-Institute of Bonn[77] with the focus on constructive approaches in advanced training and education. One of the lecturers, Carola Iller, who referred to aspects of motivation and opportunities in the second part of professional life, pointed to adult and advanced education as an important sub-category of educational science. She alludes to this crucial issue also in her professorial dissertation where she investigates the intriguing question whether and how individuals can influence the aging process in the course of their vocational and educational biography. In her theoretical review of research concerning age and education in the course of the human life-span, she summarizes that the axiom of lifelong learning not only takes learning in advanced age for granted, but that it has developed towards a

[77] The conference volume was edited by Hildegard Zimmermann (2008). One of the topics of this conference was the investigation of the potentials and learning behaviour of the elderly and the search for concrete concepts for the organisation and realisation of future educational models.

kind of overall concept. In this context she cites Weinert & Mandl's quotation "was Hänschen nicht lernt, lernt Hans immer mehr", once more rebutting the outdated assumption of impaired cognitive abilities with progressing age (Iller, 2005: 95).

When Christian Stamov-Roßnagel (2008) who investigates age-related differences in learning competency and their implications on learning and continued educational strategies at the Jacobs Centre for Lifelong Learning at the University of Bremen asks the question "how can we promote age-specific learning?" he presents three different learner profiles who for different reasons lack competency in learning. He maintains that whereas at the bottom line there seems to be an unrestricted learning aptitude beyond working life, the readiness to learn is subject to inhibiting factors such as yearlong withdrawal from learning or lack of appropriate support. However, he advocates that systematic aid and encouragement may very well compensate these constraining influences. Given the state-of-the-art of brain research, I regard this view as verisimilar and consistent with recent findings.

From the point of view of cognitive sciences Hedden & Gabrieli, just like Buckner et al. (see Chapter 3.4.1) set out to explore how normal aging affects the neural basis of cognition. What they are specifically interested in, is the question whether age related declines are due to normal or pathological processes and whether normal age-related differences occur throughout adulthood, or only after some critical age. They state that for reasons of lack of relevant research data within the age group from 30 to 60, there are limitations as to the ability "to distinguish changes that occur across the adult lifespan from changes that occur late in life" (Hedden & Gabrieli, 2004: 94). With the present study I will not only attempt to narrow the mentioned gap of information but I will also try to investigate whether advanced adult learners adopt strategies in response to putative declines in cognitive ability or neural deficits in a self-sufficient manner. In a way it is in line with Hedden & Gabrieli's claim concerning future research:

> Researchers should emphasize not only age-related neural differences, but also their association with performance. Only when the answers to these questions are resolved will we be able to determine what constitutes normal ageing, and whether normalcy implies the inevitability of cognitive ageing effects. (Hedden & Gabrieli, 2004: 94).

Quite evidently, learning is and should not be limited to childhood, school years and university. A new learning science must span the whole life and overthrow the dogma that we are born with all the brain cells we will ever have. Although achievements of brain research are still sparse, recent neuroscientific findings should encourage us to follow the path of tracing the hidden powers of the brain and to fight cognitive decline.

3.5 The Sociopolitical Variance

> *It is not in fact difficult to understand the importance of foreign-language learning in today's world. As the planet becomes smaller, and the means for moving around it easier, so it has become more multicultural and multilingual.* (Johnson, 2008: 5f)

3.5.1 Changing demands in a changing world

I will now turn to those aspects of foreign language acquisition that are to be seen in close relation to the changing demographic developments now and in the future. In order to contextualize this approach, I would like to refer to Singleton and Ryan's reasonings about the implications of the falling birth- and deathrates for education in industrialized countries. They claim that

> … while fewer young people are making demands on educational facilities, more older people, including elderly people, are opting to return to part-time or full-time education. (Singleton & Ryan, 2004: 211)

This is the educational aspect of the current major demographic shifts towards a significantly older population put in a nutshell. A similar perspective is reflected by the renowned Austrian sociologist Leopold Rosenmayr (2007: 7f) when he pinpoints the lack of in-depth scientific examination of the socially relevant demands of the elderly as opposed to the attention that has been given to the young generation. Although important aspects regarding the needs and developments of the elderly generation have been extracted from various longitudinal studies by US-American as well as German gerontologists[78], Rosenmayr quite rightfully maintains that there is still a long way to go. Having taken up this cause, he seeks to explore what he calls "a new social potential" within a varying framework of upcoming resources. With this he refers to the emergence of a new group, liberally denoting it as 'a new generation in age' that needs to be assessed in its historical context. He continues:

> Wir suchen die nunmehr Schritt für Schritt aus dem beruflichen Leben ausscheidende „Generation" zu charakterisieren, und dies im Zeichen der großen Veränderungen die als „demografischer Wandel" etikettiert werden. (Rosenmayr, 2007: 8)

Whether and how the "new elderly"[79] can act as social saviors by voluntarily contributing to the socio-political demands of a new culture of longevity[80], remains to be seen.

As numerous demographic studies in Western societies attest, the proportion of people under 15 years old and those age 65 and over is generally moving in opposite directions. A most interesting contribution on

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78 E.g.: Hans Thomae (1915-2001), the founder of interdisciplinary gerontology in post-war Germany and President of the International Association of Gerontology. Ursula Lehr (born 1930), psychologist, former German Federal Minister and one of today's leading gerontologists.

79 Following the title of: „Die neuen Alten – Retter des Sozialen"

80 An approach that as I understand it, is – due to a lack of concrete solutions - not satisfactory.

this matter stems from Jenny Meyer, who in her discussion paper about the interrelation of the age structure of the workforce and the usage of information and communication technologies (ICT) points at a clear increase of the employment rate of individuals between 55 and 64 during the last five years:

> In the EU-25 the employment rate of this age group has increased by 5.9 percent from 2000 to 2005 and amounted to about 42 percent in 2005. The employment rate of individuals between 15 and 24 years has decreased by about 1.3 percentage points in the same period (Eurostat 2007). This development has two implications. Firstly, the working population is getting older and secondly, the composition of the workforce in terms of age is changing. (Meyer, 2008: 1)

With reference to learning capabilities, Meyer adverts to the complementarities between the human capital of younger and older workers that may indicate potential benefits of heterogeneous age structures:

> Younger workers are more comfortable with the use of ICT and may learn more quickly. As from a gerontological point of view, the fluid part of the brainpower – the part which is responsible for efficiently processing information and for adapting to new situations – decreases with age. By contrast, the crystalline intelligence, comprising verbal competence and experience, rather increases with age. Older employees are more experienced and have a better knowledge of the intra-firm structure and the operating process. (Meyer, 2008: 1f)

I suggest that Meyer's comments which primarily allude to the aspect of the adoption of new technologies, may also be valid for other types of cognitive processes, such as for instance foreign language learning.

In their comprehensive paper "Demographic Trends in the 20th Century" Hobbs & Stoops look at the aging aspect of US society, pointing at the decline of the young and the increase of the old generation in a country that is considered as mainly young, as it has historically attracted youthful

immigrants (Hobbs & Stoops, 2002). Explanations on this topic by Bernard Salt that refer to Australia point in the same direction when he indicates that the “20-something” group is flat-lining and the “50-something” group is growing steadily, adding that “it will be trendy to be 50” (Salt, 2001). In Europe the same kind of trend has emerged. According to Kupiszewski et al. (2006) “the old-age dependency ratio (regarding population over 65) is envisaged to more than double from 22% in 2005 to 45% in 2050”. They continue that the population aged 80 years and over is going to treble in the same period, climbing from 5% to 15%. Due to this expected increase of demographic burden, societies have to adjust on multi-layer levels. Among other things we will have to ask the question “will the aging of Europe’s population challenge our existing education system?”

When Ines Breinbauer addresses the issue of educational concepts for the elderly population she raises the question whether we can or should expect elderly people to take the challenge of education, arguing that this may be too demanding. First and foremost she looks at the question from the perspective of a philosophical clarification of the term “Bildung”. At the outset of her critical look at the educational infrastructure she asks:

> Ist es nicht eine Anmaßung, das ganze Leben mit pädagogischen Ansprüchen zu begleiten? Kann man nicht geltend machen, sie mögen im Kinder- und Jugendalter ihre Berechtigung haben, allenfalls aufgrund der gesellschaftlichen Veränderungsgeschwindigkeit noch berufsbegleitend, aber nicht mehr im Alter? (….) Auf welche Begründungen wird bei der Befürwortung und Abweisung von „Bildung im Alter“ zurückgegriffen?“
> (Breinbauer, 2007: 85)

Breinbauer raises questions that are somewhat provocative in style and probably aiming at sharpening the reader’s mind towards a more profound contemplation of this matter. Still, in the end, she owes us the very answer. She maintains that self-perception and an “internalized value system” of the elderly population tends to become gridlocked in familiar ways of thinking in the course of time. This prompts her to ask the question why

and whereupon education for the older generation should be targeted at all? – Again a highly stimulating question that leaves the reader behind with an array of vague arguments that do not nearly come close to what might be called an explanatory approach. In her “provisional conclusion” she notes that when talking about “education”, the status quo of the theoretical discussion of pedagogical understanding should not be undercut. However, the reader is left behind with a highly unclear picture of this status quo. She then once again underlines the vagueness of what had seemed to be a revealing approach regarding the topic “Bildung im Alter” by drawing upon Wolfgang Fischer’s quote “Die dem Menschen eigentlich zukommende Bildung ist das Philosophieren, aber das Philosophieren ist nicht jedermanns Sache“ (Fischer, 1997: 161).

Bernd Marin and Ashgar Zaidi (2007: 27-105) look at the phenomenon of an increasingly aging society from a more pragmatic point of view. Warning against the implications of a “cliff-edge fall from full-time work directly into retirement” (Marin & Zaidi, 2007: 39) and calling attention to a “dramatic unused productive capacity of people aged 55 to 65” (Marin & Zaidi, 2007: 42), their approach not only addresses the severe fiscal and social problems for most of the European welfare systems in the near future, but also brings to the fore the crucial need to improve the potential for solutions. The long-term projections of the impact of aging from the sociological perspective, as elaborated and reflected in this volume, clearly need to be extended to educational necessities, a feature that is hardly mentioned in Marin’s volume, let alone given a chapter of its own. When discussing the quality of life of the elderly in European societies, Heinz Herbert Noll (2007: 329-358) in his attempt to throw a light on the importance of life domains within different age groups leaves out the aspect of education altogether. The important issue of education as an influencing factor within a changing demographic context is mentioned but marginally in the article by Orsolya Lelkes (2007: 359-391). In her investigation of the value of life satisfaction across the life-span, she

concedes that “life-long learning, or self-education may play a major and cumulative role in the acquisition of knowledge and as a result, the appreciation of life” (Lelkes, 2007: 379).

In view of the aforesaid, is it not high time that social sciences and educational sciences close ranks in order to measure up to the complexities of the aging society? Do these results not suggest that it is time to act? In order to advance professional development activities, information and educational resources, the sociological approach ought to take into account the impact of age-biased aspects on one hand and educational issues and concerns on the other and view them as an integral part of the socio-political developments of the future. A plea that will hopefully be attributed more attention in the field of social sciences in the years to come. Besides, to date the education system does not seem to have exhibited adequate elasticity in adjusting to the vast demographic changes. The willingness of politicians to increase the education budget for elderly still seems to be lagging behind current and future needs. A vacuum that will hopefully be attributed more attention in the field of educational politics.

3.5.2 The educational dimension

Do not fear going forward slowly,
fear only to stand still.
(Chinese proverb)

The above mentioned appeal to decision-makers on the political level to consider the growing demand as regards adult education is backed up by a number of recent studies. A review on the projection of student numbers across various age ranges conducted by Singleton and Ryan (2004: 211-225) hint at concurrent trends in the United States and Europe throughout the past years. It indicates a clear tendency towards a rise in percentage of advanced age students. Referring to the situation in the United Kingdom, Singleton sums up as follows:

> In the period 1996-2002 adult education participation rates increased in all age groups except the 17-19 and the over-75 categories, and the greatest rise in participation rates was among those aged 49-54. (Singleton & Ryan, 2004: 212)

Subsequently he cites studies by Bernice Neugarten (1974), a pioneer in the study of age, who is noted for changing negative stereotypes about aging through her studies of personality, aging, competencies of middle-aged and older people, and generation relations. Neugarten's "young-old" category comprises people between 55 and 75 who move away from the traditional profile of their age-group, especially in terms of education. Based on a higher medium educational level, the "young-old", Singleton and Ryan maintain, combine a number of attributes that qualify them as potential foreign language aspirants.

> The 'young-old' are perceived as an extremely promising constituency for late education. Moreover, given that they appear to have a penchant for foreign travel and for exploring other cultures (…) they would seem to offer the possibility of a particularly rich harvest in the domain of foreign languages. (Singleton & Ryan, 2004: 213)

All this suggests that the uptake of late-in-life educational opportunities seems set to increase in many parts of the world. Accordingly, in recent years a number of institutions and organizations have started catering for adult and continuing education. They have attracted learners from the entire adult age spectrum across different fields of education. Based on the interconnection of a high degree of personal flexibility in terms of income and health on one hand and an increasing dynamic growth of travel interests, many of these candidates manifest a vital interest in the enrolment in foreign language classes. What particularly sets older learners apart from the very young ones is the fact that most adult education is voluntary and therefore generally better motivated. Institutions, administrators and teachers seem to be aware of this tendency but they tend to neglect two important aspects that emerge alongside this trend - the time and space factor. Our rapidly changing world challenges each

individual's constant adjustment at an incredibly fast pace. We must not forget that for the middle-aged and elderly population catching up with and adapting to recent developments in the high-tech world of computers has been and most probably will continue to be an immense task. This task is time-consuming, just as each individual's life with its specific characteristics and requirements in itself (e.g. job, family, mobile life-style, diverse interests and hobbies) is time-consuming. A predominant characteristic of our time quite evidently is "lack of time".

The working adult, the adult who is beyond traditional undergraduate college or university age is unlikely to have the freedom to simply quit his job and go back to full time education. Attending traditional study programs such as courses, seminars and workshops at a regular basis may be difficult for the larger part of these learners. For them – in order to expand knowledge and to stay up-to-date on new developments, it will be essential to be able to resort to learning methods that easily blend into their vocational and private lives. Future-oriented learning methods should therefore embrace a broad range of opportunities that take into account the acceleration of scientific and technological progress on one hand and the growing trend of individualization on the other.

In light of these prerequisites a sensible question to pose is: How is the working generation supposed to squeeze in something as time-consuming and demanding as foreign language learning and how successful is it likely to be? Do educational institutions and current training offerings meet the demands of mainstream modern life-style? – I believe not. Apart from cognitive and memory aspects which have been considered and scrutinized in the foregoing chapters, it is also the - what I would like to coin as "time-and-space" component that has to be taken into consideration. Researchers, developers of teaching methods and textbooks as well as policy-makers in the field of adult education ought to take into account that today we are confronted with a wholly new adult

learner typology: I suggest to call this new type of L2-learner “the learner in the crossfire of macro-micro demands” who will be referred to in detail in Chapter 3.5.3. This typology is meant to give due consideration to the learner who is caught in-between two plains in his pursuit of satisfactory personal achievements: the macrocosm of an ever expanding globalization and the microcosm of individual potentials and needs.

3.5.3 The foreign language learner in the crossfire of macro/micro demands

In its literal sense the dichotomy of macrocosm and microcosm goes back to the ancient Greek schema of world concepts – from the large-scale universe-level to the small-scale metaphysical level. In other words, it was used to describe human beings and their place in the universe[81]. In the present thesis the terms are used with a slightly different connotation – shifting the focus away from the philosophical analogy of “individual vs. universal”, and adapting it to two different “living spaces” the individual is exposed to, the macro-living space of the globalized world with its overriding demands and the micro-living space of the individual with his personal needs. When speaking of current socio-political issues, these concepts may in a sense translate into the terms macro-sociology and micro-sociology.

Today we live in a globalized world with widely ramified networks that confront each individual with enormous challenges - challenges that go far beyond his/her individual needs of coping with day-to-day life. In a way each individual is embedded in a macrocosmic structure that comprises a

[81] Macrocosm/microcosm is a Greek compound of μακρο- "Macro-" and μικρο- "Micro-", which are Greek respectively for "large" and "small", and the word κόσμος *kósmos* which means "order" as well as "world" or "ordered world". Ancient Greek philosophers developed this concept to describe human beings and their place in the universe (they viewed the individual human being as a little world, whose composition and structure correspond to that of the great world).

wide spectrum of basic parameters (especially in terms of job responsibility) within which he is meant to find his microcosmic balance. The question now is what is “microcosmic balance” and how do we achieve it? I understand microcosmic balance as a state-of-being that is nurtured by and builds on the individual’s ability to cope with the multiplicity of environmental as well as personal demands. The rapid technological progress, the increase of knowledge, and the great shifts in time and space requirements in modern society provide a great challenge to the individual. Only if the microcosmic web of an individual is harmonious, coherent and consistent, can he or she develop and act efficiently. Macro/micro demands are intrinsically interdependent and interwoven. It must be emphasized that one cannot do without the other. Macro demands in terms of time and space have a direct impact on the micro structure of each individual’s life and vice versa. The call for mobility and flexibility pervades all spheres of life. I would argue that quite evidently education and training is one of the sectors that needs to adapt to these new challenges. It needs to consider the interdependence of small and large systems and the fact that a smaller system always has to be seen as representative of or analogous to a larger one.

This leads us directly to the question whether current educational schemes meet these ever-rising requirements. A look around today’s educational and training landscape confronts us with a considerably alarming deficit. Although the range of programs and courses is manifold, established learning opportunities do not seem to fully meet the demands of the modern learner who is embedded in the “macro-micro-web” of surging claims in terms of time and space flexibility. I suggest that taking immediate action will be indispensable and a top priority issue. This is why within the context of the present thesis I will focus on a particular segment of foreign language learning programs. A segment that gives due consideration to the components of individual time and space requirements: the autodidactic segment.

Based on my adult foreign language teaching experience over a time-span of about 20 years as well as my own foreign language learning experience in several languages[82], I had the opportunity to examine and test a variety of study programs. Over the years I became particularly concerned with the investigation and implementation of effective learning methods that would do justice to the developments of the time we live in. In my search I particularly focused on methods that would not only take into consideration the fact that there is generally only limited time for adults to attend to learning because of restrictions imposed by family and/or job responsibilities, but also the phenomenon of a variety of individual constraints such as age, intelligence, aptitude, personality, motivation, learner beliefs and learning styles, as well as aspects of independence in terms of temporal and spatial parameters. There is no denying that advances in technology are diametrically opposed to the long-established 9 to 5 rhythm of work which had for a long time favored the classic learning models of attending classes on a regular basis.

Whenever new foreign language teaching methods and textbooks are introduced, they claim to be based on the latest research in psychology, linguistics, or pedagogy. In general they tend to promise to be more effective than those that had gone before. Without doubt progress has been achieved throughout the last half decade and we have witnessed a number of different promising approaches. The upswing development of self-study-programs throughout the past decades is one among a number of efforts in search for an improvement of educational standards. However, as far as I can judge from my own experience, virtually none of the self-study learning materials that have been promoted as top-quality, can keep their promise of immediate success[83]. They do have their strong points, but they also have their clear weaknesses. First and foremost they tend to

82 For details see Chapter 5.2 of this study.

83 This refers specifically to the big sellers and well-known brands on the English-speaking market.

overload the learner by confronting him/her with too much input at a time without sufficient opportunity to consolidate the newly learnt words and phrases. Secondly, they do not include supportive measures that reinforce retentiveness and foster spontaneous communicative competence. Instead, most self-study programs focus on simple and stereotype repetition of words and phrases without adequate stimulation for effective self-guided language processing, which is according to Buckner et al. (see Chapter 3.4.1) a most important pre-requisite for sustainable memorization especially with older learners. Finally most of these programs are misleading in terms of feasibility. They promise fast and easy learner progress with very little effort, but in most cases they do not meet these expectations. Ultimately, these deficiencies have a highly demotivating impact and leave the learner behind with a totally deceptive self-concept. This self-concept may range from “untalented” or “not bright enough” to “too old” to learn a foreign language.

The present research offers the opportunity to close the gap between “what we have and what we need” by developing new ideas as to more efficient foreign language learning concepts and suggesting improved methods for future-oriented self-study programs. A comprehensive explanation and illustration of what efficient learning programs need to comprise will be given in Chapter 7.3.3.

3.6 Conclusion

The ‘younger=better’ premise that had for a long time dominated the educational landscape is currently being dismantled. Recent research virtually altogether rebuts the stereotype of the adult as a disadvantaged foreign language learner, a stereotype that is to be traced back to a wholly outdated theory of the brain. The *Critical Period Hypothesis* that was put forth by Lenneberg in the 1960s and that was based on then current theories of brain development (arguing that the brain lost cerebral

plasticity after puberty, making second language acquisition extremely difficult for adults) can no longer be upheld against accumulating research findings in the field of neurobiology. Rightly and legitimately the quantum leap in brain research in the last years has given rise to a wholly new approach to age-related foreign language learning issues. When in 1987 Mary Schleppegrell, one of the pioneers in the field, asserted that research is providing increasingly positive answers to the question whether older adults can successfully learn foreign languages, she stood at the gateway of a pioneering rethinking process in terms of the implementation of outcome-oriented education and requirements for adult learners (Schleppegrell, 1987). Today we know about the flexibility and continued plasticity of the adult brain. Neuroscientific research provides evidence that the ability to adapt to changing circumstances and acquire new information continues into old age. In corroboration of this argument Blakemore & Frith (2005) assert that lifelong learning is an essential mindset for the future and that it will be advisable to harness the learning powers of the brain. It is beyond controversy, that current scientific research underscores the potentials of the older learner.

It will now be for the advanced adult learner-herself/himself to internalize and make use of what neuroscientific research has revealed: the advantage for adults is that the neural cells responsible for higher-order linguistic processes such as understanding semantic relations and grammatical sensitivity develop with age. Especially in the areas of language structure, there is good reason to believe that adults are actually better language learners than children. Not only do they have more highly developed cognitive systems that enable them to make higher order associations and generalizations, but they can also integrate new language input with their already substantial learning experience. In DeKeyser's words, they have the 'short-cut' advantage (DeKeyser, 2005: 335). At the advent of the twenty-first century it is time to overthrow old patterns of belief, it is time to stand up against the fear of failure and it is

time to make use of the hidden powers of the brain. On the basis of substantial evidence that the human brain has continued plasticity well into advanced age, Blakemore and Frith's quote that "learning occurs at all ages and it is never too late to learn" (2005: 123) appears to be the perfect concluding remark.

As regards the socio-political implications of adequate educational measures for the adult foreign language learner we must bear in mind the dramatic changes of the past years. Both the globalization process and an ever increasing mobility call for intercultural education and the promotion of foreign language learning options. Before this background it is quite clear that we need adequate structures and measures for language learning on the one hand, and the overcoming of individual anxieties and other barriers in terms of learning on the other. Setting up well-functioning structures that help reduce longstanding fears and biases and boost and strengthen self-efficacy among older language learners will be the responsibility of educationalists and politicians. Accepting the challenge of learning at an advanced age will be the responsibility of each single person. So the responsibility, I purport, is twofold: institutional and individual and I regard Breinbauer's quote "Bildung erfordert Mut. Bildung macht aber auch Mut" (Breinbauer, 2007: 103) as a synonym of what is at stake in the field of educational theory in the upcoming years. Connecting the socio-political aspects with the theoretical language acquisition frame of this project is another step towards a quest for interdisciplinary discussion and considerations, this time bringing together the fields of sociology and education.

Chapter 4
NEW CONCEPTUAL PERSPECTIVES

The important thing is not to stop questioning.
(Albert Einstein)

After an overview of what I consider the most seminal and pioneering views on age-related, psycholinguistic, neuro-cognitive and sociopolitical issues that influence the advanced aged foreign language learner, and the analysis of the present empirical research (as presented in Chapter 6), it turned out that there was a void in terms of a suitable theoretical framework as regards an adequate and satisfactory analytical coverage of the crucial properties of the adult foreign language learner population. Though over the past years research has generated valuable insights into this field it soon became clear that an appropriate forward-looking perspective needed to be developed.

4.1 Themes and Trends in Older Adult Learner Research

Over the past decades the worldwide challenge of an aging population with a substantial number of people living in functional health with an increasing level of educational attainment has propelled the older adult generation into focus of adult education programming and research. A very recent study on this issue that analyzes and assesses corresponding publications in major adult education journals[84] over a time-span of 26 years (1980-2006) claims that "the literature on older adults in adult education journals (….) lags behind what we know about older adults, their diverse properties, their cognitive and physical capacities, and their developmental needs and interests" (Chen, et. al, 2008: 18). In their

[84] Such as: *Adult Education Quarterly*, *Adult Learning*, *Adults Learning, Canadian Journal for the Study of Adult Education*, and the *International Journal of Lifelong Education*.

qualitative content analysis that is based on a data set of 93 articles (29 of which were empirical studies), segmented by decades (1980s, 1990s, and 2000-2006) the authors filtered out interesting trends in terms of topics and methods. They purport that while the 1980s were dominated by issues such as educational experiences and participation, instructional designs and strategies, and descriptions of educational programs for older adults, in the 1990s the focus shifted towards the whole societal learner context, it became more project-oriented and expressed an increased interest in the implementation of educational opportunities for older adults. In other words, there was a shift from a descriptive approach regarding educational projects and programs to a reflective approach. Chen et al. continue that publications of the beginning 21st century represent a more varied picture with a newly emerging interest in the exploration of the nature of learning, including self-directed learning. Despite the fact that the reviewed articles fall into the general domain of older adult learner portrayal, covering a broad selection of topics and research questions, the Chen-study is interesting in that it reflects the status quo of research agenda and practical engagement with older adults between 1980 and 2006. Their search for a clear picture of the topics addressed and the assumptions underlying the specifics of learning in older adulthood reveals that

> with few exceptions, the literature portrayed older adults as a homogeneous group free from age-related physical and cognitive decline, enabling them to proactively participate in learning opportunities. (Chen, et. al, 2008: 15)

The authors' rejection of the notion of the adult language learner as a kind of 'universal prototype' is primarily based on the neglect of ethnic, educational or cognitive differences that they feel need to be accounted for. Quite obviously this normative description of older adults in adult education must be seen in close connection with the predominant research 'landscape' of formal settings, a fact that evokes a certain amount of critique on the side of the authors, as this falls short of representing the specific characteristics of learners within an informal

setting and thus sets limitations in terms of all-embracing scientific conclusions. Much the same critique holds for SLA in general. Similar to the Chen article, the present study also rejects a normative portrayal of the adult language learner, though with a slightly different train of thought. In addition to the critical look concerning the neglect of the above mentioned aspects, it primarily argues for age-specific differentiation within the adult learner group. In other words, it advocates that in terms of age there is no such thing as “an” adult learner group. In fact we need to take a more diversified stance, a claim that is in compliance with the division of the subjects into the three assigned age groups in the present study.

Altogether, the summary of conclusions as derived from the references in the Chen-article, though they do not specifically refer to foreign language learning, represent an interesting bridge to the present study. What it doubtlessly reveals is an increase in the level of educational attainment with a continually rising likelihood of engagement of the older generation in educational and learning activities. Against this background and in order to stay abreast of the challenges to come, we will have to intensify research on the distinguishing factors of the older foreign language learner, his/her major driving forces, his/her potentials, and his/her shortcomings. The findings within the present study have revealed a number of parameters that are consistent with the general trends in recent years, as outlined by Chen et al. They are, however, not consistent with current tentative explanations and theoretical constructs that would do justice to the specifics of the instruction-based advanced aged foreign language learner. Based on this insufficiency, I searched for measures that would provide an adequate theoretical framework for future research.

4.2 In Search of Re-evaluation

4.2.1 The advanced-aged L2 learner – an object of research in his/her own right

Review of foreign language acquisition research shows that the main emphasis has been on younger learners and the discussion of their learner specifics. Indeed, there are very few studies that exclusively refer to adult learners[85], and most of these studies investigate immigrants involved in ESL programs with special emphasis on pronunciation. In her literature review on second language acquisition in adult learners[86], Johnson summarizes that relevant research is primarily observational and focused on programmatic issues rather than linguistic processes and she points out that

> there appear to be no language development theories that could accurately describe and explain the process of how an adult acquires a second language. (Johnson, 2001: 3)

With this statement she indicates that the explanation and prediction of adult foreign language learning remains an important area of investigation. Parallel to Chen's observations (see Chapter 4.1) she uncovers the limitations of how older adults are portrayed as learners. What we still lack is a selective research approach with the emphasis on adult language learners who learn the foreign language on a formal instructional basis and detached from the natural language environment. A learner setting that does share some similarities with that of school children or students who receive 'classic' foreign language instruction in their mother country.

There are indications in recent years that in many vocational settings the command of at least one foreign language is regarded as an essential prerequisite. From the perspective of global economics and social mobility, English indisputably takes the first place. However, also other languages are gaining more and more importance, especially languages that are spoken in the 'backyards' of promising high-yield and densely-populated

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[85] For an overview of recent research in this field up until 2000, see Johnson, 2001, and from 2000 onward, see Mathews-Aydinli, 2008.

[86] E.g. Johnson & Newport, 1989; Bialystok & Hakuta, 1994; Klein, 1995; Lalleman, 1996; Bongaerts et al., 1997; Pennington, 1998; Schachter, 1998; Wang, 1999.

economic regions such as China or India. Although international corporate groups in these countries generally refer to English as their lingua franca, which they use at meetings and on the higher levels of corporate co-operation, we must not forget that at the grass-roots level of working life people almost exclusively communicate in their mother tongue. Indeed, professional relocation to remote industrial or rural zones in a foreign country may limit a person's effectiveness, as the common worker there generally does not speak any language except the mother tongue. However, in face of an increasingly competitive situation on world markets, it often does not suffice to be an expert in one's professional domain. Taking these skills for granted, more and more companies start to attach importance to two other very decisive competencies: intercultural know-how and foreign language skills. It is these skills that are of vital importance when it comes to business with societies with a wholly different value system such as for instance China or other nations that do not share our Western set of values. A logical consequence of this tendency is a steadily growing demand of efficient foreign language learning methods for professional experts at different ages. These are people, who in order to be competitive and (economically) successful, will increasingly rely on the synergies of professional expertise and basic foreign language skills. They certainly need not reach native-like competence in the target language. They simply need to be able to socialize and make themselves understood as regards day-to-day life. We have reason to believe, that in future years an essential professional faculty on the international platform (apart from expert knowledge) will be the ability to bridge cultural gaps and set up short-cuts between business strategy and foreign language-specific accomplishment.

These prospects and demands not only justify, but they actually call for a new theoretical approach. New studies should be encouraged, and extended methodological perspectives should be developed. Experts in the field ought to extend the scope of age-related research and grant the

advanced aged L2 learner his/her proper place. In other words, the advanced aged foreign language learner deserves to be viewed as an object of research in his/her own right.

4.2.2 From 'overlooked and understudied' to 'incorporated and recognized'

The interdependence of language skills and 'employablility' on the corporate level, as outlined above, will require rethinking and re-evaluation also on the educational and political level. The apparent inconsistency between 'haves' and 'needs' raises immediate and important questions about the nature of language learning and teaching with respect to advanced age[87]. Mathews-Aydinli, who focuses on the population of adult English language learners, critically observes that in recent years the needs of this learner group have not been sufficiently met and that

> no study to date has looked at the full scope of research on this particular population of learners to understand the exact extent of its neglect in the literature or to provide an accurate picture of what research does exist. (Mathews-Aydinli, 2008: 199)

This critical remark may be extended to all foreign language learners, no matter what their target language is. Moreover, as has been shown in Chapter 2, no matter what specific aspects of influencing factors are concerned (be it the *Critical Period*, *Universal Grammar*, *Individual Differences Research*, or *Multilingualism*), the adult language learner had always been outshone by the young language learner. With the main focus on children, adolescents and students, research as conducted to date has literally left the working adult learner one step behind, largely disregarding the specific characteristics that impact his/her learning success. In other words, the age-specific pros and cons of foreign language learning have been overlooked and understudied. It seems that we have reached a crossroad of insufficiencies with a plethora of open

[87] Within the present study, 'advanced age' refers to the broad age spectrum of adult life, from post-educational entry into working life to mature old age.

questions that to a large extent have barely been investigated. What we need now is realignment and considerate reference to these long-neglected L2 learner aspects. We need to incorporate the specific profile features of the working adult language learner into the 'big picture' of SLA, TLA and PLA research (see Chapter 2.4.2) and we need to recognize that there may be new, and more adequate ways to explain the intrinsic qualities of the advanced foreign language learner's aptitude. Building on the analysis and evaluation of the available data-base, the present study is meant to help overcome the apparent inadequacy and lack of proper explanatory concepts. With the formulation of a new theoretical construct, the *3-Power-Model*, I hope to take the adult foreign language learners with their specific characteristics and needs one step forward. The new paradigmatic concept aims at opening up a new forward-looking perspective in terms of adult-appropriate foreign language learning approaches and above that seeks to acknowledge this learner group as a research group in its own right.

4.3 3-Power-Model of Adult Foreign Language Learning

> *To raise new questions, new possibilities, to regard old problems from a new perspective, requires creative imagination and marks real advance in science.* (Albert Einstein)

Having offered an overview of the evolution of psycholinguistic, neurobiological and social theories over the past decades, and having highlighted some of the most promising new conceptual themes, in this section I would like to present a new conceptualization of this multifaceted field that re-orients the whole concept in relation to a specific foreign language learner group, namely the *adult foreign language learner*. In an attempt to synthesize the status quo of foreign language learning research as outlined above with my own research findings, I would like to propose a

new model, the *3-Power-Model*, which is a three-level construct, that comprises the following pivotal dimensions: *willpower*, *brainpower* and *instrumental power*. (See Figure 3-11)

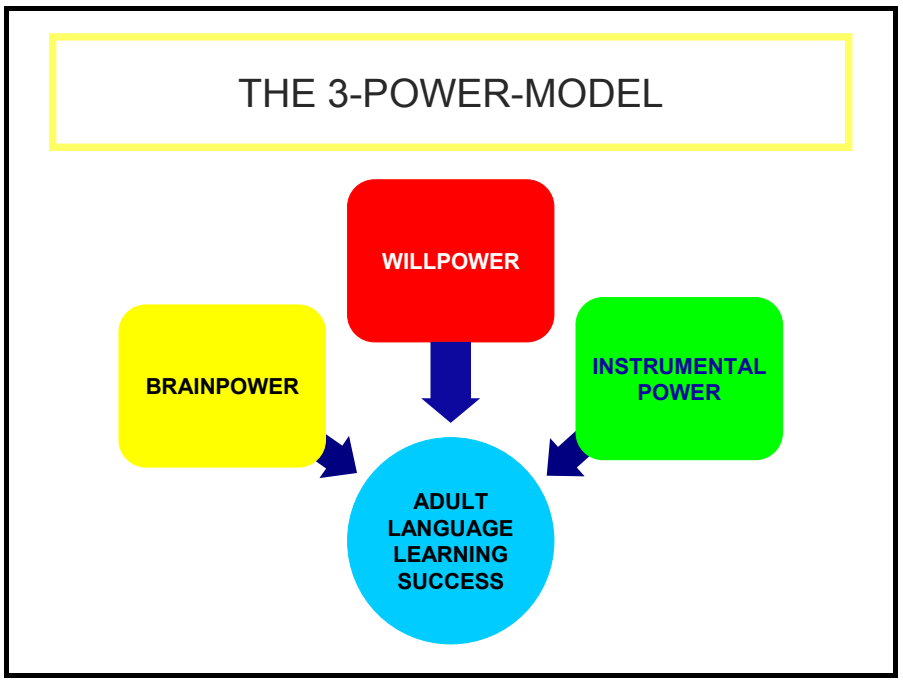

Figure 3-11: 3-Power-Model

The theory suggests that success of adult foreign language learners is powered by three independent channels, each of which can be traced back to differential basic human resource patterns. While *brainpower* is to a large extent biologically conditioned, *willpower* is substantially determined by psychological factors and *instrumental power* is closely connected to cognitive maturation. In the following, I will elaborate the specifics of the three features and explain how they connect to the findings within the present thesis. Table 4-1 (p. 153) will then give an overview of the properties, facets and dimensions of the three powers.

4.3.1 Willpower

By definition, *willpower* is the human ability to exert one's will over one's actions. As such, it relates to human attributes such as determination,

decisiveness, inner firmness, resolution, persistence and self-control. Casually speaking, willpower is a “want-to-do” feature. Though research in psychology has revealed that genetic disposition is believed to have an impact on these traits and in this respect *willpower* is to be regarded as a component that can to a certain extent not be influenced, there is reason to believe that it also holds a substantial potential of direct human influence. It is especially noteworthy that despite considerable effort directed at identifying the specific genes that contribute to individual differences in personality, “to date these efforts have not produced confirmed and replicable findings” (Bouchard & McGue, 2003: 26). Given the lack of a heterogeneous set of recent findings and with reference to a number of reviews of earlier studies, Bouchard & McGue argue that genetic influence on personality trait variation ranges between 40 and 55 percent. They eventually conclude that “there is a strong consensus that common (shared) family influence on personality traits is very close to zero” (Bouchard & McGue, 2003: 37).

Within the 3-Power-Model it is assumed that willpower expresses the human being’s self-regulatory and self-management skills, and these can to a large degree be consciously controlled. In addition, we must consider that there seems to be a subtle interactive relation between will, action and goal. The more demanding and sophisticated the goal, the more intricate is the action-component and the more volatile the will-component. Moreover the interaction between these modules is subject to diachronic variance. This means that the specific conscious influencing factor at the beginning of a certain task may change over time and adopt a series of wholly different content structures. Learner attributes such as setting goals, planning out, launching an action and following through are never static.

With regard to foreign language learning, especially when exposure is voluntarily based, as is the case with most adult language learners who are out of school or university, the target may well be considered as

ambitious and difficult to achieve. Following through requires effort and perseverance. This is even more so, when the target language does not allow any linguistic or conceptual reference to the mother tongue or other previously learnt languages, as is the case in the present research project. In this project virtually each and every aspect of the linguistic features of the target language was unfamiliar to the participants. In a way, the learners immersed into a totally different world of sounds, morphological, syntactic and semantic structures. Not surprisingly, and as had been anticipated at the outset, there was a certain drop-out rate. Though each participant had started out with a very high level of motivation, the *willpower* component had very soon shown its power of impact. How this impact evolved across and also within the three age groups in the course of the three-month learning period will be explained in Chapter 6.1.2.

4.3.2 Brainpower

The New Shorter Oxford English Dictionary (Brown, 1993, Vol.1: 273) very briefly defines the term *brainpower* as *mental ability* or *intelligence*. So on the one hand it is understood as a predisposition of the mind which governs reactions to stimuli and very generally touches upon how the human mind copes with input, and on the other hand it relates to sagacity and the quickness or superiority of comprehension.

Within the framework of this study, I will take the above definition a step further and connect it to neurological factors that arise when viewing brainpower from a diachronic perspective. Generally speaking, *brainpower* is a “can-do” property, and it is primarily biologically conditioned. Cognitive neurosciences suggest that there are several variables that influence and determine our (language) learning ability and processing quality. Cabeza et al. (2005) provide stunning insights into the dynamic interplay between neurobiological and cognitive processes across the life span. In their seminal book on cognitive neuroscience of aging, they maintain that despite a decrease in volume especially of frontal and hippocampal

structures (which are responsible for higher order cognition), the brain appears to retain a certain amount of residual plasticity, and they continue that it may even “remodel or reorganize activation patterns and neural networks or partially mitigate the effects of the decreasing integrity of the aging brain” (Cabeza et al., 2005: 10). This statement is consistent with the findings of other researchers as discussed in Chapter 3 of the present thesis.

Beyond doubt, genetic disposition is a crucial pre-requisite. A further decisive criterion is brain plasticity in the course of a human’s life span. It is tightly linked to the phenomenon of neurogenesis, the birth of nerve cells in the brain (see Chapter 3.2.4). Another important issue is the maintenance factor. Mental gymnastics plays a prominent role. Memory-enhancing elements such as an enriched environment, constant stimulation and exercise and explicit learning must also be seen as tightly connected to *brainpower*. In other words, central issues in terms of lifelong learning are “how malleable is the human brain?” and “how does this malleability relate to new challenges, practice and exercise?” (see also Chapter 3.4.2)

Altogether, all the above mentioned aspects of *brainpower* are to a certain extent beyond human control. We cannot influence the basic structure of our mental abilities, and it may be assumed that we have only a very limited scope of control mechanisms regarding plasticity. It thus seems that we can influence our intellectual capacity by applying *train-the-brain-measures*, even though there will always be the underlying cause of genetic predisposition as a constant. Blakemore & Frith (2005: 123) hold that “there is enormous capacity for change in the adult brain, limited only by the natural decline of old age”. This statement must be seen in close connection with the gradual decline of auditory and visual senses. Along with their statements that “the hippocampus is known to remain plastic well into adult life” (p. 126) and “brains change according to use” (p. 129), and

“there is no resting on your laurels when you have achieved a high degree of skill” (Blakemore & Frith, 2005: 129) they not only refute the *Critical Period Hypothesis* but also suggest that it is essential to keep on learning throughout life.

Although the present study suggests that the *brainpower* component is a decisive factor in the process of learning a foreign language, the determination of its exact impact is not possible. From what neuroscientific research has revealed to date, at least we can conclude that progressing age does not foreclose our capacity to learn foreign languages effectively. Even though research on the development of the human brain is still scarce as this research relies mainly on post-mortem brains, the longstanding dogma that we are born with a certain amount of brain cells and new ones cannot develop, seems to be obsolete. Independent statements by Eriksson, Gould and Kempermann maintain that nerve cells are renewed in certain areas of the human brain throughout life (see Chapter 3.2.4). With reference to studies conducted by van Praag et al. (1999), Blakemore & Frith point out that despite an undeniable loss of brain cells over the years “new research shows that there may be ways of replacing at least some of the lost cells in some brain regions” (Blakemore & Frith, 2005: 136). With this statement they emphasize the importance of continuing exercise and repetition, a stance that is largely supported by current neurolinguistic and neurobiological research (Ge et al. 2007; Hedden & Gabrieli, 2004; van Praag et al., 2005).

Frederic Vester, who deals with the question of how the brain learns and when it maroons us, believes that cognitive performance of adult learners can be enhanced by mental training, multi-level stimulation and repetition. He advocates that

> Erst wenn mehrere Synapsen aus möglichst vielen Gehirnbereichen gleichzeitig angeregt werden, löst dies in der Zelle die Kaskade von Prozessen aus, die nötig ist, um den elektrischen Schwellenwert dauerhaft zu senken und die spätere Aktivierung

> dieser synaptischen Verbindung, also das Erinnern, zu erleichtern. (…) Wie wir wissen, sollten wir alles zu Lernende, also jede neue Information, mehrfach wiederholt aufnehmen. Sie muss wiederholt über das Ultrakurzzeit-Gedächtnis angeboten werden. (Vester, 2007: 89)

Singleton & Ryan also suggest that cause-effect relationship between brain and language may be bidirectional. They argue that "new learning (…) can induce striking new changes in the brain region related to the learning of the new task", and they cite literature that describes

> brain development in terms of an overlapping and interconnected series of multi-modal additive and regressive neural events, noting that these neural events may drive or alternatively reflect developmental behaviours such as motor development, social and emotional development, intellectual development and language development. (Singleton & Ryan, 2004: 155)

Based on the findings in the present research, I fully share their belief that the cause-effect relationship between brain and foreign language learning must be seen as much more persuasive than the *Critical Period Hypothesis*. This view is also consistent with Blakemore & Frith's emphasis of the importance of using the aging brain in unfamiliar ways to enhance the formation of new connections when they maintain that "more and more evidence is surfacing to validate the idea of use it or lose it" (Blakemore & Frith: 2005: 137).

4.3.3 Instrumental Power

With reference to foreign language learning, the term *instrumental power* is a wholly new concept. Per definitionem *instrumental* signifies "serving as an instrument or means to achieve a particular end or purpose" (Brown: 1993: 1383f). In combination with the word 'power' which describes a defined mental faculty, capacity or ability, the concept in its literal sense describes "the ability to apply specific means to reach a certain goal". The word combination also comprises the notion of *functionality* and both consciously and unconsciously *controlled influence*. In other words, within

the context of foreign language acquisition, *instrumental power* functions as a metacognitive and metalinguistic vehicle that influences the learning process. As such it is closely connected to cognitive maturity and the reservoir of accumulated knowledge, know-how and skills. Older learners often have a higher level of problem solving abilities and they tend to have an advantage in metacognitive knowledge and experiences. This view is shared by De Keyser, who explains the foreign language learning process against the background of the implicit/explicit learning dichotomy. In his explanation of observed differences in strategy and success between children and adults, DeKeyser argues that in the foreign language acquisition process adults can use their analytical abilities (though these may vary widely) and "learn faster because their capacities for explicit learning let them take short cuts" (DeKeyser, 2005: 335). This precondition relates to earlier learning experiences and to a large part derives from their previous foreign language learning record. Depending on previous foreign language learning experience, metalinguistic awareness may be more developed at an older age. Over the years, learners tend to automatize certain skills and store learner strategies without even being aware of it, which suggests that conscious individual influence is limited. Taking this into account, there is reason to believe that, as Lightbown and Spada put it – "older learners may be able to make better use of the limited time they have for second language acquisition" (Lightbown & Spada, 2006: 74). Lightbown & Spada furthermore indicate that

> cognitive psychologists working in an information-processing model of human learning and performance see second language acquisition as the building up of knowledge that can eventually be called on automatically for speaking and understanding. (Lightbown & Spada, 2006: 39)

Within the field of foreign language learning, metacognitive knowledge is the building up of knowledge about language in general and in specific. According to Flavell, metacognitive knowledge implies "stored world knowledge that has to do with people as cognitive creatures and with their

diverse cognitive tasks, goals, actions, and experiences" (Flavell, 1979: 906). It comprises a variety of aspects that have led to a considerable amount of confusion. Jessner (2006: 40f) points out that it is rather difficult to get a clear picture of research on metalinguistic awareness, as there is a high degree of conceptual and terminological variation. She argues that this is not only due to different scientific backgrounds and orientations, but it is also linked to the fact that scientists of different countries use these concepts in their proper languages. Jessner furthermore points out that quite evidently the lack of a systematic use of different signifiers calls for terminological clarification. Her proposal to follow Masny's (1997) suggestion of distinguishing between *language awareness* that is "driven mainly by applied linguistics theory and pedagogy" and *linguistic* or *metalinguistic awareness* that is "grounded in psycholinguistic and cognitive theories" (Jessner, 2006: 43), seems an appropriate means of approaching and explaining metalinguistic aspects within the present research.

Instrumental power as it is conceptualized within the *3-Power-Model,* refers to the notion of the learner's ability to exploit his/her knowledge about language through reflection on and manipulation of language, which is consistent with Masny's notion of metalinguistic awareness. It is closely linked to cognitive maturity and the ability to make use of one's conscious and unconscious methodological language learning potential. As such, instrumental power is of limited individual influence. The learner, when exposed to a new foreign language, draws on a variety of previously set up tool boxes comprising conceptual, strategic or systematic abilities. The learner's successive speech processing steps from perception via monitoring on to production are conditioned by the availability of familiar concepts and experiences. Depending on the number of languages learnt and the proficiency achieved, the language learner may boost his or her learning capacity without being aware of it. To put it in a nutshell and expressed in casual terms, *instrumental power* draws on the learner's

wealth of life-experience and holds efficient self-dependent action potential. It builds on conscious as well as unconscious “know-how-to-do” features. The present study examines the impact of these features on the different adult age groups and opens up new perspectives for understanding and evaluating multilingualism (see Chapter 6.3.1.2).

The following table lists the properties and dimensions of the three powers and gives detailed account of their inherent and actional features.

WILLPOWER	**BRAINPOWER**	**INSTRUMENTAL POWER**
the *want-to-do* feature	the *can-do* feature	the *know-how-to-do feature*
► primarily action-oriented	► primarily biologically conditioned	► primarily building on accumulated knowledge
inherent features:	***inherent features:***	***inherent features:***
▪ self-discipline	▪ genetic disposition	▪ cognitive maturity
▪ conscientiousness	▪ brain plasticity	▪ LL experience
▪ assertiveness	▪ neurogenesis	▪ conscious level
▪ goal-orientation	▪ sensory skills	▪ unconscious level
▪ perseverance	▪ perceptive faculty	▪ metacognitive inventory
▪ self-management & self-regulation	▪ memory faculty	▪ strategy inventory
actional features:	***actional features:***	***actional features:***
▪ setting goals	▪ gathering input	▪ general life experience
▪ planning out	▪ language decoding	▪ previous languages
▪ launching actions	▪ transforming patterns	▪ explicit memory strategy
▪ carrying out	▪ language processing	▪ implicit memory strategy
▪ following through	▪ language encoding	▪ progress monitoring
▪ striving for achievement	▪ proactive transfer	▪ strategic adaptation

Table 4-1: Properties of the 3-Power-Model

4.4 Résumé

Innovation is not the product of logical thought, although the result is tied to logical structure.
(Albert Einstein)

After having surveyed a selection of what I consider to be the most significant research approaches within the vast and multi-levelled field of foreign language learner-related influencing factors, it soon became clear that, although all these approaches had looked into a multitude of different aspects in notable and perceptive ways, the advanced-aged learner and his/her peculiar specifics and needs had been somehow overlooked. On the question of age-related implications Singleton & Ryan rightfully state that there are "very few simple truths concerning the role of age in language acquisition" (Singleton & Ryan, 2004:226). I share their view that instead of talking about *an* age factor we had better think in terms of a *range* of age-related factors. In face of the state-of-the-art of adult foreign language learner research as presented in Chapter 2, I furthermore agree with Mathews-Aydinli who claims that "the research studies that do exist often lack a theoretical base and thus remain disconnected from each other" (Mathews-Aydinli, 2008: 199). To bring the adult language learner out of a kind of "also-ran" role and in the attempt to fill the vacuum of a distinctive scientific approach to the special characteristics and subsequent requirements of older foreign language learners, it seemed of key importance to develop a hypothesis that would not only account for the findings of the present research project, but would above that serve as an instrument or means to broaden the scope of age-related approaches and permit selective scrutiny of this learner group. The need of a better understanding of the intricate interaction of age and personality features of the adult foreign language learner resulted in the conceptualization of an appropriate theoretical frame. The *3-Power-Model* has been implemented as a theoretical framework for a higher level of transparency as regards the intricate and volatile cause-effect relationship between age and

psychological, genetic, biological as well as cognitive dimensions. With its claim to distill the essence of what I contend to be the most pivotal features of the adult L2 learner and the arrangement of these attributes in a structured pattern (see Table 4-1) that distinguishes the *inherent* level from the operative or *actional* level, the model is believed to provide a framework of avail for the investigation of future adult-specific learner needs.

Chapter 5
THE STUDY – SETTING, DESIGN, METHOD, PROCEDURE

Learning a second language may challenge the very foundations of thought.
(Bialystok & Hakuta, 1994: 110)

5.1 Historical Dimensions of the Research Focus

The topic of the present thesis is not only one of the few truly popular issues of the discussion of lifelong learning, but it is also hoped to become one of the truly perennial issues as regards the adaptation of individual foreign language learner needs to demographic change. Over the past decades the age factor has been a constantly recurring theme of language acquisition. The connection between age and language learning has been commented on in many ways and from a variety of different angles and theoretical perspectives. Professionals and researchers involved in foreign language acquisition have set out to find theoretical explanations to a broad spectrum of questions connected with this issue, so that today we can resort to a vast range of viewpoints and an array of scientific conclusions. Each of these set out from very specific research questions focusing on very specific target groups with very specific and distinctive properties. What they all have in common is their quest for a better understanding of what underlies the mechanisms of learning and the revelation of the unique characteristics of learner language. What makes them all distinct is their investigative focus that must be seen as intrinsically tied to the sociopolitical context of their time of emergence. There is always a historically conditioned dimension to scientific needs and their affiliate findings and expertise. Each century and each decade has its specific qualities and faces its very proper and specific challenges.

As a consequence, individual difference research in second language acquisition has a considerable history in applied linguistics. Interest in individual differences has grown since the 1970s and become a major area of second language acquisition research. Educational scientists who view learning from a social-constructionist perspective have approached this topic in a variety of different ways, using a variety of different research instruments. Be it language aptitude, learning style, motivation, anxiety, personality, learner beliefs or learning strategies – all these individual difference factors have attracted more and more attention in an era of changing perspectives towards the language learners and the way they are viewed. Alluding to Horwitz's characterization of these changes (Horwitz, 2000), Rod Ellis outlines this tendency as follows:

> Whereas earlier they were seen in absolute terms, as either innately endowed with or lacking in language learning skills, in more recent research, they are characterized in more relative terms, as possessing different kinds of abilities and predispositions that influence learning in complex ways. (Ellis, 2004: 525)

Quite evidently the shift from universalist to differential approaches must be seen in close connection to the prevalent spirit of the time – the postwar emphasis on freedom and individuality. Ellis, who gives an instructive account of the most frequently used instruments in researching individual difference factors, critically addresses the fact that "research into individual difference has relied predominantly on quantitative methods", a condition that he considers as "unfortunate" (Ellis, 2004: 526-529), clearly favoring a "hybrid approach" as suggested by Spolsky (Spolsky, 2000). The present study which is qualitative in method, is meant as a step towards balancing Ellis's critical remarks regarding the over-reliance on quantitative methods.

Since the late 1980s, when the process of transformation of local phenomena into global ones started to become a matter of world-wide relevance, there has been a slowly proceeding, though clearly visible shift

in the general picture of foreign language acquisition research. The new dimension of research approaches was the discovery of a wholly new target group on a broader scale. Apart from the research on foreign language acquisition of children and adolescents, the specifics of adult foreign language learners with an initial special focus on the immersion environment became more and more interesting for researchers. Swain & Lapkin who conducted early research in Canadian immersion programs with special focus also on what they call 'adult' second language teaching, suggest that older may actually be better:

> older learners may not only exhibit as much success in learning certain aspects of a second language as younger learners, but they can also accomplish this learning in a shorter period of time than can younger learners.
> (Swain & Lapkin, 1989: 150)

However, for them "older" meant secondary rather than elementary students.

This development is to be seen in close connection to the immigration flow especially in the United States and the follow-up questions the cultural and linguistic integration brought to the fore (for more research see Genesee, 1987). A wide range of languages and purposes served by immersion worldwide is presented and discussed in Johnson & Swain (1997). A recent volume edited by Fortune & Tedick (2008) provides an overview of immersion education from beyond its starting contexts in Canada and Florida and shows how it has been adapted to many new contexts in a host of countries or in multilingual environments with variable linguistic situations.

As the globalization process continued and job requirements changed accordingly, again a new group of foreign language learners appeared on the scene: The adult employee who is required to flexibly move around in this globalized world and to be able to collaborate and communicate with

locals all around the globe. In addition to that and due to continuously falling birth rates and rising life expectancies he/she is and will be faced with a prolongation of active working life and thus rising demands in terms of lifelong learning. These are the major issues we have to consider when assessing present-day adult learner requirements and developing adequate curricular and administrative avenues. This is the new type of language learner that has so far received only little scholarly attention and will have to be incorporated into future methodological considerations within the domain of foreign language acquisition research. The present study is a determined step towards that direction.

5.2 Background to the Study

> *Each of the world's languages gives its speakers a different set of lenses through which to observe and analyze the world.*
> (Longatan, 2008: 2)

One message from world demographics is that learning foreign languages is immensely important for social and practical reasons. Today throughout much of the world being able to speak at least two languages, and sometimes three or four, seems to be increasingly essential to function in society. It promises to favor active and effective participation especially in labor market development. When in their 1982 publication Krashen et al. argue that "in business affairs, foreign language needs loom large", indicating that "economic futurists say that knowledge of a foreign language will be among the most sought after skills for business people from the 1980's on into the twenty-first century" (Dulay, Burt, Krashen, 1982: 9), they wisely anticipate the urgent need to adapt to a socio-political development of major importance at a time when the world had just arrived at the threshold of the "global village" and the "World Wide Web". Their forward-looking investigative approach regarding the importance of knowing foreign languages, however, goes beyond this

essential economic insight, also picking up the equally significant psycholinguistic aspect, when they say:

> Survival language skills of business needs are not the
> only compelling reasons for learning a second language.
> Neurolinguistic research is beginning to suggest that people
> who know more than one language make use of more
> of the brain than monolinguals do.
> (Dulay, Burt & Krashen, 1982: 9f)

With this statement they refer to studies conducted by Albert and Obler (1978), who in their review of a series of post-mortem studies on polyglot brains (from people who spoke three to twenty-six languages) had found that certain parts of these brains were especially developed and markedly furrowed. This will be another overarching future issue for joint research in the fields of education and brain sciences.

In their attempt to study as complex a system as the “learning of a second language”, Bialystok and Hakuta who quite frankly concede that “it would be overwhelmingly difficult and ultimately unproductive even to attempt to study a system of this complexity in its entirety” (Bialystok & Hakuta, 1994: viii), take us a step further, adverting to the fact that “second language learning (…) is both language learning and concept learning” (Bialystok & Hakuta, 1994: 108).

To me this body of thought presents the ideal link to the background story of the present thesis. On the one hand, we are in the midst of sociopolitical and cross-cultural developments that urgently call for the promotion of foreign language learning as foreseen by Dulay, Burt and Krashen. On the other hand,we are in the lucky position that thanks to sweeping advances in brain research throughout recen t years we may get a better insight into the complex relationships between learning processes and brain activity, a topic that Albert and Obler had turned to in the late 1970s (see previous page). And last but not least, there is good reason to believe that Bialystok & Hakuta’s stance that learning a new language changes the way

concepts are organized in our mind firmly, supports the theory that we ought to go on learning, no matter how old we are, no matter where we stand. It will help us broaden our horizons, it will help us preserve our mental capacity, and it will help us stay connected with the fast-paced developments of society. In technical terms one might say, it is a kind of 'individual facility management' that promises sustainability and keeps us prepared for future challenges.

Having been involved in adult language teaching for many years and in face of the new educational demands, my main concern has developed towards the investigation and implementation of effective learning methods, both in-class and out-of-class. Methods, that would not only take into consideration the fact that there is generally only limited time for adults to attend to learning, because they primarily have more pressing obligations, but also the phenomenon of a variety of individual constraints, such as the age aspect, that might hamper learning success. The spectrum of external circumstances the adult language learner is generally exposed to is manifold. These are circumstances that I think have so far been neglected by L2-researchers, though they quite often have an impeding influence on the learning success: Due to everyday life obligations that take first priority such as the job or family, flexibility in terms of time-management for adult learners in employment is fairly restricted. There is good reason to believe that traditional course programs based on rigid and predetermined patterns do not any longer meet the requirements of today's fast-moving society. Furthermore I purport that individual learner needs are becoming more and more specific and ask for flexibility regarding learning approaches. Quite obviously there is need for a re-thinking process and for action. It is no longer people who have to adapt to learning measures, but it is learning measures that have to adapt to society's changing needs. A first step towards this goal is a corresponding adjustment in terms of flexibility of time and space. A feature that is inherent in self-study programs.

To be able to better understand an adult's approach to and his/her struggle with a totally or fairly foreign language, I decided to submit myself to a self-experiment and set out to investigate the field of new language families myself. I started to learn Japanese at the age of 47 and after that turned to Chinese-Mandarin. With a full-time job that involved a highly irregular working rhythm I had to look for learning options that would facilitate the best possible outcome with the least possible corset in terms of time and spatial dependency. This is how I came to examine and test a variety of self-study programs and thus became acquainted with a wide range of learning materials – from bad to acceptable and reasonable. The concentrated exposure to different self-study-programs along with the possibility of intensive scrutiny and comparison eventually influenced the selection of the study program the present thesis builds on (for details see Chapter 5.6.1.2).

Apart from the benefit of having reached a beginner's survival level of proficiency in these new languages, this first-hand experience provided an insight into the processes and difficulties of learning a foreign language at an advanced age with only limited time. It was hard work, and learning did not come as easily as in adolescent years in terms of memorizing words and phrases as well as coping with totally unknown grammatical, syntactic and semantic structures. Attainment was not to be equated with talent, as many would argue. Previous experience in language learning[88] and know-how in terms of teaching methodology certainly may have helped, but definitely the main parameters for success were my motivation, my interest and my determination. I came to the conclusion that with the right tools and a committed attitude, learning a foreign language is an attainable goal, regardless of age. But of course this was but an assumption based on my individual case and a hypothesis that was scientifically not tenable. It was then that I realized that in order to truly come close to a scientifically meaningful and reliable proposition, I needed to conduct a research study.

[88] Other foreign languages I had learnt before are: English, French, Spanish, Italian.

This is why – on the basis of my vital interest for language teaching and learning as well as my own experience in that field - I decided to embark on investigating the rather virgin territory of foreign language acquisition in advanced age. Against the background of sparse studies and conflicting views of the impact of age differences on foreign language acquisition of adults, I hope to be able to contribute to a better understanding of this linguistic field.

5.3 Purpose and Significance of the Study

The purpose of this study is the exploration and inspection of the many issues that surface when we leave the broader perspective of age-related SLA-research (that comprises primary, secondary and tertiary education) and narrow our focus down to the very specifics of the working adult foreign language learner as he was characterized in Chapter 3.5.2. Based on the hypothesis that older learners take a different approach to language acquisition than their younger peers, research questions had to be formulated and a method developed to provide reliable findings. It was assumed that neurobiological disadvantages might be compensated by maturity-related characteristics, such as a more developed aptitude in terms of measuring and monitoring attainment or a more sophisticated strategic and operative learner approach. In other words, the purpose of the study is to understand the intricate relationship between the age of acquisition and the different factors that might foster or hamper individual learning success. It also aims at identifying traces of mainstream tendencies across specified adult age groups that may boost respective future research endeavours and in the long run allow for cutting-edge measures in terms of study program design. Through that it is hoped that the compilation of findings and conclusions may lead to interesting implications as regards future age-related questions and theories.

On the exploratory level, the study investigates the state-of-the-art of linguistic research on age-related foreign language acquisition and how the findings to date tie in with the data evaluation of the present study. In that the interpretation of the final results of the present study is meant to contribute to and extend the scientific debate of the *Critical Period Hypothesis* and the *optimal age discussion*. It is meant to promote and help develop further studies with a sharper focus on adult-specific learner characteristics that may produce more specific and accurate research questions.

Theoretically, the study, situated in the broad context of foreign language acquisition, will contribute to the international literature and theory building on age-related learning aptitude. So far little research has touched upon the advanced-aged language learners' characteristics, with their advantages as well as disadvantages. The integrative reference to socially conditioned aspects as well as neuropsychological facets will help clarify the picture of present-day requirements in terms of learning across the life-span. As such the project is also to be regarded as a conceptual framework for *lifelong learning*.

At a more practical level, it is hoped that the research findings will sensitize designers and authors of language learning programs to age-related particularities within the field of foreign language acquisition, also considering parameters that lie outside the limits of the classical linguistic domain. The study will provide valuable information on skill and comprehension dimensions across the adult life-span and the feasibility of working-life-embedded learning measures. As such the study is not only meant to encompass and merge linguistic, socio-political and neuroscientific realities, but it may also pave the way for insightful theories and more efficient strategies in the years to come.

5.4 Research Questions and Design of the Study

To the best of my knowledge the present study is the first to exclusively focus on the adult foreign language learner group in a formal learner setting. The overarching goal which results from this position was, to stake out a field in which research into the intricate interaction of adult learner specifics could take place. In a systematic effort to make headway in this direction, specific research questions were drafted and cornerstones of a research program laid. The research questions as formulated in Chapter 1.4. form the foundation of the general layout of the research project. Given the interdisciplinary approach that comprises psycholinguistic, neurobiological and social aspects, the following issues took center stage: Can the aging brain learn and is learning an unfamiliar language system an attainable goal? Other parameters that were to be investigated are the influencing variables of neurobiological and maturity-related as well as intellectual aspects. In order to be able to elaborate possible distinctive features of age-related differences across the whole body of adult foreign language learners, it was essential to split the subjects into three groups and compare their performance.

The present empirical study was conceptualized as a qualitative study of age-related aspects and learning results in autodidactic foreign language learners of different adult age groups. 30 subjects split into 3 age groups with 10 learners per group participated in the project. Group A was aged 20 to 32, group B 33 to 45 and group C was between 46 and 69. There was no upper limit to the 46+ group, as in light of the interdisciplinary quest in terms of demographic transition, the main purpose of the study was to focus on the learning potential of the more advanced aged learners. Comparative in its layout and performance, the study was designed to reveal the most significant distinguishing factors of the three groups in terms of memory aspects and learning aptitude, with – as mentioned above – the main emphasis on the older-aged group.

5.5 Test Persons and Learner Profile

In order to provide for a homogeneous profile structure, test persons were primarily recruited from a specific professional line, which was the aviation business. This choice not only offered wide-ranging conformity in terms of working conditions and respective off-time patterns (which are highly volatile), but it also promised to evoke a high degree of shared alertness in terms of motivation and utility factor. All subjects participating in the study were pilots, pursers and flight attendants operating on long-haul flights – except for three, one of whom had, however, previously worked in this segment. Their most significant common denominator were time management aspects. They were equally exposed to a high degree of irregularities such as time-zone differences, change of climate, exposure to jet-lag and sleeping disorder. Another joint aspect was the possibility of occasional exposure to the target language in real life situations. In Chapter 5.6.2, which gives a step-by-step account of the implementation phase of the empirical project, I will refer to the recruitment of the subjects, and the concomitant learner-relevant procedures such as the distribution of the study material, the instructions concerning the study phase and the final test phase. The green section of Table 4-2 (p. 167) provides an overview of these steps.

5.6 Organization and Project Phases

The organization of the study comprised a number of strategic and administrative steps, which fall into three categories or phases: First, the *preparation phase*, which comprises the choice of the target language, the selection of the study material, the organization of the copyright, the reproduction of the learner CDs, the design, compilation and proof-reading of the supplementary learner material, the design and reproduction of the questionnaires and study diaries, and the design and production of the final tests. Second the *implementation phase*, which includes the recruitment of subjects, the distribution of the study material, the study

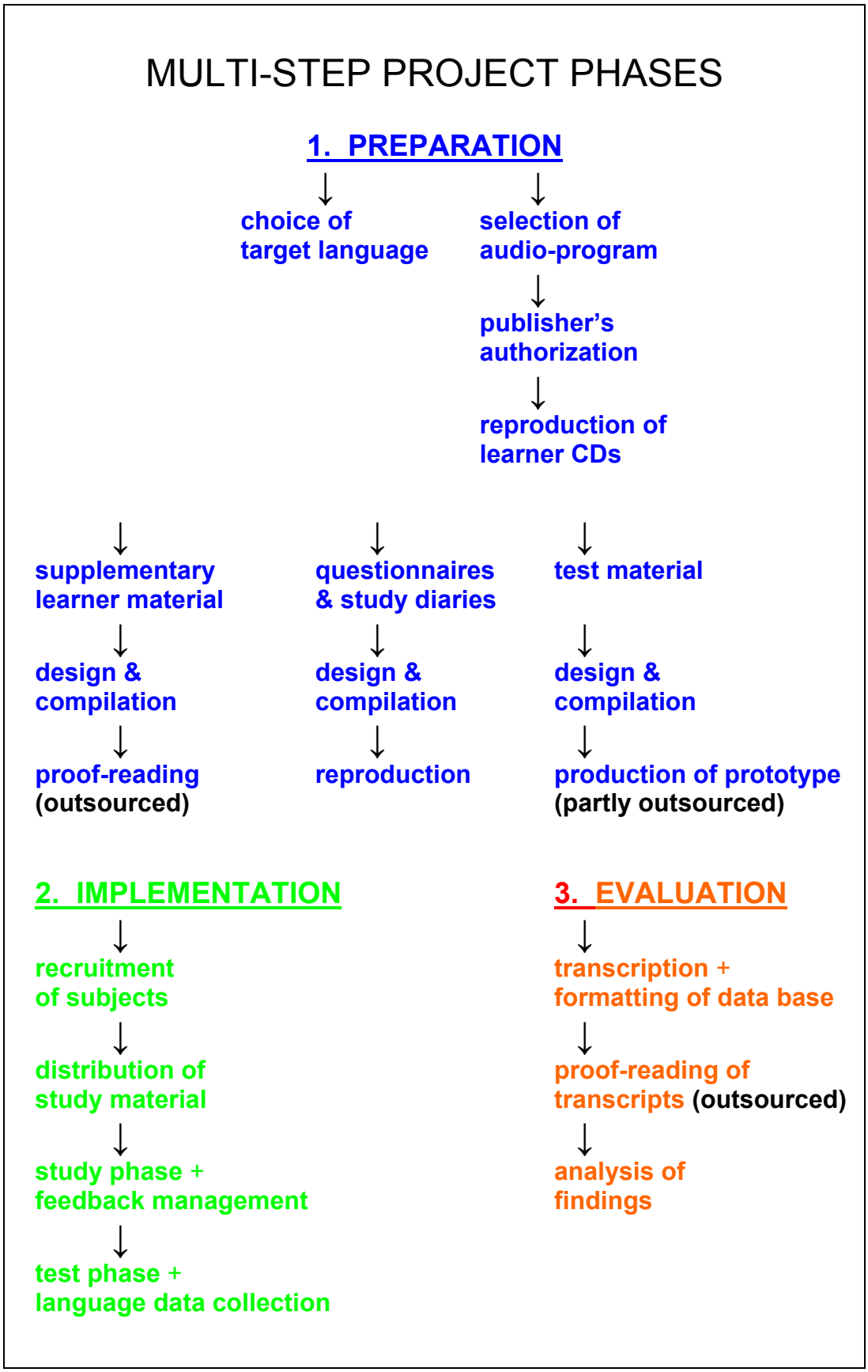

Table 4-2: Multiple-step project phases

phase, and the final test. Third, the *evaluation phase* with the transcription and proof-reading of the data base and the analysis of the findings. Altogether these project phases covered a time-span of approximately two years. Table 4-2 (previous page) gives an overview of these multiple-step project phases.

5.6.1 Preparation

5.6.1.1 Target language

An important aspect to allow for scientifically verifiable results from which to set future directions for adult foreign language teaching concepts was the selection of the target language. It was essential to make sure that the participants' point of departure was homogenous. None of the participants should have any previous knowledge of the target language. Nor should they have been in contact with any other language within the corresponding language family. Starting out with this proposition, and as it was to be presumed that rudimentary knowledge of one or the other tongue of the large Indo-European language family might be commonplace for potential test persons, the Sino-Tibetan language family seemed to be a safe terrain. It was to be made sure that prior language experience be ruled out.

Within the context of a significantly growing focus of Western economies on the Chinese market, Chinese Mandarin seemed to be a choice that might attract the interest of prospective participants. As the world is becoming more and more integrated, contacts between China and the rest of the world have also become common. This tendency will continue to be of significance in the foreseeable future. Moreover the population in China accounts for about 1.3 billion, which is about one fifth of the total population of the human race. Against such a background and considering the fact that the linguistic features of this language family stand in sharp

contrast to the Indo-European languages, this choice promised to meet the demands of a perfectly balanced point of departure for everyone.

Chinese Mandarin that is also referred to as “Pǔtōnghuà” or “common language” is primarily spoken in and around the capital city of Beijing. As the Chinese language as such splits up in numerous language groups and dialects, the use of Mandarin has been widely promoted as an instrument of national unity. Chinese writing adopts a logographic system with characters that are partially morpho-syllabic. Although Chinese speakers from different parts of the country may not be able to carry out a meaningful conversation in their own spoken language, they can easily communicate in writing, which creates a common, solidifying and profound cultural bond among all Chinese dialect speakers. The meaning attached to each character is the same for each of the Chinese languages and dialects, however, there are considerable lexical and phonological variations across the country.

Spoken Mandarin, like all Chinese dialects, is a tonal language with four basic tones and one neutral tone. Since the meaning of a word changes with each change in tone, it is important to pronounce the syllable in the correct pitch of voice. Thus a syllable such as “ma” can be pronounced in four different pitched tones, each time conveying a different meaning. Figure 3-12 indicates the pitch level at which the four tones are spoken:

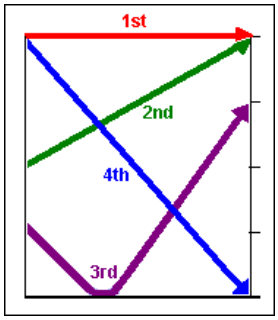

Figure 3-12: The four tones

mā - (first tone) means “mama, mother”
má - (second tone) means “hemp, flax”
mǎ - (third tone) means “horse”
mà - (fourth tone) means “to curse, to scold”

The participants' learning target of the present study was solely directed at spoken Mandarin. The Chinese writing system, which is a collection of ideograms with no phonetic proposition, was not included in the study. Instead the phonetic script system of "pīnyīn" was used. Pīnyīn uses Roman letters to represent sounds in Standard Mandarin. Learning the characters would have gone way beyond the scope of possibilities within the set time frame. However, in order to enable achievement of the learning target, a pīnyīn script seemed to be indispensable. Sun (2006: 21) and Ross & Ma (2007: 4) provide a short introduction into the romanized Chinese spelling system (hànyǔ pīnyīn fāngàn, short: pīnyīn) which was adopted in the People's Republic of China in 1958 in order to facilitate the promulgation of pǔtōnghuà (common speech) all around the world[89].

5.6.1.2 Audio-program in use

For a short-term study period that would guide learners from zero knowledge to a reasonable and basic command of the foreign language, it was crucial to select an efficient program. Here again it was my personal experience that would help and finally influence the selection of what I considered an appropriate choice to guarntee feasibility. Having worked through several different self-study programs in different languages myself (French, Spanish, Italian, Japanese, Chinese), I had had the opportunity to examine and test them and get a profound insight into the quality of various best-selling and keenly promoted products[90]. As it turned out, they ranged from bad to acceptable and reasonable. In fact there was no single program that I felt would fully serve my purpose. This is why I chose one that I felt best met the requirements. Eventually I came to the conclusion

[89] For a comprehensive guide to the linguistic structure of Chinese-Mandarin, its pronunciation and tonal sound system, its morphology and its syntax, as well as its historical development and its intricate conceptual structure see: Sun, 2006 and Ross & Ma, 2007.

[90] Most of the tested FLL programs were American self-study-programs.

that most of the self-study programs on the market today are not suitable for efficient and effective adult language learning. On the contrary, they are very often of a rather discouraging quality, thus raising the drop-out rate and supporting the widespread attitude that older language learners cannot be successful. The main dilemma certainly is the overload of information and the presentation of the learning material. It is my true conviction that the question “are adults able to learn a foreign language?”, had better be replaced by the question “does the learning material on the market meet the adult learners’ demands”?

All in all, the study program was required to comprise features that would not only provide a best possible methodological and didactic layout, but a program that would also guarantee independence in terms of time and space. The beneficial potential of learner autonomy, as discussed in Benson’s seminal volume and the “pressing need for data-based research that will ground the construct of autonomy in everyday practice” (Benson, 2001: 224f) additionally supports this claim. As has been mentioned earlier, this is why a self-study program was chosen.

Another desirable prerequisite was the “brain-activating-component”, a feature that would stimulate self-acting extraction processes as outlined by Spitzer when he talks about the mechanisms of learning. He says:

> Wie neuronale Netzwerke lernen auch Kinder dadurch, dass sie allgemeine Strukturen aus Beispielen selbst extrahieren. Regeln werden nicht durch Predigten, sondern anhand von Beispielen gelernt (Spitzer, 2000: 68).

The learning program of the present pilot study builds on this principle. The way it introduces and processes input heavily, leans upon Chomsky’s notion of there being an innate system, a Universal Grammar that is ready to self-reliantly extract essential rules from a limited body of information (stimulus-of-poverty), so that the language learner eventually knows what expressions are acceptable and what expressions are unacceptable.

The audio-program used for this study is an approved American autodidactic audio-program[91]. Based on its communicative method of instruction along with a well-balanced input-output ratio excluding vocabulary overkill, it was selected from among the current leading brands of the American foreign language self-study programs as being regarded as "most suitable and promising". Following a thorough evaluation of the chosen material, and in order to adapt it to the requirements of the present project (as it was found to be insufficient in various aspects), it had to be upgraded and supplemented with relevant supportive material (see Chapter 5.6.1.3). The original study program as edited by the publisher would not meet the requirements of an effective conduct of the study. These findings suggest a clear impetus to further the research and development of more adequate and high-performing learning materials.

The language learning program used in this study consists of 15 audio CDs with a one hour running time each. It is an approved American program with English as base language and Chinese-Mandarin as target language and comprises 30 units. Though the subjects' L1 is German, the use of English as base language did not pose any problems, an aspect that will be referred to further down. The length of each unit, just under 30 minutes, is the ideal time span for a concentrated learning task. As it is entirely based on listening and speaking skills, the most important criterion is to respond aloud to the tutor's instructions. There is a pause after each instruction, allowing time to reply. It is essential to the learning progress that the learner speak out in a normal conversational voice when asked to respond. Throughout the whole program active participation in thinking and speaking is required. The course unfolds in a perfectly well balanced way in terms of new input, repetition of the familiar and – most important – the continuous challenge to the brain to restructure all these elements in till then unknown ways. By neurobiological standards the program

[91] Pimsleur Language Program, Mandarin I, Second Edition, Simon & Schuster Audio, 2000.

comprises all those features that foster neurogenesis and thus constitute a strong link between brain science and education. It was therefore felt to be very well suited to the present study.

According to the publisher's recommendation, the allotted learning time amounts to half an hour per day, 30 days a month. With the additional guideline that the learner has daily contact with the language, he would then be able to work through the program in an efficient and successful way. As daily life of the participants would not allow for regular and routine learning intervals (and as the suggested approach had not even remotely proved to be viable for a full time employee in a previous trial run), the recommended learning period was extended from 1 to 3 months.

In principle the test persons' mother tongue[92] is German. They all have a good command of English, and Mandarin is new territory for them. As English was used as the source language, there was good reason to assume that direct translation from the mother tongue to the target language may be eliminated. Whether this was the case or not, will be discussed (though not exhaustively) in Chapter 6.3.2.3 (p. 236). Quite evidently, this presumed exclusion of direct interference of the mother tongue would offer an additional interesting feature to be more fully investigated in similar future research projects.

Once the program had been chosen, negotiations with the publisher[93] had to be conducted in order to get the authorization for reproduction of the CD-sets for each test person for academic use. In view of the high costs of

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92 Except for one test person; her mother tongue is English, however, the language used in everyday life is German.

93 I would like to thank Simon & Schuster Audio, 1230 Avenue of the Americas, New York, NY 10020 for their authorization to make 30 copies of the Pimsleur Chinese-Mandarin Level 1 Program for use in testing as part of dissertation studies at the University of Vienna. (Letter dated May 11, 2007).

the study program[94], the successful transaction was a crucial prerequisite for the launching of the project. After the copyright had been granted, the next major step was the reproduction of the learner CDs (15 CDs per subject).

5.6.1.3 Supplementary learning material

Along with the CDs, each test person received handouts. These are divided into two parts: First, an introductory sheet supplying information on the structure and layout of the course, along with the learning guidelines and instructions including an introduction into the tonal system. Second, the supplementary written learning material with essential words and phrases.[95]

The chosen language learning program - though in terms of listening comprehension and oral practice for good reasons rated the best - entirely lacks any kind of written material regarding the language input. Given these shortcomings in terms of visual aids, and to provide for full benefit, scripts comprising the entire language input had to be produced. I opted for this solution as on the one hand it is my conviction that learning a foreign language without any visual aid is generally a cumbersome endeavor and does not facilitate the learning process, and on the other hand I could refer back to my own learning experience with the plain audio program. It was especially this experience that rendered the production of supportive material indispensible. The compilation of references increased the window of opportunity regarding individual learner styles and preferences.

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94 Which would have amounted to approx. €10,000.

95 See Appendix 1 (Learner Instructions) and Appendix 2 (Samples of Learning Material).

The written learning material that I prepared prior to the study phase, comprises a chart of the new language input for each unit as well as a full vocabulary list. The "pinyin" system of transliteration, which is the official Romanization system of the People's Republic of China, has been used for this purpose. Based on the Roman alphabet and supplemented by tone marks, Pinyin is a phonetic system to help people familiar with alphabetic writing systems pronounce Chinese Mandarin. It was adopted in the 1950s and has gained wide acceptance in China and abroad in recent years. After compilation and prior to distribution, the material was examined and revised by a native Chinese linguist[96]. The proofreading was to warrant linguistic accuracy.

5.6.1.4 Questionnaires and study diaries

To gain a full picture of learner profile and performance, the data elicitation was rounded off with two questionnaires and 5 study diaries, one per set of 6 units. On the basis of Dörnyei's concept of the dynamic nature of learner variables (see Chapter 2.3.4.3), these three instruments were implemented to cover the chronological progress of learner self-concept: pre-actional, actional and post-actional. Apart from its informative value in terms of personal profiles, this was an essential step towards a comprehensive insight into learner beliefs and strategic procedures. In the absence of studies on the belief of older language learners (with an exclusive look at this learner group) a relevant questionnaire had to be designed from scratch[97]. In order to provide ample information, I embarked on the "more is better" strategy when designing the questionnaires[98], however, not all data were drawn on in the analysis. The two questionnaires are presented in Appendix 3.

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96 Mrs. Zhang Wei, Teacher of German and Chinese Studies, German Swiss International School, 11 Guildford Road, The Peak, Hong Kong, WZhang@gsis.edu.hk

97 I would like to thank '*market'* (Institut für Markt-, Meinungs- und Mediaforschung), Klausenbachstraße 67, 4040 Linz, for their valuable advice.

98 See Appendix 3 (Questionnaires) and Appendix 4 (Sample of Study Diary).

The pre-study (initial) questionnaire (henceforth: PQ) comprised 20 questions and had to be filled out at the outset of the study and before engaging in the learning process. On the one hand it focused on personal details (age, sex, education, profession, etc.), previous foreign language learning experience and expectations, targets and goals, on the other hand it was meant to throw a light on soft factors such as aspirations, motivation, preferred learning styles, previous experiences, expectations and related indicators.

The final questionnaire (henceforth FQ) included 34 questions and had a slightly different structure. Subjects were to fill it out just before taking the language tests. Its main focal points were: individual learning styles and strategies, metacognitive aspects, learner behaviour and coping styles, self-efficacy and self assessment, and quality monitoring. In other words, it was laid out to generate information about the test persons' experiences (time they spent on studying, practices they adopted, ups and downs, difficulties they ran into, a personal account on advantages and disadvantages of the self-study program, etc.) throughout the learning process. It also included a closing assessment, a short free-style account of learning experiences (expectations met, objectives achieved, pros and cons, etc.).

The two questionnaires are the principal source of the analysis of learner variables, such as learner beliefs, learning and cognitive styles, language learning strategies and student self-regulation. For reasons of transparent data elicitation, each question was assigned a code. In Chapter 6.2, which investigates the personal data base, questions of the initial questionnaires are referred to as PQ-1 through PQ-20, whereas questions of the final questionnaire are termed FQ-1 through FQ-34.

Parallel to the learning phase and after having finished a set of 6 units, the participants consecutively handed in the study diaries. Each study diary

comprised 7 questions. This tool allowed to keep track with each participant's learning progress and handle individual feedback management (see Appendix 4). The motivation factor was continually monitored across all three instruments.

This data collection was to permit a clear view of the learner profile, especially in terms of the abilities/propensities-dichotomy as outlined by Ellis in his paper on individual differences in second language acquisition (Ellis, 2004: 534ff.).

5.6.1.5 Test material

With reference to the research questions, the rationale of the test format was to provide a best possible insight into each subject's retentiveness, his/her oral fluency and listening comprehension. As the audio-program does not comprise any chapters that summarize the essence of learner input, suitable tests had to be developed. In terms of test design, one important premise was the coverage of some of the most significant speech samples, the other one structural compliance with the learner program and learning experience. In other words, the test layout should elicit learner achievement on a broad scale and correlate with familiar practice and exercises. For this purpose a Chinese native speaker was hired[99] with whom two different tests were produced on two separate prototype CDs. The goal was to expose the subjects to prosodic features similar to their learning experience (speech-flow, pauses) when taking the tests.

Test 1 was designed to investigate retentiveness. It comprised 40 sentences. Following the familiar model of the audio-study program, subjects were given whole sentences in English which had to be translated into Chinese Mandarin. There was a clearly defined pause after

[99] Mag. He Lihua, Johannes Kepler University, Linz, lihua.he@students.jku.at; Zhengzhou China, 450000, Nanyang Road, Dong 1 Street, Building 21-1#; email: XueXue0244@hotmail.com

each sentence during which subjects had to produce their speech sample. After the pause, the next sentence followed, so that the CD did not provide for individual deviations in terms of available time.

Examples:

1)
English speaker: Would you like to drink something?
--------- *pause for subject to produce speech sample* ---------
2)
English speaker: No, thank you, but I would like to eat something.
--------- *pause for subject to produce speech sample* ---------

Test 2 was designed in a wholly unfamiliar structure. It comprised an audio CD and a multiple choice answer sheet with two options each. This test was to determine listening comprehension. It consisted of 20 sentences each of which had two answer options. After listening to a Chinese sentence and repeating it (which was also audio-recorded), participants would have to tick a suitable respectively correct reply on the answer sheet.

Examples:

1)
Chinese speaker: Duìbuqǐ, qǐngwèn, nǐ huì shuō Yīngwén ma?
--------- *pause for subject to repeat sentence* ---------
Answer sheet: a) Huì, wǒ huì shuō Yīngwén.
b) Bú huì, wǒ bú huì shuō Yīngwén.
2)
Chinese speaker: Nǐ xiǎng zuò fēijī qù Xiānggǎng ma?
--------- *pause for subject to repeat sentence* ---------
Answer sheet: a) Xiǎng, kěshì tài guì le.
b) Qǐngwèn, děng yíhuìr.

5.6.2 Implementation

5.6.2.1 Recruitment of subjects

Simultaneously to the preparation phase I started recruiting prospective test persons mainly from among my own occupational field. The following

reasons accounted for this decision: Due to its comparative layout, the study had a kind of preset heterogeneous structure in terms of age (from 20 to ‘as old as possible’). As I considered a preferably homogeneous point of departure as beneficial in terms of explanatory value of learner performance, it seemed fundamental to compensate the aforementioned deficiency. As pointed out in Chapter 5.5, recruitment from within the “aircrew guild” promised a high common denominator in a variety of aspects. It was assumed that one of the most significant shared learner characteristics certainly was the motivation factor that was in turn believed to be tightly connected to the utility factor, as contact with the target culture at regular intervals is integral part of this profession. In other words the prospect of applicability was regarded to play a pivotal role.

Shortly before the scheduled study period, the ‘study packages’ (CDs, instructions, initial questionnaire, study diaries, supplementary learning material) were distributed. Subjects were asked to fill out the initial questionnaire and return it by mail before starting with unit 1.

5.6.2.2 Study phase and feedback management

The project was laid out for a study period of 3 months, during which time participants were requested to accomplish a clearly defined work load of 30 units. They were asked to work through the material at their individual pace, simultaneously building on their individual time management strategies. There were no stringent guidelines or restrictions as to the individual time devoted to studying, however, subjects were asked to keep a record (study diaries).

The designated time span for the learning period was considered important for the following three reasons. First of all it was to be ensured that everyone have the same overall time-frame. Secondly, the motivation factor had to be considered. It was assumed that a well-balanced time frame might enhance the chances to recruit candidates. The third reason

is simply administrative and practical. Three months seemed to be a promising option. During this three month period, subjects were supposed to proceed independently and in a self-regulatory manner according to the guidelines they received with the study program. Whenever they had finished a chunk of 6 units, they were asked to submit the respective study diary, indicating the amount of time they had dedicated to studying. On the one hand this feedback tool served as a source of information, as it allowed for continuous monitoring of the project's progress over the entire study period. On the other hand - and this aspect was considered fundamentally crucial - this feedback tool served as a 'psychological tie'. As will be shown in Chapter 5.6.3.2, the likelihood of a considerable drop-out rate had to be accounted for and provisions be made in order to provide for a positive development and outcome. The constant need to report on one's own progress was intended to serve as a motivational tool and should also keep the subjects' sense of responsibility and commitment on a high level. It was implemented to strengthen rapport between each individual learner and the researcher. On the basis of average learning progress as reported via study-diary-feedback and due to the fact that the final test was scheduled for end of January, it was decided in mid-December to extend the learning-phase until mid-January and subjects were informed accordingly. Towards the end of the study phase participants were asked to sign up for the final test (monitoring session). In the two weeks between the official end of the study phase and the monitoring date the subjects had additional time for repetition.

5.6.2.3 Language data collection

Language data collection was performed on four consecutive days, split up in one-to-one sessions of approximately one hour. It was conducted in a relaxed and stress-free setting. At the beginning, each test person was to fill in the final questionnaire. The follow-up language data collection was split in two separate oral test phases – firstly translation, secondly listening comprehension. Each test person's performance was audio-recorded. In

Test 1 the maximum number of sentences to be worked through was 40 (see App. 5), in Test 2 the maximum number was 20 (see App. 6).

The fact that there was a high degree of variation as regards individual success in learnt units (some participants managed to work through the whole program while others did not nearly get that far) was accounted for by the following measure: The progress of the test task was accurately matched with the learning progress. If a subject had just managed to work through half of the units, his individual test session would stop at the corresponding sentence in the test (e.g.: a test person who had worked through all 30 units was to solve all 40 respectively 20 examples of the two tests, whereas a person who had worked as far as Unit 12 was to solve only 16 respectively 8 examples). Thus the layout of both tests permitted optional finalization at different points.

Via headphones subjects listened to the instructions on the prototype CDs (see Chapter 5.6.1.5) and were asked to react accordingly. The learner output was sound-recorded and stored on a memory stick. Before starting with the tests, each subject received comprehensive instruction on how to proceed.

In Test 1 subjects were asked to translate whole sentences into Chinese Mandarin, one by one. With their headphones on they listened to English sentences. After each sentence there was a pause for them to say the sentence in Chinese Mandarin. Whenever there was more than one option to express a sentence, subjects were instructed to use either one or both. They were furthermore asked to skip a sentence in case they would feel unable to translate it and then immediately concentrate on the next one. Above that they were encouraged to supply partial answers in case they would not recall particular words or phrases. The design and procedure of this test, which in terms of degree of difficulty was more demanding than

Test 2, followed the familiar model of the audio-study program so that the test persons felt quite confident.

In Test 2 participants were handed a multiple choice answer sheet along with the headset. In this part they listened to sentences in Chinese Mandarin and were then asked to repeat the sentences, one by one. Again there was a pause for the audio-recording after each single sentence. After they had repeated the sentence, they were to turn to the answer sheet that displayed two optional replies for each example. Only one was meaningfully connecting to the previous sentence. In the following they would hear both optional responses by a native speaker, while at the same time they would be able to read along. Ultimately they were asked to tick the correct and appropriate reply. The design of this task was totally unfamiliar to the participants. This clear handicap was counterbalanced by the fact that the assignment of this task was easier in terms of level of difficulty as compared to Test 1.

5.6.3 Evaluation

5.6.3.1 Transcription and formatting of data base

Following the transactions that involved learner engagement, the data base was formatted for analysis. The audio recordings which had been saved and stored on a memory stick were transcribed. In the following, transcriptions were proof-read by a Chinese linguist[100]. Results were compiled in four different charts (see Charts 1-1, 1-2, 1-3, 1-4 in App. 7). As indicated in Chapters 5.6.1.4 (questionnaires and study diaries) and 5.6.1.5 (test material), the data base comprises 2 major components. Firstly the oral speech production which is split up in two audio recordings of each participant (see Chart 1-1) , and secondly the data collection referring to personal background and individual performance carried out

[100] Dr. Li Jie, University of Hong Kong, rosejiejie@gmail.com. The proof-reading was limited to the critical and controversial sentences (see 5.6.3.2).

by use of two questionnaires and a sequence of 5 study diaries (Charts 1-2, 1-3, 1-4). It was felt that this two-componential data base would allow for a comprehensive analytical interpretation of the multitude of factors affecting foreign language acquisition.

5.6.3.2 Analysis of findings

As it turned out, the extensive and intricate structure of the research project resulted in various impediments and problems that needed to be addressed. One of these handicaps was the drop-out rate. From among the 30 participants that had initially signed up, 21 entered the final test session (5 of group A and each 8 of groups B and C) and could be drawn upon for analytical purposes. This means a drop-out rate of 9 persons respectively 30%. While there are no available data for 3 of out of the 30 (which suggests that they had not started working through the program), 6 test persons had handed in study diaries, but not participated in the final tests. These 6 had worked through a total of 67 units which is an average of 11,16 units per person (~37%). For lack of language data of the 30% drop outs, they were not included in the analysis. In comparison, with a total of 420 units the 21 subjects who had taken the final tests, achieved a mean value of 20 units per person (~66.7%).

When surveyed separately, the mean value of the three age groups turns out to be as follows: With 5 persons accomplishing a total of 75 units, age group A (20-32) achieved a mean value of 15 units or 50%. In age group B (33-45) 8 test persons had worked through 136 units which results in an average of 17 units per person or 56.7%. As compared to these two groups, age group C (45-69) with 8 persons having worked through a total of 209 units showed much better results, amounting to 26.13 units per person or 87.1% (see Table 4-3, p.184).

group	total number of subjects	total of units learnt	mean value of units per subject	mean value in %
A	5	75	15	50%
B	8	136	17	~57%
C	8	209	26	~87%

Table 4-3: Number of learnt units – of all (21) subjects participating in the final tests

However, as indicated above, for reasons of substantive group comparability only 5 persons per group were included in the final analysis, the results of which will be presented and discussed in Chapter 6.
Table 4-4 displays the performance of the 15 finalists in terms of goal achievement.

group	total number of subjects	total of units learnt	mean value of units per subject	mean value in %
A	5	75	15	50%
B	5	104	20.8	~69%
C	5	148	29.6	~99%

Table 4-4: Number of learnt units – of subjects in the final analysis (15)

Evaluating the language learning data of Test 1 was also a delicate and critical task, as language production varied from ‘fully correct’ via ‘nonstandard, but colloquially acceptable’ and ‘partly correct’ (e.g. one half of the sentence) to ‘incorrect’. A method that would allow for a sound and valid comparison across the three age groups had to be adopted. Given the great variety of ‘intermediate stages’ and the difficulty of thorough measurability of the results, it was decided to set up the following criteria for data evaluation. The data were split in two groups:

a) correct and colloquially acceptable sentences
   (coll. acceptable = when sentence was not translated literally, but semantically fully correct (see Task 13, below).
b) incorrect and partly correct sentences (this also comprised sentences with only one false or missing word)

In most cases the decision was clear, however, some 'border cases' proved to be critical and needed fine-tuned coordination with the proof-reader. With reference to transcripts A-1 and A-2 (see Appendix 8) the following 'border cases' are meant to illustrate the intricacy of the evaluation process:

Examples of a):

A-1: Task 13:
"At what time?" was translated into: "shénme shíhou", which actually means "when". Though the literal translation of this phrase is "jǐ diǎn zhōng", the alternate version used by the subject was rated correct as it is semantically congruent with the optimal version.

A-1: Task 21:
"No, I can't" was translated into: "wǒ bù kéyǐ", which actually means "I can't". The fully correct translation of this phrase is "bù kéyǐ, wǒ bù kéyǐ". Despite the omission of "no" ("bù kéyǐ"), this phrase was rated as "correct, though not commonly used in daily communication".

Examples of b):

A-2: Task 2:
"Yes, I can speak a little Mandarin" was translated into: "shì, wǒ huì shuō yìdiǎnr Pǔtōnghuà". Except for the initial "yes" which ought to have been expressed with "huì", the sentence is fully correct. However, it was rated "incorrect", as it did not correspond to the preceding question.

A-2: Task 20:
"Can you buy some beer?" was translated into: "Nǐ kéyǐ mǎi píjiǔ ma?". The correct translation of this sentence is "Nǐ kéyǐ mǎi yìdiǎnr píjiǔ ma?". On the one hand the omission of "yìdiǎnr" does not interfere with correct sentence structure. On the other hand it may be argued that in principle the phrase is semantically correct. According to the decision of a strict judgement in terms of absolute semantic correctness, it was rated "incorrect" by the native proof-reader.

It is especially the last example that illustrates the complexity of the rating procedure. In addition, it is an excellent example of the rigorous assessment criteria, which in turn allows conclusions as to the high quality of learner performance.

Though the audio-recordings offer a broad scale of possibilities for linguistic analysis, not all aspects could be considered within this study. In light of the research questions, and for reasons of a limited scope, it was decided to confine analysis to listening comprehension, retentiveness and grammatical accuracy. The exploration of other significant linguistic features such as for instance pronunciation would have gone beyond the scope of this study, however, it may be stated here that the present language data would represent an ideal source for a profound investigation of this learner aspect.

Chapter 6
ANALYSIS OF FINDINGS

We now accept the fact that learning is a lifelong process of keeping abreast of change. And the most pressing task is to teach people how to learn.
(Peter F. Drucker)

This chapter aims to explore the differences in learner achievement of the three adult age groups (see Chapter 5.5). It will relate to the collected data on three overarching levels: First, the level of global learning trajectories (Chapter 6.1) such as task accomplishment and ranking criteria. Second, the linguistic level (Chapter 6.2), which includes the analysis of language production in terms of relative learning success, absolute learning success and the operation of UG principles. The relevant data were extracted from the audio recordings and are compiled in Chart 1-1 (see Chapter 6.2 and Appendix 7). Third, this chapter will discuss learner variables (Chapter 6.3) and their putative impact on learner results. This section covers the two distinct fields of learner demographics (education, job situation and multilingual factors) on the one hand, and psycholinguistic/cognitive parameters (motivation, self-concept and self-efficacy, learning styles, strategies and self-regulation, and self-assessment) on the other. The corresponding data were compiled from the questionnaires and study diaries and are listed in Charts 1-2, 1-3 and 1-4 (see Appendix 7).

Charts 1-1 to 1-4, which display the main body of descriptive data, are the basic matrix for the fine-tuned explication of determinants in the diverse diagrams (see Appendix 7). Column A of each of these charts refers to the subjects' personal code which they were allotted to in sequential order at the time of signing up for the project. According to the total number of recruited subjects the personal codes ranged from A-1 to A-10 in age group 20 to 32, from B-1 to B-10 in the middle-aged group (33 to 45) and

from C-1 to C-10 in group 46+. As only the five best-performers of each group were included in the final analysis, the subjects' codes range in a seemingly random manner, however, these numbers refer back to their signing-up sequence. The final ranking in the charts results in the subjects' individual in-group performance level (from best-performers A-2, B-8 and C-5 to fifth position: A-4, B-5 and C-7).

6.1 Global Learning Trajectories

6.1.1 Task accomplishment

The first aspect to turn to is that of the broader perspective of all 30 subjects that had signed up for the project, as these results indicate a significant tendency. Column B of Chart 1-1 (p. 193) shows the age of each subject included in the final analysis. Below each group, the mean age of the subjects who were considered in the analysis is given. However, in order to get a more comprehensive picture, the age factor of the 15 subjects who were not included in the final analysis (drop-outs and poor-performers) will also be referred to in this section. Diagram 2-1 juxtaposes the average age of all 10 test persons (yellow bars) who had signed up and the mean age of the 5 best-performers (blue bars) of each age group (see also Table 4-5, p. 192). From among all diagrams within this study, this is the only one that refers to all 30 subjects.

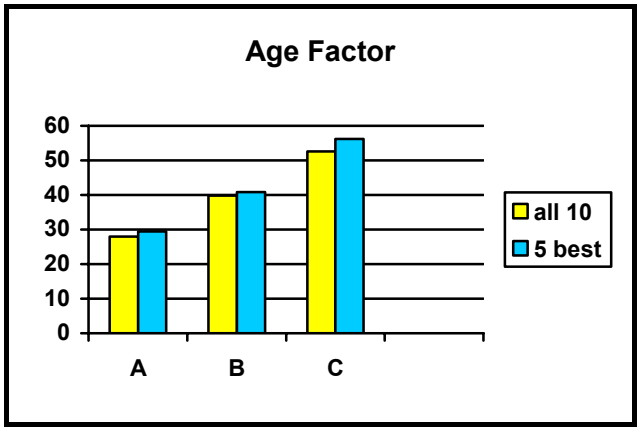

Diagram 2-1: Mean age of all 30 participants

	Group A	Group B	Group C
all 10:	28.0	39.8	52.6
5 best:	29.4	40.8	56.2

At the outset of the project the participants of group A ranged from 21 to 32 years of age, reflecting an average age of 28. The average age of qualified participants of group A at the end of the project phase was 29.4 years. This indicates that within the younger age group the more advanced-aged subjects were more successful. Group B (33 - 45) started out with an average age of 39.8 years and resulted in an average age of 40.8 of the five best-performers. Again a narrow margin of rising age can be observed. Age group C (46 +) with an average age of 52.6 years at the time of recruitment and a mean age of 56.2 of the five best-performers shows a slightly different picture. While for groups A and B there is to be registered a marginally rising age-success-curve (by 1.4 and 1.0), age group C shows a slightly steeper curve with 3.6 years (see Diagram 2-1, p. 188). These figures suggest a tendency of heightened reliability in terms of goal achievement with increasing age. From this we may conclude that in the first instance and from the point of view of perseverance, commitment and the ability to keep focused, rising age does not have an inhibiting effect on foreign language learning. On the contrary, present results suggest that the older the language learner, the more competitive his or her chances to arrive at an envisaged goal. Hence, coming back to the first and foremost research question, whether the adult foreign language learners are capable of learning a wholly unfamiliar language system even at an advanced age, the answer is unambiguous: Yes, they are.

The fact that the average age of the five best-performers of each group is higher than the average age of all subjects who had signed up per group suggests that there is a direct correlation between rising age and more sophisticated and rewarding self- and task-management skills. Establishing a strategic plan and following through seems to be a battery of resources that tends to improve with rising age. The older one gets, the more developed the volitional control mechanisms and strategic operations. In light of the above mentioned results it may be argued that the advantages of progressing maturation in terms of strategic self-

regulation do carry considerable weight. As will be shown in Chapter 6.2.2.3, they hold a potential of components that promise to foster the learning process.

The next indicator to be looked at, which is in its nature closely connected to the previous one, refers to task accomplishment in terms of units learnt. The results relate to the five best performers of each age group. Diagram 2-2 (see also Chart 1-1, column C) shows the group results of units learnt per person and gives a very clear account of target achievement.

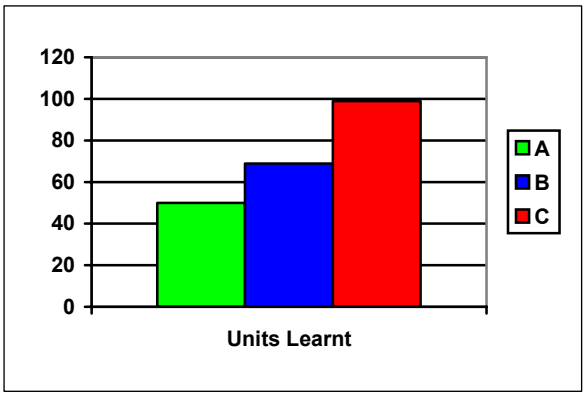

Diagram 2-2: Total of units learnt (in %)
A/50 – B/69 – C/99

While age group A accomplishes approximately 50 percent of the set goal, group B arrives at about 70 percent. Participants of group C, achieving nearly 100 percent of the objective, clearly outperform their younger counterparts. This result is even more surprising when set against the initial motivation curve of the particular groups (see Chart 1-3, column U, Appendix 7) which shows a mean value of only 72 percent with age group C as opposed to approximately 90 percent of groups A and B. In other words, while at the outset the two younger age groups seemed more determined to reach their goal, they eventually dropped back and the older language learner group performed considerably better. The contradicting results in terms of expectations and achievements puts the willpower component in clear perspective and indicates a strong influence of the ability to “follow through” as a major driving force for learner success. All

this suggests that learner parameters such as commitment, perseverance, diligence and time-management skills are more important than individually sensed motivation and an elevated degree of interest.

Present results suggest that these parameters not only constitute a useful toolkit for active and conscious learning, but they virtually pave the way for effective language learning at a more advanced age. As opposed to their younger counterparts, the older age group (C) generated and acted out a fully developed and realistic action plan, which in turn functioned as supporting pillar of their success curve. In addition these results militate in favor of the existence of the dynamics of motivation and its temporal axis as introduced by Dörnyei & Ottó (1998, 43-69) in their three-phased *process model of L2 motivation*. While groups A and B show a clear head-start in the preactional stage (setting goals and forming intentions), they eventually fall back in the all-decisive actional phase that involves action control and self-regulation.

6.1.2 Ranking criteria

In the following we will turn to the pivotal parameters that influenced the selection of subjects for final analysis. The criteria for the ranking of the top five performers of each group were determined by the number of units learnt and the absolute learning success of each individual. Together these data flow into the *absolute mean value* (see column K, Chart 1-1). With 9 drop-outs out of 30 participants (5 in group A and 2 each in groups B and C) this benchmark eliminated a further 3 participants of groups B and C, who had participated in the final test, however, produced poorer results than their in-group peers.

As it had been pointed out in Chapter 5.6.3.2, from among the 30 subjects who had signed up for the project, 21 entered the final test session. With 5 participants group A showed the highest rate of drop outs, while groups B and C had 2 drop-outs each. In other words, data analysis could be

conducted with 5 subjects of group A, 8 subjects of group B and 8 subjects of group C. The unequal data availability across the three groups posed the problem of validity of direct group comparison and was solved as follows. For reasons of substantive and reliable group comparability it was decided to include the same number of participants per group in the final analysis. Thus the number of subject data per group that was to be considered, was aligned to the lowest performing group in terms of perseverance and general task accomplishment, which was group A with 5 test persons. For this reason, each 3 participants of groups B and C were eliminated from final analysis. Table 4-5 presents the data that are decisive for the ranking of the top five performers of each group. It includes the *absolute mean value* (AMV) of the 6 poor-performers who were not considered in the linguistic analysis[101].

Code	Age	Units learnt	AMV	Code	Age	Units learnt	AMV	Code	Age	Units learnt	AMV
		%	%			%	%		%	%	%
A-2	29	80	70.83	B-8	43	100	94.17	C-5	64	100	92.5
A-3	29	76.66	67.22	B-3	39	80	69.17	C-8	53	100	80
A-1	29	53.33	37.78	B-1	40	73.33	64.44	C-1	46	93.33	79.44
A-6	28	16.66	15.55	B-9	38	53.33	51.94	C-9	49	100	78.33
A-4	32	23.33	15.27	B-5	44	40	25.83	C-7	69	100	73.33
mean value	**29.4**	**49.99**	**41.33**	mean value	**40.8**	**69.33**	**61.11**	mean value	**56.2**	**98.67**	**80.72**
A-5	32			B-4	43	26.66	25.55	C-2	47	93.33	72.78
A-7	27			B-2	33	43.33	25.28	C-6	48	70	56.67
A-8	21			B-7	39	36.66	23.89	C-3	50	40	35.83
				mean value / all 8	**39**	**56.66**	**47.53**	mean value / all 8	**53.3**	**87.08**	**71.11**
A-9	26			B-6	43			C-4	47		
A-10	27			B-10	36			C-10	53		
mean age / all 10	**28**			mean age / all 10	**39.8**		47.53	mean age / all 10	**52.6**		

Table 4-5: Age, units learnt and Absolute Mean Value (AMV) of all 30 participants (drop-outs are marked in black color)

6.2 Language Data Analysis (Chart 1-1)

[101] From among all tables within this study, Table 4-5 is the only one that includes language data of all subjects who had taken the final test.

This section refers covers speech production analysis as regards *relative* learning success, *absolute* learning success and the operation of UG principles. The relevant data were extracted from the audio recordings and are compiled in Chart 1-1, columns D to K. They yield an exhaustive compilation of results that reflect the impact of learner variables. In the following sub-chapters the different columns of Chart 1-1 will be explained in terms of their analytical value. All figures listed in columns C to K are percentage values.

Language Data of Top 5 Performers										
A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
			LS	LS	LS	Mean Value	LS	LS	LS	Mean Value
		Learnt	relative	relative	relative	**relative**	absolute	absolute	absolute	**absolute**
Code	**Age**	**Units**	Part 1	Part 2	**D + E**	**C + D + E**	Part 1	Part 2	**H + I**	**C + H + I**
A-2	29	**80**	78.125	87.5	82,.813	**81.875**	62.5	70	66.25	**70.833333**
A-3	29	**76.66**	64.52	100	82.26	**80.393333**	50	75	62.5	**67.22**
A-1	29	**53.33**	40.9	80	60.45	**58.076667**	20	40	30	**37.776667**
A-6	28	**16.66**	75	100	87.5	**63.886667**	15	15	15	**15.553333**
A-4	32	**23.33**	30	75	52.5	**42.776667**	7.5	15	11.25	**15.276667**
	29.4	**49.996**	**57.709**	**88.5**	**73.105**	**65.401667**	**31**	**43**	**37**	**41.332**
B-8	43	**100**	87.5	95	91.25	**94.166667**	87.5	95	91.25	**94.166667**
B-3	39	**80**	59.4	100	79.7	**79.8**	47.5	80	63.75	**69.166667**
B-1	40	**73.33**	73.33	100	86.665	**82.22**	55	65	60	**64.443333**
B-9	38	**53.33**	95.5	100	97.75	**82.943333**	52.5	50	51.25	**51.943333**
B-5	44	**40**	31.25	62.5	46.875	**44.583333**	12.5	25	18.75	**25.833333**
	40.8	**69.332**	**69.396**	**91.5**	**80.448**	**76.742667**	**51**	**63**	**57**	**61.110667**
C-5	64	**100**	77.5	100	88.75	**92.5**	77.5	100	88.75	**92.5**
C-8	53	**100**	55	85	70	**80**	55	85	70	**80**
C-1	46	**93.33**	64.86	94.4	79.63	**84.196667**	60	85	72.5	**79.443333**
C-9	49	**100**	40	95	67.5	**78.333333**	40	95	67.5	**78.333333**
C-7	69	**100**	40	80	60	**73.333333**	40	80	60	**73.333333**
	56.2	**98.666**	**55.472**	**90.88**	**73.176**	**81.6726667**	**55**	**89**	**72**	**80.888667**

Chart 1-1: Language data analysis

Column D reflects the *relative* learning success of test battery 1 (Part 1), column E of test battery 2 (Part 2) and column F the combined results of these two. Column G displays the mean value of the aforementioned figures, including also the units learnt, and is hence called *relative mean value*. Column H shows the *absolute* learning success of test battery 1 (Part 1), column I of test battery 2 (Part 2) and column J their combined results. Column K lists the mean value of the aforementioned figures, again including the units learnt, and is hence called *absolute mean value*.

For reasons of valid group comparison, and as had been pointed out in Chapter 6.1.2, it was regarded essential to include the same number of subjects in each group. In order to elaborate a fine-tuned and reliable picture of effective learner achievement, data evaluation was conducted on two distinct levels, *relative* and *absolute* learning success. They will be juxtaposed and explained in detail in the following chapter.

6.2.1 *Relative* learning success versus *absolute* learning success

The participants' *relative learning success* and their *absolute learning success* were defined and measured separately, as the relevant figures allow for a more reliable and comprehensive assessment of the retentiveness factor (*brainpower* component).

Since not all subjects had achieved the predetermined target of learning all units within the set time frame, it was essential to align the test design accordingly. The standard final test of Part 1 comprised 40 sentences, whereas Part 2 had a maximum of 20 tasks to be solved. For reasons of adaptability of test requirements to the different learner stages at the end of the learning phase[102], the final language test was designed in a flexible fashion. Depending on individual learning progress measured in units at

[102] Some subjects had managed to work through all 30 units and thus had reached the learning objective in terms of coverage of the specified learning content, while others had not been able to achieve this goal and ended up at various stages, from 5 units to 29.

the end of the learning phase, each subject was exposed to a commensurate test. In other words, a test person who had worked through all 30 units had 40 (Test 1) respectively 20 (Test 2) tasks to solve, while a test person who had worked as far as for instance unit 15 had only 20 (Test 1) respectively 10 (Test 2) tasks to solve[103]. The adjustable design in terms of test length used in the present research is assumed to be valid because it measured the accumulated knowledge each individual learner had gained through the self-teaching phase. The modification in terms of individually adjustable length was deemed necessary in order to guarantee the face validity of test results at various learner stages.

The *relative* learning success as listed in Chart 1-1 column F, measures the learning success in relation to the units the participants had actually worked through, as extracted from the two audio recordings. On the other hand, the *absolute* learning success which is listed in Chart 1-1, column J gives account of the learning success in relation to the defined learning goal of 30 units. This explains the considerable deviation in *relative* and *absolute* learner success of subjects who had not even remotely reached the learning target of 30 units (e.g.: test person A-4, with 52.5 % in relative learning success and 11.25 % in absolute learning success). In contrast, high achievers in terms of task accomplishment show a more balanced or even equal ratio (e.g.: test person C-5, with 88.75 % both relative and absolute learning success).

A look at Diagram 2-3 (p. 196) illustrates the difference of these benchmarks[104]. It juxtaposes the data of relative and absolute learning success of the three groups and clearly shows the deviation in results. While the *relative* learning success curve with a ratio of 73-80-73 over the three groups displays a lead of 7 percent of group B over groups A and C,

[103] For the 2 tests with an overview of the various test stages, see Appendix 5 (Monitoring, Part 1) and Appendix 6 (Monitoring, Part 2).

[104] For the purpose of clarity, the 3 groups were assigned a specific color in the diagrams and tables: group A = green, group B = blue, group C = red.

the *absolute* learning success shows a different picture. With a ratio of 37-57-72, it largely correlates with the table of general task accomplishment as outlined in Diagram 2-2 (p. 190) (total units learnt) that shows a rising curve from A to C. After the short introduction of the above terms, the inter-group differences of these parameters and their role in investigating learner success will now be referred to in more detail.

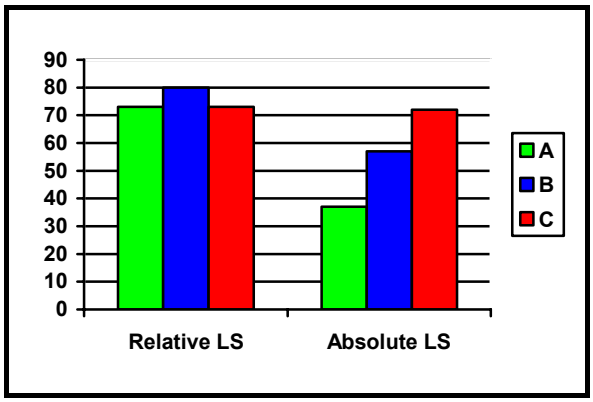

Diagram 2-3: Relative vs. absolute learner success
Relative LS: A/73 – B/80 – C/73
Absolute LS: A/37 – B/57 – C/72

6.2.2 *Relative* learning success and *relative* mean value

Results of *relative* learning success as shown in Diagram 2-3 (left) reveal that the middle-aged group performed best in terms of retentiveness. In other words, in terms of input-output success ratio they showed the highest proficiency level. With 80 percent they point to a moderate, but noticable lead of age group B over groups A and C with 73 percent each. This indicates that with regard to learning aptitude in terms of memory, cognitive abilities as well as brain capacity and plasticity the middle-aged group (B) proved to be the best performing one, while groups A and C reached about the same performance level. Hence, prima facie the answer to the analogous research question which refers to possible declines beyond the age of 45 seems to be both “yes” and “no”. *Yes*, when group C is compared to group B, and *no*, when it is compared to group A. Indeed, this issue is quite intricate, and the complexity of the whole

learning process requires a more discerning look at the answer to this question.

If rated in isolation and separated from other influencing factors, the results would adduce clear evidence against the CPH and significant brain volume decreases, since the performance of the older age group equals that of the younger one. However, as theory suggests (see Dörnyei 2005; Lightbown & Spada, 2006), it is always interaction of several pivotal factors that influence the success curve. At this point it is essential to look at this issue from a broader perspective.

First of all, it must be conceded that in view of the methodological structure of the learning program, extended task accomplishment offers more opportunities for repetition and consolidation of input. The further a learner gets in terms of units learnt, the more chances he/she has to practice the accumulated language input, as the learning modalities build on continued integration of material learned in the early stages into newly learnt words and phrases. In other words, perseverance has a potentiating effect on retentiveness. As the older aged group performed best in terms of the 30-unit target, this would explain the balanced performance levels of groups A and C, with group A having had relatively few, and group C having had a lot of opportunities to repeat and consolidate input.

Secondly, other dispositions also seem to be significant. With reference to age group A, the lead of age group B may to some extent be assigned to maturity related aspects such as more developed conceptual, strategic or systematic abilities, and more advanced metacognitive and metalinguistic skills. However, if one assumes prolonged continuation of this tendency with rising age, such a hypothesis would not stand the comparison of group B with age group C. The complexity of this issue, which would require an in-depth investigation of the influence of meta-knowledge, goes beyond the scope of this paper and can therefore not be dealt with

exhaustively. However, without doubt it is an interesting subject matter for future research projects, and further studies are particularly desirable.

With regard to Birdsong's exploration of the possibility of a connection between brain volume decrease in aging and a decline in L2 acquisition and processing (Birdsong, 2006: 29-35) in which he refers to evidence from the cognitive, brain volume and dopamine literature and argues for linear declines "that begin in early adulthood and continue throughout the life span" (2006: 34), I purport that the present results seem to dissent this assumption. In view of the fact that age groups A and C reveal similar results in relative learning success, it may be argued at this point that the impact of putative volumetric declines in certain brain regions over age, seems to be of less importance than has been largely assumed. Arguably, such a suggestion must be seen in the wider context of candidate causal mechanisms both of neurobiological and neurocognitive nature. Above that, it may be assumed that other factors such as multilingualism, psycho-social and affective dimensions as well as motivational and strategic aspects take momentum in terms of individual variance. This proposition is consistent with Birdsong's warning against a tendency of isolation and simplification in the discussion of the underlying sources of age effects in L2 learning and processing that misleadingly "polarizes stances on an extremely textured set of issues" (Birdsong, 2006: 36).

All in all, in the context of the present study, the figures of relative learning success may be regarded as a significant indicator of the *brainpower* component as outlined in Chapter 4.3.2. They substantially support the hypothesis that with regard to biological and neuroscientific issues, an increase of age does not necessarily inhibit L2 learning, production and processing.

Diagram 2-4 (next page) shows the combined results of units learnt and relative learning success, which add up to the *relative mean value*. This

mean value (see also Chart 1-1, column C) shows a fairly flat curve with a ratio of 65-77-83 from group A to B to C and gives a clear picture of the combined "*willpower-brainpower* factor" and how this component levels off group differences. The comparison of the scores indicates a shift of input-output ratio as it had been determined in the *relative learning success* (see Diagram 2-3, p. 196, left) in favor of the older aged groups from most to least successful. In sum, this record shows that the advanced-age group (C) is the best-performing group, even though only by a comparatively narrow margin. Altogether these results are much more balanced than the *absolute mean value* (see Chapter 6.2.3) which serves as the ultimate benchmark of the analysis and will be discussed in the following chapter.

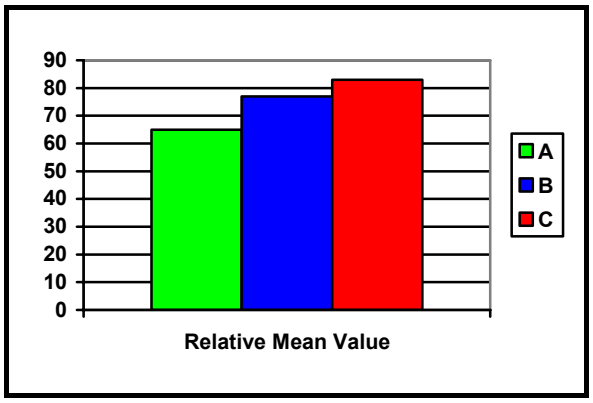

Diagram 2-4: Relative mean value
A/65 – B/ 77 – C/83

6.2.3 *Absolute* learning success and *absolute* mean value

Results of absolute learning success are shown in Chart 1-1, column K and Diagram 2-3 (p. 196, right). The diagram depicts a rising performance curve from young to old. Group A achieved 37 percent, group B 57 percent and group C 72 percent. This value displays the learning success set in relation to the learning target of 30 units. Accordingly, it shows a climbing success curve similar to the task accomplishment curve in Diagram 2-2 (p. 190) (total of units learnt).

A comparison of these two values (units learnt and absolute learning success) reveals the following interesting results: Group C, with a task accomplishment of 99 percent achieved 72 percent of the absolute learning target which is a difference of 27 percent (from 99 to 72). As compared to this fairly sizable drop, group B falls back by 12 percent (from 69 to 57) and group A by 13 percent (from 50 to 37). In other words, when 'ultimate language proficiency' and 'learner discipline' are contrasted, the younger learner groups prove to be more efficient. The better performance level of groups A and B over group C is an indicator for their elevated *brainpower*, suggesting a more stringent likelihood of successful memory storage before the threshold of 46. However, in view of a "clear-eyed and open-minded" (Birdsong 2006, 37) attempt to integrate a wide range of dimensions of L2 learning and processing, it is essential to also incorporate personality and strategic aspects, which will be done in Chapter 6.3.

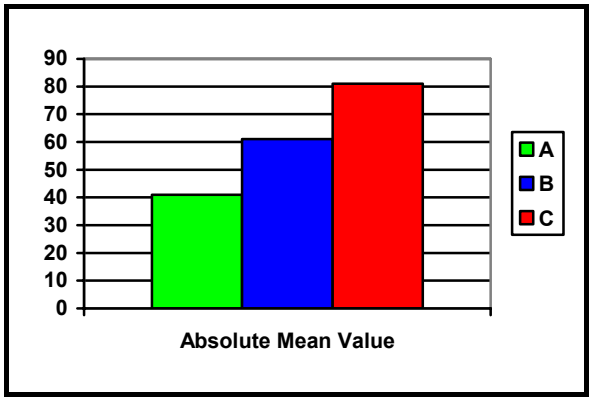

Diagram 2-5: Absolute mean value
A/41 – B/61 – C/81

As mentioned above, the *absolute mean value* (see Diagram 2-5) was taken as decisive factor for the ranking of the 5 best performers per group. Apart from the biological and cognitive aspects, this value includes the important element of self-management skills, which has been identified as one of the key issues for learner success (see Chapter 2.3). It is the combined result of *learnt units* and *absolute learning success*. Accordingly, it largely correlates with the results of Diagram 2-2 (p. 190, units learnt).

This analogy is based on the fact that the ultimate learning target within the set time frame comprises the effective coverage of learning material plus command of the specified ultimate language learning target. Diagram 2-5 (p. 200) shows that the performance curve is in clear favor of group C, who leads by 20 percent over group B and 40 percent over group A. This means that in terms of *all* relevant learner characteristics, the 46+ group proved to be the best performing group, followed by group B and group A, which holds the last rank.

6.2.4 Operation of UG principles

As discussed in Chapter 2.2, the ongoing debate on UG and the age factor is a learner aspect that needs to be accounted for within a holistic approach. We will therefore look at the defensibility of Chomsky's innateness theory and examine whether the present study reveals any indications that older language learners still have access to principles and parameters. Within the project's explicit learning context, test persons were exposed to a limited number of words and phrases with the necessity to produce an unlimited number of utterances they had never heard before. In other words, they were confronted with a confined number of morphological and syntactic samples. In turn, they were required to deduce their functions and continuously generate new versions. The investigation of this aspect is especially important in view of the necessity of explicit grammatical instruction in adult L2 learning processes.

From among the many particular linguistic features of Mandarin, the following special characteristics will be highlighted:

- ► *asking yes-no questions* and
- ► *replying to yes-no questions*.

Although the program in use included other unfamiliar linguistic features, such as the following examples, they were not included in the analysis. The reasons will be given further down.

► the general classifier *gè* (see Ross & Ma, 2007: 46), which is used with many different nouns, but does not contribute any meaning to the noun phrase in which it occurs (e.g.: a person = yí gè rén, one week = yí gè xīngqī)

► the pronoun modifier *de* (see Ross & Ma, 2007: 51), that in combination with a pronoun serves the same function as a possessive pronoun in English and other languages (e.g.: my husband = wǒ de xiānsheng)

► the manner adverbial construction with *de* (see Ross & Ma, 2007: 181-182), that describes *how* an action is generally performed (e.g.: you speak very well = nǐ shuō de hén hǎo, I don't speak well = wǒ shuō de bù hǎo)

► the introduction of adjectival verbs (see Ross & Ma, 2007: 56) that unlike English adjectives, are not preceded by a linking verb such as the verb *shì*=be (e.g.: the adjectives *guì*=expensive and *gòu*=enough; is that enough = gòu ma? / gòu bú gòu?, it's too expensive = tài guì le)

► the use of the verb suffix *le* to mark an action as completed and past (see Ross & Ma, 2007: 226) (e.g.: yesterday they bought = zuótiān tāmen mǎi le)

The choice of grammatical features included in the analysis had to take into account two important aspects. First of all, the considerable learner achievement variable from 5 to 30 units had to be accounted for. Not all participants had achieved the target goal of working through all units, and thus they had not encountered the whole range of presented grammatical features. Above that, the number of test samples of those features that all subjects had been introduced to (e.g. the manner adverbial construction with *de* – see Appendix 5, Test 1, No. 3 ("kěshì, wǒ shuō de bù hǎo") does not suffice to justify a representative analysis. This was the only test sample of its kind. Second, it must be emphasized that the design of the test is primarily geared towards the investigation of retentiveness, with the goal to allow for a survey of how much input subjects are able to store in their memory. The present test layout does not allow for sufficient evidence for language specifics as listed above. A profound and comprehensive inspection of these features would necessitate a wholly different set of test samples. Therefore it must be emphasized that though Part 1 of the tests does yield adequate evidence for a preliminary

investigation as regards the two selected features, it does not claim to provide for an exhaustive coverage of this linguistic detail. In order to produce more comprehensive findings, a systematic study with an exclusive coverage of this aspect would be necessary. Before turning to the analysis, a short introduction into the specifics of the two grammatical features that were investigated will be given.

► Asking yes-no questions:

In Chinese Mandarin question formation has its very specific features. Questions differ from Indo-European languages in their syntactic structure. Based on different underlying concepts, there are various main types of interrogative forms. From among the most common question types in Mandarin, the yes-no questions (Ross & Ma, 2007: 152ff) and the corresponding answer formation (Ross & Ma, 2007: 155f) will be investigated in this section. Yes-no questions are questions that can be answered with *yes* or *no*. In spoken Mandarin there are two principal ways to form these questions: the '*ma*'-formation and the '*verb-not-verb*' structure. Both options are introduced in the self-study program of the present project and may be used optionally. Unlike English, the overall phrase order of statements and yes-no questions is the same. The following examples will demonstrate their structure and usage:

1. The verb *shì* = be:

Statement:
You are Chinese. = Nǐ shì Zhōngguórén.

Question:
Are you Chinese?
=

ma-formation	*verb-not-verb* structure
Nǐ shì Zhōngguórén ma?	Nǐ shì bú shì Zhōngguórén? *

2. The verb *yǒu* = have:

Statement:
You have US-dollars. = Nǐ yǒu Měijīn.

Question:
Do you have US-dollars?
=

ma-formation	*verb-not-verb* structure
Nǐ yǒu Měijīn ma?	Nǐ yǒu méi yǒu Měijīn?

3. Other verbs:

Statement:
You can speak Mandarin. = Nǐ huì shuō Pǔtōnghuà.

Question:
Can you speak Mandarin?
=

ma-formation	*verb-not-verb* structure
Nǐ huì shuō Pǔtōnghuà ma?	Nǐ huì bú huì shuō Pǔtōnghuà? *

* bù is usually fourth tone, however, when it is followed by a fourth-tone syllable, it changes to the second tone: bú

Unlike English, there is generally no rising intonation at the end of the question (see questions above: the *ma*-questions end with a neutral tone, and the *verb-not-verb* questions with different tones, from rising to a high-level and falling). Since Chinese Mandarin is rich in homonyms, it is primarily the tonal system that helps distinguish different words. The main prosodic features of the four tones (plus the neutral tone) supersede sentence intonation.

Forms and functions of the two yes-no question constructs were presented at the beginning of the course, however, only in one specific speech sample each. Based on this input, learners were in succession requested to develop the many variations with different verbs self-dependently. With this approach the study program seems to postulate that exposure to new samples triggers parameters to adopt the correct setting. Learners have to

make distinct linguistic choices, develop strategies and produce utterances they have never heard before. In view of this poverty-of-stimulus situation (see Chapter 2.2.1) the data below may allow conclusions as to the advanced aged learner's access to UG principles and possible operative variables across the three age groups.

Qu.	1	4	7	12	17	20	22	29	33			
Code												
A-2	1	1	0	0	1	1	0	x	x			4
A-3	1	1	1	0	1	1	1	x	x			6
A-1	1	1	0	0	1	1	0	x	x			4
A-6	1	1	1	x	x	x	x	x	x			3
A-4	0	1	0	x	x	x	x	x	x			1
total	**4**	**5**	**2**	**0**	**3**	**3**	**1**	x	x		**27**	**18**
B-8	1	1	1	1	1	1	1	1	1			9
B-3	1	1	1	1	1	0	1	0	x			6
B-1	1	1	1	1	1	1	1	0	x			7
B-9	1	1	1	1	1	1	1	x	x			7
B-5	1	1	1	0	x	x	x	x	x			3
total	**5**	**5**	**5**	**4**	**4**	**3**	**4**	**1**	**1**		**36**	**32**
C-5	0	1	1	1	1	1	1	0	0			6
C-8	1	1	1	0	1	1	0	1	1			7
C-9	1	1	1	0	1	1	0	1	1			7
C-1	1	1	1	1	1	1	1	1	1			9
C-7	0	1	1	0	1	0	0	0	1			4
total	**3**	**5**	**5**	**2**	**5**	**4**	**2**	**3**	**4**		**45**	**33**

Table 4-6: Yes/no question formation (maximum: 45 questions)

Table 4-6 gives account of each test person's performance regarding correct yes/no question formation. It also displays group performance results. Out of the 45 possible speech samples per group (9 per person), the questions each group was exposed to correlated with the group learner success in terms of units learnt. In other words, the number of sentences to be translated was matched with the units each individual had been able to work through. From among the 9 questions in the translation test (Part 1: sentences 1, 4, 7, 12, 17 20, 22, 29, 33 – See Appendix 5), the following results were generated: Group A was requested to answer a

total of 27 examples and produced 18 correct and 9 incorrect constructs. This results in a relative success rate of 67 percent. Group B who was exposed to a total of 36 out of the 45 possibilities generated 32 correct and 4 incorrect questions, which equals a relative success rate of 89 percent. Group C who due to advanced learner progress in terms of units was confronted with all 45 examples produced 33 correct and 12 incorrect questions. Thus this group achieved a 73 percent success rate both relative and absolute.

► Replying to yes-no questions:

1. Replying 'yes':

There is no word for 'yes' in Mandarin. To reply 'yes' to a yes-no-question in 'ma'-form, or in 'verb-not-verb'-structure, 'yes' is expressed by **repeating the verb**. (Ross & Ma, 2007: 155). The following examples illustrate the structure.

Example 1:
Are you Chinese?

ma-formation	*verb-not-verb* structure
Nǐ shì Zhōngguórén ma?	Nǐ shì bú shì Zhōngguórén?

Answer:
Yes, I am (Chinese).
=
Shì, wǒ shì Zhōngguórén.

Example 2:
Can you speak Mandarin?
=

ma-formation	*verb-not-verb* structure
Nǐ huì shuō Pǔtōnghuà ma?	Nǐ huì bú huì shuō Pǔtōnghuà?

Answer:
Yes, I can (speak Mandarin).
=
Huì, wǒ huì shuō Pǔtōnghuà.

Example 3:
Do you have US-dollars?
=

ma-formation	*verb-not-verb* structure
Nǐ yǒu Měijīn ma?	Nǐ yǒu méi yǒu Měijīn?

Answer:
Yes, I do.
=
Yǒu, wǒ yǒu Měijīn.

2. Replying 'no':

If the question asks about non-past time[105] and the main verb of the sentence is any verb except for 'yǒu' (= have, possess, there is, there are, exist), the 'no' answer is: **bù + the verb**. If the main verb of the question is 'yǒu', the 'no' answer is: **méi yǒu**. (Ross & Ma, 2007: 155f)

In the audio-program, these features were introduced in direct correlation with specific speech acts. However, only one example each was offered as a model for repetition. Based on the initial one-time introduction of these two structures, learners were then required to construct and produce the subsequent 'no'-answers self-reliantly. Hence, after having been introduced to the '**bù** + the verb' structure with the verb 'huì', they were asked to apply the same rule to all subsequent 'no' answers with different verbs on their own[106] without having heard them before. Based on this particular model, they entered an evolving process of their own

[105] If the question asks about the past or a completed event, the 'no'-reply cannot be formed with 'bù'. Instead the 'méi yǒu' structure has to be used. However, this structure is not part of the learning program.

[106] New and unfamiliar grammatical features were introduced in a mode that would encourage and activate self-dependent cognition of basic grammatical structures. The instructor in the audio-program did not explicitly supply grammatical explanations. Instead, when introducing something new, he referred to relevant familiar structures, structures that the learner had been exposed to earlier in the learning process. E.g. after having learnt the word *zhīdao* (to know), they were asked to respond to the question "do you know him?" with 'no' and generate the so far unknown version of 'bù zhīdao'.

interlanguage grammar. Via trial and error, they eventually extended their unconscious knowledge of subtle distinctions and ideally succeeded in implementating and successfully integrating a wholly new grammatical feature into their L2. In other words the program assumes that by drawing on minimal input, learners eventually develop subtle and abstract knowledge of specific features and incorporate these features in a self-regulatory manner into a steadily expanding knowledge-base of their L2.

Example 1:
Are you Chinese?

ma-formation	*verb-not-verb* structure
Nǐ shì Zhōngguórén ma?	Nǐ shì bú shì Zhōngguórén?

'no'
=
bú shì

Example 2:
Can you speak Mandarin?
=

ma-formation	*verb-not-verb* structure
Nǐ huì shuō Pǔtōnghuà ma?	Nǐ huì bú huì shuō Pǔtōnghuà?

'no'
=
bú huì

Example 3:
Do you have US-dollars?
=

ma-formation	*verb-not-verb* structure
Nǐ yǒu Měijīn ma?	Nǐ yǒu méi yǒu Měijīn?

'no'
=
méi yǒu

Table 4-7 lists the replies to the yes/no questions in Part 1. These are sentences 2, 5, 8, 18 and 21 (see Appendix 5). There was a maximum of 25 answers per group (5 per person), again depending on target achievement in terms of units. Group A produced 16 correct answers out of 21 which is equivalent to a success rate of 76 percent. From among 23 test samples, group B generated 21 correct versions, which amounts to 91 percent success rate. With a score of 18 correct replies of the maximum of 25, group C came up with the lowest success rate of 72 percent.

Reply	**2**	**5**	**8**	**18**	**21**			
Code								
A-2	0	1	1	1	1			4
A-3	1	1	1	1	1			5
A-1	1	1	1	0	1*			4
A-6	1	0	1	x	x			2
A-4	0	1	0	x	x			1
total	**3**	**4**	**4**	**2**	**3**		**21**	**16**
B-8	1	1	1	1	1			5
B-3	1	1	1	1	1			5
B-1	0	1	1	1	1			4
B-9	1	1	1	1	1			5
B-5	0	1	1*	x	x			2
total	**3**	**5**	**5**	**4**	**4**		**23**	**21**
C-5	1	1	1	0	1			4
C-8	1*	1	1	1	1			5
C-9	1	1	1	1	1			5
C-1	0	1	0	1	1			3
C-7	0	0	0	0	1*			1
total	**3**	**4**	**3**	**3**	**5**		**25**	**18**

Table 4-7: Reply to yes/no questions (maximum: 25 answers)
* incomplete, but colloquially correct

Table 4-8 (p. 210) juxtaposes and brings together the results of language production of yes/no questions and replies (medium value). Interestingly, they are not fully congruent with relative learner success as displayed in Diagram 2-3 (see p. 196 - with a percentage of 73-80-73).

	questions	replies	**medium value**	**relative LS**
A	67%	76%	**~ 72%**	**73**
B	89%	91%	**~ 90%**	**80**
C	73%	72%	**~ 73%**	**73**

Table 4-8: Medium value of relative learner success of yes-no questions and replies vs. relative LS

The question now arises, why group B diverges by 10 percent, whereas groups A and C show complete analogy. In face of a fairly high success rate and a zero probability of cross-linguistic influence, it may be argued that in general adult L2 learners are able to acquire complex and subtle properties of language that were not explicitly induced from L2 input. The ability to transfer the one-time introduced principle of the structure of a yes-no reply (shì / bú shì) to other verbs (xiǎng / bù xiǎng) support the theory of the existence of unconscious knowledge of subtle distinctions as proposed by White (2003: 22-57). One example of one phrase, and the subjects automatically knew the internal structure of all other phrases. The clear margin lead of group B over groups A and C furthermore evinces that among the adult learner group as a whole we must bear in mind the probability of differences. However, the scarce data of this phenomenon within the present study do not allow for a proper statistical analysis. Drawing hasty conclusions on the basis of evidence relating to one structure only is neither advisable nor permissible. Nevertheless, I am inclined to second Flynn's position who maintains that Universal Grammar continues to underpin second language learning, both for adults and children, and that there is no such thing as a critical period after which Universal Grammar ceases to operate (Flynn, 1996: 121-158).

In summary, it may be argued that despite the impeding fact that not all participants had reached the ultimate learner target of 30 units and thus

could not be exposed to the whole range of relevant linguistic features, the above data seem to support Mitchell & Myles's argument that the question whether Universal Grammar is available to second language learners ought to be replaced by more focused questions such as "which sub-components of Universal Grammar might be available or not to the second language learner" or "how Universal Grammar interacts with other modules involved in language learning" (Mitchell & Myles, 2004: 83). The consistently high percentage of relative learner success across the three groups shows that test persons were able to understand and apply the subtle properties of this grammatical feature. Unfortunately, the limited scope of the present paper does not permit reliable conclusions concerning the lead of group B over groups C and A. However, it seems likely that future research that takes an exclusive look at this specific feature may trigger valuable insight and allow proposals as to the precise nature of age-related Universal Grammar influence.

6.3 Learner Variables (Charts 1-2, 1-3, 1-4)

For reasons of a comprehensive insight into learner variables originating in demographic variation and personality traits, the following data were generated from the initial and final questionnaires and listed in Charts 1-2 (see p. 212), 1-3 and 1-4 (see Appendix 7): On the one hand these charts give account of general education and recent educational involvement, job situation, previously learnt foreign languages including self-study experience, and previous contact with target language and culture, issues that will be investigated in Chapter 6.3.1. On the other hand these variables are an informative resource about learner beliefs and learner characteristics, though as must be conceded, questionnaire data are generally subjective self-reports and therefore always arguable in terms of validation. Furthermore it must be stated, that although these parameters give a revealing insight into each individual's personal beliefs, their impact on learner results are difficult to measure and determine. It is important to

note that respective conclusions concerning learning success are highly hypothetical and call for critical assessment. Chapter 6.3.2 evaluates these aspects in terms of learner success.

6.3.1 Learner demographics

6.3.1.1 Educational background and employment

Chart 1-2 scores information on the educational and vocational history of the test persons.

PERSONAL DETAILS - HARD FACTS								
A	L	M	N	O	P	R	S	T
	PQ-8	PQ-8	PQ-4	PQ-5	PQ-3	PQ-16	PQ-13	PQ-14
Code	Proficieny	Languages	U.E. Dipl.	Univ. degree	Job	Prev. edu.	Mandarin	Culture
A-2	**3** - A B B	IT SP RU	yes	no	part	no	no	5 +
A-3	**4** - A I I B	IT SP FR JP	yes	yes	full	yes	no	5 +
A-1	nil	nil	no	no	full	yes	no	5 +
A-6	**1** - I	FR	no	no	full	yes	no	5 +
A-4	**3** - A I B	IT FR SP	yes	no	full	no	no	5 +
	2,2							
B-8	**3** - A I B	FR IT SP	yes	no	full	no	no	5 +
B-3	**1** - I	IT	no	no	full	no	no	5 +
B-1	**3** - I B B	FR IT CH	yes	no	full	yes	basics	5 +
B-9	**3** - A A I	FR IT SP	yes	CPL	part	no	no	5 -
B-5	**2** - B B	IT SP	no	no	full	yes	no	5 -
	2,4							
C-5	**4** - A A I B	FR SP GR HI	yes	yes	part	yes	no	never
C-8	**4** - A I B B	FR IT SP LA	yes	CPL	full	yes	no	5 +
C-9	**4** - A A I B	FR SP IT PT	yes	yes	part	yes	no	5 +
C-1	**2** - I B	FR IT	yes	no	full	no	no	5 -
C-7	**1** - I	IT	yes	no	full	no	no	5 +
	3							

Chart 1-2: Questionnaires – demographic data

Columns N (university entrance diploma) and O (university degree or equivalent higher education) in Chart 1-2 reflect the subjects' educational background as regards school graduation (A-level/Matura/Abitur – yes or no), and university degree as well as higher job education. Two test persons of group A have O-levels, three hold an A-level, one of them with a university degree. Group B shows a similar pattern with two O-levels and three A-levels, one of the A-level subjects holding the Commercial Pilot License (CPL), a vocational training which in terms of educational standards may be compared with tertiary education. Group C has the highest educational standard with five A-levels, two university degrees and one CPL-holder. Column R in Chart 1-2 refers to recent educational measures. Within the last five years, three subjects of group A had taken advantage of further educational training, two of group B and three of group C. The others had not been involved in specific, non-job-related learning processes. However, as the exact nature of these activities is non know, their evaluation is not considered conclusive in terms of explanatory power.

While group C scores highest in terms of educational background and further training, which may be regarded as additional evidence for their lead, these data must be treated with caution and may at best be considered as partially significant. Though these data indicate particular disposition and added willingness to involve in continuing education and thus may be seen as having a potentiating effect, they do not allow for the extraction of reliable and coherent evidence in terms of learning success. These traits may be compared to what Dörnyei regards as "the two dimensions that are intuitively most closely related to learning", "Openness to Experience and Conscientiousness", and which he links to the production of consistent learner results (Dörnyei, 2005: 20). Despite the fact that he considers these personality dispositions as having a positive impact, Dörnyei continues that "even in the studies that do report a significant association between personality and learning measures, this

relationship rarely explains more than about 15% of the variance in academic performance" (Dörnyei, 2005: 21).

Without doubt the difficulty to assess personality-achievement correlation is obvious, and to date research has not been able to produce compelling results. The present study is no exception. The comparison of the scores shows a pattern that is too heterogeneous to deliver an all-embracing answer, however, it determinedly seeks to accentuate the presence of a strong link between personality traits and learner achievement that deserves more attention in order to overcome the research deficit that Dörnyei notes in his seminal book on individual learner differences (Dörnyei, 2005: 24).

Column P in Chart 1-2 gives account of the subjects' job situation. As had been mentioned earlier, being part of the work force was essential to qualify for participation in the project. It has also been stated that for the purpose of a homogeneous starting point, the recruiting process focused on a specific field of business, the aviation business. This was to guarantee a certain degree of conformity in working conditions and pace of life. People who work in this business are continually subject to change of climate and time difference. In general they are exposed to a physiologically delicate and challenging working environment. From among all 30 participants three do not belong to this professional category. Based on their learner progress, they were among those who qualified for linguistic analysis. One group-C-member is self-employed, the second one a free-lance English language teacher. The non-flying member of group B is also self-employed. As can be seen in Chart 1-2, there are differences in terms of working schedule with 4 subjects working part time (each one in groups A and B, and two in group C) and 11 full time. These data are included for reasons of completeness, though it must be stated that they are not believed to adduce evidence as to a direct correlation between learning success and scope of work completed during the study period.

6.3.1.2 Multilingual influence

Another possible influencing factor that was taken into consideration is previous foreign language learning experience. Not included in this list is English as a foreign language for the following reason: English is the base language of the learning program and good command of this language was a pre-requisite of participation. As a lingua franca it takes a prominent role in the subjects' working lives, both as an essential job requirement and in terms of day-to-day business.

For the purpose of a comprehensive coverage of the language aspect, we must briefly refer to the learners' history in terms of target language and culture. Column S and T of Chart 1-2 refer to the subjects' pre-study exposure to Chinese language and culture. Inquiries about previous knowledge of the target language as well as contact with Chinese culture generated the following results: One subject of group B reported very little previous knowledge such as greeting, saying 'thank you' or counting from 1 to 10. The remaining participants had never had any pre-study contact with the target language (Chart 1-2, column S). In terms of previous contact with Chinese culture only one test person, who eventually ranked number one in group C, had never been to a Chinese-speaking country before. Eleven of the remaining participants had been to China more than five times, three less than five times (Chart 1-2, column T). Although almost all participants had occasionally been exposed to the target language in real life situations, they had never seriously engaged in it.

Columns L and M in Chart 1-2 give detailed account of individual multilingual prerequisites concerning language family (M) and corresponding proficiency level (L). The chart shows that group C has the highest level of foreign language expertise both in number of languages and skills. While subjects in group A and B speak an average of 2.2 respectively 2.4 foreign languages, group C sets itself apart with an average of 3 languages per test person. From this it may be concluded

that previous L2 learning experience seems to have a positive impact on the learning of a successive language. However, the present data do not supply sufficient evidence. In order to permit more reliable verification, the factor would have to be isolated in future studies.

At this point it may be argued that there is a correlation between the data at hand and Jessner's theory of multilingual proficiency as a potential driving force in the process of the acquisition of a new language. The fact that group C has a more expanded multilingual background may to some extent explain their ultimate lead. This assumption may be corroborated by the fact that the three best performers of group C speak 4 foreign languages, the leader being a foreign language teacher. The interaction of linguistic awareness and a solid strategic toolbox does seem to foster learner success. Given the putative impact of the multilingual mind within this study, Jessner's plea for a more positive approach with "a reorientation towards the dynamics of multilingualism" (2006, 141) seems to be of cumulative importance and ought to be pushed forward in future research projects.

For reasons of a broader perspective, Table 4-9 (p. 217) looks at this aspect from a different angle. Contrary to the above view, it is not comparative in terms of group differences, but aims at extracting all-embracing information on whether there is a correlation between previous foreign language potential and learner success in a new learner setting. The table shows a cross-sectional profile of subjects with a previous language learning experience of 0 to 2 respectively 3 to 4 and juxtaposes it to their combined value of relative learning success. 6 subjects with a previous foreign language learning experience of up to two languages achieved an average relative learner success of 67 percent. 9 subjects who had reported preceding learning experience of 3 or 4 languages reached 81 percent and thus outperformed their peers by 14 percent. Again it must be pointed out that the figures referring to foreign language

expertise do not include English. From this we may conclude that linguistic awareness seems to be both an essential product and a necessary prerequisite of multilingualism. The results render affirmative proof of the catalytic effect of multiple foreign language learning as pinpointed by Jessner (2006: 140). The cognitive advantages of multilingualism that are to a large extent based on an increased level of metalinguistic awareness are beyond doubt an emerging property.

languages	0 to 2	3 to 4
subjects	6	9
combined relative LS	67%	81%

Table 4-9: Previous language learning experience versus medium value of relative learner success

Finally I would like to hint at one aspect that needs to be considered when relating learner success to multilingual experience: the tight bond between multilingual competence and learning strategies. This issue, which is regarded to be of eminent importance will be referred to in detail in Chapter 6.3.2.3.

6.3.1.3 Summary

In sum, with reference to learner demographics the findings of the study suggest the following: There are indications of a notable interdependency of previous and current foreign language learning experience. However, with regard to other age-extrinsic factors such as level of education or job implications, the presented data do not generate conclusive results. If we want to learn more about the influence of these parameters, it will be essential to expand respectively adjust the scope of research, both in terms of number of subjects and in terms of research approach. If we start

from the assumption that there is a causal relationship between general educational level and language learning aptitude, the underlying approach into this field of research will have to be different from the present approach. A specially designed questionnaire with a more detailed and comprehensive investigation of this research issue might be one way to allow for a reliable examination of and better insight into this feature.

6.3.2 Psycholinguistic and cognitive features

In the following we will turn to learner beliefs and strategic measures as they were queried, scrutinized and recorded in Charts 1-3 and 1-4 (see Appendix 7). From these charts indices were segmented and compiled in various Tables (4-10 to 4-20), and inserted in the following chapters, according to relevance.

As has been outlined in Chapter 2.3, a most significant and crucial factor in the process of learning a foreign language lies in the complex and widely ramified network of individual differences. In compliance with recent propositions by Ellis (2004) and Dörnyei (2006) for an overarching and concerted approach, aspects such as motivation, self-concept, expectations, propensities, self-consciousness, self-efficacy, self-regulation, learning styles and strategies, and self-assessment are part and parcel of the present empirical study. The corresponding data were generated from both questionnaires (pre-study and final) in which test persons were asked to give a personal record of expectations, strategies, experiences and self-awareness (for explanation of questionnaires and study diaries see Chapter 5.6.1.4).

6.3.2.1 Motivation

Table 4-10 (p. 219) lists each individual's report concerning preactional and postactional motivation. At the outset of the project (initial = pre-study questionnaire, henceforth: PQ), test persons were asked to rate their

motivation level on a scale from 10 (highly motivated) to 1 (absolutely demotivated) (Table 4-10, columns U). They were exposed to the same question at the end of the project (final questionnaire, henceforth: FQ) (Table 4-10, columns V), just before taking the two oral tests. It was considered essential to extract the postactional data prior to the two tests, as the subjects' self-perception of the ultimate performance may have influenced their self-assessment in a distorting manner. The results of the questionnaires show the following pattern of self-perception across the 15 subjects of the three test groups (see Diagram 2-6).

A	U	V	A	U	V	A	U	V
	PQ-20	FQ-31		PQ-20	FQ-31		PQ-20	FQ-31
Code	Mot. before	Mot. after	Code	Mot. before	Mot. after	Code	Mot. before	Mot. after
A-2	10	10	B-8	9	9	C-5	7	10
A-3	10	10	B-3	10	10	C-8	9	10
A-1	9.5	9	B-1	10	10	C-9	7.5	7.5
A-6	7.5	5	B-9	8	10	C-1	5.5	6.5
A-4	8	3	B-5	7.5	8	C-7	7	8
mean v.	**9**	**7.4**	mean v.	**8.9**	**9.4**	mean v.	**7.2**	**8.4**

Table 4-10: Motivation

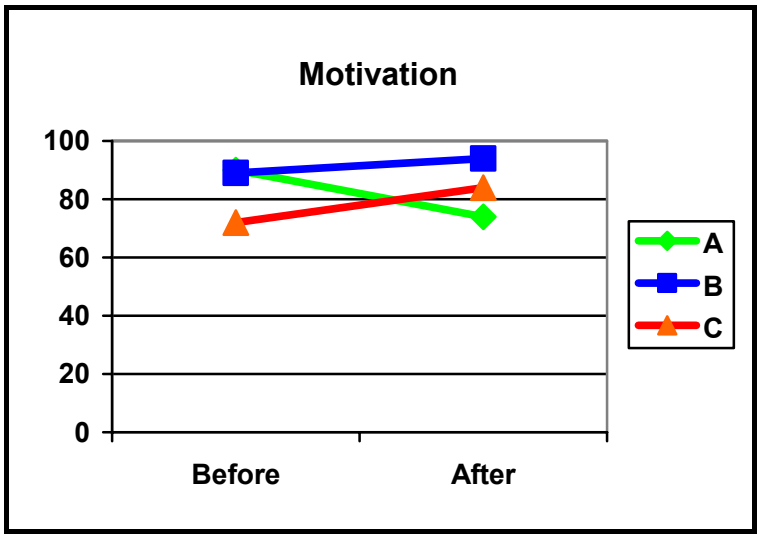

Diagram 2-6: Motivation
before: A/90 – B/89 – C/72
after: A/74 – B/94 – C/84

Group A, who ended up third in learner success ranking, shows a falling motivational curve by 16 percent, from 90 at the beginning to 74 at the end of the project. In terms of initial motivation that according to Dörnyei/Ottó (Dörnyei, 2005:85) refers to motivational functions such as setting goals, forming intentions and launching action, this group started out with the highest expectations. The falling motivational curve towards the end of the project phase may reflect personal disappointment with ultimate target achievement as a result of the inability to master all 30 units within the given time span.

Group B, the runner up in ultimate learner success, shows a rather balanced motivational curve. With a motivation level of 89 percent at the outset, their motivation eventually rose by 5 percent to 94 at the end of the project. This suggests a degree of enjoyment in learning the language and general contentedness with one's own performance. With reference to the Dörnyei/Ottó taxonomy it may be argued that in terms of executive motivation that comprises generating and carrying out subtasks and ongoing action control, this group had been able to live up to and even slightly surpass own expectations.

Group C, who performed best, also shows a rising level of motivation from beginning to end. With a factor of 72 percent at the start of the project, their motivation eventually rose by 12 percent to 84 at the end of the learning phase. The considerable rise in motivation in the course of the study period may be regarded as a clear indicator of profound satisfaction with personal performance and achievement of objectives. With regard to the three-staged Dörnyei/Ottó model, it may be stated that well-engineered action control as well as mature knowledge and use of self-regulatory strategies in the actional stage effectuated motivational development in a highly positive way.

All in all, the results are congruent with ultimate learner success in terms of ranking and corroborate Dörnyei's concept of the dynamic and changing quality of motivation as outlined in Chapter 2.3.4.3. Present data of the three groups militate in favor of the chronological variance of the motivation factor as a product or mirror of learner performance. They verify Dörnyei & Otto's Process Model of L2 Motivation (Dörnyei 2005: 84ff) that breaks down the motivational process into three discrete temporal segments, from wishes and desires to enactment and execution and then on to retrospect and evaluation. Interestingly, the first or 'preactional' stage, that leads to the selection of the goal the individual is going to pursue, shows a very high score within groups A and B, whereas group C starts out with a fairly moderate motivational level. Among the variety of influences this stage comprises, expectancy of success and perceived coping potential may have played a major role especially for group C. As opposed to this, it seems that at stage one groups A and B were primarily driven by other aspects such as goal relevance and intentions. The second or 'actional' stage was documented in the study diaries and is generally in line with learner progress. The 'postactional' stage, which reflects the learners' retrospective evaluation of how things went, is a perfect mirror image of overall group performance. It is closely tied to learner success, mapping a fairly realistic self-concept of each group. Group A, who achieved the poorest results, reports a 16 percent motivational decline. In group B, the runner up, we can observe a slightly upward moving motivational curve of 5 percent, while the best-performing group C presents a climbing motivational curve of 12 percent.

However, a view from a different angle, a view that does not focus on motivational evolution but juxtaposes the static final stage motivational level of the three groups, produces a picture that does not coincide with learner success over the three groups. Though group B shows the highest degree of satisfaction with 94 percent, this group is not the highest performing one in terms of absolute learning success. What does this tell

us? Of course we must never forget that whenever self-assessment is involved, we are walking on thin ice. The diversity of individual self-concepts inevitably hampers objective evaluation. Without doubt, this is one of the major shortcomings of the psychological aspects of individual differences research. It affirms Dörnyei's conclusion that although the study of human personality has generated a great amount of knowledge, "it is likely to remain an active and developing field in psychology for the foreseeable time" (Dörnyei, 2005: 14).

6.3.2.2 Learner self-concept and self-efficacy

Learner self-concept and self-efficacy is the individual's perception of one's skills and abilities regarding specific learning targets. In the following I will explain, how these values were determined and for reasons of comparability converted into congruent values. This source refers back to questions PQ-18 (expectations prior to the study phase) and FQ-25 (expectations concerning learner output after the study phase and before taking the test) in the two questionnaires and is then juxtaposed to learner retentiveness as it was measured in the category *relative learner success*.

At the outset (PQ-18) subjects were asked to rate their expected command of the language they were going to learn on a scale from 1 (poor command) to 10 (excellent command). The question went as follows: "After the learning phase of three months, what are your expectations in terms of fluency and command of the language you were exposed to in the course". This was to determine their pre-study self-concept of individual learner capability. The same question with the same answer scale was posed in the final questionnaire (FQ-25). Before taking the test, subjects were asked: "How would you rate your overall command of the language you had learnt in the course of this project?". The answer was to provide an evaluative and interpretive view of their expected post-study performance. In other words, subjects were asked to give account of their

current (post-study) view of their L2 learner self as regards retentiveness. Table 4-11, columns W and X gives account of these results.

A	W	X	A	W	X	A	W	X
	PQ-18	FQ-25		PQ-18	FQ-25		PQ-18	FQ-25
Code	Self-ass. bef.	Self-ass. after	Code	Self-ass. bef.	Self-ass. after	Code	Self-ass. bef.	Self-ass. after
A-2	5	8	B-8	6	8	C-5	4	7
A-3	8	7	B-3	5	7	C-8	6	8
A-1	6.5	8	B-1	7.5	6	C-9	3	7
A-6	4.5	7	B-9	4	8	C-1	7	7
A-4	5	7	B-5	7.4	6.5	C-7	5	6
mean value	**5.8**	**7.4**	mean value	**6**	**7.1**	mean value	**5**	**7**

Table 4-11: Expecations / self-concept before and after study phase

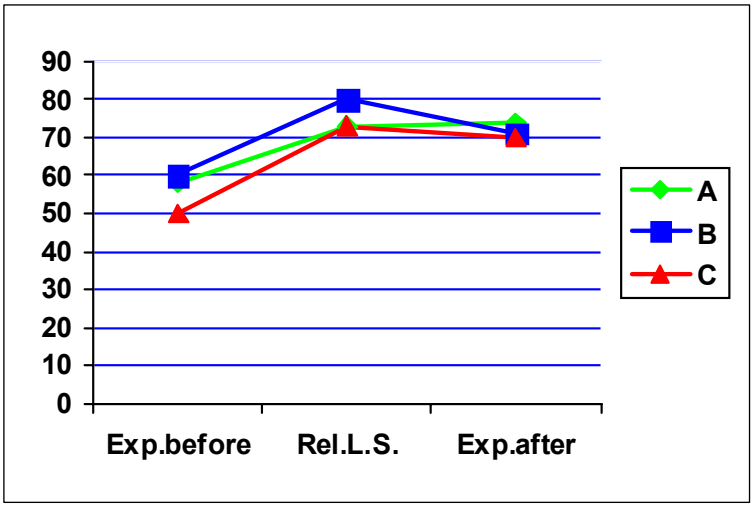

Diagram 2-7: Self-concept of retentiveness

Expectations before: A / 5.8 – B / 6.0 – C / 5.0
Relative Learning Success: A / 73% – B / 80% – C / 73%
Expectations after: A / 7.4 – B / 7.1 – C / 7.0

Diagram 2-7 depits the curve of 'prior expectations' – 'relative learning success' – 'post-study expectations' and is a revealing source of learner self-concept and self-efficacy across the three groups. On the one hand, the chart gives account of how the subjects thought they would perform. It reflects their expectations of their "ideal learner outcome", which (though on a slightly different level, i.e. the level of expectations) corresponds to

Dörnyei's motivational concept of an *Ideal L2 Self* (see Chapter 2.3.4.3). On the other hand, it reflects the subjects' self-concept as regards the ability to memorize language input by juxtaposing relative learning success and its post study self-evaluation. In other words, here subjects expressed their opinion on what they thought they were able to retain with reference to what they had learnt (learner progress in units), which links with Dörnyei's concept of an *Ought to L2 Self* (see Chapter 2.3.4.3). Altogether the diagram reveals an interesting pattern of self-concept across the three groups. In the following I will refer to the explanatory power of these values, depending on two different perspectives of assessment.

The first perspective is that of the direct comparison of pre- and post-study expectations. Group A starts out with an expectation level of 5.8 and reports an expectation level of 7.4 at the end of the study phase. Group B indicates a pre-study expectation level of 6 as opposed to 7 at the end of the study phase. Group C quotes an initial expectation level of 5 versus a final expectation level of 7. Thus, from the perspective of development over time, the expectation level rises across all three groups, with +1.6 in group A, +1.1 in group B, and +2 in group C. In view of the general tendency of rising expectations in terms of learning success it may therefore be argued that the study phase was experienced as positive, beneficial and productive across all three groups.

The second perspective views each of these two values (pre- and post-study expectations) in relation to the retentiveness factor as expressed in the *relative learning success*. Table 4-12 (p. 225) lists the ratings and results of each group and offers a more specific and subtle informative value.

First of all, we will turn to group A. With an initial expectation level of 5.8 points and a relative learning success of 73 percent, participants of group

A rate their assumed capability to store language input lower than test results show. The deviation is 1.5 points or 15%. In other words, at the outset they underestimate their learning capability by these measures. As opposed to this value their post-study expectations of 7.4 points come very close to their effective retentiveness factor of 73%. With a deviation of 0.1 points or 1% their post-study expectations slightly exceed learner achievement. In other words, their self-concept changes from underestimation at the outset to a slight overestimation at the end of the project.

group	pre-study expectations vs. relative LS	relative LS vs. post-study expectations
A	5.8 points / 73%→ +1.5 (15%)	73% / 7.4 points → +0.1 (1%)
B	6 points / 80% → +2 (20%)	80% / 7.1 points → - 0.9 (9%)
C	5 points / 73% → +2.3 (23%)	73% / 7.0 points → - 0.3 (3%)

Table 4-12: Deviation – expectations / relative learner success

Group B shows a different pattern. This group starts out with a pre-study expectation level of 6 points and achieves a learner result of 80 percent. At the end of the study phase they report an expectation level of 7.1 points. While at the outset they underestimate their learner capability by 2 points respectively 20%, their self-concept in terms of memorizing language input at the end of the study phase (with a deviation of 0.9 points respectively 9%) continues to be more pessimistic than learner results suggest. In other words, they underestimate their own learning capabilities both at the beginning and at the end of the study phase.

Group C shows a curve that tends to be similar to that of group B. However, it is different in degree. This group reports the lowest level of initial expectations with a moderate 5 points at the outset of the study phase. With a relative learning success of 73 percent, they exceed initial learner expectations by 2.3 points or 23 percent. Similar to group B, they

eventually rate their capability to store language input lower than test results show. At the end of the study phase they forecast their retentiveness factor with 7 points, which is 0.3 points or 3% lower than actual performance.

In sum, the above data give insightful information on the self-concept and self-efficacy of the three groups. In terms of group comparison, group A shows the lowest rate of deviation in both directions (1.5 / 0.1), followed by group C (2.3 / 0.3) and group B (2 / 0.9). Thus it may be argued that with reference to the *3-Power-Model,* group A comes closest to reality as regards their self-concept of the *brainpower component*.

Whether, and to what extent the above mentioned self-concepts do de facto influence learner outcome can not be answered conclusively at this point. However, though the collected data may not reflect universal validity, their quality in terms of overall group variation suggests that these factors may have an impact on learner success. In any case, they give support to Ellis's appeal that it is time to grapple with the role of consciousness as an overriding issue in future L2 acquisition research (Ellis, 2004: 547; see also Chapter 2.3.3 of the present study).

6.3.2.3 Language learning strategies and self-regulation

In this chapter we will turn to aspects that were investigated in the final questionnaire and refer to self-regulatory measures such as time management, and individual language learning strategies such as for instance the use of mnemonic devices. The elicitation of relevant data is an attempt to determine the impact of certain strategic steps on learner success. The time management data were elicited from questions FQ-2, FQ-5 and FQ-18, which run as follows:

FQ-2: Throughout the whole learning period, approximately on how many days did you learn?
FQ-5: Would you have preferred a set time frame to stick to? (e.g. deadlines for handing in the 5 study diaries)

FQ-18: Did you set up a time-plan before you studied learning? – If your answer is “yes”, were you able to stick to your time plan?

Consciously applied learning strategies were derived from FQ-19 and FQ-20. They read as follows:

FQ-19: Human memory is fundamentally associative. You can remember a new piece of information better if you can associate it with previously acquired knowledge that is already firmly anchored in your memory. to what extent did you make use of such mnemonic hooks?
FQ-20: Did you in any form use the German language as a resource or medium? (e.g.: using learning cards, mere mental processes)

The compiled data are listed in Charts 1-3 and 1-4 (see Appendix 7) and short-listed in Table 4-13.

	FQ-2	PQ-17	FQ-17	FQ-18	FQ-18	FQ-19	FQ-5
Code	Study days	Planned days	Coping	Time-plan	cont.	Mnem. hooks	Pref. time frame
A-2	68	32.5	4	no	0	20	no
A-3	30	58.5	4	no	0	30	yes
A-1	37	32.5	4	yes/no	10+ 10-	10	no
A-6	9	32.5	2	no	0	0	no
A-4	15	32.5	3	no	0	20	yes
	159	**188.5**	**3.4**		**0**	**16**	**40% yes**
B-8	50	32.5	3	yes/yes	10+10+	0	no
B-3	70	58.5	4	yes/partly	10+ 5+	10	no
B-1	30	58.5	4	no	0	10	no
B-9	20	32.5	4	no	0	10	no
B-5	20	58.5	4	yes/no	10+ 10-	15	yes
	190	**240.5**	**3.8**		**35**	**9**	**20% yes**
C-5	50	32.5	4	no	0	40	no
C-8	60	32.5	4	yes/partly	10+ 5+	20	no
C-9	70	58.5	3	no	0	70	no
C-1	56	32.5	4	yes/yes	10+10+	15	no
C-7	75	32.5	3	yes/yes	10+10+	30	no
	311	**188.5**	**3.6**		**55**	**35**	**0% yes**

Table 4-13: Learner strategies & self-regulation

At the outset, a brief look at the subjects' statements on general coping abilities as investigated in question 17 of the final questionnaire and their satisfaction with the quality of the learning program as investigated in question 6 of the final questionnaire is meant to build a bridge to time management aspects.

In FQ-17 subjects were asked "With this learning method I could cope …", and offered the following 4 answer options: a) very well (4 points), b) well (3 points), c) more or less satisfactorily (2 points), and d) not at all (1 point). This question refers to learning methodology. It determines the subjects' ability to cope with the self-study program and shows a fairly congruent pattern across the three groups. Group B stated to have been able to cope best (with a total of 19 points out of 20), slightly ahead of group C (with a total of 18 points) and group A (with a total of 17 points). These learner statements largely comply with satisfaction concerning the general quality of the study program, which was investigated in question 6 of the final questionnaire. In FQ-6 participants were asked "In general, were you satisfied with the quality of this language learning program?" and had the following answer options: a) very satisfied (4 points), b) satisfied (3 points), c) partly satisfied (2 points), and d) not satisfied (1 point). This analysis shows a 100 percent satisfaction level for groups A and B with 20 points each and a slightly lower level of group C with 19 points.

Diagram 2-8 (p. 229) juxtaposes these two parameters. The finely nuanced variance of these two parameters across the three groups does not give sufficient proof of age-related differentiation. It seems, however, that the information at hand is clear and supportive evidence for the effectiveness of the learning method for all three age groups.

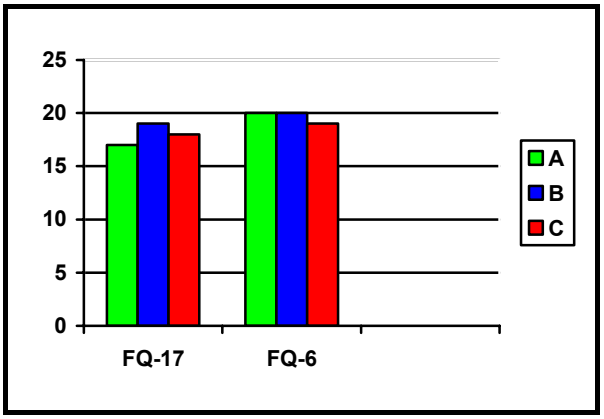

Diagram 2-8: Evaluation of learning method and program:
FQ-17: Coping with learning method
FQ-6: Satisfaction with learning program
Maximum number of points per group: 20

Question 18 of the final questionnaire (FQ-18) reflects time management strategies (see Table 4-13, p. 227, column 5 for general results and column 6 for fine-tuned results). Subjects were asked whether they had set up a time-plan before they started learning, and if so, whether they had been able to stick to that schedule. While only one group-A-member reported to have worked out a time-plan without having been able to comply with it, the patterns of groups B and C concerning this strategic tool are congruent. Two subjects of each group reported that they had not set up any specific time-schedule, whereas three members of each group confirmed the use of this supportive measure with varying success (Table 4-13, p. 227, column 5). The comparison of group A with groups B and C taken as a single combined unit, adduces strong evidence for the impact of consciously applied time-management methods on ultimate learner success. However, comparison of groups B and C does not allow for this conclusion. With reference to the limited number of test persons, the available data do not seem to hold sufficient statistical validity regarding a differentiated analysis of this aspect for groups B and C. Indeed, extrapolation of the fine-tuned data of groups B and C render more significant results (Table 4-13, p. 227, column 6).

As cited on page 227, FQ-18 is split into two parts:

1. Did you set up a time plan? (with two answer options: *yes* and *no*)

– and if so

2. Were you able to comply? (with 3 answer options: *yes*, *partly* and *no*)

Table 4-14 gives account of the projection of the available data into mathematical entities. For analytical reasons, the following mathematical key was designed: If the answer in the first part of the question was *no*, subjects received 0 points. If the answer was *yes/yes*, candidates received 10+/10+ points. For *yes/partly* 10+/5+ points were assigned and for *yes/no* 10+/10- points were allocated. With a ratio of 0-35-55 for groups A-B-C, these hypothetical data are largely in compliance with the ratio of absolute learner success (absolute mean value / AMV = 41-61-81).

group	yes/yes 10+/10+	yes/partly 10+/5+	yes/no 10+/10-	no 0	points	compliance rate
A	-	-	1	4	10+/10-	0
B	1	1	1	2	45+/10-	35
C	2	1	-	2	55+	55

Table 4-14: Time-management data (Table 5-13, columns 5 and 6)
Mathematical key: 10+/10+ = yes/yes (= full compliance with time plan)
10+/5+ = yes/partly (= partial compliance with time-plan)
10+/10- = yes/no (= failure to comply with time plan)

Given the lack of a specific time-management strategy of group-A-subjects, and assuming that setting up a time-schedule is primarily a matter of wanting or willful intention we may conclude that this *willpower* component is potentially underrepresented in this group, a fact that immediately translates into learner success. Groups B and C show a wholly different *willpower* pattern with a high degree of conformity at the beginning and evolving variance in the course of time. Although they had started out with identically set goals, they eventually drifted apart when it came to

launching actions and following through. In other words, within group C self-regulation with concrete strategic objectives was much more mature, a fact that is consistently reflected in their ultimate learner success.

Another interesting aspect of learner needs may be derived from the comparison of effective time management strategies as reported in FQ-18 (implementation and realization of a time-plan) and post-study judgements as ascertained in FQ-5 (see Table 4-13, p. 227, column 8), where participants were asked whether they would have preferred a strictly set time frame with deadlines for handing in the five study diaries and termination of the individual study phase in case of non-compliance. Table 4-15 juxtaposes these two parameters and compares pre-study planning and mid-study implementation (left) to diagnosed post-study needs (right).

	FQ-18	FQ-5
A	0	2
B	35	1
C	55	0
	accomplishment	requirements

Table 4-15: Effective time management vs. requirements
accomplishment: in points (maximum per group = 100 points)
requirements: persons per group

For a more holistic look, the following explanation also considers ultimate learner success (AMV, *absolute mean value*).

2 subjects of group A, a group with zero-effectiveness in time-management procedures and with 0 effectiveness points (Table 4-15) and the lowest level of learner success (AMV = 41%), argue that they might have achieved better results if exposed to a strict time-corset. One subject of group B, a group that achieved a numerical value of 35 (out of 100; see Table 4-15) effectiveness points regarding time management and ranks

midfield in terms of learner success (AMV = 61%), states to have preferred a fixed schedule. None of the group-C-subjects, reports to have preferred a strict time-corset. This group was not only the most efficient group in terms of time-management skills, but also with regard to ultimate learner success (AMV = 81%).

In plain language, the left column (FQ-18) of Table 4-15 (p. 231) says “this is what I accomplished”, and the right column (FQ-5) says “this is the assistance I need”. These findings suggest that the younger the learner, the less developed his/her efficiency in terms of self-dependent action and the more pressing the need for extrinsic strategic time-management mechanisms. As such these results are an important marker for the conceptual formulation of future learner strategic measures. With reference to the *3-Power Model*, it may be argued that this indicates need for supportive action as regards the *instrumental power* component of younger learners.

Two additional aspects must be seen in close connection with actual time management skills. The first one refers to the test persons’ intentions regarding time management before the learning process, the second one alludes to effective study time as reported in question 2 of the final questionnaire (FQ-2) (Table 4-13, p. 227, column 2). In the initial questionnaire (PQ-17), (Table 4-13, p. 227, column 3) each learner’s pre-study time-concept in terms of task accomplishment was also probed. Participants were asked approximately how many days a week they thought they would dedicate to learning. Both groups, A and C, indicated a planned target of 188.5 days over 13 weeks, which would amount to a total of 37.7 per person for the whole study period respectively 2.9 days per person per week. Group B announced a planned target of 240.5 days over 13 weeks which would translate into 48.1 days per person for the whole study phase and an average of 3.7 days per person per week (see Appendix 7, Chart 1-4, column Z-E).

The following table (Table 4-16) lists the above data.

A-2	32.5	B-8	32.5	C-5	32.5
A-3	58.5	B-3	58.5	C-8	32.5
A-1	32.5	B-1	58.5	C-9	58.5
A-6	32.5	B-9	32.5	C-1	32.5
A-4	32.5	B-5	58.5	C-7	32.5
total	188.5	total	240.5	total	188.5

Table 4-16: Planned study days

It is interesting now to compare these figures with the ones obtained from the final questionnaire (FQ-2, see Table 4-13, p. 227) where subjects were asked to indicate their total number of study days. Out of 455 possible study days per group (91 per person), the total number of group A amounts to 159 effective study days, which corresponds to 31.8 days per person over 13 weeks and an average of 2.44 study days per person per week. The total study days of group B amounts to 190 days. This corresponds to 38 days per person over 13 weeks and an average of 2.92 study days per person per week. Group C reports a total of 311 study days. Broken down to individual values this means 62.2 days per person over 13 weeks and 4.78 days per person per week.

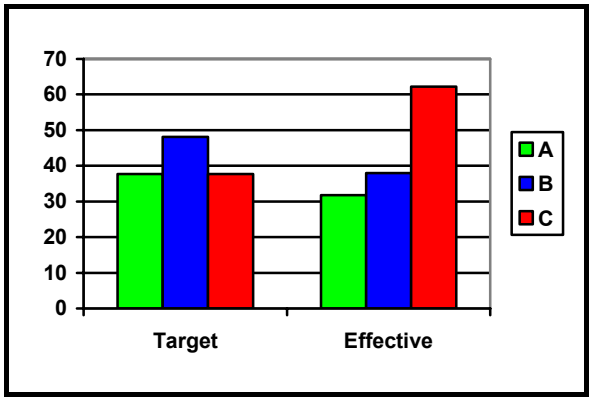

Diagram 2-9: Study days per person, over the time-span of 3 months
target: A 37.7 / B 48.1 / C 37.3
effective: A 31.8 / B 38 / C 62.2

As can be seen in Diagram 2-9 (p. 233), all three groups show a considerable amount of deviation from plan to reality. For clarification, the following calculations are listed in Table 4-17. Groups A and B show a shortage of time investment of 5.9 and 10.1 study days per person, whereas group C records an increased time effort of 24.9 study days per person.

	effective		intended		deviation (per person)
group A	31.8	-	37.7	=	- 5.9
group B	38	-	48.1	=	-10.1
group C	62.2	-	37.3	=	+24.9

Table 4-17: Deviation – intended (target) and effective study days

On the one hand, this deviation pattern supplies a clear age-related picture of the discrepancy between a learner's intentions and the subsequent realization. On the other hand, it is an indicator of flexibility and adaptability. While groups A and B show a regressive development in their learning endeavour, the performance of group C is highly progressive. It may therefore be argued that group C exerts the highest degree of combined *willpower* and *instrumental power* with the learning target continually in focus over the 3-month period and the ability to implement necessary steps. They proved to be in constant control of their learning progress, adapting rate of learning to the ultimate learning target. Their ability to ensure continuous self-monitoring may be regarded as one of the major driving forces and accentuate Lightbown and Spada's view "that some older learners do achieve the highest level of success" (Lightbown & Spada, 2006: 74).

After the investigation of the impact of time-management strategies on learner progress, we will now turn to other language learning strategies

that are also believed to be of significance. The corresponding data were obtained from FQ-19 and FQ-20 and relate to the conscious use of supporting devices in order to facilitate the learning process and/or enhance retentiveness.

As has been outlined in Chapter 2.3.4.5, images or 'mnemonic hooks' are part and parcel of cognitive strategies. Question 19 of the final questionnaire (FQ-19), which investigates the associative aspect of cognitive learner strategies, refers to the use of these auxiliary learning devices. It runs as follows:

"Human memory is fundamentally associative. You can remember a new piece of information better if you can associate it with previously acquired knowledge that is already firmly anchored in your memory. To what extent did you make use of such mnemonic hooks?"

On a scale from 0 to 100, subjects indicated how frequently they thought they had used this auxiliary device. For reasons of clarity, subjects were given a selection of samples (orally, during the process of filling out the questionnaire). As it turned out (see mean value, Diagram 2-10, p. 236), this feature shows a wide and varied spectrum across the three groups. While group C reports a 35 percent use of mnemonic hooks, group A states a 16 percent use and group B only 9 percent (Table 4-13, p. 227, column 7). Though the advanced age group reports a considerable use of this strategic measure, the fact that the curve is not a falling one from older to younger learners does not allow us to adduce evidence to age-related links. Nor does the link to previous language learning experience reveal significant evidence for stringent correlation, as this feature (previous use of menmonic hooks) was not included in the questionnaire.

However, when viewed from the perspective of the realm of language teaching methodology, one can very well detect a direct and powerful impact. The two subjects with the highest proportion of mnemonic hooks, C-5 with 40 percent and C-9 with 70 percent, are both qualified foreign

language trainers. With 88.75% relative learner success, subject C-5 ranks third, whereas C-9 takes with 79.63 percent ninth position in the individual ranking of all 15 subjects (Chart 1-1, column F). With reference to subject C-5 one might argue that there is a connection between methodological know-how and learner success, which would speak in favour of the *instrumental power* component. However, this does not apply for subject C-9. Given the fact that the two best-performers in terms of relative learner success reported a very sparse use of mnemonic hooks (B-9 with a relative success rate of 97.75 percent and 10 percent use of mnemonic hooks, and B-8 with a relative success rate of 91.25 percent and zero use of mnemonic hooks), methodological aspects seem to step back in favour of the *brainpower* component. Diagram 2-10 displays the individual use of mnemonic devices (numbers 1 to 5 refer to in-group ranking).

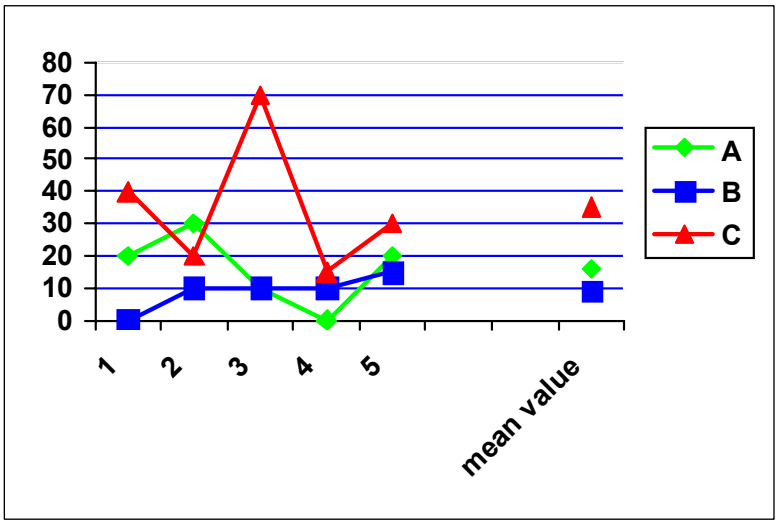

Diagram 2-10: Use of mnemonic devices
mean value: A/16, B/9, C/35

In conclusion, it may be stated that due to the inconsistency of these data, this learner aspect does not allow for reliable and verifiable conclusions within the present study. Quite obviously it seems to be tightly connected to individual preference and – as Dörnyei suggests "logically linked to *learner beliefs*" (Dörnyei, 2005: 173), and remains outside the age-pattern

we have found for other factors. However, in view of what has been said so far, a more profound verification of this specific feature with a close look at the utility of mnemonic hooks is considered to be an interesting and rewarding object of investigation for future researchers.

Another cognitive strategy investigated within this study, is that of conscious use of the mother tongue. As has been explained in Chapter 5.6.1.1, the base language of the study program is English, whereas the subjects' L1 is German[107]. Question 20 of the final questionnaire (FQ-20) was to find out whether and to what extent the German language was used as a vehicle. This question seeks to probe, whether the exclusive use of an L2 as base language would have an inhibitive effect on the acquisition of an L3. As noted in Chapter 4, all participants have a good command of English. Within the 3 optional answers (*often*, *sometimes*, *never*) 4 subjects each of groups A, B and C reported that they had never referred to German in any way. Only one test person from group A reported frequent switching to the mother tongue in order to facilitate the learning process, and one subject each of groups B and C stated that they had occasionally used German as auxiliary tool. From this we may conclude that provided that a language learner has a comprehensive knowledge of an L2, the L1 need not necessarily be used as base language in L3 acquisition. All in all, these findings seem to corroborate the assumption (Chapter 5.6.1.1) that in a learner setting with an L2 as base language, direct influence of an L1 to an L3 seems to be insignificant. In view of the growing importance of English as a lingua franca this may be an interesting aspect for future developers of language learning programs even in countries where English is not the first language.

In conclusion, it may be argued that this section provides evidence of Ehrman & Oxford's claim of the advantage of greater 'world knowledge'

[107] Except for 1 test person, who is bilingual (English, German), with English as first language.

(Ehrman & Oxford, 1995: 68; see also Chapter 2.1.5 of the present study). Furthermore, it accentuates Muñoz's suggestion of the positive impact of superior cognitive development and more refined explicit learning mechanisms with rising age (Muñoz, 2006: 33f).

6.3.2.4 Self-assessment (Chart 1-3)

According to Oscarson (1997), self-assessment relates to how, under what conditions and with what effects learners judge their own language performance. As Shao-Ting Hung (2009, 132f) justifiably states, the learner's ability to self-assess accurately has to be met with due concern. Beyond doubt, when a learner is asked for a self-report in terms of language aptitude and language proficiency in a questionnaire, we must consider that these statements do not fully meet the criteria of objectivity. Indeed they are highly subjective and their explanatory power must be viewed with due caution. Despite the controversial aspect of this issue, it is believed that within the present study the subjects' reflections on their abilities as opposed to the test results may produce valuable insight into the significance of learner self-image. This is why the following two facets concerning learner beliefs will be looked at, though it must be conceded that the relevant data from the questionnaires may not allow conclusive statements and interpretation has to be conducted with scepticism.

A	Y	Z		A	Y	Z		A	Y	Z	
	PQ-11	FQ-24	FQ-10		PQ-11	FQ-24	FQ-10		PQ-11	FQ-24	FQ-10
Code	FLL apt.	Lear. exp.	Progr. ass.	Code	FLL apt.	Lear. exp.	Progr. ass.	Code	FLL apt.	Lear. exp.	Progr. ass.
A-2	2	2	4	B-8	2	3	4	C-5	2	4	4
A-3	2	2	4	B-3	2	3	3	C-8	2	2	2
A-1	2	2	4	B-1	2	1	3	C-9	2	3	2
A-6	2	3	4	B-9	2	3	4	C-1	3	3	4
A-4	2	3	3	B-5	2	3	4	C-7	3	3	3
mean value	**2**	**2.4**	**3.8**	mean value	**2**	**2.6**	**3.6**	mean value	**2.4**	**3**	**3**

Table 4-18: Self-assessment of language learning aptitude

Question 11 of the pre-study questionnaire (PQ-11, Table 4-18, p. 238, column Y) and question 24 of the final questionnaire (FQ-24, Table 4-18, column Z) relate to the subjects' general attitude regarding previous foreign language learning experience in terms of difficulty and their evaluation of the difficulty-factor concerning the learning experience in the course of the present project.

These are the questions:

PQ-11: Looking back at your previous language learning experience, how difficult was it for you to learn a new language?
FQ-24: Looking back at your learning phase, how difficult was it for you to learn this language?

On a scale from 1 to 4, test persons were asked to rate their individually sensed difficulty level:

1 = generally easy
2 = not very difficult
3 = difficult
4 = very difficult

Diagram 2-11 (p. 240) gives account of this assessment.

PQ-11, in which subjects were asked to look back at their previous language learning experience and indicate how difficult it appeared to them, produced the following results: All subjects of group A and B reported that for them foreign language learning was generally 'not very difficult', which produced a group mean value of 2 (= not very difficult). In group C three subjects voted for 'not very difficult' and two had experienced previous language learning acquisition as 'difficult'. These data generated a mean value of 2.4 (= between 'not very difficult' and 'difficult').

FQ-24, which investigates the learners' judgement of their individually sensed difficulty level during the study phase produced a more diversified pattern. Three group-A-subjects reported that learning Chinese was 'not very difficult' and two felt that it was 'difficult', which produced a group

mean value of 2.4. Four subjects of group B perceived the learning process as 'difficult' and one group member reported that the learning experience was generally 'easy'. These data added up to a group mean value of 2.6. Three subjects of group C indicated that learning Mandarin was 'difficult', one group member felt that it was 'not very difficult' and one test person claimed that it was 'very difficult'. In sum, these data yield a mean value of 3 (= difficult).

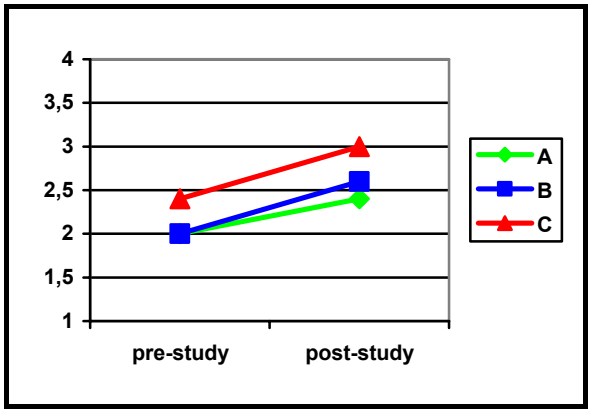

Diagram 2-11: Self-assessment of foreign language learning aptitude
1 = generally easy, 2 = not very difficult, 3 = difficult, 4 = very difficult

Group A:	pre-study: 2	post-study: 2.4
Group B:	pre-study: 2	post-study: 2.6
Group C:	pre-study: 2.4	post-study: 3

As can be seen in Diagram 2-11, all three groups rated their current learning process as more difficult than their previous foreign language learning experience, with a rise of 0.4 in group A and 0.6 each in groups B and C. What may we conclude from this? On the one hand, it might be argued that these parameters generate interesting insights as to the quality of the learning program in use, which would mean that all three groups experienced the current learning method as more difficult, respectively less efficient than the previous ones. However, results generated from question 10 of the final questionnaire (FQ-10, Table 4-18, p. 238), in which subjects were asked to rate the efficiency of the learning method in use as compared to previously experienced learning methods, do not corroborate this hypothesis. In FQ-10 subjects were asked: "How would you rate the efficiency of this language learning method as

compared to previously experienced learning methods?", and they had four answer options, which were rated as follows:

4 = much better
3 = better
2 = about the same
1 = worse

Table 4-19 displays the corresponding results.

A-2	4	B-8	4	C-5	4
A-3	4	B-3	3	C-8	2
A-1	4	B-1	3	C-9	2
A-6	4	B-9	4	C-1	4
A-4	3	B-5	4	C-7	3
group mean value	3.8		3.6		3

Table 4-19: Assessment of language learning program (as compared to previously used programs) – FQ-10
4 = much better
3 = better
2 = about the same
1 = worse

From this, one may conclude that the reported rise in difficulty assessment is to be seen as a result of a generally higher degree of difficulty of the target language from the point of view of the learner's language background. Unfortunately, for lack of sufficient relevant data, there is no back-up for this hypothesis. However, it is suggested to include this aspect in future studies of a similar design, as it may provide valuable insights into how learners who have foreign language learning experience only in the Indo-European language family (as it was the case in the present study), rate the difficulty level of a wholly different set of linguistic and conceptual properties, such as the Sino-Tibetan language family.

We will now take the examination of this aspect a step further and juxtapose the values in Diagram 2-11 (p. 240) to the subjects' effective learner outcome (AMV, absolute mean value). Diagram 2-12 (p. 242)

visualizes this step and generates the following interesting considerations. For higher transparency in terms of comparison, values of Diagram 2-11 (p. 240) were converted into percent with the following conversion key:

1 = 0%
2 = 33.3%
3 = 66.6%
4 = 99.9%

Table 4-20 shows the results of Diagram 2-11 converted into percent.

2 points	=	33.3%
2.4 points	=	47%
2.6 points	=	53%
3 points	=	67%

Table 4-20: Conversion of results of Diagram 2-11 into percent

A preliminary look across the three groups shows that pre-study assessment is closest, post-study assessment reveals slightly more spread results and AMV discloses the greatest spread.

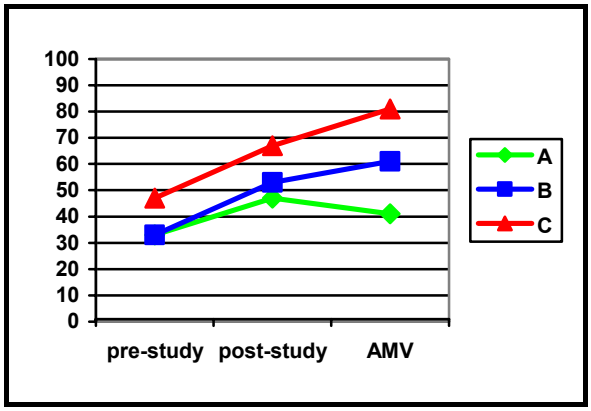

Diagram 2-12: Self-assessment in percent vs. AMV (absolute mean value)

	pre-study assessment in %	(points)	post-study assessment in %	(points)	absolute mean value (AMV)
A	33%	(2)	47%	(2.4)	41%
B	33%	(2)	53%	(2.6)	61%
C	47%	(2.4)	67%	(3)	81%

The narrow-margin results of post-study assessment of 20 percent (from 47% to 53% and 67%) over the three groups are not consistent with the effectively achieved results in terms of learner success (AMV), which diverge by 40 percent (from A/41 to B/61 and C/81). This considerable degree of divergence suggests that in terms of learner self-perception, subjects of group C tend to underrate their effective L2 learning aptitude (by 14%), while group A shows a tendency to slightly overrate their learning capacity (by 5%). Group B ranks in-between with an underrating of 8 percent. The disparity between the real and the perceived self-image at the end of the learning phase demonstrates that human traits and self-assessment are volatile, sensitive and delicate variables and therefore speculative in nature.

In retrospect, the examined aspects of psycholinguistic and cognitive learner features, though they do generate valuable insights into the intricate web of individual learner differences, leave us behind with at least as many questions as answers. To exemplify this we will take a short look back at the present investigation of motivational research (Chapter 6.3.2.1). From the point of view of motivational in-group dynamics the present findings suggest interdependence of motivation and learner results. However, when we compare the motivation-level of the three groups as a static parameter at the end of the study phase, reality and individual self-concept drift apart. Considered as a whole, it may not be an exaggeration to say that conclusions are of a ‘mixed quality’ and call for further investigation of the convergence or divergence of individual psychology and foreign language production.

In conclusion to this chapter it must be stated that possible explanations to the raised questions may be controversial and at times admittedly highly hypothetical. However, for reasons of the general problem of generating cohesive data on how the human brain acts and judges, it will always be difficult to arrive at universally valid propositions. Still it is hoped that the

above findings may provide some insight into the delicate field of psychological and neurobiological factors that operate when humans set out to learn a foreign language and most of all encourage future studies in the field.

Chapter 7
CONCLUSION AND OUTLOOK

Live as if you were to die tomorrow. Learn as if you were to live forever.
(Mahatma Gandhi)

This chapter summarizes the major findings of the present study and specifies the contributions it makes to the existing knowledge on the interrelationship of advanced age and foreign language learning. It will also review the limitations of this study and conclude by pointing out directions for future research.

7.1 Major Findings of this Study

The present study set out to investigate the pivotal factors that influence foreign language learning in adult life, with special focus on the more advanced age groups. Apart from summarizing the diverse variables that influence the acquisition process, it clarifies some of the most distinctive properties and unique characteristics of the three comparison groups. It also addresses a theoretical void with regard to the specific profile features of the adult foreign language learner that needs to be filled. I believe that foreign language learning is a most intricate process that must consider what Dörnyei calls "the individual's personal *core*" (Dörnyei, 2005: 93) and theory formation ought to build on a "whole-person perspective" in a "lifelong setting". Against this background, the study develops concepts that improve on current inadequacies in theorizing about language learning in advanced age and thus help bridge a theoretical as well as methodological gap. The conceptualization and synthesis of the multi-faceted array of learner variables as presented in the *3-Power-Model* attempts to open up a new chapter in adult foreign language learning research. Given the enormous intervowenness of

factors that influence foreign language learning processes, the new model provides a conceptual approach that views language learning processes as a result of an intricate interaction of three major strands of human traits: *willpower*, *brainpower* and the power to utilize accumulated knowledge, which is called *instrumental power*. These major strands are not only believed to partially overlap, but also to be subject to change over time.

To put it in Dörnyei's words, it is hoped that this new concept will "genuinely help to map the rugged terrain of L2 attainment" (Dörnyei, 2005: 219). The integration of linguistic, psychological, cognitive and physiological approaches in a balanced and complementary manner generated the following major findings.

7.1.1 Age and target orientation – the *willpower* component

> *Strength does not come from physical capacity. It comes from an indomitable will.*
> (Mahatma Gandhi)

Overall, the findings of this study suggest that within the domain of adult foreign language acquisition, age differentiation is a revealing and decisive factor. As illustrated in Chapter 6.1, the quantitative analysis of the age factor that comprises all 30 subjects across the three groups reveals that within each age group there is a tendency of heightened success rate with rising age. The incorporation of the drop-out rate shows that persistence is a highly meaningful parameter. As pointed out in Chapter 6.1.1 (Diagram 2-1), the fact that the average age of the five best-performers of each group is higher than the average age of all subjects indicates that there is a direct correlation between rising age and target-orientation. The study suggests that in terms of self-regulated learning and strategic planning the older age group outperformed their younger peers. The present data reveal an elevated success rate with rising age. Altogether, the present

results argue for a fine-tuned differentiation of age-specific research and teaching in the field of adult foreign language acquisition.

With regard to target achievement results show a very distinct pattern which accentuates the aforementioned issue. We saw in Chapter 6.1.1 (Diagram 2-2) that it is the advanced age group that explicitly relegates the mid-aged and young adult learners to second and third place. Self-regulation and self-management, perseverance and the ability to stay focused apparently tend to be more developed and sophisticated the older one gets. A highly developed goal-oriented behaviour along with continuous conscious monitoring of one's own performance are vital driving forces for learner success and supply a distinct mirror image of a person's *willpower*.

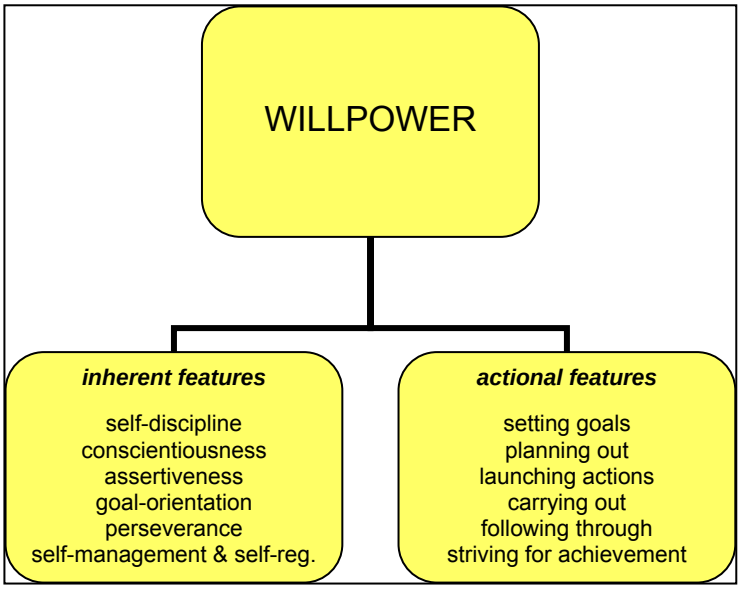

Figure 3-13: Properties of Willpower

Given the widespread problems observed with regard to the multidimensional and complex nature of principal learner variables and in the hope to offer conceptual clarification, I divided the key features of the three powers into two mainstream categories: the *inherent* features and the *actional* features. The inherent features refer to built-in qualities that are conceived as an essential constituent or characteristic of the specific

powers. The actional features pertain to, respectively depict action that permits the accomplishment of an objective. The theory draws on the interrelation and interaction of these inherent and actional properties. As these features fall into the domain of human traits, the theory purports that they must be seen as core variables that are volatile in nature. On the one hand they are subject to overlap and on the other hand they are subject to a dynamic and ever-changing process. Figure 3-13 (p. 247) lists the relevant features of the *willpower* component. It is a final overview of the properties of what I believe is the number one influencing factor on learner progress that implies the notion of "where there is a will, there is a way".

The rising performance curve from young to old as depicted in Diagram 2-5 in Chapter 6.2.3 unambiguously shows that maturity may have a highly potentiating effect on human *willpower*. The ultimate learner results of the present study, which largely comply with the strong-willed procedural mode of the older learners, are affirmative evidence of the enormous impact of the *willpower* component.

7.1.2 Age and intellectual capacity – the *brainpower* component

> *Anyone who stops learning is old, whether at twenty or eighty. Anyone who keeps learning stays young. The greatest thing in life is to keep your mind young.*
> (Henry Ford)

Another learner-specific feature that was of significance within the present study is primarily physiological in nature. This feature is determined by the learner's ability to remember and spontaneously deploy the whole array of newly learnt linguistic components. It refers to brain capacity and plasticity, issues that are in turn tightly connected with memory functions and retentiveness.

Results of the present study illustrate that with regard to the retentiveness factor, the middle-aged group outperforms both their younger and older peers (see Chapter 6.2.2). The relative learner success chart (left graph) as depicted in Diagram 2-3 (Chapter 6.2.1) reveals a lead of group B in both directions. Keeping in mind that the groups are so small, however, one must treat with due caution the narrow margin of their lead. For lack of a falling success-curve from young to old which would support the concept of critical or sensitive periods, it may be argued that there is no such thing as a continuously diminishing functionality of the human brain from late adolescence onwards. The fact that in the present study the middle-aged group generates better results than their younger peers, and the congruent performance level of the young and old groups, suggest that the *Critical Period Hypothesis* cannot be arbitrarily extended. In other words, the classical concept of the CPH as it was developed for the period between early childhood and adolescence does not seem to be of paramount relevance in adult life.

Apart from the fact that present results challenge the classical concept of the CPH when taking an exclusive look at the adult foreign language learner group, they also lend support to Kempermann's (2006) theory of adult neurogenesis and substantiate Eriksson's (1998) claim of continuous generation of new neurons throughout life. As has been shown in Chapter 3.2.4, new neuroscientific research methods have generated evidence that supports the hypothesis that neurons are renewed in certain areas of the brain throughout life. Results of the present study also support this hypothesis and suggest that brainpower remains intact for much longer than foreign language acquisition researchers had for a long time thought it would and many contemporary potential learners believe it might.

Although there may be other influencing factors that do have an impact on brain plasticity, such as continuous conscious stimulation and learning activity, we cannot exclude biologically conditioned changes in favour of a

long-lasting flexibility of the aging brain. Despite the possibility of promising findings in the near future, as pointed out by Gage et al. (2008), it must be conceded that at present neuroscientific sources of age-related cognitive decline do not hold sufficient evidence for ultimate verification. In view of the fast-paced developments in the field (see Chapter 3.2.4), it is hoped that future research in brain maturation and development may disclose new findings and allow for a more reliable interpretation of age-related foreign language acquisition. When referring to the process of neurogenesis, Aimone & Wiskott (2008: 478) hold that "our understanding of the added possibilities is just beginning, and (….) the full story behind this process is not yet realized". Most likely future research in this field will reveal new insights into the interrelation between neurogenesis and learning, however, at the moment we have to be content with what according to Abrous & Wojtowicz (2008: 456) the current state-of-the-art of relevant research discloses, when they say: "the rate of neurogenesis determines learning and, reciprocally, learning influences the rate of neurogenesis".

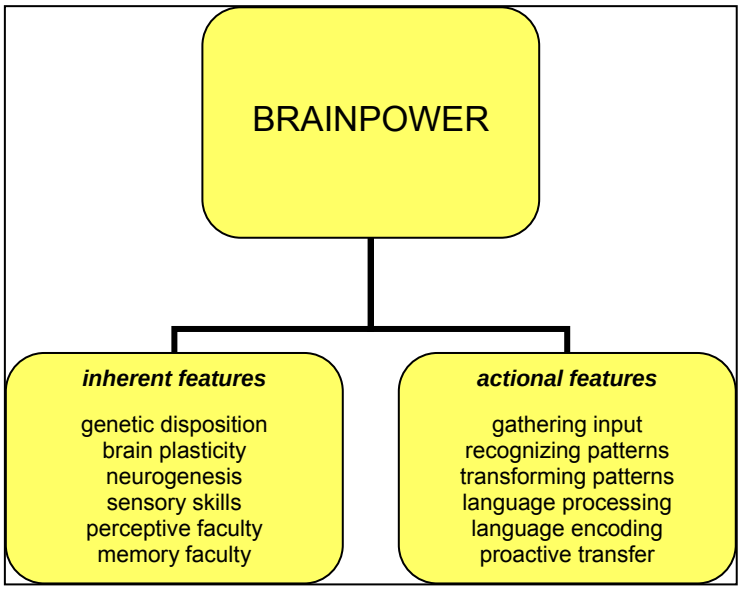

Figure 3-14: Properties of Brainpower

From the perspective of linguistic research I believe that the interaction of the inherent and actional features of the brainpower component as

displayed in Figure 3-14 (previous page) has a catalytic effect on the two-way interrelation of neurogenesis and learning.

As has been illustrated in Chapter 4.3 (Table 4-1), the functionality of our brain conditions our "can-do" faculty. With a short review of the specific features of the *brainpower* faculty with its inherent facets and actional range (Figure 3-14) and in defiance of the quotation "you can't teach an old dog new tricks", I would like to once again point at the significance of these properties for foreign language learning aptitude in adulthood.

7.1.3 Age and accumulated knowledge – the *instrumental power* component

> *Life is a succession of lessons which must be lived to be understood.*
> (Ralph Waldo Emerson)

Another factor that must be taken into consideration in the process of foreign language acquisition is that of metacognitive and metalinguistic knowledge and experience. Figure 3-15 gives a final overview of what I believe are the pivotal facets (inherent facets) and the strategic toolbox (actional features) of the *instrumental power* component.

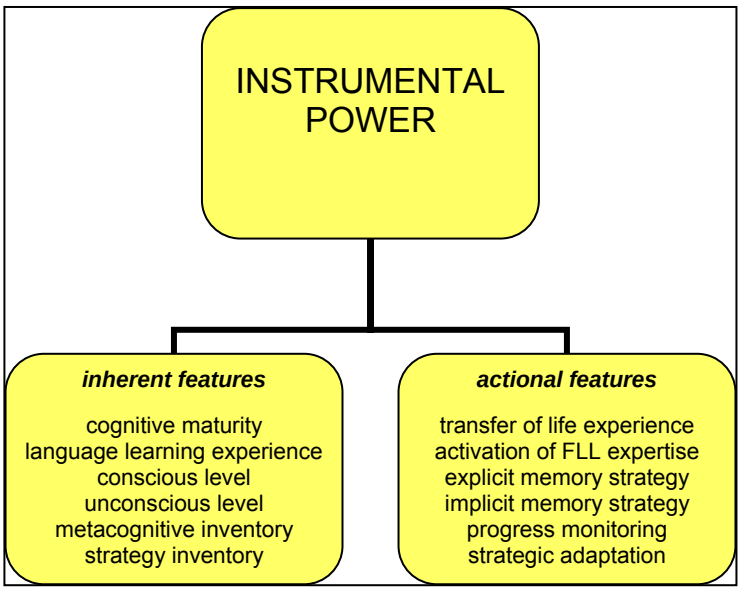

Figure 3-15: Properties of Instrumental Power

Again, it is their dynamic interaction that I contend to be of utmost importance. And again, we must consider overlap and chronological variance.

Although it is difficult to measure the impact of accumulated knowledge, know-how and skills, the present study incorporates this feature, as it is believed to hold a not yet sufficiently explored potential of important conclusions. Instrumental power, which is closely linked to cognitive maturity and its transformation into strategic measures, is based on previous learning as well as general life experience. Within the present study the following aspects of this learner dimension were investigated: The impact of previous foreign language learning, learning styles, learner strategies and self-regulatory schemes. In this context it must be added that the evidence used in this study is based on the participants' subjective self-evaluation statements. For this reason the results obtained must be met with an appropriate degree of caution and scepticism.

First of all, the analysis of the questionnaires corroborates Herdina & Jessner's (2002) theory of a considerable impact of multilingual dynamics on learner progress. As has been shown in Table 4-9 in Chapter 6.3.1.2 (p. 217), previous foreign language potentials correspond with relative learner success. This refers both to the number of languages spoken and the proficiency levels.

The investigation of learning styles produces a slightly different picture. With reference to the use of mnemonic devices Diagram 2-10 (Chapter 6.2.2.3, p. 236) shows a mean value of 16 percent for group A, 9 percent for group B and 35 percent for group C. Though it may be argued that the older learners' frequent use of this auxiliary device could have an impact on learning results, this theory does not apply when set in relation to the learning success of the two younger age groups, as group A reports a

more frequent use of mnemonic hooks, but is less successful in ultimate learning results than group B.

A similarly inconclusive result refers to the use of the German language as a vehicle to facilitate the learning process. The narrow margin results across the three groups with only one subject per group using the L1 as auxiliary device does not suggest any implications as to the influence on learning progress. At this point it may be speculated that in future research projects a more profound and detailed investigation of these aspects might produce more informative and reliable results.

Individual learner strategies and self-regulation in terms of time management and continuous strategic adaptation are the most significant influencing factors. Evaluation of the relevant statements shows that the strategic method and action is in full compliance with the ultimate learning target. The older group who had started out with the most elaborate time-plan eventually achieved the best learning results. The performance of the two younger age groups in terms of learner success is also commensurate with their strategy/result ratio. When set against the individual needs analysis (the need of a stricter time frame), which shows a falling demand curve from young to old, it turns out that time-strategic performance is fully consistent with it (Tables 4-14 and 4-15, Chapter 6.3.2.3). Given this outcome it will be of utmost importance to incorporate this aspect into future self-study programs for the adult foreign language learner.

To put it in a nutshell, it will be essential to account for age-specific differences and necessities within the adult foreign language learner group, as they have been traced in the present thesis and may be elaborated in future research projects. We should no longer contemplate the needs of the adult foreign language learner from an all-embracing perspective that lumps together language learners from childhood to advanced age. Instead I contend that it is high time to assess the adult foreign language

learner's needs from the perspective of a differentiated age-specific development and the potency of the three operant learner powers. We must attach much more importance to the highly diverse age-dependent learner specificities of *willpower*, *brainpower* and *instrumental power*.

7.1.4 Summary

In the present study I have investigated the special properties that operate when adults learn a foreign language, exclusively focusing on the 20+ age-group. The literature research that preceded the present empirical project revealed that one specific purported influencing factor featured in almost all studies is the question whether there is a critical period for the acquisition of an L2. Thus, within the special context and setting of the present study, the *Critical Period Hypothesis* was also probed. In the attempt to reconcile the various theoretical positions with the findings of this study, the concept proved to be inappropriate. It was found that it does not meet the criteria for a good theory that would sufficiently explain the influencing variables of this specific learner group. The pioneering research approach of this study opened up questions that could not be answered within a theoretical framework that includes young children and adolescents. The answer had to be searched for within the exclusive domain of adult learner psychology. In my quest to frame the present findings in an adequate and defensible hypothesis, I developed the *3-Power Model* not as an antipole to the CPH, but rather as a means to meet the requirements of and do justice to the adult foreign language learner and allow for an up-to-date assessment of his/her specific properties.

7.2 Limitations of this Study

Given the complex and exploratory nature of the project, the 'exotic' target language it is based on (from the point of view of the test persons), and the limited resources of an individual researcher, the number of test

persons had to be limited. In light of the anticipated dropout rate, the empirical study finally generated a body of data with a finite scope. The unbalanced ratio of six males versus 24 females did not allow for a gender-related elucidation of the topic. However, it would be desirable and interesting to include this aspect in future studies. Despite these limitations, the collected language database of each subject is considerably comprehensive and supplies substantial material for a preliminary understanding of major tendencies. Though questionnaires cover a multitude of revealing data, it must be conceded that for reasons of subjectivity their informative value is to be assessed with caution. There always remains the risk that individual participants might interpret the items differently.

Before concluding this study, it is necessary to point out again that the present research considered the performance of a fairly small number of learners working on foreign language with set limits in terms of input and time. Although the present database is limited, it is believed to yield substantive evidence for the formulation of a new conceptual approach. However, it gives also rise to a number of questions that may serve as stimulation for further research projects.

7.3 Contributions of this Study

7.3.1 Theoretical contributions

Given the considerable cultural and socio-political changes of recent years and the resulting demands in educational policy, this study attempts to encompass all aspects that seem relevant for an updated and holistic view of foreign language learning concepts for adult learners. As the whole field is most complex, diverse and volatile, covering the whole array of theoretical implications in a satisfactory manner is almost impossible. It was therefore decided to structure it into two prime fields: a linguistic

section and a section covering biological as well as socio-political issues that are relevant to the topic.

Apart from the core subject, much importance was attached to the investigation of the related fields that incorporate a variety of non-linguistic issues such as neurological aspects, memory research and socio-political necessities. Multidisciplinarity, a frequently used catchword and an approach that is mainly deployed within large scientific networks, was applied within the microcosm of this empirical thesis for two reasons. First of all, it was to point at the complexity of theoretical constructs foreign language learning literature has produced over the past decades. It may look simple, but it certainly is not always easy to have an overview of the diversity of influencing factors that are primarily rooted in other scientific fields. Secondly, different research fields adopt different approaches and methodologies. To find the optimal route for the construction of a comprehensive body of scholarly knowledge for diverse disciplines is an ambitious goal. The most important problem in my view is the difficulty for diverse disciplines to build on and complement one another and eventually generate reliable overarching theories for future research. The endeavour to encompass such different fields as linguistics, psychology and neurobiology and acquire sufficient expertise for a better understanding of foreign language learning properties and mechanisms in adult life, which has been the primary intention of this research, may hopefully inspire future researchers.

Theoretically the linguistic section clarifies and extends the vast field of different approaches to language learner specifics. The study juxtaposes established hypotheses and theories with new conceptual considerations. From the debatable ‘young-old’ polarity of the age factor and the controversial standpoints regarding the CPH (Chapter 2.1.5) to new insights in the field of UG research with the move away from the ‘English-only’ perspective and the consideration of other languages that according to White (2003) embraced the integration of unheard-of concepts (Chapter

2.2.3), from the versatile and inconclusive state-of-the art of individual difference research (Chapter 2.3.5) to the assumedly growing multilingual influence on learner achievement (Chapter 2.4.3), I have tried to incorporate those theoretical considerations that I thought were of major importance to my research questions. Different from previous research, which has focused mainly on younger foreign language learners, the present study brings into view the older language learner, assigning this new learner group its proper place within the field of foreign language acquisition. With a close look at the specific properties of the adult foreign language learner, which includes strengths, weaknesses, needs and beliefs, the study discusses different perspectives. It also re-evaluates the status-quo of present individual differences research. From this basis a new theoretical concept was developed. A concept that is believed to best describe and meet the demands of the contemporary adult foreign language learner.

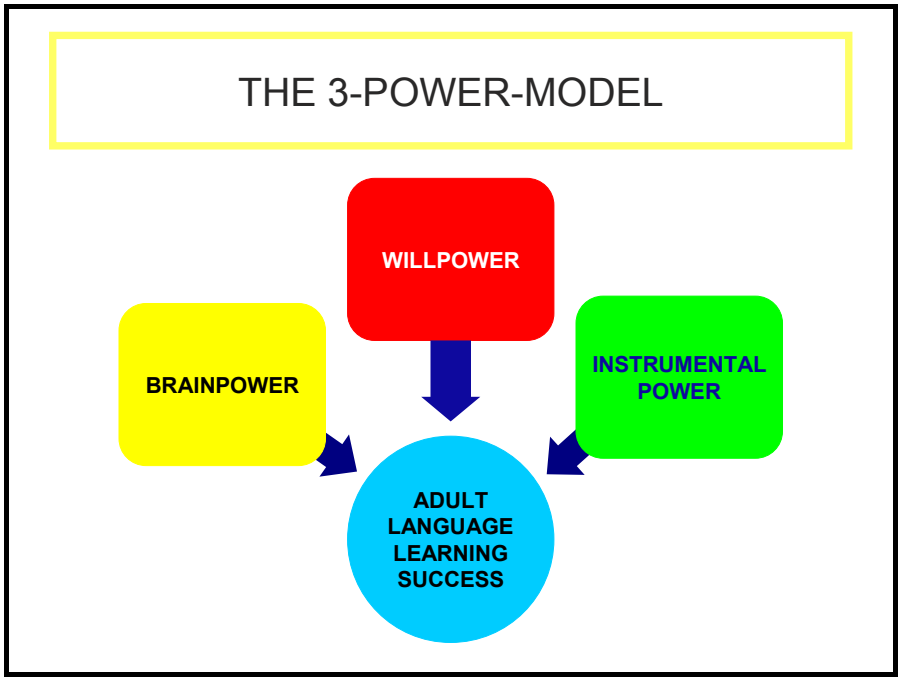

Figure 3-11: 3-Power-Model

With its claim to overcome insufficiencies and supply a beneficial tool for further adult foreign acquisition research, the *3-Power-Model* directly affiliates to Mathews-Aydinli's reproachful detection of an apparent

inconsistency between a new educational agenda for adult higher education and the realities of achievement (2008, 198-213).

7.3.2 Empirical contributions

To my knowledge, this study with its specific layout, is among the first to systematically investigate foreign language acquisition at an advanced age. It compares different adult age groups with the goal to extract reliable evidence of age-related learner specifics that influence success and failure. Based on the analysis of audio-recorded data and accompanying questionnaires, the study examines how adults between 21 and 69 years of age cope with, conduct and perceive foreign language learning in a formal learner setting within a given time frame. The scope, structure and procedure of the research, which is flexible and adaptable in various ways, may benefit future projects as guideline and framework. Thus it is hoped that the findings may provide foundation for other studies that are interested in the acquisition of a foreign language at an advanced age. More specifically, it is hoped that future researchers will focus on what Blakemore and Frith (2005:186) subsume under the heading “new science of learning” that takes into account that learning can and should be a lifelong process. Whether they build on the present structure or develop new empirical procedures to investigate adult foreign learner specifics from a holistic point of view, may be of secondary importance. What appears to be of real importance is the exclusive focus on the adult foreign language learners as an object of scientific research in their own right.

7.3.3 Educational implications

Based on what the findings reveal, the following major issues should be incorporated in the development of future foreign language learning programs.

1. Adult self-study foreign language learning programs must be manageable in terms of content. Educationalists ought to bear in mind that a human brain, although it is a highly intricate and elaborate organ, has limitations in terms of memory capacity. This applies to young and old learners alike, though for reasons of a gradual decline of brain power, it is especially the older learner who deserves the utmost attention and care in this respect. Too many words and phrases in too short a time is the number one big error in the conceptualization of many language learning programs. With reference to learner feedback (see Chapter 6.3.2.3, Diagram 2-8) it may be argued that in terms of the language-input/study-time ratio the language learning program used in the present research met the demands of a well-balanced learning program. It must, however, be added that the publisher's recommended time frame that suggests respectively advocates a study period of one month was extended to three months. As results show, the adapted time-frame was the absolute minimum to guarantee feasibility. Those who had reached the learner target of 30 units reported that they could not have managed to accomplish this task within a shorter period.

2. Adult self-study foreign language learning programs must in the first place foster communication skills. Learners who are able to effectively speak the language they learn from the very first moment, will be motivated learners with a high probability of perseverance. It is essential to make them understand and talk from the very beginning. This presupposes a perfectly executed und well-balanced tuning of the input-output ratio with supportive measures that reinforce retentiveness and steps up spontaneous communication competence. In this respect the language learning program in use fully met the learners' requirements.

3. Provided that the primary learner target is spontaneous face-to-face oral communication competence, language learning programs must address auditory and visual senses with the main focus on the listening-

speaking aspect. With regard to the first issue, the subjects' feedback attests that the program in use fully complies with these learner needs. However, as the original program does not comprise any written aids, this void had to be filled. As it turned out, the complementary scripts that were produced by the researcher prior to the study phase, were assessed as 'indispensible' learner tool in the final questionnaire. In addition, these scripts were judged as 'just right', which corroborates the theory that accompanying written material is absolutely essential, but ought to be used on a small scale, preferably only as a start-up aid. As the present study has revealed, overuse of written material may considerably hamper correct pronunciation[108].

4. Learning programs should also provide for mnemonic devices as instruction guidelines. On one hand the language learner should be encouraged to create his/her own versions, on the other hand this element might be incorporated in the program. As the present study shows, mnemonic devices can substantially facilitate storage of new elements in long-term memory. These learning aids may foster optimal performance with regard to vocabulary retention. Depending on the specific features of the target language – the extension to other linguistic characteristics such as unique syntactic or semantic properties may also be rewarding.

5. Grammatical explanations should be an integral part of the communicative teaching concept. Pivotal grammatical features should be introduced in direct correlation with specific speech acts and should always be meaningfully embedded. Subsequently, learners should be exposed to slightly modified exercises that incorporate the same rules. This procedure not only stimulates self-reliant and proactive handling of

[108] This refers to one test person, who reportedly resorted to the script for vocabulary repetition as a main study procedure, and eventually developed the poorest pronunciation level. However, as the study focused on retentiveness, subtly nuanced phonological aspects such as the intricate and error-sensitive tonal system (see Chapter 5.6.1.1) were not taken into consideration in the data analysis.

new information but also promotes the anchoring-process in long-term-memory. The program in use met these demands, as grammatical features were introduced in the context of speech acts.

6. Learning material must be clearly arranged in manageable units, easy to handle in technical terms and allow for high flexibility in space and time. In other words, it must be individually adjustable to different life-styles. Though the original program meets these learner needs, the analysis of the questionnaire indicates that accompanying monitoring measures are desirable. With regard to time-management, the implementation of a step-by-step frame that is adjustable to personal needs and linked to a monitoring schedule, provides for longitudinal stability and enhances the likelihood of successful learner achievement.

7. Setting a specific goal enhances the chances of learner success. This is especially relevant when it comes to self-study programs, where there is usually no guidance except for learner instructions and recommendations. Without a clear target it will be difficult for learners to stay focused. They need a framework to hold on to. This may be a set time frame, a clearly defined work load, a final test, an external tutor (or institution) or most preferably a combination of the four, as was the case in the present study. In other words, learners need a benchmark for their success story. These are essential measures that continually appeal to the learner's sense of responsibility and his/her personal mission and promise to be a highly effective back up.

7.4 Suggestions for Future Research

In view of the pioneering quality of the present study and its claim to open up perspectives for a largely neglected species of foreign language learners, replication studies are not only desirable but essentially needed. No matter what base or target language future research with a similar

structure may include, it will definitely contribute to the exploration of a scientific field that deserves tribute and due attention. It is therefore hoped for, that in the years to come researchers with a distinctive interest in age-related foreign language learner aspects will shift their focus towards the more advanced age groups and thus help uncover the very specifics and needs of this learner population. Not only does the adult L2 learner in a non-academic setting deserve to be attended to, but current trends and developments strongly suggest further and more profound discussion of this topic.

The changing quality of L2-learner needs has implications for prospective research approaches. In this light I would like once again to draw the reader's attention to some aspects that I have identified in this study as essential for future age-related foreign language acquisition research with special focus on the *adult language learner*.

► With reference to the fairly inconsistent quality of age specifications regarding the adult L2-learner in earlier studies, it would be desirable to consider a more concise age demarcation method in future studies. In other words, clear-cut age specifications are essential in order to generate more reliable conclusions and insights regarding *critical* or *sensitive* periods across the whole span of an adult's life.

► This being said, it would also be interesting to further investigate DeKeyser's suggestion that adults learn faster because "their capacities let them take short cuts" (see Chapter 2.2.3) with special consideration also of Dörnyei's concept of the dynamics and changing quality of individual learner variables across the life-span. The impact of these features on foreign language learning aptitude at an advanced age definitely deserves exhaustive investigation. It is suggested that studies like these incorporate up-to-date neuroscientific findings in terms of cognitive abilities.

► Finally, following Jessner's plea (2006: 141) for more focused investigations of the multilingual metasystem as a "step towards the clarification of issues concerning the exact role of consciousness and awareness in language learning", it would be desirable to conduct respective research with age groups similar to the ones in the present study [109]. Extended empirical underpinnings in terms of age-related metacognitive and metalinguistic strategies with special focus on the advanced aged learner may take us a step further in the conceptualization of adequate measures for lifelong learning, and thus also advance multilingual development on a broader scale.

7.5 Concluding Remarks

To summarize, findings of the present study substantiate Mathews-Aydinli's (2008) argument that with regard to research on the specific population of the adult second language learner, there is a lot of catching up to do. My findings support her claim that there are indications that the needs of adult foreign language learners are not being fully met and that despite best efforts of educators, "dropout rates (…) remain a problem" and "achievement is at best inconsistent" (Mathews-Aydinli, 2008, 199).

Given these shortcomings it seems evident that it is high time to act. The status quo of current adult foreign language learning programs does no longer satisfy the needs and requirements of modern society, and it does not meet the demands of the future. Current adult foreign language learning programs must be re-evaluated. The needs and requirements of modern society must become the center of attention. The Common European Framework of Reference for Languages (2007) is a first

[109] As pointed out in Chapter 6.2.2, this highly complex issue deserves in-depth investigation, and further studies are particularly desirable. However, within the limited scope of the present study, an exhaustive discussion was not possible.

promising step in that direction. The European Portfolio of Languages[110] as an instrument for language description and learner information promotes personal responsibility and provides self-management tools. However, it is still in its infancy, debatable in terms of self-assessment, and too far from the language learner. It is an initiative with a high potential, but it needs to be intensified, refined and most of all made customer-friendly and more accessible. Above all, it needs to expand the scope of languages from the European level (with a selection of nine languages) to the world level.

The community of adult foreign language learners must be acknowledged as a self-contained and independent learner group. From an epistemological and methodological perspective, late L2 learners in a non-academic context should be given access to age-specific study material that provides for their unique biological and cognitive qualities as well as their personal life situation. In this respect, it is hoped that the study of age-related foreign language acquisition, from the perspective of a holistic approach, will be expanded, for it is the development of sensitive paradigms through which to explore the subtle properties of L2 aptitude that can best contribute to the search for adequate and forward-looking steps in adult foreign language acquisition.

In conclusion I would like to express my sincere hope that the present thesis will give fresh impetus to the development and advance of age-related foreign language learning research. May the extension of Blakemore & Frith's quote "disagreements, findings and counterfindings, are part and parcel of normal scientific progress and integral to the evolution of our understanding about the brain…" (2005, 3) with my addition *"…and its impact on the advanced aged learner"* inspire future

[110] The European Language Portfolio is a document in which those who are learning or have learned a language – whether at school of outside school – can record and reflect on their languge learning and cultural experience. It contains a language passport which its ownder regularly updates. For further information see: http://www.coe.int/T/DG4/Portfolio/?L=E&M=/main_pages/introduction.html

scientists to accelerate ongoing research in the field of lifelong learning, because, as Mahatma Gandhi said: "*Live as if you were to die tomorrow. Learn as if you were to live forever".*

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APPENDICES

Appendix 1

LEARNING INSTRUCTIONS

ABOUT THE PROGRAM

This course is aimed at complete beginners.
It will help you to learn conversational Chinese for use in social context.
You will learn to use up-to-date language in everyday situations.
You will learn lots of transferable structures which will allow you to make up your own conversation as you pick up more new words and phrases.

Remember that when learning a new language, it is better to study little and often rather than spend too long at any one time. **Little and often** is far more effective than a long session every now and then.

Each of the 30 units of this course has an initial dialogue.
Following to that you will enter a highly interactive course program that asks you to listen and respond. By asking you to **repeat words and phrases** and giving you certain prompts with **gaps** on the recording **for you to speak**, you will easily pick up new input and be able to transfer it to your individual speaking requirements.

Replay and repeat units and sections as many times as you wish.
YOU are in control of your learning, and YOU set the pace.
Speak out loud as much as possible. This is the best way to learn and to build your confidence to speak the language. For repetition purposes listen in the car, on the bus, while exercising or doing the housework. The more you listen and repeat, the better you will get.

Chinese Mandarin is written in characters, but you don't need to learn the Chinese characters for this course. All the conversations and all the words and phrases that come up in the course are written for you in the Latin script (called **Pinyin**) in the accompanying **handout**. The handout will enable you to remind yourself how words are pronounced. However, you do not need the Pinyin-transcript in front of you every time you play your recording. **Visualizing words in your mind** is a much better tool.

HOW TO USE THE PROGRAM

You will receive 15 CDs with 30 units. The appointed time-span for working through the program is three months, from October to December 2007.

The course comprises 30 units with a running time of half an hour each.
To get the full benefit of each lesson, **choose a quiet place** where you can **practice without interruption** and a time of day when your mind is most alert and your body least fatigued.
The length of each lesson being just under **30 minutes** is the ideal time-span for a concentrated learning task.
Daily contact with the language is recommended, it is however not crucial for your learning success. If possible, do try to set yourself a **minimum of 2 to 3 times a week**.

Once you have started the program, simply follow the tutor's instructions.
The most important instruction is to **respond aloud**. There will be a pause after each instruction, giving you time to reply. It is essential to your progress that you speak out in a normal conversational voice when asked to respond. Your **active participation** in thinking and speaking is required for your success.
Listening attentively will help you to identify the new sound system, and speaking out loud will help you to establish the new sound system.

You will notice that each lesson contains both new and familiar material, and just when you may be worrying about forgetting something, you will conveniently be reminded of it. Within the half hour you will be responding many times in many different ways.

Complete the units in **strict consecutive order** and do not skip around.
Do **not** do **more than one unit per day**, however feel free to repeat each lesson more than once (the same day or on the consecutive days).
Stop the recording whenever you feel this is necessary.
Do not move on too fast.

The simple **test for mastery** is whether you are able to respond spontaneously and accurately when a question is asked. If you are responding correctly at least **80 percent** without stopping the recording, then you are ready to proceed to the next unit. It is important to keep **moving forward step by step**.

Within the given time span of 3 months work as far as you can, but do not worry if you cannot finish the 30 units.

PINYIN-HANDOUT

The handout is divided into **2 parts**.
As it comprises all the learning material of the course, you will not have to refer to dictionaries or other books.

Part 1 is a compilation of the language input of the 30 units.
Just like the recording, it is split into **30 autonomous sections** and is meant to be used along with the respective unit and also **in consecutive order**.
Each unit contains an **initial dialogue** as well as the **new words and phrases**.
At the bottom of some units you will find **"additional useful words"** that have been added for your personal needs. These are not part of the audio-program.

As the main focus will be on listening and speaking, it is recommended not to use the script whenever you are listening. You should, however, have the script close by when you first listen to the unit, as visualizing the different sounds will help you memorize the words and phrases more efficiently.

Part 2 is a reference section and contains the whole range of **Chinese-English vocabulary** in alphabetic order.

QUESTIONNAIRES + STUDY DIARIES

1. INITIAL QUESTIONNAIRE (PRE-STUDY QUESTIONNAIRE)

Along with the CDs you will get an initial questionnaire. Please fill it in BEFORE you start with your language learning program.

2. 5 STUDY DIARIES

Also along with your CDs you will receive the 5 study diaries. Study Diary **1** for units 1-6, Study Diary **2** for units 7-12, Study Diary **3** for units 13-18, Study Diary **4** for units 19-24 and Study Diary **5** for units 25-30. Please fill in each study diary AFTER you have worked through the corresponding units (e.g.: fill in Study Diary 1 only after you have finished unit 6 and started with unit 7, etc.) and then **directly** return it to me by mail. (Helga Linhart, Pfarrleiten 16, 4048 Puchenau)

3. FINAL QUESTIONNAIRE

This questionnaire will be filled in after you have completed the course.
You will be asked to do this when we have our monitoring session.

MONITORING

Following the three months' learning period there will be a monitoring session in January 2008. In this session you will be required to spontaneously respond to familiar prompts and cues (quite similar to the method used on the CDs).
Your responses will be audio-recorded. It will take about 1 hour.

The recordings will be carried out strictly confidential.
There is no pressure as to your performance.
The recorded data are going to be used for academic purposes.
Your answers will be recorded on tape and later on used for linguistic analysis.
The same applies to the questionnaires and the study-dairies.

PLEASE FOLLOW THESE INSTRUCTIONS

1. You will receive 5 study diaries. Each one will be a record of your learning progress and strategies of each block of 6 units. **Fill in each diary accurately** (tick the boxes) and **mail** it to me immediately **after** you have worked through **each block of 6 units**.

2. **Do not use** any **other learning material** while using this program.

3. Go through the units in **strict consecutive order**.

4. Do **not** do **more than one new unit per day**.

5. Repeat each unit as often as you like.

6. Go on to the next unit only if you are able to master **80%** of the unit.

7. **Stop learning after 3 months** (end of December), even if you are not through with the 30 units.

HOW TO BEST WORK YOUR WAY THROUGH EACH UNIT:

1. Listen to the unit and respond - if necessary, use the Pinyin script of this particular unit for visualization of the new words. (1/2 hour)

2. Listen and respond again as often as you wish.

3. As you repeat the unit according to your own needs, feel free to write down words and phrases (this might enhance memorizing).

4. If necessary, create your own learning cards
(on one side the English word/phrase, on the other side the Chinese word/phrase).

5. Whenever you have time during the day, try to recall the new phrases and use them in your daily life:
(e.g.: when greeting someone, think of or speak out loud the Chinese version "nǐ hǎo").

6. At the bottom of some units you will find "additional useful words".
You will not hear them on the audio CDs.
You can use these words to build your own little meaningful dialogues when you are not working with the CD.
(e.g.: I am German: "wǒ shì Déguórén").

Tones in Chinese Mandarin

Chinese is a tonal language.

As you work through the course you will gradually be introduced to this new sound system. Word by word you will learn how to pronounce the words correctly, and in the handout you will find the corresponding tone marks. So do not worry about this when you start with the program. It will all work out easily.
The following explanations are just meant to be a reference section.

In Mandarin Chinese, there are **4 tones**, indicated respectively by the tone marks which are placed above the vowel: **ō, ó, ǒ** and **ò**.

Tone	**Tone mark**	**Description**	**Example**
First tone	**ā ē ī ō ū**	high level pitch	**bā** = 8
Second tone	**á é í ó ú**	starting high and rising	**chá** = tea
Third tone	**ǎ ě ǐ ǒ ǔ ǖ**	falling first, then rising	**wǎn** = late
Fourth tone	**à è ì ò ù**	starting high and falling	**kàn** = to see

Some words have unstressed syllables: (e.g.: **ma** = question particle)
This type of syllable is often called a **neutral tone** syllable.

Tone Changes

Sometimes the tone of a syllable or a word changes depending on the tone of the syllable that follows it.
You will notice these tone changes as you work through the program.
Again, do not worry about these 'exceptions'. In the program, you will get the necessary explanations as you proceed.

1. The negative adverb: <u>bù</u> (= not)

Normally it is pronounced in the fourth tone: **bù**
e.g.: wǒ **bù** mǎi (= I don't buy)
bù hǎo (= not good)

However, when **bù** is followed by a fourth-tone syllable (like "**shì"** = to be), its tone changes to the second tone: **bú**
Examples: wǒ **bú** shì (= I am not)
wǒ **bú** huì (= I cannot)

2. The numeral: <u>yī</u> (= one)

When read in isolation, in counting or in reading numbers, the numeral **yī** is pronounced in the first tone.
yī, èr, sān, sì … (= 1, 2, 3, 4 ….)
yījiǔjiǔbā (= 1998)

However, when the numeral **yī** precedes a first-, second-, or third-tone syllable, its tone changes to the fourth tone:
yìzhāng zhǐ (= a piece of paper)
yìpán cídài (= a tape)
yìběn shū (= a book)

When it is followed by a fourth-tone syllable, its tone changes to the second tone:
yíliàng qìchē (= a car)

3. A third-tone syllable preceding another third-tone syllable

When a third-tone syllable (e.g.: **nǐ**) precedes another third-tone syllable (e.g.: **hǎo**), it is pronounced in the second tone "**ní**" and the phrase then sounds like this: n**í** h**ǎ**o (however, the tone mark remains the same: n**ǐ** hǎo)

tone mark:		pronunciation:
wǔběn shū (= five books)	-	**wú**běn shū
nǐ hǎo (= hello)	-	**ní** hǎo
hǎohǎo xuéxí (study well)	-	**háo**hǎo xuéxí

Appendix 2

UNIT 1

Duìbuqǐ qǐngwèn, nǐ huì shuō Yīngwén ma?
> Bú huì, wǒ bú huì shuō Yīngwén.
Wǒ huì shuō yīdiǎnr Pǔtōnghuà.
> Nǐ shì Měiguórén ma?
Shì, wǒ shì Měiguórén.

bú huì	no (cannot)
duìbuqǐ	excuse me
huì	can (= know how to)
ma?	= question particle
Měiguó	America
Měiguórén	American
nǐ	you
Pǔtōnghuà	Mandarin (used on the mainland)
qǐngwèn	may I ask?
rén	person
shì	to be
shì	yes (answer to shì-question)
shuō	to speak, to say
wǒ	I
yīdiǎnr	a little, a bit
Yīngwén	English (= usually written)

ADDITIONAL USEFUL WORDS:

Àodìlì	Austria
Àodìlìrén	Austrian (person)
Déguó	Germany
Déguórén	German (person)
Déyǔ / Déwén	German language
Yīnggélán	England
Yīnggélánrén	English (person)
Yīngyǔ	English language (= usually spoken)

UNIT 5

Duìbuqǐ qǐngwèn, Xué Yuàn Lù zài nǎr?
> Zài nàr.
Cháng Ān Jiē ne, shì zài zhèr ma?
> Shì, shì zài zhèr.
Nǐ huì shuō Yīngwén ma?
> Bú huì, wǒ bú huì shuō Yīngwén. Zàijiàn.
Zàijiàn.

chī	to eat
chī yìdiǎnr dōngxi	to eat something
dōngxi	thing, something
hē	to drink
hē yìdiǎnr dōngxi	to drink something
nǐ xiǎng	you would like
wǒ xiǎng	I would like
xiǎng	would like to
yìdiǎnr dōngxi	something
zhīdao	to know

UNIT 10

\# Li xiānsheng, wǒ xiǎng gēn nǐ yìqǐ chī yìdiǎnr dōngxi. Hǎo ma?
\> Jǐ diǎn zhōng? Liǎng diǎn zhōng hǎo ma?
\# Bù hǎo. wǒ xiǎng guò yíhuìr chī.
\> Bā diǎn zhōng háishì jiǔ diǎn zhōng?
\# Jiǔ diǎn zhōng.
\> Hǎo.

dōngxi	thing, anything
sān	3
sān diǎn zhōng	3 o'clock
zhōng	clock
sì	4
sì diǎn zhōng	4 o'clock
wǒ(a)	as for me (do you mean me?)
wǔ	5
wǔ diǎn zhōng	5 o'clock
yào	going to

UNIT 15

\# Yíhuìr jiàn.
\> Yíhuìr jiàn. Nǐ qù nǎr?
\# Wǒ yào qù mǎi yìdiǎnr dōngxi.
\> Kěshì, nǐ méi yǒu Rénmínbì.
\# Yǒu, wǒ yǒu yìdiǎnr Rénmínbì.
\> Nǐ yǒu duōshǎo Rénmínbì?
\# Wǒ bù zhīdao. Shí sì kuài huòzhě shí wǔ kuài.
\> Wǒ gěi nǐ yìdiǎnr Rénmínbì. Ne, shí jiǔ kuài Rénmínbì.
Xiànzài nǐ yǒu duōshǎo qián?
\# Wǒ xiànzài yǒu hěn duō qián.
Xièxie nǐ.

bù kěyǐ (bù kéyǐ)	cannot
gěi nǐ de	for you (= give to you)
kěyǐ (kèyǐ)	can (= be able to)
nǐ ké bù kěyǐ? (nǐ kěyǐ bù kěyǐ)	can you?
gěi wǒ de	for me

liù jiā liù shì duōshǎo?	6 + 6 is how much?

UNIT 20

Chan tàitai, ní hǎo.
> Nǐ hǎo, Jones xiānsheng. Qǐng jìn.
Xièxie nǐ.
> Jones xiānsheng, nǐ xiǎng hē shénme?
Yìdiǎnr píjiǔ?
Wǒ bù xiǎng hē píjiǔ, máfan nǐ wǒ xiǎng hē shuǐ.
> Jones tàitai zài nǎr?
Tā gēn nǐ yìqǐ zài Běijīng ma?
Bú shì. Wǒ de tàitai bú zài Běijīng.
Tā zài Měiguó.

dà	big, large
érzi	son
gè / ge	measure word
jǐgè	a few, several, some
jǐgè?	how many?
liǎnggè	2 (with determiner)
nǚ'ér	sister
sānge xiǎoháir	3 children
tā bú shì hěn dà	she is not very big
tā gēn nǐ de xiānsheng zài yìqǐ	she is with your husband
tā gēn nǐ zài yìqǐ ma?	is she with you?
tā hěn dà le	he is very grown up
tāmen	them
tāmen	they
xiǎoháir	child, children
yīge (yíge rén)	1 (with determiner)

UNIT 25

Qǐngwèn, zhè tiáo lù qù Měixīn Fàndiàn ma?
> Bú shì.
Nàme, nà tiáo lù qù Měixīn Fàndiàn.
> Nǐ yīnggāi zǒu nà tiáo lù. Bú shì hěn yuǎn.

guān	closed
guānmén le	are / is closed
guānmén	closed
kāi	open
kāimén	open (door)
le	particle (= have been)
mén	door
shāngdiàn	store
wǎn	late
wèishénme?	why?
yīnwèi	because
zài shuō yícì	say again

UNIT 30

Nǐmen zài zhèr duō jiǔ le?
> Wǒmen zài zhèr liǎng tiān le.
Yào dāi duō jiǔ?
> Wǒ bù zhīdao.
Kěnéng yíge xīngqī, kěnéng liǎnggè xīngqī.

bú kèqì	you are welcome
hěn duō dōngxi	a lot of things
jǐgè xīngqī le	for a few weeks
jīntiān zǎoshang	this morning
Tiāntán	Temple of Heaven
zǎoshang	morning
zěnme shuō	how do you say?
zuótiān wǎnshang	yesterday evening
zuótiān zǎoshang	yesterday morning

Nǐ hǎo.
> Nǐ hǎo. Nǐ shì shénme shíhou dàodá?
Wǒ gēn wǒ de tàitai shì zuótiān dàodá.
> Nǐmen shénme shíhou qù le Tiāntan?
Wǒmen jīntiān zǎoshang qù le Tiāntan.
> Nǐ jīntiān xiǎng gēn wǒ yìqǐ chī wǎnfàn ma?
Xiǎng. Jǐ diǎn zhōng?
> Bā diǎn zhōng, hǎo ma?
Hǎo. Xièxie nǐ.
> Bú kèqì.
Zàijiàn.

LIST OF VOCABULARY

B

ba (at the end of the sentence)	11	= particle: let's (mild imperative sentence)
bā	9	8
bā diǎn zhōng	9	8 o'clock
bǎi	23	100 (hundred)
bānjī	23	flight
bàozhǐ	14	newspaper
bēi	8	glass, cup
Běijīng Fàndiàn	7	Beijing Restaurant
bǐjiào	18	relatively, rather
bǐjiào	18	to compare
bǐjiào guì	18	it's more expensive
bù / bú (*)	2	no, not
bú gòu	16	not enough

bù hǎo	2	not good, not okay
bú huì	1	can not
bú kèqì	14	you are welcome, don't mention it
bù kéyǐ	15	can not
bú shì	2	it is not
bú tài guì	17	it isn't too expensive
bùxíng	9	impossible

(*) - *both pronunciations possible, depending on following sound; see also handout: "Tones in Mandarin Chinese"*

C

chá	7	tea
Cháng Ān Jiē	4	Long Peace Street
chī	5	to eat
chī fàn	11	to eat food
chī le	29	ate
chī wǎnfàn	11	to eat dinner
chī wǔfàn	8	to eat lunch
chī yìdiǎnr dōngxi	5	to eat something

D

dà	20	big, large
dà	21	older
dà érzi	21	older son
dà nǚ'ér	21	older daughter
dāi	26	to stay
dào	24	road
dàodá	29	to arrive
dàren	23	adult
de	2	particle (with words describing an action)
děng	21	to wait
děng yíhuìr	21	wait one moment
diǎn	9	o'clock
dǐng	18	measure word for: hats, caps, etc.
dōngxi	4	thing, something
dōngxi	12	anything (with negative sentence)
duìbuqǐ	1	excuse me
duō	12	many, much, more
duō jiǔ le?	28	for how long?
duōshǎo?	12	how much? how many?
duōshǎo qián?	12	how much is it?

X

xiǎng	5	would like to
xiǎng	26	to think
xiǎng yào	8	would like to order
Xiānggǎng	22	Hong Kong
xiānsheng	8	Mr.
xiānsheng	18	husband
xiànzài	6	now
xiǎo	21	small, little, young, younger
xiǎoháir	20	child
xiǎojie	8	Miss
xiǎojie	13	young lady

xiǎoshí	22	hour
xièxie	2	thanks
xǐhuan	29	to like
xīngqī	29	week
xǐshǒujiān	21	bathroom
Xué Yuàn Lù	4	College Road

Y

yào	8	to want
yào	10	going to
yào jǐgè xiǎoshí	22	how long will it take?
yě	6	also, too
yī (*) yì / yí	9	1
yìbǎi	27	100 (one hundred)
yìbēi	8	1 cup
yìdiǎn zhōng	9	1 o'clock
yíge	20	1 (with determiner)
yíge rén	27	1 person
yíge xīngqī le	29	for 1 week (= it has been 1 week)
yíge xīngqī	29	1 week
yí kuài Rénmínbì	12	1 Renminbi
yí kuài	12	1 unit
yìdiǎnr dōngxi	5	something
yìdiǎnr	1	a little, a bit
yìdǐng màozi	18	a hat
yíhuìr	6	later, in a moment, shortly, for a little while
yíhuìr jiàn	6	see you later
yīnggāi	24	should
Yīnghuáng Dào	24	King's Road
Yīngwén	1	English
yīnwèi	25	because
yìqǐ zǒu	27	leave together
yìqǐ	8	together, along
yìsi	28	meaning
yìsi shì	28	it means
yìzhí wǎng qián	23	straight ahead
yìzhí wǎng qián zǒu	23	go straight ahead
yòng	22	in (showing the way in which sth. is done)
yòng Pǔtōnghuà shuō	22	say it Mandarin
yǒu	13	to have
yǒu méi yǒu?	13	do (you) have?
yòubiān	24	to the right
yuǎn	23	far (it's far)

(*) *"yì" before words in first, second and third tone*
"yí" before the fourth tone

Z

zài	4	in, at, on, located
zài Měiguó	19	in America
zài nàr	4	(located) over there
zài nǎr?	4	where?
zài shuō yícì	25	say again
zài tīng yícì	24	listen again
zài Washington	19	in Washington

zài wèn yícì	22	ask it again
zài yícì	22	again
zài yìqǐ		to be located together with
zài zhèr	4	(located) here
zàijiàn	2	good-bye
zǎo	30	morning
zǎoshang	30	morning
zěnme	23	how
zěnme shuō?	23	how do you say that?
zěnme wèn	22	how do you ask?
zhè	23	this
zhège	23	this
zhège bānjī	23	this flight
zhège wèntí	23	this question
zhēn de	21	really
zhēn de?	21	really?
zhèr	4	here
zhīdao	5	to know
zhōng	10	clock
Zhōngguó	3	China
Zhōngguórén	3	Chinese person
zhù	19	to live
zǒu	23	to go, walk (= take)
zǒu	27	to leave
zǒu le	27	to leave (to have gone)
zuò	8	to do
zuò	22	to go by / to travel by
zuò fēijī qù	22	to take a plane
zuǒbiān	24	to the left
zuótiān	29	yesterday
zuótiān wǎnshang	30	yesterday evening
zuótiān zǎoshang	30	yesterday morning

VERBS
English - Mandarin

answer	huídá
arrive	dàodá
ask	wèn
be	shì
buy	mǎi
can	huì
can	kěyǐ (kéyǐ)
close	guān
compare	bǐjiào
do	zuò
drink	hē
eat	chī
enter	jìn
follow	gēnzhe
give	gěi
go by, travel by	zuò

go to	qù
go, walk	zǒu
going to	yào
have	yǒu
know	zhīdao
leave	zǒu
like	xǐhuan
listen, hear	tīng
live	zhù
open	kāi
order	xiǎng yào
say, speak	shuō
see	kàn
stay	dāi
think	xiǎng
trouble, bother	máfan
try	shì
understand	míngbai
wait	děng
want	yào
work	gōngzuò
would like	xiǎng

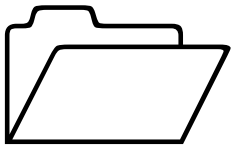
VERBS
Mandarin - English

bǐjiào	compare
chī	eat
dāi	stay
dàodá	arrive
děng	wait
gěi	give
gēnzhe	follow
gōngzuò	work
guān	close
hē	drink
huì	can
huídá	answer
jìn	enter
kāi	open
kàn	see
kéyǐ (kěyǐ)	can
máfan	trouble, bother
mǎi	buy
míngbai	understand
qù	go to

shì	be
shì	try
shuō	say, speak
tīng	listen, hear
wèn	ask
xiǎng	think
xiǎng	would like
xiǎng yào	order
xǐhuan	like
yào	going to
yào	want
yǒu	have
zhīdao	know
zhù	live
zǒu	go, walk
zǒu	leave
zuò	do
zuò	go by, travel by

Appendix 3

INITIAL QUESTIONNAIRE



PERSONAL CODE (please do not fill in this box)

NAME ……

Please fill in this questionnaire before you start with your language learning program. Then return it by mail, using the enclosed envelope.

Tick the appropriate boxes and fill in the empty spaces (marked: …….).
If several answers are possible, this will be indicated.

---

1. Nationality: ……..

---

2. Gender:

   ❑ male
   ❑ female

---

3. Profession: (*please fill in either a) or b)*)

   a) aviation business
      ❑ cockpit
      ❑ cabin
      ❑ ground staff
      ❑ full time
      ❑ part time

   b) other
      ❑ employed
      ❑ self-employed
      ❑ free-lance
      ❑ out-of-job, unemployed
      ❑ full time
      ❑ part time

---

4. High School Graduation (*Abitur, Matura*):

- ❑ yes
- ❑ no

---

5. University Degree:

- ❑ yes
- ❑ no

---

6. Mother Tongue

……

---

7. Bilingual Education?

- ❑ yes
- ❑ no

---

8. What other languages do you speak (except German and English) and how would you rate your level of proficiency?

……	❑ beginner's level ❑ intermediate ❑ advanced
……	❑ beginner's level ❑ intermediate ❑ advanced
……	❑ beginner's level ❑ intermediate ❑ advanced
……	❑ beginner's level ❑ intermediate ❑ advanced

---

9. How did you learn these languages? (*Several answers are possible)*

- ❑ at school
- ❑ with family/friends
- ❑ language course
- ❑ private tuition

- ❑ self-study
- ❑ stay abroad with tuition
- ❑ stay abroad without tuition

---

10. Have you ever used a self-study language learning program before? (*several answers are possible)*

    - ❑ yes, a computer program
    - ❑ yes, audio-CDs + book/s
    - ❑ yes, CDs only
    - ❑ yes, book/s only
    - ❑ no, never

    If so, were you satisfied with the quality?
    (*if your answer above was NO, skip this question)*

    - ❑ very satisfied
    - ❑ satisfied
    - ❑ partly satisfied
    - ❑ not satisfied

---

11. Looking back at your previous language learning experience, how difficult was it for you to learn a new language?

    - ❑ generally very difficult
    - ❑ generally difficult
    - ❑ generally not very difficult
    - ❑ it was generally easy

    Which of these did you generally find more difficult?

    - ❑ understanding
    - ❑ speaking

---

12. Looking back at your previous language learning experience, how would you rate the following features:

    a) for me memorizing words and phrases was:
       - ❑ generally very difficult
       - ❑ generally difficult
       - ❑ generally not very difficult
       - ❑ generally easy

b) for me pronouncing words and phrases correctly was:
- ❑ generally very difficult
- ❑ generally difficult
- ❑ generally not very difficult
- ❑ generally easy

---

13. As regards Chinese-Mandarin, do you have any previous knowledge?

- ❑ yes, very little *(e.g.: saying thank you, greetings, counting)*
- ❑ yes, I know some basics *(I can say short simple sentences)*
- ❑ no, I have no knowledge at all

---

14. Have you ever been to a Chinese-speaking country?

- ❑ never
- ❑ 1 – 5 times
- ❑ more than 5 times
- ❑ I am temporarily staying in a Chinese-speaking country

---

15. Why do you want to learn Chinese?
(*More than one answer is possible)*

- ❑ job
- ❑ travelling
- ❑ personal interest
- ❑ other reason/s …….....

---

16. Looking back at the past 5 years, have you been engaged in any education course/s other than language training? If so, which ones? (e.g.: at university, VHS or similar institutions)

- ❑ yes, frequently ……
- ❑ yes,occasionally……..
- ❑ very rarely …….
- ❑ never

---

17. On average, how many days a week do you think you will be able (are you planning) to study Chinese-Mandarin throughout the appointed study period of 3 months?

- ❑ every day
- ❑ 4 – 5 times a week
- ❑ 2 – 3 times a week
- ❑ possibly less

---

18. After the learning phase of 3 months, what are your expectations in terms of fluency and command of the language you were exposed to in the course?
Indicate this on a scale from 10 (= excellent command) to 1 (= poor command).(*Put an* X *in the appropriate place in the line below the numbers)*
I expect the following:

10 9 8 7 6 5 4 3 2 1 (0)

excellent command poor command

---

19. There are different types of language learners with different preferences. How would you classify yourself as regards the following features?

a) When learning a new language, for me grammatical rules are basically
- ❑ very important
- ❑ important
- ❑ not so important
- ❑ I don't know

b) When learning a new language, for me seeing how words are spelt and written is basically
- ❑ very important
- ❑ important
- ❑ not so important
- ❑ I don't know

c) When learning a new language, for me listening and speaking out loud is
- ❑ very important
- ❑ important
- ❑ not so important
- ❑ I don't know

---

20. How would you rate your level of motivation to take part in this program? – *Indicate this on a scale from 10 (= highly motivated)*

to 1 (= absolutely demotivated).
(*Put an X in the appropriate place in the line below the numbers)*
I am:

10	9	8	7	6	5	4	3	2	1	(0)

highly motivated absolutely demotivated

Appendix 3

FINAL QUESTIONNAIRE

PERSONAL CODE _____

---

1. Within the given time span I worked as far as Unit ……..

---

2. Throughout the whole learning period, approximately on how many days did you learn? ……..

---

3. Considering the set task, was the designated time span sufficient?

   - ❑ by far too short
   - ❑ not sufficient
   - ❑ just sufficient
   - ❑ too long

---

4. Do you think that independence of time and learning at your own pace was beneficial to the learning success?

   - ❑ absolutely
   - ❑ not at all

---

5. Would you have preferred a set time frame to stick to? (e.g.: deadlines for handing in the 5 study diaries)

   - ❑ yes
   - ❑ no

---

6. In general, were you satisfied with the quality of this language learning program?

   - ❑ very satisfied

- ❑ satisfied
- ❑ partly satisfied
- ❑ not satisfied

---

7. How would you rate the pace of the program?
(In terms of language input per unit)

- ❑ too fast
- ❑ just right
- ❑ too slow

---

8. How helpful do you consider the handout?

- ❑ indispensable
- ❑ very helpful
- ❑ helpful
- ❑ not helpful

---

9. Was the handout sufficient in terms of coverage of the language to learn?

- ❑ fully sufficient
- ❑ partly sufficient
- ❑ not sufficient

---

10. How would you rate the efficiency of this language learning method as compared to previously experienced learning methods?

- ❑ much better
- ❑ better
- ❑ about the same
- ❑ worse

Answer this question only, if you have used a self-study program before:
How satisfied are you with this self-study program as compared to previously used ones?

- ❑ more satisfied
- ❑ less satisfied
- ❑ the same

---

11. Would you recommend this language learning program to other people?

- ❑ yes, absolutely
- ❑ basically yes
- ❑ not really
- ❑ no, absolutely not

---

12. On the whole following the tutor's instructions was

- ❑ very difficult
- ❑ difficult
- ❑ not very difficult
- ❑ generally easy

---

13. Which of the 2 voices on the CDs was easier to understand and why?

- ❑ female voice …….
- ❑ male voice …….
- ❑ they seemed pretty much the same

---

14. Looking back at the 3 months, how would you rate the following features?

d) memorizing words and phrases was:
- ❑ generally very difficult
- ❑ generally difficult
- ❑ generally not very difficult
- ❑ generally easy

e) pronouncing words and phrases correctly was:
- ❑ generally very difficult
- ❑ generally difficult
- ❑ generally not very difficult
- ❑ generally easy

f) understanding words and phrases was:
- ❑ generally very difficult
- ❑ generally difficult
- ❑ generally not very difficult
- ❑ generally easy

---

15. Do you think you could have managed without the handout? (Pinyin-Script)

- ❑ yes, absolutely
- ❑ probably yes
- ❑ I don't think so
- ❑ absolutely not

---

16. For me the grammatical rules supplied by the tutor in-between the learning instructions were

- ❑ fully sufficient
- ❑ sufficient
- ❑ partly sufficient
- ❑ not sufficient

---

17. With this learning method I could

- ❑ cope very well
- ❑ cope well
- ❑ cope more or less satisfactorily
- ❑ not cope at all

---

18. Arranging and Planning:
Did you set up a time-plan before you started learning?

- ❑ yes
- ❑ no

If your answer is „yes", were you able to stick to your time-plan?

- ❑ yes
- ❑ partly
- ❑ no

---

19. Human memory is fundamentally associative. You can remember a new piece of information better if you can associate it with previously acquired knowledge that is already firmly anchored in your memory. To what extent did you make use of such mnemonic hooks? (Eselsbrücken)
Indicate this on a scale from 100% to 0%
(*Put an* X *in the appropriate place in the line below the numbers):*

10 9 8 7 6 5 4 3 2 1 (0)

100% 0%

---

20. German language as a vehicle:
Did you in any form use the German language as a resource or medium? (e.g.: using learning cards, mere mental process)

- ❑ yes, often
- ❑ yes, sometimes
- ❑ no, never

---

21. Have you tried out your language competence in real life situations? (Speaking experience with Chinese native speakers during learning phase)

a) ❑ During this time I did not have any opportunity to pratice
b) ❑ During this time I had about ….. times the opportunity to practice

If your answer is **b)**,
please give an account of your experiences :

Speaking :
When confronted with this situation,
- ❑ I did not speak at all
- ❑ I used some of the language I had learnt, but people did not understand me
- ❑ I used some of the language I had learnt and people could partly understand me
- ❑ I used the language I had learned and people could understand me quite well

Listening comprehension:
When confronted with this situation,
- ❑ I did not understand a single word
- ❑ I was able to understand some of the language they used
- ❑ I could make out (almost) all the words and phrases I had learnt so far

---

22. In terms of foreign language learning I consider myself as

- ❑ quite gifted

- ❑ gifted
- ❑ not so gifted
- ❑ absolutely ungifted

---

23. What would you say is easier for you as regards the units you have learnt?

    - ❑ understanding Chinese
    - ❑ speaking Chinese
    - ❑ I can see no difference

---

24. Looking back at your learning phase, how difficult was it for you to learn this language?

    - ❑ very difficult
    - ❑ difficult
    - ❑ not very difficult
    - ❑ generally easy

---

25. How would you rate your overall command of the language you have learnt in the course of this project?
    Indicate this on a scale from 10 (= excellent command) to 1 (= poor command). (*Put an* X *in the appropriate place in the line below the numbers):*
    I consider my overall command as follows:

    10 9 8 7 6 5 4 3 2 1 (0)

    excellent command poor command

---

26. Looking back at the units you have learnt, how many percent of the language input do you think you have stored in your memory?
    Indicate this on a scale from 100% to 10%.
    (*Put an* X *in the appropriate place in the line below the numbers):*

    10 9 8 7 6 5 4 3 2 1 (0)

    100% 0%

---

27. How would you rate your command of the language in terms of pronunciation? - *Indicate this on a scale from 10 (= excellent*

command) to 1 (= poor command).
(*Put an* X *in the appropriate place in the line below the numbers):*
I consider my command as follows:

10 9 8 7 6 5 4 3 2 1 (0)

excellent command poor command

---

28. How would you rate your command of the language in terms of comprehension? - *Indicate this on a scale from 10 (= excellent command) to 1 (poor command).*
(*Put an* X *in the appropriate place in the line below the numbers):*
I consider my command as follows:

10 9 8 7 6 5 4 3 2 1 (0)

excellent command poor command

---

29. Are you satisfied with your learning results?

- ❑ very satisfied
- ❑ satisfied
- ❑ not very satisfied
- ❑ totally unsatisfied

---

30. Were your expectations concerning the learning success met?

- ❑ fully
- ❑ in large part
- ❑ partly
- ❑ not at all

---

31. How would you rate your level of motivation after having taken part in this program? - *Indicate this on a scale from 10 (= highly motivated) to 1 (= absolutely demotivated).*
(*Put an* X *in the appropriate place in the line below the numbers):*
In terms of language acquisition I am now:

10 9 8 7 6 5 4 3 2 1 (0)

highly motivated absolutely demotivated

---

32. Throughout the 3 months' learning period did you ever consider to back out?

- ❑ very often
- ❑ often
- ❑ sometimes
- ❑ never

---

33. Are you planning to continue studying Chinese Mandarin?

- ❑ yes
- ❑ no
- ❑ I don't know yet

If your answer is YES, which of the following methods would you consider as most appropriate for continuing your studies of Chinese Mandarin?
(Please tick **only one** of the options below):

- ❑ language course
- ❑ private tuition
- ❑ self-study program similar to the one I used here
- ❑ self-study computer program
- ❑ self-study program based on CDs + books
- ❑ self-study program based on CDs only
- ❑ self-study program based on books only
- ❑ stay abroad (in a Chinese-speaking country) with tuition
- ❑ stay abroad (in a Chinese-speaking country) without tuition

---

34. Give a short account of your learning experience:
(in your own words)

Appendix 4

STUDY DIARY 1
Units 1 - 6

(Study diaries 2 – 5 are identical)

1. PERSONAL CODE _____

2. On average, how often did you study?
   - ☐ every day
   - ☐ 4 – 5 days a week
   - ☐ 2 – 3 days a week
   - ☐ less

3. How many hours did you learn for:
   a) unit 1 _____
   b) unit 2 _____
   c) unit 3 _____
   d) unit 4 _____
   e) unit 5 _____
   f) unit 6 _____

4. Did you make use of any of these additional learning methods: *(several answers possible)*
   - ☐ learning cards
   - ☐ writing
   - ☐ reading

5. Did you use any material other than the supplied CDs and the handout?
   - ☐ yes
     what? _____
   - ☐ no

6. How difficult was it to imitate the pronunciation of the tutor?
   - ☐ very difficult
   - ☐ difficult
   - ☐ not very difficult
   - ☐ easy

7. What is easier?
   - ☐ understanding
   - ☐ speaking
   - ☐ I can see no difference

8. My motivation to continue:
   - ☐ highly motivated
   - ☐ motivated
   - ☐ not very motivated
   - ☐ have to force myself

Appendix 5

TEST 1

TEST PERSON : _____ as far as UNIT : _____

MONITORING
PART 1
TRANSLATION

Unit		
1	**1**	**Excuse me, may I ask, can you speak Mandarin?** Duìbuqǐ, qǐngwèn, nǐ huì shuō Pǔtōnghuà ma?
2	**2**	**Yes, I can speak a little Mandarin.** Huì, wǒ huì shuō yìdiǎnr Pǔtōnghuà.
3	**3**	**But I don't speak well.** Kěshì, wǒ shuō de bù hǎo.
3	**4**	**Are you American?** Nǐ shì Měiguórén ma?
3	**5**	**No, I am not American.** Bú shì, wǒ bú shì Měiguórén.
4	**6**	**I don't understand what you are saying.** Wǒ bù míngbai nǐ shuō shénme.
5	**7**	**Would you like to drink something?** Nǐ xiǎng hē yìdiǎnr dōngxi ma?
5	**8**	**No, thank you, but I would like to eat something.** Bù xiǎng, xièxie nǐ, kěshì wǒ xiǎng chī yìdiǎnr dōngxi.
7	**9**	**I would like to go to the Beijing Restaurant, and you?** Wǒ xiǎng qù Běijīng Fàndiàn, nǐ ne?
5	**10**	**I don't know.** Wǒ bù zhīdao.
8	**11**	**I would like to order tea.** Wǒ xiǎng yào chá.

9 **12** **Would you like to eat lunch with me?**
Nǐ xiǎng gēn wǒ yìqǐ chī wǔfàn ma?

10 **13** **At what time?**
Jǐ diǎn zhōng?

10 **14** **I don’t want to eat now.**
Wǒ bú yào xiànzài chī.

11 **15** **What would you like to do this evening?**
Nǐ xiǎng jīntiān wǎnshang zuò shénme?

12 **16** **How much is it? (How much does it cost?)**
Duōshǎo qián?

13 **17** **Do you have US-dollars?**
Nǐ yǒu méi yǒu Měijīn?
Nǐ yǒu Měijīn ma?

14 **18** **No, but I have Renminbi.**
Méi yǒu, kěshì wǒ yǒu Rénmínbì.

15 **19** **This is for you.**
Zhè shì gěi nǐ de.

15 **20** **Can you buy some beer?**
Nǐ ké bù kěyǐ mǎi yìdiǎnr píjiǔ?
Nǐ kěyǐ mǎi yìdiǎnr píjiǔ ma?

15 **21** **No, I can’t.**
Bù kěyǐ, wǒ bù kěyǐ.

16 **22** **Is that enough?**
Gòu bú gòu?
Gòu ma?

17 **23** **It’s too expensive.**
Tài guì le.

18 **24** **Please give me water.**
Máfan nǐ gěi wǒ shuǐ.

19 **25** **My husband and I, we live in Beijing.**
Wǒ de xiānsheng hé wǒ, wǒmen zhù zài Běijīng.

21 **26** **I would like to go to America.**
Wǒ xiǎng qù Měiguó.

21 **27** **With whom?**
Gēn shéi yìqǐ?

21 **28** **With my son.**
Gēn wǒ de érzi yìqǐ.

21 **29** **Can you wait a moment?**
Nǐ ké bù kěyǐ děng yíhuìr?
Nǐ kěyǐ děng yíhuìr ma?

22 **30** **Tomorrow she is going to take a plane to HKG.**
Míngtiān tā yào zuò fēijī qù Xiānggǎng.

23 **31** **Which flight goes to HKG?**
Nǎge bānjī qù Xiānggǎng?

24 **32** **Please go straight ahead.**
Qǐng, yìzhí wǎng qián zǒu.

25 **33** **Are the stores open today?**
Jīntiān shāngdiàn kāimén le ma?
Jīntiān shāngdiàn shì bú shì kāimén ?

25 **34** **Why?**
Wèishénme?

25 **35** **Because we would like to go shopping.**
Yīnwèi wǒmen xiǎng mǎi yìdiǎnr dōngxi.

26 **36** **I would like to see some friends.**
Wǒ xiǎng kàn jǐgè péngyou.

26 **37** **I think I am going to see some friends.**
Wǒ xiǎng, wǒ yào kàn jǐgè péngyou.

29 **38** **We have been here for 1 week.**
Wǒmen zài zhèr yíge xīngqī le.

29 **39** **When did you arrive?**
Nǐ shì shénme shíhou dàodá?

30 **40** **Yesterday they bought a lot of things.**
Zuótiān tāmen mǎi le hěn duō dōngxi.

Appendix 6

TEST 2

TEST PERSON : _____ as far as UNIT : _____

MONITORING
PART 2
LISTENING COMPREHENSION

Tick the appropriate answer:
(The answer sheet for the test persons only showed the two answer options for each task, while the sentences they referred to could only be heard and were not written)

Unit		
3	**1**	**Duìbuqǐ, qǐngwèn, nǐ huì shuō Yīngwén ma?** a) Huì, wǒ huì shuō Yīngwén. b) Bú huì, wǒ bú huì shuō Yīngwén.
3	**2**	**Nǐ shì Měiguórén ma?** a) Xièxie nǐ. b) Bú shì, wǒ bú shì Měiguórén.
5	**3**	**Nǐ xiǎng chī yìdiǎnr dōngxi ma?** a) Cháng Ān Jiē zài nàr. b) Bù xiǎng, kěshì wǒ xiǎng hē yìdiǎnr dōngxi.
6	**4**	**Nǐ xiǎng xiànzài qù fàndiàn ma?** a) Xiànzài bù hǎo, guò yíhuìr, hǎo ma ? b) Bú zài zhèr.
8	**5**	**Nǐ xiǎng yào shénme?** a) Bù xiǎng, wǒ xiǎng hē píjiǔ. b) Wǒ xiǎng yào yìdiǎnr chá.
8	**6**	**Nǐ xiǎng gēn wǒ yìqǐ chī wǔfàn ma?** a) Xiǎng, wǒ xiǎng. b) Wǒ yě chī wǔfàn.
9	**7**	**Jǐ diǎn zhōng?**

a) Bùxíng.
b) Bā diǎn zhōng.

12 **8** **Duōshǎo qián?**
a) Hǎo, shénme shíhou?
b) Shí èr kuài Měijīn.

14 **9** **Nǐ yǒu méi yǒu Rénmínbì?**
a) Yǒu, wǒ yǒu hěn duō Rénmínbì.
b) Gěi wǒ yìdiǎnr Rénmínbì.

15 **10** **Nǐ yào mǎi yìdiǎnr dōngxi ma?**
a) Hǎo, zhè shì gěi nǐ de.
b) Bú yào, wǒ bú yào.

17 **11** **Nǐ ké bù kěyǐ gěi wǒ yìdiǎnr qián?**
a) Kěyǐ, wǒ kěyǐ.
b) Tài duō le.

18 **12** **Gòu bú gòu?**
a) Máfan nǐ gěi wǒ shuǐ.
b) Gòu le.

22 **13** **Nǐmen zhù zài nǎr?**
a) Wǒmen zhù zài Běijīng
b) Tāmen xiǎng qù Xiānggǎng.

23 **14** **Nǐ xiǎng gēn shéi yìqǐ qù?**
a) Shì gěi wǒ de ma?
b) Wǒ xiǎng gēn nǐ yìqǐ qù.

22 **15** **Nǐ xiǎng zuò fēijī qù Xiānggǎng ma?**
a) Xiǎng, kěshì tài guì le.
b) Qǐngwèn, děng yíhuìr.

24 **16** **Fēijīchǎng zài nǎr?**
a) Zàijiàn.
b) Zài nàr, yìzhí wǎng qián zǒu.

26 **17** **Nǐ yào kàn nǐ de péngyou ma?**
a) Wǒ xiǎng wǒ yào kàn wǒ de péngyou.
b) Wǒ yào qù nàr.

26 **18** **Míngtiān nǐ yào bú yào gōngzuò?**
a) Yào, wǒ xiǎng wǒ yào gōngzuò.
b) Tāmen yào yìqǐ zǒu.

29 **19** **Tāmen shì shénme shíhou dàodá?**

a) Tāmen yǒu yíge érzi, liǎnggè nǚ'ér.
b) Tāmen shì zuótiān wǎnshang dàodá.

30 **20 Zuótiān nǐ zuò le shénme?**

a) Wǒ mǎi le hěn duō dōngxi.
b) Yíge xīngqī le.

Appendix 7

Chart 1-1

CRITERIA FOR RANKING OF TOP 5: ABSOLUTE Mean Value C + H + I (= Units learnt + Part 1 + 2 in % **(x out of 40 + x out of 20)**)										
A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
			LS	LS	LS	Mean Value	LS	LS	LS	Mean Value
		Learnt	relative	relative	relative	**relative**	absolute	absolute	absolute	**absolute**
Code	**Age**	**Units**	Part 1	Part 2	**D + E**	**C + D + E**	Part 1	Part 2	**H + I**	**C + H + I**
A-2	29	**80**	78.125	87.5	82,.813	**81.875**	62.5	70	66.25	**70.833333**
A-3	29	**76.66**	64.52	100	82.26	**80.393333**	50	75	62.5	**67.22**
A-1	29	**53.33**	40.9	80	60.45	**58.076667**	20	40	30	**37.776667**
A-6	28	**16.66**	75	100	87.5	**63.886667**	15	15	15	**15.553333**
A-4	32	**23.33**	30	75	52.5	**42.776667**	7.5	15	11.25	**15.276667**
	29.4	**49.996**	**57.709**	**88.5**	**73.105**	**65.401667**	**31**	**43**	**37**	**41.332**
B-8	43	**100**	87.5	95	91.25	**94.166667**	87.5	95	91.25	**94.166667**
B-3	39	**80**	59.4	100	79.7	**79.8**	47.5	80	63.75	**69.166667**
B-1	40	**73.33**	73.33	100	86.665	**82.22**	55	65	60	**64.443333**
B-9	38	**53.33**	95.5	100	97.75	**82.943333**	52.5	50	51.25	**51.943333**
B-5	44	**40**	31.25	62.5	46.875	**44.583333**	12.5	25	18.75	**25.833333**
	40.8	**69.332**	**69.396**	**91.5**	**80.448**	**76.742667**	**51**	**63**	**57**	**61.110667**
C-5	64	**100**	77.5	100	88.75	**92.5**	77.5	100	88.75	**92.5**
C-8	53	**100**	55	85	70	**80**	55	85	70	**80**
C-1	46	**93.33**	64.86	94.4	79.63	**84.196667**	60	85	72.5	**79.443333**
C-9	49	**100**	40	95	67.5	**78.333333**	40	95	67.5	**78.333333**
C-7	69	**100**	40	80	60	**73.333333**	40	80	60	**73.333333**
	56.2	**98.666**	**55.472**	**90.88**	**73.176**	**81.6726667**	**55**	**89**	**72**	**80.888667**

Chart 1-1: Language data analysis

Appendix 7

Chart 1-2

PERSONAL DETAILS - HARD FACTS								
A	L	M	N	O	P	R	S	T
	PQ-8	PQ-8	PQ-4	PQ-5	PQ-3	PQ-16	PQ-13	PQ-14
Code	Proficieny	Languages	U.E. Dipl.	Univ. degree	Job	Prev. edu.	Mandarin	Culture
A-2	**3** - A B B	IT SP RU	yes	no	part	no	no	5 +
A-3	**4** - A I I B	IT SP FR JP	yes	yes	full	yes	no	5 +
A-1	nil	nil	no	no	full	yes	no	5 +
A-6	**1** - I	FR	no	no	full	yes	no	5 +
A-4	**3** - A I B	IT FR SP	yes	no	full	no	no	5 +
	2,2							
B-8	**3** - A I B	FR IT SP	yes	no	full	no	no	5 +
B-3	**1** - I	IT	no	no	full	no	no	5 +
B-1	**3** - I B B	FR IT CH	yes	no	full	yes	basics	5 +
B-9	**3** - A A I	FR IT SP	yes	CPL	part	no	no	5 -
B-5	**2** - B B	IT SP	no	no	full	yes	no	5 -
	2,4							
C-5	**4** - A A I B	FR SP GR HI	yes	yes	part	yes	no	never
C-8	**4** - A I B B	FR IT SP LA	yes	CPL	full	yes	no	5 +
C-9	**4** - A A I B	FR SP IT PT	yes	yes	part	yes	no	5 +
C-1	**2** - I B	FR IT	yes	no	full	no	no	5 -
C-7	**1** - I	IT	yes	no	full	no	no	5 +
	3							

Chart 1-2: Questionnaires – demographic data

Appendix 7

Chart 1-3

MOTIVATION before / after - SELF-ASSESSMENT before / after (Learner Beliefs) - STUDY TIME expected / de facto - Preferences								
A	U	V	W	X	Y	Z	Z-A	Z-B
	PQ - 20	FQ - 31	PQ - 18	FQ - 25	PQ - 11	FQ - 24	FQ - 2	FQ - 5
Code	Mot. before	Mot. after	Self-Ass. before	Self-Ass. after	FLL aptitude	Learn.Exper.	Study time/hours	Set time frame
A-2	10	10	5	8	2	2	68 (2.8)	no
A-3	10	10	8	7	2	2	30 (1.3)	yes
A-1	9.5	9	6.5	8	2	2	37 (2.3)	no
A-6	7.5	5	4.5	7	2	3	9 (1.8)	no
A-4	8	3	5	7	2	3	7 (1.0)	yes
	9	**7.4**	**5.8**	**7.4**	**2**	**2.4**	**1.8**	**40% yes**
B-8	9	9	6	8	2	3	50 (1.7)	no
B-3	10	10	5	7	2	3	70 (2.9)	no
B-1	10	10	7.5	6	2	1	30 (1.4)	no
B-9	8	10	4	8	2	3	20 (1.3)	no
B-5	7.5	8	7.5	6.5	2	3	20 (1.7)	yes
	8.9	**9.4**	**6**	**7.1**	**2**	**2.6**	**1.8**	**20% yes**
C-5	7	10	4	7	2	4	50 (1.7)	no
C-8	9	10	6	8	2	2	60 (2.0)	no
C-9	7.5	7.5	3	7	2	3	70 (2.3)	no
C-1	5.5	6.5	7	7	3	3	56 (2.0)	no
C-7	7	8	5	6	3	3	75 (2.5)	no
	7.2	**8.4**	**5**	**7**	**2.4**	**3**	**2.1**	**0 % yes**

Chart 1-3: Questionnaires – motivation, self-assessment, study habits

Appendix 7

Chart 1-4

Learning Styles, Strategies, Self-Regulation										
A	**Z-D**	**Z-E**	**Z-F**	**Z-G**	**Z-H**	**Z-J**	**Z-K**	**Z-L**	**Z-M**	**Z-N**
	FQ-2	PQ-17	FQ-17	FQ-18	FQ-18	FQ-19	FQ-20	FQ-29	FQ-30	FQ-32
Code	Study days	Planned days	Coping	Time plan	cont.	Mnem. hooks	L1 vehicle	Satisf. results	Exp. met	Back out
A-2	68	32.5	4	no	0	20	1	3	4	4
A-3	30	58.5	4	no	0	30	1	3	4	4
A-1	37	32.5	4	yes/no	10+ 10-	10	1	3	2	4
A-6	9	32.5	2	no	0	0	3	2	1	3
A-4	15	32.5	3	no	0	20	1	2	2	4
	159	**188.5**	**3.4**		**0**	**16**	**1.4**	**2.6**	**2.6**	**3.8**
B-8	50	32.5	3	yes/yes	10+ 10+	0	1	3	3	4
B-3	70	58.5	4	yes/part	10+ 5+	10	1	4	4	4
B-1	30	58.5	4	no	0	10	1	2	4	4
B-9	20	32.5	4	no	0	10	1	4	4	4
B-5	20	58.5	4	yes/no	10+ 10-	15	2	2	2	4
	190	**240.5**	**3.8**		**35**	**9**	**1.2**	**3**	**3.4**	**4**
C-5	50	32.5	4	no	0	40	1	3	3	4
C-8	60	32.5	4	yes/part	10+ 5+	20	2	3	3	4
C-9	70	58.5	3	no	0	70	1	3	4	4
C-1	56	32.5	4	yes/yes	10+ 10+	15	1	3	4	4
C-7	75	32.5	3	yes/yes	10+ 10+	30	1	3	3	4
	311	**188.5**	**3.6**		**55**	**35**	**1.2**	**3**	**3.4**	**4**

Chart 1-4: Learning styles, learner strategies, self-regulation, self-concept

Appendix 8

Green numbers indicate sentences that are fully correct.
Blue numbers indicate sentences with acceptable deviations and thus rated as correct.
Red numbers indicate sentences that were rated as incorrect

A - 1
Part 1
Transcript

Unit 16 No. 22

1 **Excuse me, may I ask, can you speak Mandarin?**
Duìbuqǐ qǐngwèn, nǐ huì shuō Pǔtōnghuà ma?
>> Duibuqi qingwen, ni hui shuo Putonghua ma?

2 **Yes, I can speak a little Mandarin.**
Huì, wǒ huì shuō yìdiǎnr Pǔtōnghuà.
>> Hui, wo hui shuo yidianr Putonghua.

3 **But I don't speak well.**
Kěshì, wǒ shuō de bù hǎo.
>> Keshi, wo shuo bu hen hao.

4 **Are you American?**
Nǐ shì Měiguórén ma?
>> Ni shi Meiguoren ma?

5 **No, I am not American.**
Bú shì, wǒ bú shì Měiguórén.
>> Bu shi, wo bu shi Meiguoren.

6 **I don't understand what you are saying.**
Wǒ bù míngbai nǐ shuō shénme.
>> Wo bu mingbai ni shuo (--).

7 **Would you like to drink something?**
Nǐ xiǎng hē yìdiǎnr dōngxi ma?
>> Ni xiang - yidianr he (--).

8 **No, thank you, but I would like to eat something.**
Bù xiǎng, xièxie nǐ, kěshì wǒ xiǎng chī yìdiǎnr dōngxi.
>> Bu xiang, (--) (--), keshi wo xiang yidianr chi (--).

9 **I would like to go to the Beijing Restaurant, and you?**
Wǒ xiǎng qù Běijīng Fàndiàn, nǐ ne?
>> Wo xiang chi Beijing fan, ni ne?

10 **I don't know.**
Wǒ bù zhīdao.
>> Wo bu zhidao.

11 **I would like to order tea.**
Wǒ xiǎng yào chá.
>> Wo xiang yao cha.

12 **Would you like to eat lunch with me?**
Nǐ xiǎng gēn wǒ yìqǐ chī wǔfàn ma?
>> Wo xiang chi wanfan gen ni yiqi (--).

13 **At what time?**
Jǐ diǎn zhōng?
>> Shenme shihou?

14 **I don't want to eat now.**
Wǒ bú yào xiànzài chī.
>> Wo (xx)

15 **What would you like to do this evening?**
Nǐ xiǎng jīntiān wǎnshang zuò shénme?
>> (xx)

16 **How much is it? (How much does it cost?)**
Duōshǎo qián?
>> Duoshao qian?

17 **Do you have US-dollars?**
Nǐ yǒu méi yǒu Měijīn? / Nǐ yǒu Měijīn ma?
>> Ni yao mei you Meijin?

18 **No, but I have Renminbi.**
Méi yǒu, kěshì wǒ yǒu Rénmínbì.
>> Mei you, keshi wo yao Renminbi.

19 **This is for you.**
Zhè shì gěi nǐ de.
>> (Gei wo ne.) (--) (--) gei ni ne.

20 **Can you buy some beer?**
Nǐ ké bù kěyǐ mǎi yìdiǎnr píjiǔ? / Nǐ kěyǐ mǎi yìdiǎnr píjiǔ ma?
>> Wo (--) mai (--) pijiu ma?

21 **No, I can't.**
Bù kěyǐ, wǒ bù kěyǐ.
>> (--) (--), wo bu keyi.

22 **Is that enough?**
Gòu bú gòu? / Gòu ma?
>> Shi bu shi gou le?

Appendix 8

Green numbers indicate sentences that are fully correct.
Blue numbers indicate sentences with acceptable deviations which were rated as correct.
Red numbers indicate sentences that were rated as incorrect

A - 2
Part 1
Transcript

Unit 24 No. 32

1 **Excuse me, may I ask, can you speak Mandarin?**
Duìbuqǐ qǐngwèn, nǐ huì shuō Pǔtōnghuà ma?
>> Duibuqi qingwen, ni hui shuo Putonghua ma?

2 **Yes, I can speak a little Mandarin.**
Huì, wǒ huì shuō yìdiǎnr Pǔtōnghuà.
>> Shi, wo hui shuo yidianr Putonghua.

3 **But I don't speak well.**
Kěshì, wǒ shuō de bù hǎo.
>> Keshi, wo shuo de hen hao.

4 **Are you American?**
Nǐ shì Měiguórén ma?
>> Ni shi Meiguoren ma?

5 **No, I am not American.**
Bú shì, wǒ bú shì Měiguórén.
>> Bu shi, wo bu shi Meiguoren.

6 **I don't understand what you are saying.**
Wǒ bù míngbai nǐ shuō shénme.
>> Wo bu mingbai ni shuo shenme.

7 **Would you like to drink something?**
Nǐ xiǎng hē yìdiǎnr dōngxi ma?
>> Ni xiang he shenme?

8 **No, thank you, but I would like to eat something.**
Bù xiǎng, xièxie nǐ, kěshì wǒ xiǎng chī yìdiǎnr dōngxi.
>> Bu xiang, (--) (--), keshi wo xiang chi yidianr dongxi.

9 **I would like to go to the Beijing Restaurant, and you?**
Wǒ xiǎng qù Běijīng Fàndiàn, nǐ ne?
>> Wo xiang qu Beijing Fandian, ni ne?

10 **I don't know.**
Wǒ bù zhīdao.
>> Wo bu zhidao.

11 **I would like to order tea.**
Wǒ xiǎng yào chá.
>> Wo xiang yao cha.

12 **Would you like to eat lunch with me?**
Nǐ xiǎng gēn wǒ yìqǐ chī wǔfàn ma?
>> Ni xiang gen wo yiqi chi wanfan ma? – chi wufan

13 **At what time?**
Jǐ diǎn zhōng?
>> Ji dian zhong?

14 **I don't want to eat now.**
Wǒ bú yào xiànzài chī.
>> Wo bu xiang xianzai chi.

15 **What would you like to do this evening?**
Nǐ xiǎng jīntiān wǎnshang zuò shénme?
>> Ni xiang jintian wanshang zuo shenme?

16 **How much is it? (How much does it cost?)**
Duōshǎo qián?
>> Duoshao qian?

17 **Do you have US-dollars?**
Nǐ yǒu méi yǒu Měijīn? / Nǐ yǒu Měijīn ma?
>> Ni you mei you Meijin?

18 **No, but I have Renminbi.**
Méi yǒu, kěshì wǒ yǒu Rénmínbì.
>> Mei you, keshi wo you Renminbi.

19 **This is for you.**
Zhè shì gěi nǐ de.
>> (--) shi gei ni de.

20 **Can you buy some beer?**
Nǐ ké bù kěyǐ mǎi yìdiǎnr píjiǔ? / Nǐ kěyǐ mǎi yìdiǎnr píjiǔ ma?
>> (Ni keyi mei pijiu?) Ni keyi mai (--) pijiu – ma?

21 **No, I can't.**
Bù kěyǐ, wǒ bù kěyǐ.
>> Bu keyi – wo bu keyi.

22 **Is that enough?**
Gòu bú gòu? / Gòu ma?
>> Gou ma?

23 **It's too expensive.**
Tài guì le.
>> Tai gui le.

24 **Please give me water.**
Máfan nǐ gěi wǒ shuǐ
>> Mafan ni gei wo shui.

25 **My husband and I, we live in Beijing.**
Wǒ de xiānsheng hé wǒ, wǒmen zhù zài Běijīng.
>> Wo de xiansheng he wo, (--) zuo (--) Beijing (qu Beijing)

26 **I would like to go to America.**
Wǒ xiǎng qù Měiguó.
>> Wo xiang qu Meiguo.

27 **With whom?**
Gēn shéi yìqǐ?
>> Gen shei yiqi?

28 **With my son.**
Gēn wǒ de érzi yìqǐ.
>> Gen - gen wo de erzi (--).

29 **Can you wait a moment?**
Nǐ ké bù kěyǐ děng yíhuìr? / Nǐ kěyǐ děng yíhuìr ma?
>> Ni keyi deng yihuir (--)?

30 **Tomorrow she is going to take a plane to HKG.**
Míngtiān tā yào zuò fēijī qù Xiānggǎng.
>> Mingtian ta yao zuo feiji qu Xianggang.

31 **Which flight goes to HKG?**
Nǎge bānjī qù Xiānggǎng?
>> Nage banji qu Xianggang?

32 **Please go straight ahead.**
Qǐng, yìzhí wǎng qián zǒu.
>> (--), yizhi wang qian zou.

Zusammenfassung

Die theoretische Forschung im Bereich Fremdsprachenerwerb beschäftigte sich im zwanzigsten Jahrhundert primär mit jungen Sprachlernern. Nun rückt jedoch die demographische Entwicklung der vergangenen Jahrzehnte völlig neue Perspektiven in den Blickpunkt. In Anbetracht einer sich gravierend wandelnden Altersstruktur der Bevölkerung und dem damit verbundenen Anspruch einer längeren Einbindung in das aktive Berufsleben gewinnt das Konzept des *lebenslangen Lernens* immer mehr an Bedeutung. Somit muss sich auch die Sprachlehr- und lernforschung neu orientieren und die Entwicklung entsprechender Lernkonzepte überdenken. Sie muss Möglichkeiten einer holistischen Erfassung von zeitgemäßen Spracherwerbstheorien schaffen und entsprechende Modelle hervorbringen.

Das vorliegende Projekt greift das Thema einer sich verändernden Altersstruktur des klassischen Fremdsprachenlerners auf und beschäftigt sich mit der Frage ob und inwieweit die Befähigung zum Fremdsprachenerwerb altersspezifischen Einflussfaktoren unterliegt. Im Brennpunkt des Forschungsinteresses steht die Frage, inwiefern die Auswertung der empirischen Daten Rückschlüsse auf die Lernfähigkeit des Menschen speziell hinsichtlich Merkfähigkeit, kognitiver Leistungsfähigkeit wie auch neuronaler Plastizität jenseits der 45-Jahres-Schwelle zulässt. In diesem Zusammenhang wurden auch andere mögliche Parameter wie Interesse, Motivation, Engagement, Fleiß, Zeit-Management und reife- bzw. entwicklungsbedingte Gesichtspunkte untersucht und ausgewertet. Schlussendlich flossen auch Werte wie vorangehender Fremdspracherwerb und akkumuliertes Lernerbewusstsein mit in die Studie ein.

30 Testpersonen im Alter zwischen 20 und 69 – aufgeteilt in drei Altersgruppen – beteiligten sich an dieser Studie. Um eine möglichst

homogene Ausgangsbasis bezüglich fremdsprachlicher Vorkenntnisse zu gewährleisten wurde Chinesisch-Mandarin als Zielsprache gewählt. Nach einer 3-monatigen Lernphase unterzogen sich die Teilnehmer einem mündlichen Test. In Hinblick auf einen wissenschaftlich vertretbaren Gruppenvergleich wurden für die analytische Auswertung die besten fünf jeder Gruppe herangezogen. Die vorliegenden Untersuchungsergebnisse weisen darauf hin, dass hinsichtlich Gesamtleistung die älteren Lerner ihre jüngeren Kollegen überflügelten. Die Datenanalyse aller relevanten Lerneraspekte spricht für die Interaktion von insbesondere drei verschiedenen Kräften, die sich maßgeblich auf den Lernerfolg auswirken. Diese Einflussfaktoren wurden als steuernde Wirkungsvariablen im Fremdspracherwerb diagnostiziert und in einem neuen taxonomischen Modell zusammengefasst. Es handelt sich dabei um die biologische, die metakognitive und die willensgesteuerte Lernerkomponente.

Die vorliegenden Forschungsergebnisse sind im Rahmen einer altersspezifisch erweiterten Fremdspracherwerbsforschung als Weiterführung der Wissenschaftsdebatte um die *Critical Period Hypothesis* und die *optimal age discussion* zu betrachten. Darüber hinaus sollen sie dazu beitragen, neue Blickrichtungen und Perspektiven hinsichtlich der individuellen Lernervariablen wie auch der Rolle des Sprachlernbewusstseins sowohl als Produkt als auch als Voraussetzung für multilinguale Fertigkeiten zu erschließen. Das in dieser Studie entwickelte theoretische Konzept des *3-Power-Models* eröffnet somit die Möglichkeit zur Erschließung neuer zukunftsorientierter bildungstheoretischer Lösungsansätze auf einer verbreiterten altersspezifischen Basis. Insgesamt stellt das vorliegende Projekt eine Ausgangsbasis für eine strategische Neuorientierung im Bereich des *Lifelong Learning* zu Beginn des 21. Jahrhunderts dar.

Curriculum Vitae

Education/Degrees:

1960 – 1965	Primary School, Steyregg, Upper Austria
1965 – 1971	Secondary School (Bundesrealgymnasium), Linz
1971 – 1972	St. Giles School, London
1974 – 1975	Academy for Preschool Education, Linz
1976 – 1977	Alliance Française, Paris
1980	Berufsreifeprüfung, University of Klagenfurt
1982 – 1989	English Language and Literature Studies, History Studies, University of Klagenfurt
1989	Master of Science, University of Klagenfurt
since 2007	PhD Studies, University of Vienna

Professional Career:

1973 – 1975	Translator – Technical English, Vöest-Alpine Linz
1976 – 1977	Assistant Foreign Correspondent, Paris
1977 – 1978	Assistant Hotel Manager, Serfaus/Tyrol
1978 – 2000	Flight Attendant – Lufthansa, Frankfurt
2000 - 2009	Intercontinental Purser – Lufthansa, Munich
since 1990	English Language Trainer in Adult Education WIFI, BFI, Austrian Medical Association, Sparkasse OÖ. (EFL, ESP, Fachakademie, Superlearning, etc)
since 2009	Independent advisor in Intercultural Communication, Foreign Language Acquisition and Education.

Languages:

German, English, French, Spanish, Italian, Japanese, Chinese

Certificates:

1972	Cambridge Certificate, London
1972	English for Foreigners, Royal Society of Arts 2 + 3, London
1977	DELF (diplôme d'études en langue française), Paris
1989	Comunicación y expresión, Centro Cultural Tandem, Madrid
1995	Medical English, Language Studies International, Brighton
1995	Business English, Language Studies International, Brighton
1995	Rhetoric & Presentation, Linz
1995	Suggestopedia, Linz
1996	French Superlearning 3, Linz
1999	Mind Mapping, Linz
1999	Teaching Methods II, Linz
1999	Reservation, Ticketing, Computing, Frankfurt
2000	Business Administration, Frankfurt
2001	Sales and Marketing, Frankfurt

Presentations:

2009	International Conference "Bridging the Gap between Theory and Practice", University of Vienna