THE SAME DESTINATION BUT DIFFERENT JOURNEYS: A COMPARATIVE STUDY BETWEEN YOUNG GIFTED LINGUISTS AND BILINGUALS WHICH EXPLORES THE LEARNING, STORAGE AND RETRIEVAL OF LEXIS.

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Thesis submitted in fulfilment of the regulations of the University of London, for the degree of Doctor of Philosophy

Institute of Education, University of London

2014

ABSTRACT

Studies in Foreign Language (FL) lexical acquisition have become more specialized since the development of Applied Linguistics. This study is multi-facetted and aims to investigate and analyse French vocabulary acquisition by two groups of successful young learners: gifted Language Two (L2) learners and young English/French 'choice' bilinguals in comparison with a group of L2 learners. The term choice bilingual is used to refer to a specific type of bilingual which is an under-researched group. The research identifies the similarities and differences between the groups in the storage of and access to L2 lexis and in their working memory. It determines what strategies for learning they employ and compares learners' attitudes and beliefs about language learning with their parents' perceived attitudes towards their children's learning of French. The study investigates patterns for successful learning of lexis which may help to improve pedagogical practices for assisting vocabulary acquisition. The research data involve aptitude, vocabulary and working memory tests, and a questionnaire. The reason for the adoption of this multi-set data examination method is to present a coherent and comprehensive analysis of the issue being studied. The thesis contributes to the field of second and foreign language lexical acquisition and presents relevant empirical data. The results of the study add positive evidence to research related to the importance of strategy training and the development of working memory for L2 learners. There is also evidence to suggest the possibility of using specifically designed vocabulary network tests to assist in judging vocabulary and linguistic development.

This study is set in the context of an attempt by the government to make a second language a compulsory subject at primary level in UK state schools originally in 2010 and now in 2014. It looks at French as the L2 for British school children in the independent sector and English/French choice bilinguals all aged 10-13.

ACKNOWLEDGEMENTS

In undertaking this study, and in bringing it to its current state of completion, I owe a profound debt to the many people who have contributed in so many ways.

I wish to thank my supervisor Dr. Shirley Lawes for her patient thought- provoking guidance which has enabled me to develop a more in-depth analysis of my research, and for her continuing help, encouragement and support throughout the years.

I am grateful to my previous supervisor Dr. Catherine Walter for her guidance at the initial stages of my research, her advice on the design of my vocabulary test and questionnaire and her generosity in sharing with me the details of her own working memory test.

I would like to express my gratitude to the Lecturers and Senior Lecturers, Dr. A. Paran, Dr. R. Heilbron, Dr. F. Diamantidaki, Dr. J. Brown, Dr. R. Freeman and Dr. R. French, who have given me assistance and advice on the initial chapters of my thesis and on the analysis of my data.

I would like to thank those who have helped me with my field work recruiting and timetabling the participants; without their assistance my research would not have been possible. They are:

My sister Mrs. M.G. Churchill, the Headteachers and teachers of the schools that I visited: Mrs. J. Pardon, Ms. J. Reynolds, Mr. Taylor, Mrs. Loveman, Mrs. S. Locke, Mrs. H. Mason, Ms. D. Harvey, Mrs. O. Martin, Mrs. S. Inshaw, Mrs. J. Pyburn; my friends Mrs. E. Saint-Dizier, Mrs. S. Hendrie and Mrs. C. Cherill.

I also wish to thank all the participants for their patience and cheerful cooperation.

I am very grateful to John Powell for his help in writing the programme for the WM Test and also for setting up a website to host the Vocabulary Network Test and provide a link to the questionnaire as well as redirecting responses from the various participants to my mail box.

I wish to thank my son Marc Stacey for his support and advice with various computer programmes, his patience and kindness. Finally, I owe a huge debt of gratitude to my husband Christopher Stacey for his continuous support and his endless proof-reading.

DECLARATION

I hereby declare that, except where explicit attribution is made, the work presented in this thesis is entirely my own.

Signature: **Date**:

Word count (exclusive of appendices and bibliography): 90,167

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ABBREVIATIONS

ANOVA	Analysis of Variance
AoIR	Association of Internet Researchers
ASL	American Sign Language
BAAL	British Association of Applied Linguists
CB	Choice Bilingual
DCSF	Department of Children,Schools and Families
DfES	Department for Education and Science
DIWK	Depth of Individual Word Knowledge
FL	Foreign Language
IAPS	Independent Association of Preparatory Schools
IEA	International Association for Evaluation of Educational Achievement
IQ	Intelligence Quotient
L1	First Language
L2	Second Language
MLAT-E	Modern Language Aptitude Test-Elementary
SILL	Strategy Inventory for language Learning
SLA	Second Language Acquisition
UG	Universal Grammar
VKS	Vocabulary Knowledge Scale
VLQ	Vocabulary Learning Questionnaire
VNT	Vocabulary Network Test
WAT	Word Association Test
WM	Working Memory
YGL	Young Gifted Linguist

CHAPTER 1: INTRODUCTION AND PROLEGOMENA

This research is set within the general field of applied linguistics which is an interdisciplinary field concerned with language acquisition. This study aims to contribute to the overall body of second language research, and focuses on the cognitive aspects of the language learning process. This process not only involves memory but also higher level thinking such as categorizing, associating, relating to prior knowledge, the utilization of strategies, analysing, deducing, drawing from social context etc. Specifically this study deals with L2 vocabulary acquisition which is fundamental to language learning and is an ongoing process. "The heart of language comprehension and use is the lexicon" (Hunt and Beglar, 2005, p. 2). Therefore, researching individual/group differences in vocabulary learning and processing may throw some light on potential predictors of second language learning success. While there are aspects of the study which appear to embrace the assumption of a universally available acquisition process, the study also recognizes the positive effect of motivation, in particular that which is influenced by perceived parental attitudes towards language learning and the nurturing process which takes place, especially for bilingual learners.

The overall objective of the study is to investigate the similarities and differences in the acquisition of lexis by two groups of successful learners: namely young gifted L2 learners (YGL) and choice bilinguals (CB) compared with standard L2 learners. In this study the term 'choice bilingual' refers to English/French bilinguals who live in England, are educated at English schools and have at least one French parent who has chosen to proactively assist their child to develop and maintain native-like linguistic ability in French. Consequently, sometimes due to other additional help, these children are literate in both languages. They are not part of a minority language community. They are therefore slightly different from the definition given to heritage bilinguals "who are either indigenous to a particular region of a present-day nation state (e.g. Aboriginies in Australia, speakers of Breton in France, Kurds in Turkey.) or populations who have migrated to other regions or nations of origin (e.g., Mexicans in the United States , Turks in Germany, Moroccans in Spain, Pakistanis in England)" (Valdes, 2005). A review of the different definitions on bilingualism set out in section 1.5.3 on page 44 details how choice bilinguals differ from other bilinguals.

The study looks at the way in which different learners encode, associate and recall vocabulary, not at their deficiencies compared with native speakers. It does not concentrate on achievement but on learning and processing. Skehan (1998) linked components of aptitude to stages of information processing. The study enquires whether aptitude for FL, illustrated by the YGL group, and proficiency in two languages results in similarities in three areas of the information processing stages compared with standard L2 learners.

The study examines several aspects of vocabulary learning including how different groups of learners encode and network new vocabulary, what strategies for learning they employ to memorise, process and recall these new words and how different their working memory scores are. It does these using quantitative methods. The choice of method of enquiry has been the result of reflection on the subject matter, that is to say, the learning or deliberate acquisition of lexis, and the participants. Although in recent years, purely positivistic methods of quantification in language research have not always been favoured; the decision to use quantitative methods was influenced by other studies both on second language vocabulary and on working memory as described in Chapters 2 and 3. It also took into account the young age of the participants (10-13 years of age) and the setting in which the research took place, that is, the school environment. The requirement that the age of the bilinguals in the study needed to be prior to the end of the critical period dictated this age range. All the young participants were drawn from private schools. Using a wider school population may have been preferable but, unfortunately, the majority of State Schools do not provide sufficient L2 teaching beneath the age of eleven.

Researching samples across a more varied selection of educational establishments was not possible. In fact, a recent longitudinal study of language learning at Key Stage 2, which looked at the nature and quality of the provision for Modern Languages in a sample of primary schools, reported that French was the most commonly taught language (Cable et al., 2010). However, it also pointed out that " few schools were providing a weekly hour of language teaching as suggested in the Key Stage 2 Framework for Languages" (DfES,2005). As the young L2 learners in this study needed sufficient knowledge of French to be able to complete the various tests this would not have been achieved on 30-40 minutes a week of lessons. As the young L2 learners were from the Independent sector, including bilinguals from two different sectors of education would

have added a different variable and rendered the sample less homogeneous. The fact that the learners all come from the same socio-economic group means that differences found in the way in which they learn, associate and recall vocabulary can be imputed to other factors.

The fact that the sample had to be taken from the Independent sector could be seen as a limitation of the study. Several socio-cultural theorists emphasized the role of socio-economic contexts in shaping the personality of children "children grow into the intellectual life of those around them" (Vygotsky, 1978, p. 88). However, Vygotsky did not research the role of social class in schooling. Bourdieu denies the existence of social class preferring the notion of social space: "No, social classes do not exist.. what exists is a social space, a space of differences, in which classes exist in some sense in a state of virtuality, not as something given but as something to be done " (Bourdieu, 1998, p. 2). For him, economic and cultural capital not only differentiate individuals but, through shared interests and activities that people have, create a kind of field or *social space* which is not static as it is the result of constant interactions. Could these social factors have an influence on second language acquisition and more particularly on learning? This is a question which very few applied linguists researching second language acquisition have attempted to answer. According to Ellis, "Social factors have a major impact on L2 proficiency but probably do not influence it directly. Rather their effect is mediated by a number of variables". (Ellis, 1994, p. 197). The variables mentioned included age, sex and ethnic identity. It would also seem reasonable to include country of education because the notion of social class takes a different meaning in for instance India as opposed to the UK. The influence of socio-economic factors: wealth, parental education and parental working situation have been positively linked to achievement and to motivational factors (Gardner, Lalonde and Pierson, 1983). A more recent study (Kormos and Kiddle, 2013) set in Chile and involving 740 secondary school children aged 15-16 belonging to different social classes reported a moderate effect of social class on the motivational scales. It found that children belonging to the upper and upper middle classes displayed more favourable motivational characteristics than the participants from the lower classes. Whereas the possibility of greater motivation and positive attitude resulting from differences in social class has not been questioned, the role of social class in influencing second language achievement was disputed by the result of a study on partial immersion involving kindergarten and Grade 1 pupils in the

USA where no difference in listening comprehension and oral ability could be found between different socio-economic and ethnic groups (Holobrow, Genesee and Lambert, 1991). This would tend to reinforce the idea that possible differences are also linked to the age of the participant. However, the problem is more complex, " it is not socio economic class as such which is producing these effects but the world knowledge and facilities of experiencing it" (Ellis, 1994, p. 206). Clearly the independent sector invests more in learners' conditions of learning than the State sector (lower teacher-pupil ratio, IT facilities, trips abroad etc.) which could facilitate learners' autonomy and higher achievement but, the effect would be cumulative and more significant with older learners who have developed greater proficiency in the language. However, this study does not focus on second language achievement but on differences in vocabulary learning and processing by near beginners and young bilinguals. In addition, the dichotomy private versus state sector in the UK is no longer as clear as it used to be with the creation of free schools and academies. "As of 1 December 2013 there are 3,522 academies open in England; 174 free schools have been opened since September 2011" (DoSF, 2014), and the current Secretary of State for Education has repeatedly expressed the desire that State Schools should become undistinguishable from private schools. Many educationalists and commentators regard this as the privatisation of State education. On the other hand, Independent schools are also changing. None of the schools in the study are examination entry schools, which means that the intake is not restricted to high achievers.

As it was not possible to carry out research in the State sector, in view of the above mentioned developments and, given the nature and context of this study, its findings provide insights which are applicable across the increasingly varied spectrum of L2 teaching to this age group.

To arrive at the monolingual groups (YGL and L2 learners) one hundred and fifteen pupils at three different schools sat the Modern Language Aptitude Test – Elementary (MLAT-E). The YGL group was formed from those whose scores were in the top 10% and the L2 learners were randomly selected from the remainder. The choice bilinguals were those who were both fluent and literate in both languages as confirmed by their teachers and parents. Because of their scarcity the choice bilinguals from the three targeted schools were supplemented with others from seven other similar schools. To provide a benchmark for some of the statistical analysis of the responses from the

three groups of young learners (YGL, CB and L2 learners), the responses to the Vocabulary Network Test from a group of adult native French speakers were included.

The conceptualisation and motivation for the research have two different origins. In the first instance, a professional concern which developed over thirty years of teaching foreign languages and which involves the secondary place given to vocabulary acquisition and the struggle to acquire a second language experienced by a large proportion of young learners. Secondly, certain observed similarities between the 'good language students', or 'young gifted learners', and the choice bilinguals both of whom are understudied groups. Today bilingualism is a widespread and expanding phenomenon in the UK and in the world generally, as globalisation has increased the mobility of the labour force. The type of bilinguals described in the present study is, in part, the result of this new diaspora.

1.1 Motivation for the current study and its context.

The primary motivation for carrying out this research originated from my dual roles as the mother of a bilingual child and as a Modern Language teacher. As the latter I observed that the teaching and learning of vocabulary over at least the last thirty five years has not always paralleled the various pedagogical changes in language teaching. The grammar translation method based on reading and writing concentrated on classical texts and the teaching of vocabulary was based on definition and etymology. Vocabulary took second place behind syntax, and dictionaries and bilingual lists of words were the chosen medium for its acquisition. The grammatical approach evolved to more conversational methods with the introduction of the first Audio Visual methods at the end of the sixties and in the early seventies. "The new approach was based on behaviourist ideas of learning" (Rowlinson, 1994, p. 213). At that time, when most secondary schools had their own language laboratories, the practice of sentence drilling was common. "Most of the work done in laboratory was again based on a Skinnerian view of operant conditioning as basic to language learning" (Rowlinson, 1994, p. 15) . As a young teacher I was frustrated by the limitations of this mechanical approach to learning and the fact that the shift of emphasis from syntax to phonology did not equate to more importance being given to vocabulary learning. Vocabulary was presented at the end of the textbooks as bilingual lists. "By the mid-1970s there were few teachers or

administrators who still believed that the language laboratory was the panacea that it had been thought to be" (Hawkins, 1987, p. 180) . The communicative approach to language teaching was born and a definition of this method suggests that

> "it is not a tightly structured method of teaching,…it is a broad assembly of ideas, from a range of sources (some linguistic, others more broadly educational), which have together come to be accepted as 'good practice' by many contemporary teachers" (Mitchell, 1994, p. 33) .

This approach was geared towards answering the requirement to cover a range of more relevant topics and situations. However, in the early years, systematic learning and rehearsal of vocabulary and phrases relevant to particular situations (for example in role plays) did not always offer the possibility of expanding the learner's linguistic independence.

Subsequently, a more 'functional' approach to language teaching was adopted which consisted of grouping together expressions relating to functions "such as apologising, thanking, requesting" (Mitchell, 1994, p. 36). The theories linking the acquisition of a foreign language with that of the first language and the need for more 'natural' methods of learning (Krashen, 1981) led to the promotion of Target Language medium teaching. The teacher was encouraged to speak exclusively in the chosen language without referring to L1 and ensuring that the language spoken in class was solely the target language. This was introduced with a view to encouraging the learners to acquire the foreign language in a more naturalistic manner. Thus, the communicative approach is seen as an oral approach which is based on authentic material and which is less constrained by the necessity to have a formal understanding of grammar but rather focuses on improving comprehension and production skills. The vocabulary was presented in word lists grouped thematically.

The diversity of methods and material available was given direction by the introduction of the National Curriculum in 1988 (Education Reform Act 1988) which set a national framework for language teaching and made the teaching of Modern Languages more homogenous throughout the country. It also reinforced this grouping of vocabulary by theme.

Finally, in the last few years, the introduction of technology into the classroom has offered a more bespoke and 'hands on 'approach to learning. However, the potential benefits stemming from its use have not always been fully realized. The vocabulary introduced and practised in computer games and exercises is often repetitive and

reminiscent of the drilling techniques used in the 70's and many learners still struggle to develop L2 lexis. In parallel with this evolution in teaching techniques, over the years a number of researchers have attempted to define the variables in language learning and the qualities of 'Good Language Learners' (Naiman et al., 1978); (Rubin, 1975); (Skehan, 1989, p. 207). Skehan and others (Carroll, 1981) also concentrated on language aptitude (see section 1.5.2.5).

This brief retrospective of the different methods of teaching over my working life and the policies and theories which influenced them illustrates the fact that, despite the new ideas and changes in the curriculum, vocabulary lists and the method of introducing vocabulary, which is mostly theme based, have not changed very much. Young learners in most educational settings are still given vocabulary manuals with the required vocabulary lists for examinations which are still organised in the same way as they were thirty years ago, and a quick glance at revision course books for GCSE and 'A' level reveals identical patterns. Although these techniques clearly have their merits in concentrating the learner's attention on one particular theme, the fact that "vocabulary knowledge is one of the major predictors of school success" (Daller, Milton and Treffers-Daller, 2007, p. 133) suggests that supplementing them may improve outcomes. Particularly in view of the fact that words are not isolated items, and, as Carter argued,

> "their meanings are defined through the sense relations they have with other words. That such relations have psychological validity for individuals is indicated by the degree of uniformity unravelled by responses to word association tests" (Carter, 1998, p. 19).

Therefore, the associative and cultural dimensions of vocabulary acquisition should perhaps take a more prominent place in the composition of school course books as they may impact on the efficient encoding and retrieval of vocabulary by promoting the development of lexical networks. Paul Nation emphasizes this point, when referring to language learning which "covers content and subject matter knowledge as well as cultural knowledge" (Nation, 2001, p. 1). Taking account of these dimensions may help create an empathy with the language, resulting in faster or different links between words being created, and might explain why I noticed a difference in the speed of acquisition and breadth of lexical knowledge which seemed to differentiate the young gifted learners and the choice bilinguals from the other young learners that I taught. In addition, other factors may condition the efficient encoding of vocabulary. For example, it could be argued that the fact that some learners retain and are able to access lexical items more

efficiently than others may be predominantly a question of memory. Thus, in order to try to establish whether there are similarities between the two groups of efficient learners (YGL and CB), the role of the working memory in the successful storage and retrieval of lexis will also be investigated in this study. Establishing what type of learning strategies are used by these successful learners is crucial to this research as it may uncover differences between the groups, and these strategies will be examined in detail later. Most studies of language learning strategies have focused on successful L2 learners (Rubin, 1975), (Naiman et al., 1978), (Oxford, 1990) but comparatively little research has been carried out on the strategies used to improve language skills apart from some relatively recent work by Cohen (Cohen and Chi, 2002, pp. 68-74) who classifies the specific strategies used by language learners according to the four language skills (listening, speaking, reading and writing). Research on specific strategies used by bilinguals is also rather scarce. This lacuna may be partly explained by the dichotomy between learning and acquisition or conscious and unconscious learning which has been argued by some researchers (Krashen, 1981). Krashen's proposition is that acquisition is the initiator of language and the use of that language will develop the linguistic competence of the individual:

> "Acquirers need not have a conscious awareness of the "rules" they possess, and may self-correct only on the basis of a "feel" for grammaticality. --our fluency in production is based on what we have "picked up" through active communication" (Krashen, 1981, p. 2).

However, in his view, "learning" concentrates on the "formal knowledge" of the language as opposed to its unconscious acquisition. Here Krashen tries to explain the child/adult differences in language production. However, as the young bilinguals (10-13 years old), in this study, can read and write in both languages, it seems reasonable to assume that they have applied some learning strategies to continue to improve their acquisition of lexis in both languages. Having raised a bilingual child in a monolingual environment, I have been able to assist and observe choice bilingual vocabulary acquisition at first hand which has motivated me to study this under researched group and compare them to other learners. Being responsible for devising a school policy on educational provision for Gifted and Talented learners gave me the incentive to study this second under researched group with a view to try to help struggling L2 learners. I have observed that both the young bilinguals and some young gifted linguists that I encountered displayed a higher than average short-term memory and that their recall

speed in vocabulary exercises was generally impressive. This led me to believe that there may be similarities in the manner in which these two groups encode and network their vocabulary, and made me reflect on the way in which the two groups categorised and connected words. My experiences with these two groups suggested that there may be significant differences and apparent similarities in lexical acquisition between them. This has motivated me to attempt to investigate them in more detail with a view to identifying them and establishing their relative importance. It has also convinced me that research into these differences and similarities may provide insights into the vocabulary acquisition process in general which could facilitate advances in the formulation of language teaching/ learning strategies. Therefore, the underlying motivation for the study stemmed from a professional concern for the successful acquisition of L2 lexis, and a desire to increase awareness of the potential for language research presented by the growing number of choice bilinguals in the UK. The study, as mentioned earlier, sets out to establish the way in which the three different groups learn and network their vocabulary. To fix the framework for this endeavour, four key questions, which underlay the study and form the basis around which the research has been designed, have been set down.

1.2 The research questions

The present study sets out to provide a useful contribution to the body of knowledge on the vocabulary acquisition process. To this end, the main research question is: What are the differences and similarities in the encoding, storage of and access to lexis by young gifted learners and choice bilinguals compared with standard L2 learners? The four subsidiary questions which derive from this general inquiry and which the thesis aims to investigate are:

- What are the common characteristics and differences in the storage of (network) and access to L2 lexis displayed by gifted linguists and choice bilinguals as compared with L2 learners?
- How much is working memory implicated in the acquisition of the L2 lexis and how similar is it in each groups?
- What strategies for learning vocabulary are employed by each of the groups?

- To what extent are group differences related to beliefs about foreign language learning and perceived parental attitudes and how much do these attitudes and perceptions influence[1] the choice of strategies employed by the groups in the encoding of lexis in the mental lexicon?

However, before elaborating further on my research focus and attempting to frame the thesis within the existing body of published work on the subject, it is necessary to give an overview of the content and structure of the thesis and to clarify some of the terminology used in it.

1.3 Structure and content

In view of the multi-facetted nature of L2 vocabulary acquisition, in order to adequately address its research questions, this study researches group differences by employing three complementary investigative instruments: The Vocabulary Network Test (Investigation 1), the Vocabulary Learning Strategy Questionnaire (Investigation 2) and the Working Memory Test (Investigation 3).

The thesis is divided into eight chapters which are summarized below.

Chapter 1 gives an introduction to the thesis. It sets out the issues which prompted the present research and the background to the study. A brief outline of the structure of the thesis is presented. This is followed by a review of the various definitions given for giftedness and talent leading to a more precise definition of linguistic giftedness and young gifted linguists. A similar introduction to the different definitions of bilingualism leads to an explanation of the category of 'choice bilingual' which is referred to in this thesis.

Chapter 2 covers some of the literature review and the conceptual framework and rationale for the thesis. It shows how Applied Linguistics has experienced a 'big bang' resulting in a number of subfields being created [2]and how the present study needs to

[1] The impact of parental beliefs on a child's second language acquisition will be measured, via questions 12-17 of the last part of the questionnaire, by examining the correlation between the incidence of positive parental attitudes and that of above average linguistic potential as recorded in the MLAT-E test.

[2] Originally, l'Association Internationale de Linguistique Appliquée founded in 1964 had two distinct areas of research: firstly Foreign Language teaching and secondly automatic translation.

review research made within the subfields that deals with bilingualism and second language acquisition with particular emphasis on vocabulary acquisition.

Chapter 3 introduces the background to the study. It aims to present previous research relevant to language processing and, in particular, the storage and retrieval of vocabulary for young learners. It reviews studies on the process of the acquisition of word meaning. The various models of L1 and L2 lexicons are also presented and analysed. In this chapter the possible influence of the differences in the efficiency of the working memory in the acquisition of vocabulary is discussed. It addresses the relevance of learning strategies in the light of previous studies and the present study.

Chapter 4 covers the research methods and design. It details the methodology and the sample used. It describes how the variables are identified in the overall research.

Chapters 5 presents the analysis of the results of the Vocabulary Network Test which was specially designed to answer the first research question on the differences in the way in which groups of participants network their vocabulary. It reports and discusses the findings. The analysis in this chapter includes the test results from the adult native speaker group for the purpose of comparison.

Chapter 6 presents and discusses the statistical results and findings from the sets of data on the Vocabulary Learning Questionnaire which was designed to answer the third and fourth research sub-questions.

Chapter 7 presents the statistical analysis of the results of the Working Memory Test and discusses the findings, comparing them with those from previous research and connecting them to the second research sub-question.

Chapter 8 summarizes and discusses the significance and implications of the results from the three parts of the study. It discusses the possible pedagogic implications impacting on teaching techniques and material as well as suggesting further avenues for future research. Throughout the thesis a number of subject specific terms are used which, in order to avoid ambiguity or confusion, need to be defined.

A look at BAAL (British Association of Applied Linguistics) shows evidence of research in many areas: ELT, FL teaching, bilingualism, multilingualism, 1st and 2nd language acquisition, and discussions on some elements of sociolinguistics, psycholinguistics and neurolinguistics.(see : http://www.baal.org.uk/about_history.pdf)

1.4 Clarification of terminology [3]

1.4.1 The Mental Lexicon

Oldfield first conceived and elaborated the concept of Mental Lexicon (Oldfield, 1966) and it has since been widened to incorporate not only the idea of a store of words but also a person's knowledge about the words, that is not just what the words represent but also their inherent properties and how a word is known in relation to other words. The lexicon "constitutes that component of a language or knowledge of a language which has to do with what one might call 'local' phenomena – the meanings of particular elements of a given language, the phonological and orthographic forms of these elements, and the specific ways in which they collocate and colligate." (Singleton, 1999, p. 15). This last definition is the one which is adopted here. This study investigates the mental lexicons of the different groups of participants in terms of vocabulary storage and retrieval. The storage system is studied in the context of word networks which are mostly organized in semantic fields, the acquisition of which has been facilitated by the use of learning strategies. The retrieval is heavily reliant on the efficient storage of words and on the various memory components but, as Aitchison explains, "in dealing with words in the mind, we must treat storage and retrieval as interlinked problems" (Aitchison, 2003, p. 10). Thus, in the present study, Singleton's definition is supplemented by Aitchison's precision on the interdependence of storage and retrieval.

1.4.2 Working Memory (WM)

This term is relatively recent and, in this thesis, it relates not only to short term memory but also to the process of dealing with the immediate information received by the learner. It is a limited capacity system which receives the input, holds and controls the flow of information whilst relating it to other permanently acquired knowledge before finally processing it. "It is a combination of a processing system and a storage system" (Walter, 2004, p. 318). A more in-depth explanation of this term can be found in section 2.5 of this thesis.

[3] These are summary definitions of terms which will be discussed in further sections of the thesis.

1.4.3 Vocabulary Learning Strategies

There have been numerous attempts to define language learning strategies and many criticisms focusing on the vagueness of such a concept. These criticisms are discussed in Chapters 2 and 3. In this study, the learning strategies researched are the ones which can be employed in the context of vocabulary acquisition and refer to specific actions, tactics or behaviours adopted by learners to facilitate the storage and processing of foreign and L1 words in the lexicon.

1.4.4 Second Language (L2) and Foreign Language (FL)

In this thesis second language means "any language that is learned subsequent to the mother tongue" (Ellis, 1997, p. 3)o Or "Any language other than the learner's 'native language' or 'mother tongue'" (Mitchell and Myles, 2004, p. 5).

In common usage, the terms second language learners and foreign language learners have tended to be used as synonymous. However, in this study, French second language learners (L2) refer to young English speakers living in England and learning French at school as part of the school curriculum. French foreign language learners (FL) also indicates the use or learning of French in a non-French speaking country but the learning can either be part of a curriculum or privately organized or supplemented. Nevertheless, as mentioned by Mitchell et al, it seems sensible to include both under the umbrella of language learners as the learning process "is similar despite some differences in circumstances and purpose" (Mitchell and Myles, 2004, p. 6),(Miles, 2008).

1.4.5 Mother Tongue

There have been different definitions of mother tongue. There has also been a suggestion of replacing terms such as 'native speaker' and 'mother tongue' with 'language affiliation' and 'language inheritance' (Rampton, 1990). The most detailed definition states that mother tongue means:

> "language(s) one learns first, identifies with, and/or is identified by others as a native speaker of; sometimes also the language that one is most competent in or uses most. There may be a change of mother tongues (bilingualism / multilingualism as a mother tongue). Indigenous or minority mother tongues are sometimes called heritage languages (often when children do not know them well), home languages (implying that they are/should not be used for official purposes), or community languages (falsely implying that majority populations do not form a community) "(Skutnabb-Kangas and McCarty, 2006, p. 9).

In this study, Mother Tongue is the language that the child uses predominantly at home and / or outside of school.

Having clarified some of the subject specific terminology used in this thesis, it is also relevant to define the two main groups of participants in the study. In order to place these definitions within a theoretical framework, theories on the concepts of giftedness and bilingualism are reviewed in this chapter rather than in the literature review (Chapter 2) which considers specifically previous studies relevant to the research questions.

1.5. The two main groups of participants and the context leading to their identification.

1.5.1 Young Gifted Linguists (YGL)

Although an in depth discussion on giftedness and talent, together with a review of the relevant literature, can be found in the next section of this chapter, a few points need to be clarified. The term 'gifted' was not chosen to refer to an elite or to a microscopic proportion of the school population, that is the savants; it was adopted simply because it is a recognised term in schools and generally refers to around 5-10% of the school population (Department for Children, Schools and Families : Identifying Gifted and Talented Learners (2008)). In this study, young gifted linguists are the 10% of language learners who have scored 90% or more in the MLAT-E Test. Therefore they are the learners who display potential or aptitude for language learning. The criteria which have informed the definition and identification of young gifted linguists in the study emerged from a critical appraisal of the main theories on giftedness as reviewed below.

1.5.2 Giftedness, intelligence and talent.

Identifying gifted pupils in order to compare them with other groups is complicated by the large numbers of different definitions of giftedness, the link between giftedness and general intelligence, the sometimes unclear distinctions made between gifted and talented and the various recommendations for identifying them.

1.5.2.1 Intelligence and aptitude

As early as 1909, Alfred Binet followed Piaget's ideas on child development and linked aptitude with age and stages of development (Binet, 1909, pp. 7,8,25,242). He also made a distinction between intelligence and talent:

> "les inspirés ont, peut-être plus de talent que d'intelligence, les réfléchis ont plus d'intelligence que de talent" [The inspired have, perhaps more talent than intelligence, the reflective have more intelligence than talent] (Binet, 1909, p. 260).

A debate subsequently developed on whether intelligence is a single entity or encompasses a range of aptitudes. The British psychologist Charles Spearman described the concept of general intelligence or the g factor which, according to him, remains constant:

> " The function appears to become fully developed in children by about their ninth year, and possibly even much earlier. From this moment, there normally occurs no further change even into extreme old age" (Spearman, 1904, p. 290).

Many years later Howard Gardner challenged this idea of a single entity or g factor and claimed that there are multiple intelligences.

> " An intelligence is the ability to solve problems, or to create products, that are valued within one or more cultural settings" (Gardner, 1983, p. XIV).

He originally proposed seven forms of intelligence: linguistic, musical, logical-mathematical, spatial, kinaesthetic, intrapersonal and interpersonal. He claimed that the different forms of intelligence did not just represent different domains but also were indicative of learning ability. His theory paved the way for numerous debates on learning styles. However, this theory is not based on any quantitative analysis. Furthermore, numerous criticisms of his work concentrated on his choice of domains which appears to be subjective and based on specific cultural and educational values (White, 1998). The fact that he added two further forms of intelligence to fill the gap of two subject areas which he had not covered, namely spiritual and naturalist intelligence, appears to link intelligence to the school curriculum rather than cognitive ability. However, his ideas provide a starting point for the concept of linguistic aptitude and the notion that intelligence is context dependent. This theory was further developed by Sternberg.

1.5.2.2. Intelligence and information processing

Stenberg's model proposes "a general theory of intelligence that can explain, at some level and within a single conceptual framework, the phenomena of retardation, disability and giftedness" (Sternberg, 1987). He does not believe that giftedness can occur in children (with the exception of child prodigies) on the basis that specific giftedness refers to a potential which is only realised in adulthood and he defines general giftedness as "that seen in most children".

This is relevant to the present study as it is important, for the sake of clarity, to position the definition of young gifted linguists adopted in the thesis with reference to the conflicting definitions and views of giftedness and talent. Here it seems that Sternberg's view of specific giftedness is linked with proficiency in a domain rather than aptitude. This view stems from his representation of intelligence. Sternberg links intelligence to the way in which an individual responds and adapts to environmental changes. That is, the way in which information is processed is indicative of intelligence. He divides his model into three parts or sub-theories. The componential sub-theory is associated with analytical giftedness and is also divided into three as seen in Figure 1.1.

Figure 1.1 Sternberg's Triarchic Theory of Intelligence

Componential Sub-theory	**Experiential Sub-theory**	**Contextual Sub-theory**
↓	↓	↓
Metacomponents	Novelty	Adaptation
Performance	Automation	Selection
Knowledge-Acquisition		Shaping

Metacomponents are

> "higher order, executive processes that are used to plan what one is going to do, to monitor it as one is doing it, and to evaluate it after it is done. Six metacomponents appear to be of particular importance in intelligence: (a) deciding upon the nature of the problem confronting one, (b) selecting a set of lower order components to solve the problem, (c) selecting a strategy into which to combine those components, (d) deciding upon a mental representation upon which the components and strategy should act, (e) allocating attentional and other resources, and (f) monitoring one's solution processes." (Sternberg, 1987, p. 141)

Although the division into six metacomponents is new, the inclusion of performance and knowledge implies a level of skill rather than an aptitude and was later associated with analytical giftedness. Performance components are organised into stages of task-solution and include: "(a) encoding of stimuli, (b) combination of or comparison between stimuli, and (c) response." (Sternberg, 1987, p. 141). They could be related to storage and access in language acquisition. Linked to these performance components is the idea that experience leads to automatization and, Sternberg believes that automatization frees mental resources which in turn enables the individual to cope more efficiently with novelty. This is relevant to any acquisition of skill, and language, in particular, is a good example of practice leading to automatization.

The contextual sub theory (see Figure 1.1) emphasizes the point that understanding the relevance of the context is key to understanding intelligence hence "intelligence is defined as purposive adaptation to, shaping of, and selection of real-world environments relevant to one's life" (Sternberg, 1987, p. 159). This notion was later defined as practical intelligence. However, there have been numerous criticisms of this concept and the unempirical nature of the theory (Gottfredson, 2003). Sternberg further states that the interaction between the abilities as determined by the three sub-theories, defines intelligence. His adaptation of his Theory of Intelligence in order to fit individual differences illustrates the fact that, for him, giftedness cannot be studied in isolation but should be viewed in comparison with other individual differences in intellectual capabilities. General intellectual giftedness is linked to individuals who "may be good at many things but not necessarily exceptional in anything" (Sternberg, 1987, p. 167). However, in the case of giftedness, both general and specific would appear to have common components such as general intelligence, motivation and metacognitive skills. These do not appear to all fit into his framework. The difference for Sternberg is based on degrees of intellectual performance and specificity. Sternberg claims that four kinds of intellectual exceptionality can be explained within a single framework. He views them as "special cases of a single phenomenon, intelligence". The idea of representing intelligence and differences within this notion on a continuum is not realistic, as the levels of differences in specific giftedness are not easily quantifiable nor can they be compared with the level of learning difficulties. Furthermore Sternberg seems to suggests that specifically gifted people have a high intelligence level and this has been

disputed as far as language acquisition is concerned (Skehan, 1998, p. 212). However, in his chapter, Sternberg specifies that

> " to the extent that specific forms of giftedness draw on metacomponents [planning, monitoring, and evaluation] they draw on general intelligence as well, some level of which is almost certainly necessary for the manifestation of specific giftedness. However, because other skills come into play, one can probably get by well with less general intelligence, in the manifestation of specific giftedness, than one would need in order to be identified as generally intellectually gifted" (Sternberg, 1987, p. 147).

His Triarchic theory of intelligence provides a clearer picture of the differences between general and specific giftedness[4].

As the theory seems to indicate that specific giftedness for Sternberg only occurs when a person has proficiency in a specific domain and considerable prior knowledge (see under componential and experiential), it cannot be used to define the YGLs in this study where giftedness relates more to aptitude or potential in languages. However it does mention under specific giftedness that the individuals have an ability to apply knowledge acquisition components which seems to correspond with initial observations made of the participants who I refer to as YGLs but, the word 'expert' cannot really apply to young learners.

The debates on both intelligence and giftedness are on-going. The present research relates to specific giftedness and more precisely to linguistic aptitude. Here again, there seem to be differences in the literature. These differences hinge on the definitions of giftedness and talent.

1.5.2.3. Giftedness and talent

As illustrated below, George (1997) defines as gifted those learners with high ability across various fields and talented those individuals with specific and exceptional academic, creative or sporting abilities, or specific aptitudes :

> "Gifted students are those with a potential to exhibit superior performance across a range of areas of endeavour. Talented students are those with a potential to exhibit superior performance in one area of endeavour" (George, 1997, p. 18).

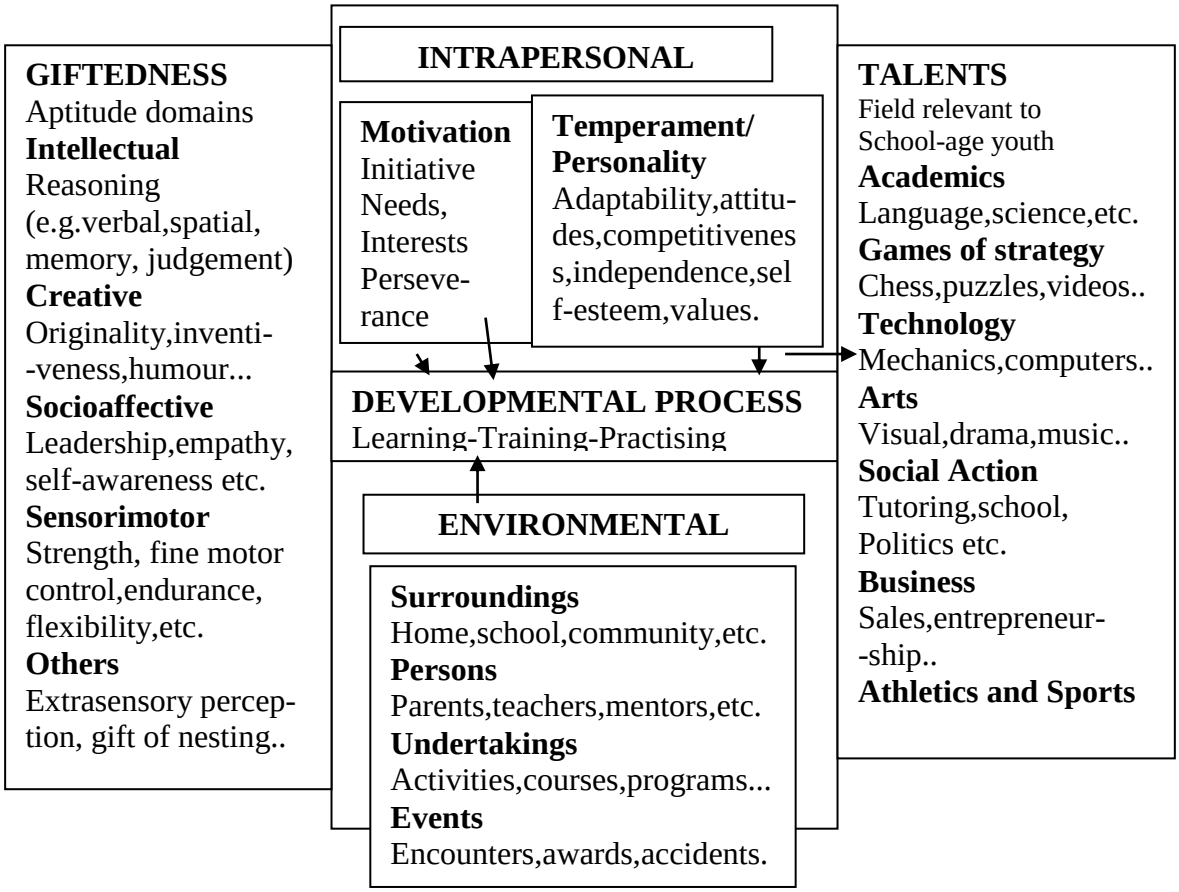
However, Gagné, (1992), proposes a different definition. For him, giftedness refers to untrained aptitudes in one area, whereas talent "designates the superior mastery

[4] The table in Appendix A has been compiled to illustrate the differences mentioned above between general and specific giftedness within Sternberg's Triarchic Theory of Intelligence.

of systematically developed abilities (or skills) and knowledge in at least one field of human activity to a degree that places a child's achievement within at least the upper 15% of age-peers who are active in that field or fields". So while for George both giftedness and talent are potential (general or field-specific respectively), Gagné uses giftedness to designate field-specific potential and talent to designate the realisation of that potential. Gagné's model is much more detailed than George's and is much closer to the DfES 2006 guidelines. These guidelines amalgamate both talent and giftedness under a definition of realised or unrealised field specific potential: Gifted and Talented children are "those who have one or more abilities developed to a level significantly ahead of their year group (or with the potential to develop these abilities)". The expectation is that these children will represent 5% to 10% of a school population (DfES, 2006, p. 1). Although the policy on provision for Gifted and Talented pupils was revised by DCSF (Department for Children Schools and Families,2008), the definition has remained the same.

Gagné's model also outlines the developmental processes (learning, training, and practising) which he holds responsible for the maturation and transformation of potential into talent. On the following page is a model where Gagné lists under giftedness the natural abilities which will lead to the development of talent (see Figure 1.2 adapted from Catalysts [positive/negative impacts]). These abilities are, for Gagné, influenced by intrapersonal characteristics and developed through formal and informal learning and training as well as through receiving positive impacts from events, persons, surroundings and specific provisions. The inclusion of impacts by persons and surroundings is particularly relevant to this study which researches particular groups of learners and the impact that their parents' perceived attitudes to the French language have on their vocabulary acquisition and use of learning strategies.

Figure 1.2 adapted from Gagné's Model of Giftedness and Talent (Gagné, 1997)



In his revised Model (Gagne, 2007, p. 95), Gagné also makes clear that giftedness in his model, as well as talent, refers to the top 10% of the school population (not the 15% he originally stated). As this study is comparing CBs, L2 learners and YGLs, the above model of giftedness and talent is important as it situates languages among the talents.

In the previous model, Sternberg does not include other elements (apart from intelligence) which might influence the development of talent. Specific giftedness is described from an adult point of view and ignores the personal characteristics, social, environmental and motivational factors which may contribute to the development of talent in a child. In Gagné's model, the aptitude domains where giftedness can be manifested follow a developmental process through learning and training which leads to the development of talents. So, a talented linguist, in his model, would be an accomplished and skilful linguist whereas a gifted linguist would be one with the potential or aptitude for languages (see Figure 1.2). This is particularly relevant to this

study and also relates to the MLAT-E test guidelines which were used to identify the gifted linguist in this study (see Chapter 4 for additional description of the test).

1.5.2.4. Giftedness and language aptitude

The notions of skill, giftedness, specific aptitude or talent for foreign language learning have also been linked by some researchers to first language acquisition. The Bristol Language Project (Wells, 1981), where the first language acquisition of one hundred and twenty eight children from Bristol was analysed, is one example illustrating this point. The children were part of a random sample from which thirty two took part in case studies. Account was taken of family / social background. The book explores children's language development from birth to ten years of age through their interactions with adults. Wells states that "human infants are born with a drive to make sense of their experience with certain effective strategies for doing so"(Wells, 1987, p. 34) but he mainly highlights the role of adults:

> "In the Bristol study we found a clear relationship between the children's rate of progress at language learning and the amount of conversation that they experienced with their parents and other members of the family circle" (Wells, 1987, p. 44).

There were also considerable differences between the children in their rate of development:

> "During these years, the children all followed essentially the same sequence of development, although some made more rapid progress than others. In general, those who were early to speak were likely to be more advanced on entry to school."

This fact would give credence to the point that individual differences do exist at first language level and this may be the source, or at least an indication, of linguistic giftedness. The correlation between early speaking and more rapid progress at entry to school also suggests that language aptitude might be linked to learning ability. It implies that giftedness in language acquisition is nurtured by interaction with close family members, rather than being innate. This study will explore the extent to which this hypothesis can be applied to second language lexical acquisition by investigating perceived parental attitudes to language learning through Part 4 of the questionnaire devised to research the strategies used to learn/acquire vocabulary in French (see Chapter 3, 4 and 6 and Appendix G for details of its design and subsequent analysis) .

1.5.2.5 Giftedness and foreign language aptitude

With regard to foreign language aptitude, J.B. Carroll conducted a five year research project in order to understand language aptitude. The research was followed by the elaboration of tests which were, not only paper based, but which also worked in conjunction with the audio visual methods in use at the time (Carroll and Sapon, 1959). The tests were trialled extensively and refined. As a result , four factors were proposed as the basis of aptitude (Carroll, 1965). They were: 1. Phonemic coding ability (that is. the ability to distinguish between sounds and the ability to recall them). 2. Associative memory (for example the ability to link a word with the foreign language equivalent). 3. Inductive language learning ability (the ability to recognise and use patterns). 4. Grammatical sensitivity (the ability to recognise the function of the words). The end result of Caroll and Sapin's work was the MLAT Test. A refinement of this test, the MLAT-E Test has been used in the present study to identify YGLs.

Skehan subsequently revised the concept of aptitude and decided to amalgamate Carroll's Inductive Language Ability and grammatical sensitivity into one factor: linguistic ability. So, aptitude would be composed of three factors : "auditory ability, linguistic ability and memory ability" (Skehan, 1998, p. 201). The idea that language competence is modular, with different aspects of language knowledge being stored and accessed in distinctive ways, has been widely debated. Skehan expands on the components of aptitude by relating them to a processing view of L2 acquisition as seen in Figure 1.3.

Figure 1.3 Aptitude and processing stages (Skehan, 1998, p. 203)

Aptitude factor	**Stage**	**Operations**
Phonemic coding ability	Input	Noticing
Language analytic ability	Central processing	Pattern identification
		Generalization
		Restructuring
		Dual-coding organization
Memory	Output	Retrieval
		-'computed'performance
		-exemplar-based performance

He further states that, when comparing L1 ability and foreign language aptitude,

> "this modularity is differently organised….In the first language case, it is argued that the modular division is between syntax and semantics, while in the second language case it is argued that modules are more readily explicable in terms of stages of information processing" (Skehan, 1998, p. 207).

Skehan explains this change of modularity by relating it to the end of the critical period (the theory which claims that the temporary predisposition to language learning fades after puberty). The evidence for the modular division between syntax and semantics in first language learning comes from the case studies of exceptional language users, who are children with very low IQs and apparent normal language development but exhibiting a dysfunction between lexical choice and meaning to be conveyed, therefore "proving that syntax and semantics can develop in independence of one another." (Skehan, 1998, p. 220). This assumption would imply that the acquisition of language is pre-wired and domain specific. However, it is based on the acquisition of an unsatisfactory language competence and therefore it could be argued that this would make it difficult to generalize the results to all learners. By contrast, the evidence of a critical period comes from various sources including a number of studies of second language acquisition.

> "Peak proficiency in the language, in terms of control over sound system as well as the grammatical structure, is displayed by those whose exposure to the language begins in infancy or very early childhood. With increasing ages of exposure there is a decline in average proficiency, beginning as early as ages four to six and continuing until proficiency plateaus for adult learners" (Newport, Bavelier and Neville, 2001, p. 483)

This claim is backed up by a study (Johnson and Newport, 1989) which shows that Chinese and Korean immigrants who were exposed to English as a second language still had difficulties with grammatical structures after many years of exposure to English. Another example cited as evidence of a critical period is that of deaf adults who acquired the American Sign Language (ASL). They also showed problems with their grammatical skills. However, this appears to be a special case as it is a visual manual language, that is a signed language and the difficulties for late learners have been linked to a lack of activation of certain areas in the right hemisphere of the brain.

> "The unique demands of processing ASL may necessarily recruit RH (Right Hemisphere) areas not seen for the processing of spoken language" (Newman et al., 2002, p. 76).

Finally, another example given as evidence of this critical period is that of feral children (that is to say those children who were not exposed to a language before puberty and as a

result of this lack of language input seemed to be unable to acquire the grammatical component of that language (Curtiss, 1977)). However, it must be noted that this evidence is based on a handful of children and applies to L1 acquisition. Nevertheless, in view of the evidence presented by researchers in the field of language acquisition about this gradual decline in language learning ability, this study purposely targets young participants whose ages have been chosen to be prior to the end of the critical period. However variables other than age could account for differences in language acquisition. The link between modularity and stages of information processing is based, as explained earlier, on the study of aptitude. On this topic Skehan concludes that:

> "Concerning the existence of a specific talent for foreign language learning, it would seem that it is the more peripheral components of this second language aptitude, input and memory output, which show most evidence of being qualitatively different from general cognitive abilities" (Skehan, 1998, p. 233).

The importance of memory in language acquisition will be examined in more detail in section 2.5.

This section, as previously mentioned, endeavours to put the thesis' definition of YGL into the theoretical context of giftedness and talent. If, as theorized by Sternberg and Skehan, ability and linguistic aptitude are related to information processing, then differences in storage of and access to vocabulary should be reflected between the groups being studied.

In order to bring this section to a close, the definition of the term gifted linguists which will be used in this study needs to be further clarified. Having due regard to the theories and guidelines previously mentioned, it will be taken that young gifted linguists are those in the selected age group who display distinctive characteristics similar to Skehan's definition of aptitude; their response speed to various kinds of stimuli are faster than the average learner.

1.5.2.6 Definition of Young Gifted Linguists

The term young gifted linguists (YGL) in this study relates to those who appear to have a distinctively above average facility for storing and retrieving lexis and for using it appropriately. It does not only relate to innate abilities but to the development of potential into talent (as in Gagné's definition). Their IQ results have not been used to determine their giftedness. It was felt that the MLAT-E test scores provided a more accurate indicator as they were a specific measure of language aptitude (see Chapter2). It

should be noted that recent research found that "non-verbal IQ measured by the Raven Advanced Matrices was significantly correlated to the overall MLAT score" (Rota and Reiterer, 2009, p. 88). It must, however, be mentioned that not all linguistically gifted children in the study share completely homogeneous characteristics due to the many variables such as individual differences, learning and teaching strategies, length and intensity of L2 study. The above characteristics of gifted linguists are closer to those applied to students who have been labelled by some researchers (Naiman et al., 1978) as "good language learners".

As was the case with YGL the definition and identification of bilinguals and in particular choice bilinguals (CB) in this study has emerged from a critical appraisal of the different theories in this field.

1.5.3. Defining Bilinguals and Choice Bilinguals

'Choice Bilinguals' (CB) is the term that I have coined to refer to the bilinguals in this study. A more in depth discussion on bilinguals and bilingualism together with a review of the relevant literature can be found in section 1.5.4. However, for the sake of clarity, the following characteristics are common to all the bilinguals in this study:

- They are between 10 and 13 years of age.
- They have all been described by their parents and teachers as being literate in French and English as well as fluent in these two languages.
- They speak French at home with at least one of their parents.
- They all attend an English school.
- They do not live in a community with other French nationals. Therefore, they do not get the support that some heritage bilinguals have in terms of family, community and school. Consequently, in all cases, the French parent has had to take a more proactive role in order to develop their child's language skills, by spending more time reading and practising French with their children, making them write to relatives, as well as enrolling them in French clubs where more formal assistance is given. Therefore, these bilinguals are more akin to Foreign Language learners in that they do not develop their language purely through implicit and spoken communicative interactions. The term 'choice bilingual' was selected because there was a deliberate choice by the parents to pass on and develop the acquisition of their native language, which is French, to their children. Equally, the child has a choice of languages with which to communicate. However by

name and definition CBs belong to the large bilingual family hence the next section gives a precis of the theories linked to the definition of bilingualism.

1.5.4 Choice bilinguals and the different views on bilingualism

1.5.4.1. Who are the bilinguals?

There are a number of definitions of who is or is not a bilingual person and bilingualism encompasses a rather heterogeneous population with a variety of differences in language competence and language use. Li Wei suggests that

> "the key variables to be considered in defining a bilingual person include:
> • age and manner of acquisition;
> • proficiency level in specific languages;
> • domains of language use;
> • self-identification and attitude" (Li Wei, 2007, p. 5)

These guidelines illustrate how incomplete some of the earlier definitions of bilinguals were. They range from the basic 'being able to speak two languages' as illustrated by the following quotation "The practice of alternatively using two languages [shall] be called BILINGUALISM, and the person involved, BILINGUAL," (Weinreich, 1953, p. 1) where the notion of bilingualism is rather vague as it does not define the degree of fluency; to Grosjean's attempt at rectifying this omission by stating that "Bilingualism is the use of two (or more) languages in one's everyday life and not knowing two or more languages equally well and optimally (as most laypersons think) " (Grosjean, 1999, p. 4). This explanation could be linked to the differences between simultaneous bilingualism (referring to the acquisition of two languages at the same time) or sequential bilingualism (that is the acquisition of one language after another) (Baker, 2006, p. 116). These definitions could, in turn, be associated with a more in depth analysis which subdivides bilingualism into co-ordinate, compound and sub-ordinate forms. These subdivisions relate to the hypothesis about the way in which bilinguals store languages. A co-ordinate linguistic system:

> "is characteristic of a person who learns a second language independently and in different contexts, as for example exclusively outside a home…It is also characterized of someone whose parents used two different languages consistently, as a matter of course, to communicate" (Javier, 2007, p. 18).

As a consequence, according to Javier, two separate linguistic systems will develop.

A compound linguistic system, on the other hand, is when one language is dependent on another and there is no independent grammar for the second language as it is presumed to be dependent on the first language. Meanings, however, are supposed to be constant in both languages. When the second language is seen as inferior, in terms of proficiency, to the first language, the term subordinate bilingualism, first coined by Weinreich (1953), is used. The notion of complete equality between the two languages is problematic as language learning happens in context. Simultaneous bilinguals may learn English in one context that is school, clubs (scouts, sports etc.,) and, for example, French in other contexts: home, family, holidays. This may lead to an inequality in language development or to different linguistic organization as seen above and as mentioned by Javier:

> "Bilinguals can develop their language differently depending upon the mode of acquisition. Some bilinguals are able to develop and maintain two more or less independent linguistic schemes or 'coordinate linguistic organization', while others develop a closer interaction between their languages than is the case in coordinate bilingualism or what we refer here as 'compound linguistic organization'" (Javier, 2007, p. 37).

The debate between the proponents of the two major theories: The Separate Development Hypothesis and the Single System Hypothesis is still current. However, the fact that there are occasions when the bilingual child uses lexifications (that is, adapting the grammar of L1 with the words from L2), would tend to suggest that the two languages are not completely separate. This seems to contradict the following statement that

> "there is general agreement that (1) both languages are active when one of them is being used, and (2) even if there are shared conceptual representations and both languages are active in bilinguals, functionally the languages are independent (for example when speaking, reading, writing"(Baker, 2006)

However the above statement is based on the following assertion: "Adults are not confused by the fact that two linguistic systems share processing space for knowledge and communication" (Bialystok, 2001a, p. 104). This apparent contradiction suggests that the two linguistic systems evolve from childhood to adulthood. A more detailed study of the influences and interferences between L1 and L2 both among bilinguals and FL learners will be developed in Chapter 3 section 3.3, as it is relevant to the populations to be studied. So, when trying to define the bilinguals in this study, age and manner of acquisition are important variables. However, the sociolinguistic aspect of bilingualism is also of great importance.

1.5.4.2 The socio-linguistic aspect of bilingualism

Earlier studies looked at societal bilingualism within the framework of immigration, that is bilingual children from immigrant families in the USA (Fitzgerald, 1993).

> "In these studies, motivated by the concern over IQ test performance of emigrant children, bilingualism was determined on the basis of ethnic group membership, which was confounded with socio-economic status". (Hakuta and Suben, 1985, p. 35);

Later societal studies look at bilingualism in bilingual countries. A significant number of countries are bilingual and, in such cases, bilingualism is supported by political, linguistic and educational infrastructures. In contrast with these, elite bilingualism, that of those "individuals who choose to learn a language" (Baker, 2006, p. 4) is also subdivided into those who learn their language through immersion methods (that is to attend immersion schools as in Canada or in some international schools like the French Lycée in London where school subjects are taught in two languages) and those who learn their two languages from birth because, although they live in a monocultural and monolinguistic country, one or both of their parents originate from a different country. This second group of children have mostly been the subject of case studies rather than extensive research, possibly because they are difficult to source. They are referred to as 'choice bilinguals' in this thesis. Most young children who have been exposed to two languages from age 0-6 are considered simultaneous bilinguals and so, the children from the present study belong to this category as their parents or teachers confirmed this fact with the researcher. Their command of both languages could be considered to be of native-like competence although, due to the context in which the languages develop, one language might become more dominant and that dominance may change depending on circumstances or, as mentioned earlier, they may be differentially competent in one language or the other depending on the context.

1.5.4.3 Bilingualism and language competence

When dealing with the notion of language competence, it is necessary to establish a working definition of this concept. In the past, the temptation has been to concentrate on skills and language components : "The skills comprise listening, speaking, reading and writing and the components of knowledge comprise grammar, vocabulary, phonology and graphology" (Baker, 2006, p. 14). The four skills " fit into two

dimensions: receptive and productive skills" (Baker, 2006, p. 7). This is an over-generalisation as there are some sub-skills within skills (pronunciation, extent of knowledge, sensitivity to situations and style of language…) and, although it is a clear definition, the sociolinguistic and socio-cultural contexts, which are of importance to both bilingual and L2 learners, have been overlooked. Dell Hymes linked this concept of linguistic competence to communicative competence highlighting the interactions between language and social life (Hymes, 1977). His contribution is further acknowledged in Chapter 2. Subsequently, Bachman proposes a model of language competence (Bachman, 1990) in which he describes communicative competence as comprising two components: Organizational Competence (including grammatical competence and textual competence), and Pragmatic Competence (involving illocutionary competence and sociolinguistic competence). The notion of strategic competence where the planning and assessment of the message takes place was developed later. Bachman's model has been criticized as a basis for testing as it tends to work more like a checklist and "does not make functional statements about the nature of performance and the way it is grounded in competence"(Skehan, 1998: 163). However, the model does have the benefit of bringing language competence within a communicative system, and, for this reason, it is a useful definition.

In summary, the bilinguals in the study are able to understand, speak, read, and write both languages. It could be argued that the study is mixing L2 and native speakers but, because of the nature of their bilingualism and their young age, the 'choice bilinguals' in this study, in addition to their use of language at home, have also had a certain amount of explicit learning in French both at home with their parents and at a French club on a Saturday where they have had some instruction in reading, writing and have had to learn new vocabulary. As it is not at the same level as the educational support delivered by immersion classes, it enables both groups of participants to be considered as still being language learners especially in terms of lexical acquisition which is a continuum.

1.6 Conclusion

When looking at language acquisition and despite the careful consideration which has been given to reaching clear definitions of the two groups, it is also important, as

previously mentioned, to consider that this acquisition is dependent on many individual differences between learners such as aptitude, L1 development and motivation. Furthermore, the acquisition of a second language by either YGLs or CBs is a dynamic process going through stages of development, plateaux and attrition (De Bot, 2005). This fact, in itself, represents an added problem when comparing the two groups, as no two learners will exhibit exactly similar levels of development in an L2 at any one time.

The differences in aptitude are also factors which warrant mention. Linguistically gifted children are not child prodigies, but, do represent the top 10% of the population. Whereas bilinguals, would be expected to be a representative sample of a population in which around 90% would not be considered to be gifted. Is the fact that they potentially achieve the same level of proficiency in the language as the gifted linguists purely due to exposure? And even if it is, is the bilingual storage of and access to lexis similar to that of the linguistically gifted child? The strategies used for developing receptive skills as well as the ones for facilitating recall might help to throw some light onto the cognitive and metacognitive similarities and differences in the lexical acquisition of each of the groups. It would seem from the various definitions and theories relative to the two main groups in the study (YGL and CB groups), that they both display empathy for languages either L1 or L2 or both. Could this empathy also help to develop greater cognitive and metacognitive skills leading to better vocabulary networking, greater use of vocabulary learning strategies and a more efficient working memory? This thesis investigates these points by looking from a different angle, that is, by searching for differences and similarities in the learning/acquisition of French lexis by the three groups of learners. It concentrates on three components: the vocabulary network, the use of learning strategies and differences in working memory. It also investigates perceived parental views on language learning as possible motivational and influential factors in developing strategies for learning. Its motivation stems from teaching and observing the learning of vocabulary over many years coupled with the experience of bringing up a bilingual child in a monolingual environment and, as a consequence, developing informal hypotheses about the processes in play. My research aims to provide a clearer understanding of these processes which, it is hoped, may be of practical use in language teaching.

The study is based on an assessment of the evolution of thinking in the multiple academic fields which contribute to advancing the understanding of vocabulary acquisition and access. The thesis builds on recent work in the field. In the interest of

clarity, the study works with its own definitions of the main participant groups, that is young gifted linguists (YGL) and ‘choice bilinguals’ (CB).

CHAPTER 2: CONCEPTUAL FRAMEWORK AND RATIONALE:

2.1 Introduction

The present study which focuses on vocabulary acquisition is set within the wider framework of language development. Although it is primarily on foreign and second language vocabulary learning, as it has been suggested that successful L1 development influences L2 development or that "there are at least points of contact between L1 and L2 experience (Singleton, 1999, p. 80), it is therefore appropriate to introduce the important theories which have been elaborated on the subject.

The debate about language development has been between the partisans of an acquisition of language influenced by biological factors and those who see it as resulting from exposure. The most influential of the former is Noam Chomsky who claims that human brains are equipped with a Language Acquisition Device (LAD) which is innate and responsible for the development of language skills. As a result all children have a "universal grammar" (UG) that is to say that they have an innate understanding of linguistic rules (Chomsky, 1969). The theory that children are genetically programmed to develop a language is based on observations showing that the stages of children's language development occur at the same age, and that children acquire language by exposure even though there seems to be no explicit information given as to the structure of the language and the poverty of stimulus contrasts with the output. Finally, Chomsky states that all natural languages have word classes and grammatical rules.

Hymes reacted against this approach by emphasizing that "linguists have observed speech but have systematically analysed just those aspects of it that have answered to problems of formal grammar. They have abstracted from speech as a structured activity. Social and expressive aspects of speech have been attended to only when they have intruded inescapably into grammar." (Hymes, 1977, p. 126) .Therefore, for Hymes, communicative competence is determined by more than innate structures, and it is necessary to concentrate on how speakers use these structures. Hymes (Hymes, 1972, pp. 58-59) suggests looking at the interaction of three units: speech situation (speaking in context), speech event (a prayer in church for example) and speech act which is influenced by the social context as well as the grammatical structure and the intonation used. He further defines how to analyse a particular community language by using

different criteria which are easily remembered with the mnemonic :SPEAKING (situation, participants, end goal, acts or speech acts, key or tone of speech, instrumentality that is the channel of communication used , norms or the rules guiding the speech and genres such as small talk, poems etc.,) (Hymes, 1972, pp. 59-65). His research added a different dimension to the study of language by re-establishing it in a community. This is of some relevance to the study as the bilinguals are using French at home but the choice bilinguals are not living in a French speaking community. Nevertheless, the purpose of learning a language and in particular acquiring new vocabulary is to communicate within a specific setting and in this sense the above mentioned works are relevant to the study.

Byram (Byram, 1997) based his model of intercultural communicative competence on Hymes model. He analysed the factors that influence communication between different cultures and divided them into four different domains or 'savoirs'; that is knowing oneself and others: *savoir comprendre* or how to relate or understand others, *savoir s'engager* or having a critical view on several domains such as education, politics etc, , *savoir apprendre / faire* having the skills to learn and communicate, and *savoir être* which relates to one's attitude towards others and other cultures. (Byram, 1997, p. 34). The notion of attitude, and in particular learners' and perceived parental attitudes, is viewed in the present study as a motivational factor and its possible influence on strategy use is studied in Chapter 6. Byram also specified that for FL learners "much acquisition of intercultural communicative competence is tutored and takes place within an educational setting" Byram,1997:43). So, for him intercultural competence is not innate but learnt and nurtured.

Chomsky's theory was also opposed by the partisans of a theory of 'natural acquisition' (Skinner, 1957), who see language development occurring through the process of exposure to that specific language and by copying and memorizing behaviours which are encountered in the child's environment. Aitchison proposed to reconcile both camps by stating that:

> "Nature triggers off the behaviour, and lays down the framework, but careful nurturing is needed for it to reach its full potential. The dividing line between 'natural' and 'nurture' behaviour is by no means as clear cut as was once thought. In other words, language is 'natural' behaviour but it still has to be carefully 'nurtured' in order to reach its full potential. In modern terminology, the behaviour is innately guided"(Aitchison, 1998, p. 90).

The review of these different positions and theories are relevant to the present study where the acquisition of their home language by CBs can be seen as both innate and nurtured. However, the purpose of the study is not to enter into the well-weathered argument between innate and nurtured language acquisition. Rather it is to provide a useful contribution to the body of knowledge on the L2 vocabulary acquisition process.

2.2 The purpose of the research and its contribution to the field of language acquisition

This thesis aims to address the topic of second language lexical acquisition comparing YGLs, CBs and standard L2 learners. In view of its position at the confluence of several fields of study, that is bilingualism, cognitive development, L2 acquisition and the mental lexicon, a review of relevant literature in these fields has been conducted in order to narrow down the theoretical framework on which the thesis is based and to identify common characteristics and strategies which apply to the successful groups of young learners.

The vast number of words known by an individual and the ease and speed with which they can be accessed must imply a sophisticated organisational structure. This study will look at how lexis is stored and networked and which common factors, if any, facilitate this process in both YGLs and CBs. What does this research add to the knowledge of the subject? As it is looking at one aspect of language development, that is the acquisition of lexis by three groups of children of similar ages and social backgrounds, the study focuses less on individual differences and more on group similarities or differences. The theoretical framework underpinning this thesis is based on a cognitive approach to vocabulary learning. This approach looks at new vocabulary, what and how the different groups of learners encode, network and access it. It focuses on three aspects of vocabulary acquisition: words and how they are networked, the strategies used by the learners and their working memory efficiency. The better understanding of vocabulary acquisition in the three groups being studied which is an objective of the research, will add to the overall body of knowledge on this topic and may provide the basis for further development of pedagogic practice in the field. Over recent years the magnitude of the potential benefits which would be generated by this better understanding of vocabulary acquisition has substantially increased. In 2011 over four

million workers in the UK were not born in the UK according to a report by the Office of National Statistics (ONS, 2011). In 2002 these foreign born workers represented 8.5% of the total workforce. By 2011 this had increased to nearly 14%. It must be noted that it is difficult to get accurate figures for the number of EU nationals resident in the UK as many are not registered at their respective consulates and some have already acquired British nationality. A survey of eight hundred and fifty thousand school children in London revealed the presence of three hundred languages other than English (Baker and Eversley, 2000). At a global level :"Numerically bilinguals and multilinguals are in the majority in the world: it is estimated that they constitute between half and two thirds of the world's population" (Baker, 2006, p. 68). Thus, bilinguals and multilinguals are the norm worldwide, and are becoming a much larger proportion of the UK school population. CBs seem to be an under-researched group as most published work like that of Ronjat (Ronjat, 1913) has been in the form of case studies rather than quantitative group research. The study of the acquisition of new vocabulary by this specific type of bilingual (CB) and a comparison with young gifted linguists will add to the body of knowledge on the acquisition of new lexis by successful language learners.

2.3 The notion of aptitude and the successful language learner

2.3.1 Language aptitude

Carroll defines language aptitude as the "rate at which persons at the secondary school, university and adult level learn to criterion" (Carroll, 1973, p. 5). The Modern Language Foreign Aptitude Test (Carroll and Sapon, 1959) was developed to test adults and high school students. It measures phonemic coding ability (storing language sounds), grammatical sensitivity (awareness of syntax), rote learning ability and inductive ability (noticing, identifying patterns etc.). Carroll and Sapon also developed an elementary version EMLAT for use with younger learners. Subsequently, this version has been revised to become MLAT-E (Carroll and Sapon, 2002) .

The MLAT-E has four parts that measure abilities that make learning languages easier:

Part 1, HIDDEN WORDS, tests the ability to associate sounds and symbols.
Part 2, MATCHING WORDS, relates to sensitivity to grammatical structure.
Part 3, FINDING RHYMES, tests the ability to hear speech sounds.

Part 4, NUMBER LEARNING, measures auditory alertness and ability to remember.

At the time of the research the MLAT-E was the only aptitude test for young FL learners. There were other aptitude tests such as The Pimsleur Language Aptitude Battery (PLAB) (Pimsleur, 1966) . However, unlike the MLAT-E, the PLAB is designed for students in grades 7-12. It "is broadly similar to Carroll's MLAT but places greater emphasis on auditory factors….Pimsleur's interest in aptitude was connected with his belief that many language students in US high schools underachieve because of auditory difficulties" (Dornyei and Skehan, 2003, p. 594) . His test consists of six subsets:

- Grade point average in areas other than foreign language study.
- Interest in learning a foreign language.
- Vocabulary.
- Language Analysis.
- Sound discrimination.
- Sound-symbol association.

This test was considered too difficult for children from the targeted age group. Its use of grade point average for areas other than foreign language infers a correlation between intelligence and foreign language aptitude which is still a controversial issue. It also adds interest in learning a foreign language which might be more relevant to testing motivation than aptitude. For these reasons, this test was not chosen for the present study.

The CANAL-FT- Cognitive Ability for Novelty in Acquisition of Language as Applied to Foreign Language Test (Grigorenko, Sternberg and Ehrman, 2000) is another aptitude test which was considered. This test has nine subsets in two categories: intermediate and delayed recall. Intermediate recall includes 1- learning neologisms from context, 2- understanding the meaning of a passage, 3- continuous paired-associate learning, 4- sentential inference, and 5- learning language rules. The delayed recall comprises 1- delayed learning neologisms from context, 2- delayed understanding the meaning of a passage, 3- Delayed continuous paired-associate learning, and 4- delayed sentential interference. It is based on an artificial language called Ursulu. Apart from the fact that this test was designed for older learners than those in the present study, it adds delayed recall which makes it more akin to a memory test than a language aptitude test

(The MLAT only has one section on rote memory). It also seems to duplicate the other instrument (WM Test) used in this study.

Finally another version of the MLAT has been adapted for young Hungarian students (Safar and Kormos, 2008). It also includes two sections directly related to WM Tests: Making logical deductions and memorising lexical items and is in Hungarian. It compares aptitude with achievement in FL. A correlation between these two points has already been found (Ehrman and Oxford, 1995). In the present study, the aptitude test is used to identify the 'potentially gifted linguists' as we are dealing with near beginners, the revised version of the MLAT-E seemed the most appropriate for the age group concerned. The scores of the participants who took part in the study are detailed in Chapter 5 pages 142-143.There are other factors which influence success at Modern Language Learning, motivation and attitude for instance. More recent studies have highlighted the role of WM as better predictor of success than aptitude. A correlation between the Aptitude test result and the WM result is included in Chapter 7.

2.3.2 The good language learner and learning strategies

Although both monolinguals and bilinguals have been extensively studied, there does not appear to have been a comparative study devoted to young successful linguists and their mental lexicon. There have been more recent Canadian studies on bilinguals as successful learners but these studies concentrated on bilingualism achieved through French immersion in elementary schools for children with English as a home language (Hart & Lapkin, 1989; Lapkin et al, 1980; Swain & Lapkin, 1991). They show that these children do well academically. However, as Canada is officially a bilingual country and Quebec is mainly French speaking, the amount of support and the cultural environment is different from that experienced by French bilinguals in the UK. In addition, the Canadian parents may have been able to provide considerable additional linguistic support. The study which is considered one of the earliest and most influential pieces of research addressing aptitude for language learning is that of a group of Canadian researchers who published "The Good Language Learner" (Naiman et al., 1978).

Naiman et al identified six dimensions of language learning: context, learner, L2 teaching, L2 environment, learning and outcome. The question which prompted

the study was "do good learners tackle the language learning task differently from poor learners, and do learners have certain characteristics which predispose them to good or bad learning". (Naiman et al., 1978) The first part of the study consisted of thirty-four interviews. All the interviewees were adults; most of them had previously learnt more than one language. Therefore, the learning strategies which they used might have been acquired and developed over a long period of time and their positive attitude towards language learning might have been influenced by their previous successes. Nevertheless, the authors concluded that

> "language learning aptitude, early starting age and length of exposure appear to be less significant to success in language learning than a strong motivation and positive attitude to learning task, favourable learning circumstances (e.g.immersion into the target language environment), certain personality characteristics, such as sociability and persistence, and the development of learning techniques suitable to the learner's personal needs" (Naiman et al., 1978, p. 39).

This statement was illustrated by three case studies:
In Case Study 1, Ms A was in the 26-35 age group. She was an MA student in Applied Linguistics. In Case Study 2, Ms B was also from the same age group and was a bilingual PhD student English/ Yiddish. She had studied Hebrew from age 10, then French, Latin and German. In Case Study 3, Mr C also in the 26-35 age group, was a Professor of Anthropology who had learnt Latin and Greek at school and then acquired Russian, Polish , German and several other languages. The sample does not appear to be representative of the average monolingual English speakers learning French as an L2. However, when considering strategies for learning Naiman et al. found that Rubin's List of Strategies of Good Language Learners (Rubin, 1975), could be reduced from seven to five items and proposed the following list of strategies :

> "Active Task Approach (actively involving themselves, practice etc.).
> Realisation of Language as a System (make effective cross lingual comparisons, analyse the target language and make inferences about it).
> Realisation of a Language as a Means of Communication (conveying and receiving messages, behaving in a culturally appropriate manner) emphasizing fluency.
> Management of Affective Demands.
> Monitoring of L2 performance." (Part II, Chap 1 section 4.3 pp.30-33).

They concluded that it is not enough to look at strategies and techniques to explain success in language learning and that personality and motivational factors also needed to be investigated.

2.3.3 The cognitive characteristics of good language learners

The main classroom study which followed the adult study appeared to have been rigorous in its population sampling and the data collected was far ranging and thorough. Students were selected at various levels of the programme in French as a second language. However, it took place in Toronto, in a country where French is an official language and therefore where students had many opportunities to experience the L2 in oral and written form on an everyday basis outside of the classroom environment; thus the sample was not fully representative of monolingual English speakers and learners of French as a L2. The methods involved included detailed interviews with the students and the teachers and a series of tests. These tests were divided into:

1. Tests measuring hypothesised effect:

The IEA (International Association for the Evaluation of Educational Achievement) Test which measures linguistic receptive competence (Listening Comprehension).

Productive competence was measured by using an "Imitation Task".

2. Tests measuring hypothesised cause (Personality and Cognitive Tests):

a. The Hidden Figures Test (a perceptual test) designed to differentiate between field dependent and field independent subjects. The reason for using this test was the authors' hypothesis that "the most successful student is the one who is able to focus on those language stimuli relevant to the language learning task at hand and to disregard the inappropriate ones." (Naiman et al., 1978, p. 67)

b. The Stroop Phenomenon Test which is "The Speed of Colour Discrimination Test". The purpose of the test is to differentiate between subjects who are capable of suppressing the stronger habit, as it is hypothesized that those students who are able to resist interference will be able to cope more successfully with native language interference.

c. The Pettigrew's Category-Width Scale-Estimation Questionnaire (Pettigrew, 1958) investigates whether a student is a "Broad Categorizer" or a "Narrow Categorizer" and indicates that the good language learner may be the middle of the road one.

It would seem that the above three Cognitive Style Tests tend to measure whether or not a student lacks the necessary attention and study skills required for efficient language learning. However, the issue which Naiman's study fails to address is whether it may be possible to remedy these inadequacies with appropriate training and

the relevant strategies for developing study skills. Furthermore, as language learning is a dynamic process, these tests can only give an indication of the level of success in language learning at the time of the study. These tests were followed by personality tests.

2.3.4 Personality and cognitive characteristics of good language learners

The four Personality Tests in Naiman et al's study were:

1. The Budner's Intolerance of Ambiguity Scale (Budner, 1962) which is a questionnaire with a seven points scale designed to test the tendency of students to interpret as threatening any ambiguous situations. Naiman et al suggested that the ability to accept ambiguous language situations could help the successful acquisition of the language.
2. The Mehrabian's Sensibility to Rejection Scale (Mehrabian, 1970) which aims to identify students who feel threatened by situations where they might feel rejected by others. This would imply a lack of risk taking and might be detrimental to language learning.
3. The Hogan's Empathy Scale (Hogan, 1969) which sets out to discriminate between high and low empathy individuals. The correlation between language learning and high empathy may be indirect as it is not initially obvious. In concentrating on the process of language learning, what is not explored are any possible links between high empathy and language use.
4. Eysenck's Introversion Extroversion scale (Eysenck and Eysenck, 1963) which measures levels of inhibition . By including this test in the study, Naiman et al recognised the importance of understanding the influence of inhibition on language learning.

Finally, the study also included classroom observations and interviews with the students. The interviews covered a range of aspects relating to classroom environment, learning behaviour, attitude and characteristics of the students. The study covered six schools and twelve classes. On the basis of the International Association for the Evaluation of Educational Achievement (IEA)'s results, six students per class were selected for classroom observation and interviews. The teachers had previously been asked for their predictions as to which students would perform best in the test. The results showed that, on the whole, the teachers' predictions were accurate but there were some mismatches. The conclusions of the tests and investigations were as follows:

Few learning strategies were identified. One possible explanation given by the author of the study was that "1) the investigators may not have spent enough time in the classroom….2) very few overt and systematic strategies are ever displayed in the language classroom." (Naiman et al., 1978, p. 145).

"The personality, attitudinal and cognitive style traits that were predictive of success were, in most instances, the same for productive (imitation) and receptive (IEA) competence" The lack of differences was attributed by the author to the fact that the tests were not adequately measuring the aspects of linguistic competence that they were supposed to test.

Several personality tests and cognitive characteristics such as tolerance of ambiguity and field independence were also highlighted by the study as being good predictors of successful language acquisition. Students' interviews revealed the use of techniques and strategies which were not necessarily visible during classroom observation. The importance of learning modality preferences were also revealed during the course of the interviews.

The multiplicity of sources of data on the various factors related to success in language learning was useful for the elimination of non-correlated variables but tended to make the analysis of the results rather challenging.

2.3.5 . Naiman's case studies

In order to illustrate the quantity of data and information that was collected, six case studies were presented. It is interesting to note that student A who was an unsuccessful language learner, had moved to the school at Grade 9 and that her previous school did not provide the same standard of French teaching (p.188). Student B was a successful student but, it is clear that "he had been positively influenced by his mother, who knew French very well. On occasion, he spoke to her in French", (p.190). This point will be referred to later on in this chapter when the importance of parental attitudes towards the language to be acquired is examined. Student F was selected as a result of being a so called mismatch in so far as her teacher did not mention her as a possible top scorer but her results were surprisingly good. However, we subsequently learnt that she had started French early at a previous school (at Grade 4) and "she further indicated that she had a good memory". Sadly, the role of memory in language acquisition was not investigated in the Naiman et al study; neither did they include any aptitude tests. The

study looked at language acquisition as a whole and did not differentiate between the various components of language competence; although Naiman used an Imitation Task to investigate productive competence, it mostly gave data on one part of productive competence, namely pronunciation. So what was the conclusion of Naiman's study?

2.3.6. Naiman's findings and the reasons for widening the field of research

The major findings relating to language learning highlighted two cognitive style factors which correlated with successful learners: tolerance of ambiguity and field independence. It also revealed a positive correlation between the use of learning strategies and good language learners but it concluded that strategies and techniques were not the only factors leading to success and that personality and motivational factors and other less obvious aspects of the learning process needed to be investigated.

Naiman's study, which was influenced by Rubin's article (Rubin, 1975) represents the seminal work on successful/gifted learners and their use of strategies. The ideas and findings that he advanced have been revised and responded to in later works by other researchers ((Macaro, 2001);(Oxford and Cohen, 1992); (Griffiths, 2008) etc. In so far as learning strategies are seen as ways of processing information and enhancing learning these early pioneers are relevant to the present study on group differences in processing vocabulary in French.

2.4 Lexical acquisition

2.4.1 Vocabulary acquisition

Initially vocabulary acquisition can be perceived as having two major components: a conceptual component, that is to say the acquisition of meaning or word concept and a phonological component, namely the interpretation of sounds. The two are intricately linked in the production of meaningful utterances. Subsequently, word knowledge deepens to include a grammar component which involves an understanding of syntax. In the past, L2 acquisition has been linked to L1 acquisition. It seems certain that there are similarities as well as interferences between L1 and L2 and the latter will be discussed more fully in Chapter 3. With regard to similarities, when investigating L1 acquisition, de Villiers (1986) stated that one relevant characteristic of learners was that:

> "In many cases it seems that the child has identified the meaning of the word with only one property of the object: its shape or sound or size. He uses the word to refer to all objects sharing that property"(De Villiers and De Villiers, 1986).

It could be argued that this capacity to overextend meanings, generalise and classify is further developed as the child grows up and is of significance in the acquisition of L2. This leads to the question of the organisation of the lexicon.

2.4.2. The organisation and storage of lexis

Although Saussure recognized the interdependence of words within the lexis, Lyons was probably one of the first to describe it as a "network of meaning relations…" and, he distinguishes "between paradigmatic and syntagmatic links" (Lyons, 1995, p. 124). Paradigmatic relates to words of the same class whereas syntagmatic refers to words of a different class. However, with regard to paradigmatic links, Lyons seemed to focus mostly on synonymy, hyponymy and incompatibility. While it is not suggested here that the notion of context in the acquisition of lexis should be ignored, it must also be said that words are encoded in the lexicon according to their relevance, similarities or opposition to other already assimilated words. It is this idea of network which has been the subject of numerous and diverse early studies (Anglin, 1970).

"Anglin's own experiments show that children were less likely than adults to sort words according to syntactic class" (Singleton, 1999). Semantic organisation has tended to be judged according to pair word tests and, the syntagmatic paradigmatic shift which has been observed was dependent on certain factors such as word frequency and types or choices of stimuli words. Meara (Meara, 2009) looks at word association in connection with the emergence of lexical networks. It could be argued that this position is more readily understood from a L1 acquisition point of view. L2 learners have already developed an organised network for their first language. In fact, Meara suggests that cross language links depend on similarities between L1 and L2. One of his suggestions, following the Birkbeck Vocabulary Project, is that the L2 lexicon is organised in a phonological rather than semantic manner. This has been disputed by other researchers (Singleton, 1999, p. 131). L2 acquisition takes place when learners are at different stages of cognitive development from L1 learners. In addition, reading which requires the child to realise that words are separable from their referents and are represented by graphological symbols further helps with the classification of lexis.

> "Children with early reading experience have a better grasp of basic concepts than children without such experience, which suggests that accession to literacy accelerates lexical development" Singleton (1999p47).

This finding highlights a possible element which may account for some differences in the vocabulary acquisition of L1 and also possibly L2 learners. Chapter 3 Section 3.2 review the different language processing models and the influences of and interferences between L1 and L2, as understanding how words are encoded is a crucial step towards elaborating how they may be networked within the lexicon and therefore designing the vocabulary test for this study. It must be emphasized that the purpose of the study is not to propose a network model but to investigate how words are classified and linked within the lexicon by different groups of learners. That certain types of classification may stimulate the emergence of a skeleton network is probable. Further clarification needs to be added with regard to the context of previous research as to what is meant by lexis and lexical items. These terms include not just words but also phrases, idioms etc. Carter made a distinction between 'grammatical words', also referred to as 'functional words', that is to say articles, prepositions, conjunctions, pronouns and auxillary verbs and 'lexical words' also referred to as 'content words' (Carter, 1998, p. 8). This study investigates the storing and access of lexical or content words. Learning words is not sufficient in itself to become proficient in a language. However, it is likely that the efficient storage of lexis creates a better basis for the successful combination of its components. This theory will be further developed in Chapter 3 when looking at more recent studies which have helped with the design of the research methods used in this study. The role of memory in the acquisition of lexis may also be assisted by a successful lexical organisation.

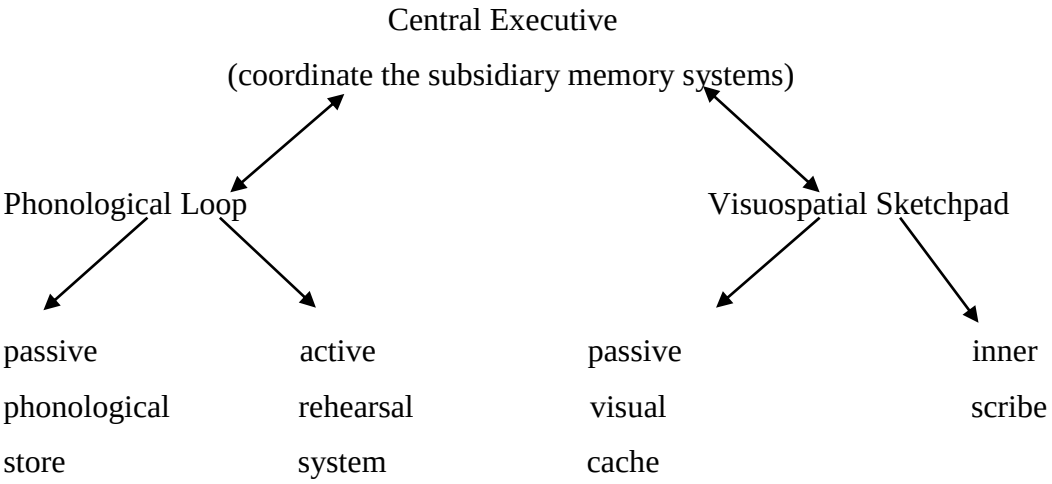
2.5 The importance of memory in lexical acquisition

Memory is not a single entity but represents the sum of multiple systems. There is a memory storage associated with each of our senses as Baddeley illustrates by stating that "human memory is a system for storing and retrieving information acquired through our senses" (Baddeley, 1990, p. 13). Traditionally, memory was thought of as having two major components: short term memory and long term memory. Short term memory has been replaced by the term working memory as it is more precise and includes both short-term memory and the process of encoding and working on immediate information. Working memory refers to "the system or mechanism underlying the maintenance of task-relevant information during the performance of a cognitive task"(Miyake and Shah, 1999, p. 1)

2.5.1 Models of working memory and their relevance to the study

The original model of working memory was based on multiple components which comprised three parts: a central executive with a role of control over the whole process, and two slave systems called the phonological loop and the visuospatial sketch pad. These two components were responsible for the processing and maintenance of domain specific material (verbal or visual) (Baddeley and Hitch, 1974). The model was revised subsequently based on experimental and neuro-imaging data. Several revisions occurred which will be mentioned in this chapter but the model illustrated in Figure 2.1 represents the key features of the original model.

Figure 2.1 A schematic diagram based on the multiple-component model of working memory(Baddeley and Logie, 1999, p. 30).



It could be said that this model relies on two types of sensory input and does not consider others such as tactile and olfactory components for example; however, within the context of language acquisition, the two components that are mentioned would seem to be the most relevant. There have been criticisms that the central executive is represented as `a little "homunculus" (Miyake and Shah, 1999, p. 8) and it can be argued that a more detailed description of the nature of working memory limitations and, in particular, the role of attention, could have thrown more light on the role and effectiveness of the central executive system. The relevance of attention and the restriction of interferences are of particular importance in this study as several studies have highlighted the possible advantages of bilingualism on restriction of interferences

(Bialystok, 2001). It has also been my informal impression that bilingual children have a greater ability than the monolingual child to disregard irrelevant information. The overloading of information affects memorization. The bilinguals' alleged facility to select information would suggest that they have a larger or more efficient working memory as "without adequate inhibition, working memory becomes cluttered with irrelevant information and decreases the efficiency of cognitive processing" (Hasher, Zacks and May, 1999). This study addresses a need to research whether both groups have high working memory scores as " higher scores at working memory go with higher learning rates" (Kees de Bot, Wander Lowie and Verspoor., 2005, p. 267). In support of this statement de Bot et al defined working memory as "one of the important components of language aptitude" and cited (Carroll, 1958) four factors of aptitude:

"-the ability to identify and remember sounds of the foreign language;
-the ability to recognise how words function grammatically in sentences;
-the ability to induce grammatical rules from language examples; and
-the ability to recognise and remember words and phrases."

Naiman et al , as mentioned earlier, was the first major study of good language learners'. Nowadays, the teaching and learning of language encompasses the use of new IT material and a plethora of audio visual facilities. Therefore, some strategies and techniques have progressed and new research needs to incorporate and explore them.

2.6 Learning strategies and lexical acquisition

Through time new reports, studies, theories and governmental guidelines have, resulted in a gradual shift of emphasis from the teacher to the learner, which has led to the study of learner's learning strategies.

2.6.1 Defining language strategies in L2 acquisition

Oxford attempted to define foreign or second language strategies as specific actions, behaviours, and techniques which students use to improve their learning and use of L2 (Oxford, 1990). In an attempt to apply learning strategies to second language acquisition and define them within the framework of cognitive theory, O'Malley and Chamot (O'Malley & Chamot1990, p. 119) discussed the four specific studies that they conducted on learning strategies. O'Malley and Chamot (O'Malley & Chamot1990, p. 3)

define learning strategies as "special ways of processing information that enhance comprehension, learning or retention of information". This definition appears to include communicative strategies as it could be argued that the use of such strategies does enhance comprehension. However, communication strategies or language use strategies may not always advance learning and may, in some cases, enable a language learner to avoid or defer learning; for example, when a learner asks for clarification to cause the speaker to rephrase the sentence using simpler vocabulary which the learner has already assimilated. "Whereas language learning strategies have an explicit goal of assisting learners in improving their knowledge in a target language, language use strategies focus primarily on employing the language that learners have in their current interlanguage" (Cohen, 1998). Within the term L2 use strategies, Cohen includes retrieval strategies, rehearsal strategies, cover strategies, and communication strategies. The definition and grouping of strategies seem to differ considerably between researchers. The focus of this study will be primarily on the use of language learning strategies but, as it could be argued that retrieval and rehearsal strategies belong to the cognitive framework which will be discussed in section 2.6.3, they will be part of the current research. Specific studies, which have led to a taxonomy of learning strategies, will be reviewed.

2.6.2. Towards a taxonomy of learning strategies

In their first study,(O'Malley and Chamot, 1990) O'Malley and Chamot's objectives were to define and classify the learning strategies used in L2 acquisition . In order to achieve this goal, they used retrospective interviews of both students learning English as a Second Language (ESL) and their teachers. The purpose of this method was to attempt to isolate the range of strategies that students might identify with specific tasks, and to discover whether ESL students would also report using strategies in functional language outside the classroom and, finally, to determine the extent of teachers' knowledge of their students' use of strategies. Classroom observations resulted in the researchers identifying seven oral language activities which were typical within a classroom setting (that is pronunciation, oral drills and grammar exercises, listening for main ideas, inferencing and making an oral presentation), and two non-classroom activities (social interaction and functional communication such as within a work context). Students were asked in small group interviews "The special tricks they did …or used to study each task". Teachers were also interviewed and asked about their

students' use of strategies for these specific tasks. Classroom observations constituted the third data collection instrument.

O'Malley Chamot's second study (O'Malley and Chamot, 1990), which is more relevant to this thesis, focused on learning strategies used by FL learners. However, the participants were sixty-four High School Spanish students and thirty-four College Russian students, and therefore the fact that they were more advanced students than those who are the subject of the present research might mean that they had developed more effective strategies for learning. The method used for this investigation was individual interviews. The interviews focused on the seven classroom tasks identified in the first study and the two non-classroom activities (social interactions outside the classroom and interactions within a work context). Their third study (O'Malley and Chamot, 1990) concentrated solely on listening comprehension strategies using a think-aloud method. It could be argued that listening comprehension strategies may be more appropriately classified as communicative strategies rather than learning strategies. However, it is difficult to deny that strategies which enable the learner to concentrate on keywords in order to facilitate understanding have an impact on subsequent learning. Finally, their fourth study (O'Malley and Chamot, 1990) regrouped longitudinal studies (over 4 semesters) of FL students (mostly Spanish and Russian who had already participated in the second study) using think-aloud methods, interviews, and the study of students' workbooks to determine the factors affecting language performance and the role of strategies in effective learning. In order to determine the role of strategies with regard to effective learning, both effective and non-effective students were enrolled in the study. However, the distinction between the two groups was made on the basis of nomination by teachers and not on any aptitude tests. The criteria for effective learners included:

> "attentiveness in class, ability to follow directions without asking for clarification, ability and willingness to comprehend the general meaning of a difficult listening comprehension passage, and ability and willingness to guess at the meaning of unfamiliar words and phrases."(O'Malley and Chamot, 1990, p. 131)

It would seem from this list that attention and motivation were as, or possibly more, important criteria as ability in identifying effective learners.

The overall purpose of their study (O'Malley and Chamot, 1990), as mentioned earlier, was to explain and provide a rationale linking the use of strategies in L2 acquisition with a cognitive theory of learning. They used think-aloud methods of

investigation relating to a variety of tasks such as cloze exercises, written descriptions of pictures, role plays, listening and reading comprehension to elicit the appropriate vocabulary. By their own admission, due to lack of time, not all the students completed every exercise. In addition, a number of students, mostly ineffective students, dropped out before the end of the study. Warm-up training sessions were provided to enable the students to think aloud about the tasks that they had to complete. The interviews were then recorded and analysed to uncover the average use of strategies for each task. They proposed an analysis of language strategies divided into three areas: cognitive, metacognitive and socio-affective.

2.6.3 O'Malley et al's three main language strategy areas

1. Cognitive strategies

Cognitive strategies are based on the three stage process of cognitive skill acquisition put forward by Anderson (Anderson, 1983; Anderson, 1985). In this system the representation in the memory involves what we know about or declarative knowledge, what we know how to do or procedural knowledge and the production systems, which are the application of procedural knowledge in the memory. Anderson's theory states that a production has a condition and an action, as in the following example:

> "If the goal is to generate a plural of a noun[=production], and the noun ends in a hard consonant [=condition], THEN generate the noun +/s/[=action]". (Anderson, 1980, p. 239).

Condition and action can, with practice, be assembled into production sets and this further step will, in turn, lead to automatic execution. The claim here is that language is learnt like any other cognitive skill and, that stages of language acquisition and production can be defined using Anderson's theory. In addition, "the theory is used as the foundation for relating learning strategies to cognitive processes and to show the influence of strategic processing on learning". (O'Malley and Chamot, 1990, p. 13). This is relevant to this study which investigates differences and similarities in storage and retrieval of French vocabulary. The application of the theory to second language acquisition and how the theory relates learning strategies to cognitive processes is as follows: Anderson describes three stages of skill acquisition: the cognitive, associative and autonomous stages. The cognitive stage is defined as the episode when the learner observes and receives guidance on how to do a task or, in some cases, he/she may deduce

for himself/herself how to do it. The associative stage is when the learner makes comparisons and connections between the various elements of what needs to be learnt and gradually pinpoints and eliminates mistakes. Finally the last stage is when the performance becomes automatic after thorough rehearsals and practice. So, "in cognitive theory, language production is seen as an active process of meaning, construction and expression " (O'Malley and Chamot, 1990, p. 37). One slight criticism that could be levelled at the theory is that it relies on the learner knowing the rules of the language. Not knowing the rules and expecting them to become obvious with usage might lead to inefficient and error laden production. According to the theory, construction and transformation rely on declarative knowledge (for example the definition of word facts such as knowing what the word means and the word class) and build on previous knowledge, but procedural knowledge (being able to accomplish a task) is acquired with practice. In Anderson's theory,

> "information in either L1 or L2 has a meaning-based representation and would be stored as declarative knowledge through either propositional networks or schemas….. and cognitive strategies for second language learning were viewed as complex cognitive skills . This followed the classification in Anderson's theoretical analysis of cognition which includes strategy like cognitive processes such as imagery, organisation, inferencing, elaboration, deduction and transfer." (O'Malley and Chamot, 1990, p. 55)

The definition and classification of cognitive learning strategies as a result of the first studies of O'Malley and Chamot are detailed in Figure 2.

Figure 2.2 Definition of cognitive strategies (O'Malley and Chamot, 1990, p. 126)

Cognitive Strategies :	
Rehearsal	Rehearsing the language needed with attention to meaning…
Translation	Using the first language as a base for understanding and/or producing the second language.
Note taking	Writing down key words and concepts…during a listening or reading activity.
Substitution	Using a replacement target language word or phrase when the intended word or phrase is not available.
Contextualisation	Assisting comprehension or recall by placing a word or phrase in a meaningful language sequence or situational context.

As a result of their longitudinal study, O'Malley and Chamot revised their definition and categorisation of cognitive strategies as follows:

> "Cognitive strategies involve interacting with the material to be learned, manipulating the material mentally or physically, or applying a specific technique to a learning task". (O'Malley and Chamot, 1990, p. 138).

Eleven cognitive strategies were identified: repetition, resourcing, grouping, note-taking, deduction, substitution, elaboration, summarization, translation, transfer and inferencing. It is worth noticing that O'Malley includes memory strategies into cognitive strategies. There is, also no distinction between *language learning* and *language use* strategies unlike in Cohen's research (Cohen, 1996). In addition, the labelling could be seen as slightly misleading as other researchers might have categorised substitution under communicative strategies. However, these labels were useful in the design and analysis of the questionnaire for the present study as can be seen in Chapter 3, 4 & 6 and Appendix G.

The next main area for O'Malley and Chamot concerns metacognitive strategies.

2. Metacognitive strategies

Metacognitive strategies are described as "higher order executive skills that may entail planning for, monitoring, or evaluating the success of a learning activity" (O'Malley and Chamot, 1990, p. 44). They contrast with cognitive strategies, which "are more directly related to individual learning tasks, and entail direct manipulation or

transformation of the learning material" (O'Malley and Chamot, 1990b, pp. 8, 99). It must be noted that the distinction between cognitive and metacognitive strategies is not as clear cut as it would appear and, when looking at the following list of metacognitive strategies, several elements seem to overlap. In addition, rehearsal and substitution, which are defined above as cognitive strategies, might be categorised as communicative strategies.

Three main metacognitive strategies were defined and detailed in O'Malley and Chamot's studies. Figure 2.3 summarises these strategies.

Figure 2.3: Definition of metacognitive strategies (O'Malley and Chamot, 1990, p. 126)

Metacognitive Strategies	
Planning	
Organizational planning	Planning the parts,sequence,main ideas, or language functions to be expressed orally or in writing.
Delayed production	Consciously deciding to delay speaking to learn initially through listening comprehension.

It could be argued that, by categorizing rehearsal as a cognitive strategy, the authors have already accounted for elements of planning strategies and organizational planning. Thus, further overlaps seem to exist in the distinction between cognitive and metacognitive strategies.

As a result of their longitudinal study, O'Malley and Chamot revised their definition and categorisation of metacognitive strategies as follows:
"Metacognitive strategies involve thinking about the learning process, planning for learning, monitoring the learning task, and evaluating how well one has learned" (O'Malley and Chamot, 1990, p. 137). Seven metacognitive strategies were then identified: planning, directed attention, selective attention, self-management, self-monitoring, problem identification and self-evaluation. Once again, by including summarizing as a cognitive strategy, it could be said that O'Malley and Chamot have already accounted for some self-management strategies and that there is a certain amount of duplication between cognitive and metacognitive strategies. As the use of

metacognitive strategies is relevant to the learning of French vocabulary, they have been included in the design of the questionnaire for the present study.

3. Social and Affective Strategies

"Social/affective strategies concern "the influence of social and affective processes on learning" (such as cooperative learning, self talk …). This definition was subsequently revised after the fourth study as follows: "Social and affective strategies involve interacting with another person to assist learning or using affective control to assist a learning task." Four social and affective strategies were identified: questioning for clarification, cooperation, self-talk and self-reinforcement. It could be argued that questioning for clarification would be more appropriately classified as a language use strategy rather than a social/affective strategy.

Oxford provided a slightly modified classification of language learning strategies divided into direct strategies and indirect strategies (Oxford, 1990). Among the direct strategies she includes first memory strategies, such as grouping or using imagery which help students to store and retrieve new information. The second group of direct strategies is cognitive strategies, such as inferencing which enable learners to understand and produce new language. Finally, compensatory strategies such as guessing, which allow learners to bridge gaps in knowledge, are included. Indirect strategies are firstly metacognitive strategies permitting learners to control their own cognition, that is, to coordinate the learning process by using functions such as centering, arranging, planning, and evaluating, secondly affective strategies which assist in regulating emotions, motivations, and attitudes and thirdly social strategies which help manage learning through interaction with others. Her taxonomy is very close to that of O'Malley and Chamot (O'Malley and Chamot 1990) and it was used to construct the Strategy Inventory for Language Learning (SILL) (Oxford, 1990), which measures the frequency of use of these language learning strategies. It was aimed at secondary school children.

There have been criticisms concerning the difficulties in defining and classifying strategies for learning and the use of questionnaires which did not take into account specific learning tasks or the context in which learning took place (see Chapter 3 section 3.6: Research into and criticisms of learning strategies and their influence on the design of the vocabulary learning strategies questionnaire p.97).

> "In sum, early critiques of LLS research centred around the lack of consensus as to the nature of a strategy, its size and location, whether external learner

> behaviour could correctly predict cognitive operations, how they could be described and classified, whether they applied to all groups of learners and to all aspects of learner's performance, and whether, given this lack of consensus, time dedicated to learner training was justifiable" Greenfell,M and Macaro,E (2007 p.20)

Schmitt (1997) produced a taxonomy of vocabulary strategies based on Oxford's taxonomy. When dealing with strategy classification for surveys, he wrote that "of the more established systems, the one developed by Oxford (1990) seemed best able to capture and organize the wide variety of vocabulary learning strategies identified" (Schmitt, 1997, p. 205). He uses four of Oxford's categories: social, memory, cognitive and metacognitive, and adds a fifth category: determination strategies which could be associated with Oxford 's compensatory strategies. His taxonomy of vocabulary strategies was originally compiled for a survey given to Japanese university students learning English as a second language. In view of the age of the participants in this study and the fact that his survey would have needed more adaptation than the SILL, it seemed that a more appropriate approach was to go back to the SILL on which he based his survey and to adapt it to the age of the participants and the task of vocabulary learning.

It must be noted that the classification of the strategies is of importance in the construction of a questionnaire related to their use (see chapters 3,4 and 6). However, at present, the most important point is not so much the classification of the strategies deduced from the various studies but the determination of how strategic processes influence learning and the possible differences existing between different groups of learners.

2.6.4. The use of strategies and language aptitude.

In order to demonstrate this point, direct parallels between Carroll's four major components of foreign language aptitude and Anderson's theory are drawn by O'Malley and Chamot as follows:

- Phonemic coding ability, that is, the ability to differentiate and identify particular sounds and to associate them with symbols representing them (Carroll, 1981, p. 105), is linked with the perceptual processing stage, as "effective listeners in a second or foreign

language know how to make use of strategies such as directed attention and selective attention to assist their perceptual processing" (O'Malley and Chamot, 1990, p. 162).
- Grammatical sensitivity or the ability to understand the grammatical functions of words within a sentence does, according to O'Malley and Chamot, correspond to Anderson's parsing stage of comprehension and to O'Malley and Chamot's deductive strategies.
- Rote learning ability (Carroll, 1981, p. 105) which is the ability to learn and retain words and their meanings "can be facilitated by strategies such as the keyword method" (O'Malley and Chamot, 1990, p. 163).
- Inductive language ability which is the ability to deduce the rules which apply to a specific learning activity is associated with the strategic use of "elaboration, summarizing and self-monitoring as well as inferencing" (O'Malley and Chamot, 1990, p. 163).

The proposal by O'Malley and Chamot to link language competence to the way in which students process information contrasts with other theories (Chomsky, 1969) which refer to language as an innate skill and this provides an incentive to research the strategies used by gifted learners. It may be possible that individual differences in processing skill could form a basis for giftedness. However, Skehan voices caution about linking learning strategies to successful learners: there is always the possibility that "good" language learning strategies ….are also used by bad language learners but that other reasons caused them to be unsuccessful" (Skehan, 1989, p. 76). Furthermore, linking learning strategies to bilinguals' success could attract criticism on the basis that bilinguals are not acquiring both languages within an academic or rule-based framework. The rules on language construction in their case may emerge through usage. However, in the case of the choice bilinguals in this study, the community where the French language is spoken is rather restricted and greater input, and sometimes more explicit input, is needed and provided by parents, teachers and facilitators (such as leaders of French clubs). Therefore the choice bilinguals are, to a certain extent, more akin to foreign language learners.

Oxford distinguishes between second language and a foreign language:

> "A second language has social and communicative functions within the community where it is learned [whereas] a foreign language does not have immediate social and communicative functions within the community where it is learned; it is employed mostly to communicate elsewhere" (Oxford, 1990, p. 7).

However, for the choice bilinguals in this study, the difference is not so clear cut. Nevertheless, this gradual accumulation of knowledge and selection of information

making bilinguals successful language learners does require certain cognitive and strategic skills :

> "We have noted that students experienced at language learning and effective language learners brought strategies to the task which they deployed in a problem solving fashion. In order to do so they must have recognized recurring patterns in the language tasks that were not evident to less experienced or less effective learners" (O'Malley and Chamot, 1990, p. 149) .

This raises the question of whether these learners always consciously use strategies for learning.

2.6.5 Strategies, conscious processes and attention

A distinction is made between conscious strategies and unconscious processes:

> "Language strategies are either within the focal attention of the learner or within their peripheral attention in that they can identify them if asked about what they have just done or thought. If a learner's behaviour is totally unconscious so that the given learner is not able to identify any strategies associated with it, then the behaviour would simply be referred to as a process not a strategy" (Cohen, 1998, p. 11).

The question of consciousness is a difficult one which could, to a certain extent, be connected to the debate on learning versus acquisition of a language. Therefore, if it could be argued that acquisition of a language is not a totally unconscious process, then certain strategies must come into play for the successful acquisition of such a language. It could also be that the learning itself leads to the development of strategies.

> "That we have not been taught vocabulary does not entail that we have not taught ourselves. An explicit vocabulary learning hypothesis would hold that there is some benefit to vocabulary acquisition from the learner noticing novel vocabulary, selectively attending to it, and using a variety of strategies to try to infer its meaning from the context" (Ellis, 1994, p. 212)

The notions of *awareness* and *noticing* in L2 acquisition have been debated extensively (Schmidt, 1990). Schmidt looks at his own study of learning Portuguese and argues that the process of learning is linked to attention and, more specifically, with regard to the input, to noticing. It could then be that the gap between experience and the learner's linguistic knowledge could be filled by the frequency of input, and the use and development of strategies.

The slowness involved in acquiring a language testifies to the complexity of the skill to be mastered. The gradual control operated by bilinguals over code-switching

(using a word or expression from the other language in a sentence) is an indication of the successful application of metacognitive strategies (planning, organisation monitoring of performance) in order to reach competence in both languages. O'Malley (O'Malley and Chamot, 1990), inferred that the most successful learners seem to use metacognitive strategies. However, this and other studies are based on ESL students and there may be some differences between their use of strategies and that of young L2 and CB learners.

2.6.6. Group differences in the use of learning strategies

It appears that successful young language learners have not been the subject of comparative research linking them to young bilinguals although it would seem that there are certain similarities between the two groups. Both the linguistically gifted and bilinguals classify and retrieve the language successfully. In (Macaro, 2001) the cognitive processes involved in language acquisition are associated with strategy research. He states that

> "the study of strategies is linked with the theory of cognition. Cognition is the way the brain holds information for short period of time, stores information, selects and retrieves information and processes information."(Macaro, 2001, p. 21).

Therefore, in the present study, some questions in the questionnaire are designed to provide insights into language-use strategies, in particular retrieval strategies and strategies for using the language. In some cases these strategies are the same as, for example, the use of keyword mnemonics which can help in both the learning and the retrieval of a word or a list of words. Thus, strategies for the acquisition of lexis might include grouping words together by theme, linking a word and an image, using flashcards, mnemonics, repeating, copying etc. The method employed to investigate the use of strategies in this study is a questionnaire as "questionnaires are the most efficient and comprehensive ways to assess frequency of language learning strategy use" (Oxford, 1996, p. 25). The aim, methods and characteristics of the questionnaire, as well as the reasoning for and concerns about the use of this particular method of data collection and analysis, will be examined in more detail in Chapters 3 and 4. The reasons for using a questionnaire are not necessarily for ease and speed of administration but mostly relate to the age of the participants and the non-threatening nature of this data collecting instrument. It is hoped that the pupils will have discovered a good deal about themselves

and the way in which they learn and the extent of influences between their own language and L2. The questionnaire also probes the way in which they perceive themselves as L2 learners and their perception of their parents' beliefs about language acquisition.

2.7 The influences of learners' attitudes and their perceptions of parental attitudes towards language acquisition.

When considering the learner as a social being, it is essential to consider the context in which the learning takes place, the possible positive and negative influences caused by the social interaction in such a context, and the structure and support such a context can offer. Positive role models for children are important in their motivation and development. Sheer volume precludes the present study from investigating all the variables implicated in learners' attitudes, beliefs and perceptions but, within the social context in which the child learns a language, parental influence is an area which has been acknowledged in research into L1acquisition (Wells, 1987), but which is not as extensively researched in the study of L2 acquisition. Historically and culturally, the idea of role models in children's development has been established. Social learning theorists take the position that much of the learning which occurs during development is acquired through observation and imitation (Bandura, 1969). To what extent do parents' perceived attitudes towards languages influence the children's acquisition of a language? The influence of parents' beliefs and the importance that parents place on the acquisition of languages is evident when looking at simultaneous bilinguals, where at least one parent speaks a foreign language. The decision to bring up a child as a bilingual in a monolingual society involves a commitment to this task and, "where parents have the ability to speak both languages to their children, there may be a latent understanding or occasionally a conscious strategy about which language to use with the child from birth upwards" (Baker, 2006:101). The desire to transmit a linguistic and cultural heritage to the child is often enhanced by the belief that languages are and will be useful skills for the child to acquire and use in the future. Other reasons include the parents 'commitment to the heritage language in order to maintain family links with their forebearers. In addition, the desire to pass on their cultural heritage may stem from a variety of more complex individual, cultural and economic factors. These motivational factors are not the subject of this research which specifically looks at the relevance of the perceived

attitudes of the parents towards language learning to the child's acquisition of French. The impact of parental beliefs may also be relevant to a number of young gifted linguists in boosting their motivation to succeed in the language. Both groups appear to have incentives to learn or continue to develop a second language. Bilingual children need their second language to understand what is happening in their family or in the country in which their family lives. Gifted linguists generally appear to be keen to learn but "sustained deep learning is never inevitable and therefore is highly dependent on affect, emotion, and motivation" (Schumann, 1997, p. 35). O'Malley and Chamot (1990) have also added social and affective strategies to their list of successful learners' strategies: "Social strategies and affective strategies involve either interaction with another person or the control of one's feelings with regard to language learning." Attitude towards second language learning and its association with achievement has previously been investigated in Canada and the conclusions of the study included the statement that "there is an association between the active and passive role of the parents, and that these roles are related to French achievement" (Gardner, 1968, p. 145). However, due to its bilingual status, Canada is, to a certain extent, a special case but nevertheless it indicates that parental beliefs are likely to be strong motivational factors for young bilinguals and gifted learners. Thus, this theory needs to be substantiated by quantitative research. The questionnaire devised for this study includes questions which probe learners' beliefs and attitudes to learning French and their perception of their parents' attitudes.

2.8. Conclusion

This chapter has mentioned and, in some cases, reviewed the work of precursors in the study of language acquisition, namely: Nation, Macaro, Naiman, Rubin, O'Malley and Chamot, Oxford , and Baker, who researched relevant fields such as vocabulary acquisition, differences among learners and how some of them were identified, bilingualism and cognitive abilities, strategies for learning and working memory. Their theories informed and framed the present study. This chapter has shown how, in the literature, aptitude has been linked to the use of strategies. It has highlighted certain characteristics of good language learners through a review of Naiman et al's research. It has questioned whether certain types of categorisation and storage of lexis, facilitated by the use of learning strategies, could encourage the development of a better performing

lexical network. The main model of WM was reviewed and the links made in previous studies between WM and language learning were highlighted. Finally, the influence of parental attitudes towards both L1 and L2 lexical acquisition was examined through references to previous literature. This review has helped in the construction of a framework for researching the differences and similarities between the two successful groups of learners. This study, suggests that both YGLs and young CBs could be considered as successful vocabulary learners. Although, choice bilinguals' knowledge of French has been mostly developed implicitly, nevertheless, at the age at which they joined the research (10/13years old) due consideration must be given to the fact that they are continuing to acquire and enhance their French vocabulary. In addition, because this acquisition occurs in a country where their home language is not spoken, explicit support is required to ensure the development of that language. Their language and literacy skills are also sufficient at that age, and, given their level of educational development, to enable them to vocalise their own strategies for learning vocabulary. Understanding the differences and similarities between these two groups could be the first step in devising more effective learning support techniques for both groups and for all young L2 learners.

CHAPTER 3 BACKGROUND TO THIS STUDY

3.1. Introduction : The acquisition of a word

In order to place this comparative study involving young gifted linguists and choice bilinguals in context, it will be necessary to research not only how the lexicon is defined in the relevant literature but also what its different elements are.

> "The crucial point about the lexicon, as it is typically understood by linguists, is that it constitutes that component of a language which has to do with what one might call 'local' phenomena, the meaning of particular elements of a given language, the phonological and orthographic forms of these elements, and the specific ways in which they collocate and colligate" (Singleton, 1999, p. 15).

With regard to young learners, the lexicon as described is not generated overnight but rather develops gradually and progressively through time, according to Kuczaj, a child needs to reach certain 'knowledge sets' in order to acquire a word. She or he needs to identify a word as a unit or morpheme, understand the word's meaning and store the word and its meaning in the mental lexicon (Kuczaj, 1997). A two year old child uses between fifty and six hundred words (Bates et al., 1982) and adds an average of ten words per day to his or her vocabulary. These figures show that there are already vast individual differences in the speed of acquisition, access to and content of the monolingual lexicon at two years of age. Lexical development has been extensively studied in the context of L1. In comparison, and despite the number of publications on the subject in the last fifty years, L2 lexical development studies are still a relatively recent phenomenon. Learning a word for L2 learners necessitates learning the pronunciation, that is being able to distinguish sounds that do not necessarily exist in their first language; it also involves learning the meaning of the word, thus associating it both to an object and to the same word in their other language. The learner must also have a knowledge of lexical categories (noun, verb, article) and be able to identify the one to which the new word belongs. Ultimately, the learner will need to be able to link the word to a network, and therefore needs to know collocation (for example blue sky, heavy rain etc.,), derivation (such as park, parks, parking), synonyms, antonyms and homonyms. It is also important to have the knowledge of social norms, that is knowing when to use the word. The learner must be able to adapt his or her decoding skills on the basis of the letter sound correspondence rules in order to read the word successfully in

the second language. Learning a word also involves the use of strategies to commit this word to memory. Referring to naturalistic L2 acquisition, Singleton emphasizes the fact that it takes place in a similar way to the acquisition of L1:

> "the challenge is to isolate lexical units in the speech stream and to make connections between such units and the meaning they are intended to communicate" (Singleton, 1999, p. 48).

However, for L2 learners and also, to a certain extent, CBs, this progressive acquisition of lexis takes place in a context where the learner has already made connections between lexical forms and the meaning of words. In the case of choice bilinguals, when considering the later development of their lexicons and also the fact that their French language development takes place in a social environment where the lack of support from a French community has to be counterbalanced by more explicit language support, their language acquisition experience has more in common with that of L2 learners than with a French L1 learner. This forming of links for these two groups can lead to considerable developmental leaps, especially when this development takes place within the context of existing literacy skills. Although this study is not strictly speaking focusing on retrieval, and is mostly concerned with the structure of the lexicon and the encoding of vocabulary, researching the vocabulary network may also involve looking at concepts and, in this instance, how they interlink. How is the lexicon organised and managed?
The subject of lexical acquisition has given rise to several models of lexical processing being proposed and a debate about the bilingual's lexicon or lexicons.

3.2 The different language processing models.

The lexicon is central to language processing, that is to say how learners interpret the meaning of a sentence and produce speech. The different levels of language structures and processing have been studied and represented in different models. The most influential was designed by Levelt (Levelt, 1989).

3.2.1 Levelt's Speaking Blueprint (Levelt, 1989)

The review of this model is important for this study as it has been adapted by De Bot to model the multilingual mental lexicon (De Bot, 1992) as explained in section 3.2.2 of this chapter. In addition, " Level's model augmented with other concepts from

cognitive psychology, particularly working memory theory, can serve as a basis for understanding second language processes"(Payne and Whitney, 2002, p. 9) . Language processing ability is closely related to learning as there cannot be an output or a production without an input. Therefore the retention and ease of activation of new vocabulary is linked to the processes of comprehension and production. This is the reason why understanding this model is important for this study which concentrates on group differences in lexical acquisition.

Levelt's Speaking Blueprint (Levelt, 1993) details the series of stages leading to the production of speech for monolingual speakers. However, it does not claim to give a description of the learning process rather it sets out to explain the stages of language comprehension and production in adults. It must also be noted that it is concerned only with speech.

This model describes three stages: the Conceptualiser, the Formulator and the Articulator. The Conceptualiser represents the location where ideas and intentions originate. These ideas and intentions consist of pre-verbal messages which are then sent to the Formulator. This is where the message is broken down into words following the selection of a set of lexical items which Levelt refers to as Lemmas. Lemmas are 'words to represent a concept' but, in addition to the concept, they also possess semantic qualities such as word type (noun, verb, adjective etc), how they can be combined with other words, which is investigated in the first experiment of the thesis, and the type of register from which these words originate (slang, formal etc). Lemmas are part of grammatical encoding whereas lexemes are phonological items which once linked with the Articulator will produce speech. Speech comprehension follows exactly the same pattern in reverse. It must be noted that, once the message has left the Conceptualiser, it cannot return. This is a continuous one way system and most parts work simultaneously as much of the system is automatic. Although, in this model, the links between the various stages of processing are not very precisely portrayed, the main questions for the present study are: How has this model been adapted to bilingual or multilingual speakers in the past or how does it relate to the study of the lexicon?

This model situates the lexicon at the centre of language processing. However, as indicated earlier, it is merely trying to throw some light on speech processing and not onto the way in which the language has been stored or learnt. Nevertheless, it does stress the importance of the semantic properties of the lemmas during the process of selection

by the Formulator. The model also tends to favour the notion of an implicit acquisition of language although it includes a knowledge component. However, "Levelt's description of this part of the model is not very extensive and it is not really clear what it actually does or does not contain"(De Bot, 1992, p. 2). Although Levelt's model relates to monolinguals, De Bot has attempted to adapt it to the multilingual mental lexicon (De Bot, 1992).

3.2.2 The adaptation of Levelt's model to multilingual mental lexicons

De Bot sees the Conceptualiser as being language independent and the Formulator as language dependent; that is to say that there should be a separate lexicon for each language. This suggestion of two parallel production systems has been favoured by a number of researchers studying the phenomenon of code-switch (the interference of one language when using the other, for example "I have eaten un bonbon"), and this will be further developed in the next section.

With regard to the knowledge component, De Bot assumes that it is not language specific, meaning that world knowledge or language conventions are part of a general knowledge bank being used by different languages. The processing components of the Formulators form two separate systems and "lexical items are selected from one common lexicon in which items are connected in networks which enable subsets of items to be activated. One such subset can be the items from a specific language" (De Bot, 1992, p. 14). This particular point on the organisation of the bilingual lexicon is not developed fully in the article. In his model, De Bot views the Articulator as a single entity for bilinguals and bases part of his argument on the fact that

> "Successive bilinguals in particular, that is to say people who were not brought up bilingually, appear to have many intonational characteristics from their L1 in their L2…Extensive evidence of cross-linguistic influences at the pronunciation and phonological level suggests that L1-models continue to play a role even when the speaker has excellent command of the L2. This evidence makes the existence of two separate systems very improbable" (De Bot, 1992, p. 19).

De Bot's model is, according to him, a first attempt at adapting a successful language processing model to bilingual learners. However, in terms of language processing it must be noted that much research has been carried out and other models have also been developed. Another language processing model has been elaborated in response to the speed with which words are recognized, namely the Logogen Model.

This model was originally developed by Morton and is based on listening comprehension (Morton, 1969). It shows that a person has at their disposal several recognition units which enable him or her to recognize a specific word. These units are called 'logogens'. They give information about the incoming word such as sound, syntactic and semantic characteristics and word type. All the logogens have a scale of activation and, when a high level of activation is reached, the logogen 'fires' resulting in the word being recognized, identified, and all the different known information about this word becoming available. Morton also points out that high frequency words are more easily accessed and that semantic priming also helps access to the word, for example if the word *butter* has been mentioned earlier, this contextual feature will increase the probability of the word *bread* being recognised. This finding seems to have been problematic. The Logogen portrays the result of both context and frequency effects in a similar way. They are shown as additional factors facilitating the recognition of a word. However, the influence of frequency on the recognition of a word is linked to a decrease in activation, that is, the word is recognised more quickly and the length of activation is reduced. Context, on the other hand, increases cumulative information and, therefore, potentially increases other semantic links as activation from one logogen spreads indirectly to those of related words hence *butter, bread, toast* etc. This criticism of the model is highly relevant as it helps to link word processing with semantic organisation and therefore to this` study on a vocabulary network. It makes a connection between the learning process and the memory based on the notion of priming. That is to say that one word may lead to the production of another word. This returns us to the question of how the words are organized in the lexicon. The representation of the lexicon by Aitchison as a 'giant multidimensional cobweb' (Aitchison, 1987) has paved the way for the idea of a vocabulary network loosely based on word associations . The notion of priming has been used to construct word association tests by giving 'stimuli' words and asking the learner to either choose or produce words that they link to the stimuli words. It is conceivable that this network type of organisation of the lexicon could assist with the retrieval of lexical items. These connectionist theories were examined by Singleton.

> "connectionism is the concept of spreading/interactive activation, the idea that in language processing a multiplicity of nodes are excited by the arousal of a node to which they are connected" (Singleton, 1999, p. 125).

This theoretical framework which is in part the basis of this study of the vocabulary network is in accord with De Bot's adaptation of Levelt's model.

So how is a lexical item retrieved? Levelt explains that two elements need to be present for the retrieval of a lexical item:

> "A lexical item is retrieved:
> a) if and only if its core conditions are fulfilled by the concept to be exposed
> b) of all the items whose core conditions are satisfied by the concept, the most specific one is retrieved" (Levelt, 1989, p. 213).

So the right word is retrieved based on conceptual information. De Bot has recently elaborated more fully on his idea of subsets mentioned earlier. He makes a distinction to cover the bilingual model; at the conceptual level he distinguishes between macro-planning and micro-planning. Macroplanning is the concept i.e. spatial reference. This concept would not be language specific whereas the microplanning ,that is the selection of the words to express the concept (the example given is *here* and *there* in English or *ici* et *là* in French or *aquí*, *ahí*, *allí* in Spanish) would be language specific (De Bot, 2007, p. 390).

However, in addition to needing an empirical basis for the evaluation of this model, De Bot's model of bilingual processing which is adapted from Levelt's unilanguage model has to meet additional requirements and, in particular, account for cross-linguistic influences.

3.3 Influences and interferences between L1 and L2

With both CBs and L2 learners, as (Herdina and Jessner, 2002) have discussed, the two languages interact. An L1 can influence an L2 and an L2 can interfere with an L1. This is particularly relevant to this study as L1 and L2 interferences must be taken into account when constructing a word association, or word network test, and a working memory test. The question which is raised by this finding is whether the L1 and L2 lexicons are using a common memory store or whether the two languages are stored separately and, if so, what the interaction between the two areas is.

Arguments in favour of a separation between the L1 and the L2 lexicon come mostly from studies on aphasia. Code switching is regarded as an argument against separation and has been later imputed to the fact that both languages are in use or activated at the time of production (De Bot and Schreuder, 1993), (Green, 1998), (Paradis, 1981) . Green, studying the phenomenon of code switching and aphasia, suggested that the situation was caused by three stages of linguistic activation: either selected, active or

dormant. However, the lines between the three stages are sometimes blurred creating some interference. Paradis introduces an additional factor, that of linguistic distance between the two languages. Hence for example, the difference between French and English is smaller than that between English and Russian. Therefore a bilingual with two related languages will be more likely to use the same lexical knowledge. Another factor could be the level of proficiency. Although, it could be argued that this point is more likely to affect the speed of language delivery rather than the internal organization. The case of attrition or loss of L1 when moving to a different country or caused by brain damage (aphasia) is also cited in favour of the separation of the two lexicons (Singleton, 1999, p. 170). De Bot (2005) looked at L2 acquisition and multilingualism through the Dynamic System Theory (De Bot, 2005, p. 42). He suggests that the various components of language acquisition are never static and that they interact with one another. This theory, when extended to bilingual or multilingual learners, would explain, to a certain extent, the connection between languages and the phenomena of code-switching. As seen above, De Bot develops the topic of multilingual language processing and more precisely the idea of one big lexicon for different languages by looking at Levelt's Speaking Blue Print and adding the notion of a language nod which would activate various language subsets. De Bot's connectionist approach needs to be balanced with general, individual and social characteristics of learners. The notion of how the lexicon is acquired must also have a bearing on the processing. Referring to bilingualism Paradis noted that:

> "The native language (i.e., the grammar, what can be described by linguists in terms of rules: phonology, morphology, syntax and the lexicon) is acquired incidentally (i.e., by paying attention to something other than what is being internalized as linguistic competence), is stored implicitly (i.e., remains opaque to introspection), and is used automatically(i.e., comprehension and production are not consciously controlled)." (Paradis, 2007, p. 4).

This may be so for very young infant native speakers but, lexical acquisition is very much an on-going process and, as for monolinguals, the accession to literacy will lead to explicit as well as implicit learning. The expectation is that it is this that results in differences between the learning processes of the two groups to be studied, and it is the understanding of these differences which will facilitate the development of teaching and learning strategies.

Singleton, (1999:46) referring to L1 vocabulary development at the time of the acquisition of literacy skills stated that:

> "The acquisition of literacy skills in an alphabetic system induces an ability to manipulate the individual phonemes out of which words are composed …accession to literacy brings with it an increased range of opportunities for learning word meanings-both via ostensive or quasi-ostensive routes and by use of context." .(Singleton, 1999, p. 12).

This view is of relevance to the age group in this study as, for gifted linguists, the acquisition of an L2 takes place in the context of an already developed L1 lexicon. If we assume that the average size of an adult lexicon is 30 000 words, even allowing for cognates, the size of a bilingual lexicon "would easily contain 60 000 elements" (De Bot, 2007; Singleton, 1999). Therefore the lexicon must be very efficiently organised and the connections made when processing words well established.

This study, while having due regard for the previous theories mentioned above, will concentrate firstly on the organisation and processing of the mental lexicon which in turn directly affects the storage of and access to vocabulary.

3.4 Assessing vocabulary acquisition: word associations; storage; access and processing.

Vocabulary acquisition, knowledge and the way in which words are organized in the lexicon and interact with one another are complex and multi-facetted subjects. When testing vocabulary knowledge, it is important to define what knowing a word entails. Furthermore, the consideration to be given to the division between receptive and productive vocabulary will further refine the definition to be chosen.

Three aspects of a word are identified as essential for the purpose of defining what knowing a word means: form, meaning and use (Nation, 2001, p. 27). However, words are not the only considerations to be taken into account when investigating vocabulary knowledge and, in particular, vocabulary acquisition, how the words are learned and assembled together are key aspects of vocabulary storage, access and processing. Therefore, the idea of a lexical space representing vocabulary knowledge as three dimensional has been proposed (Daller, Milton and Treffers-Daller, 2007, p. 8).

3.4.1 The lexical space representing vocabulary knowledge

The review of Daller et.al's theory is useful for situating the first part of this thesis (the investigation on the Vocabulary Network) in the overall context of vocabulary acquisition and knowledge. This theory of a lexical space includes firstly lexical breadth, which is the number of words that the learner possesses in his or her lexicon. This includes forms and meanings. Secondly lexical depth or how thoroughly a word is known and this includes "concepts and referents, associations, grammatical functions, collocations and constraints of use" (Nation, 2001, p. 27). This second dimension seems closer to the idea of a network of words and the way in which these words relate and interact with one another. Thirdly, fluency, that is to say how competently a learner can use the words that they have learned. This notion would also need to include speed and accuracy. The author (Daller) recognizes that trying to define such a complex field of knowledge leads to over simplification, and that the three dimensions are not completely representative of vocabulary knowledge. Although these divisions are helpful to conceptualize a relevant test, this three dimensional model has not been empirically tested. Therefore, prior to elaborating or deciding on a specific methodology linked to the first research question, a number of existing tests and attempts at quantifying the depth of vocabulary knowledge have been reviewed. However, as mentioned earlier, this is a multi-facetted topic and "finding a single measure that suits all purposes is somewhat similar to the search for the Holy Grail" (Tidball and Treffers-Dallers, 2007, p. 134).

3.4.2 Tests and attempts at quantifying vocabulary knowledge

An important aspect of the study involves vocabulary testing which was much influenced by Paul Meara's research. Paul Meara is one of the most substantial contributor in the field of vocabulary knowledge who concentrates on the differences in the breadth and depth of vocabulary between L1 and L2 learners. Among his most recent vocabulary tests are the V-tests and more specifically the V-Quint test. The V-Quint test is a variant of the V-link test (Meara and Wolter, 2004). It consists of 5 stimulus words in each frame. The V-Quint is based on ideas developed in Meara & Wolter (2004) in which they make an argument against the distinction between vocabulary depth and breadth of vocabulary preferring the distinction between vocabulary size and organization. The test tries to estimate the extent to which the words in a speaker's basic vocabulary are organized. Meara does not elaborate on what he

means precisely by 'organized' but, in a subsequent article, he states that, by looking at the data generated by their participants, they are able to estimate "the density of interword connections in the mental lexicons of our test takers"(Meara, 2007, p. 3). They achieve that objective by estimating the probability of finding a pair of associated words within a randomly selected set of five words. The assumption is that native speakers of a language are more likely to find a pair than non-native speakers. The test is based on a list of 750 words. The participants are not asked to justify their choices. Furthermore, it is assumed that the associated pairs identified by the test takers are genuine. A plan to build in a check for estimating associated pairs for a future version of V-Quint is being formulated at the present time. The author is careful to point out that the test is part of exploratory and experimental work. In Meara's study, the comparison of the experimental data with data generated by an association simulator gives an idea of the density of interword connections within the participants' mental lexicon. It is also stated that the average number of associations in the test that any one word has is three (Meara, 2007, p. 8). On the basis of this finding, in the Vocabulary Network Test designed for the present study, the participants were asked to identify three associations. However, in Wilks and Meara's study (Wilks, Meara and Wolter, 2005), the method of estimating the probability of finding a pair of associated words has been criticised and "Wilks, Meara, and Wolter concluded, somewhat pessimistically, that it might be extremely difficult to move from raw data like the data reported in Wilks and Meara's original experiments, to more theoretical claims about the way in which L2 lexicons grow in complexity" (Meara, 2007, p. 4). This study differs from the above as it does not try to quantify the number of connections but to compare the making of different types of connections by specific groups of learners. It was therefore necessary to consider research on word connections.

3.4.3 Tests and attempts at qualifying word connections

In a comprehensive study of L1 and L2 mental lexicons (Wolter, 2001) , an attempt is made to answer the question as to whether the L2 mental lexicon of a non-native speaker is organized similarly to the L1 mental lexicon of a native speaker. In this study the depth of knowledge is also considered an important element in determining the structure of the mental lexicon. The study is set in the context of previous psycholinguistic research such as (Brown and Berko, 1960) and (Erwin, 1961) in which it was reported that higher numbers of paradigmatic responses (responses involving

words from the same word class as the prompt word) occur in older as opposed to younger children. Clang responses (which are responses that give phonetically similar words or respond to the sound rather than the concept) were shown to diminish with age. This is attributed to lexical or cognitive development and is known as the syntagmatic-paradigmatic shift. Wolter does not clarify the juxtaposition of cognitive and lexical development and this association has been the subject of considerable discussions among linguists as shown below:

> "For linguistic knowledge to impact on cognitive processes, the mind must present a configuration in which language and cognition freely interact. This assumption, however, is far from consensual, and represents a major divide between alternative conceptions of language and its place in the mind"(Bialystok, 2002, p. 147)

The division between functional linguistic theories which associate language in the mind with other cognitive activities such as memory, cognition and perception, and formal linguistic theories describing language as a specialist feature not fully integrated with other specialized systems is still current. Bialystok, in her studies with bilingual children, concludes that "language development has ramifications for general cognition" (Bialystok, 2002, p. 162). Referring back to the findings mentioned earlier about the reduction in clang responses with age and the syntagmatic-paradigmatic shift, further studies on ESL students and L1 research have reinforced the theory of a similar structural organisation of L1 and L2 lexicons. Wolter, however, puts forward the hypothesis that individual words are acquired and develop separately from other words. Their close connections with other words are dependent on how well that particular word is known or how close to the core vocabulary it is situated. This explanation derives from the depth of individual word knowledge (DIWK) model:

> "A DIWK model views the connections in both the L1 and the L2 mental lexicons as conditioned not by language proficiency or word frequency per se, but by how well particular words are known to a given speaker" (Wolter, 2001, p. 46).

Thus paradigmatic associations would be made between words corresponding to a core of well-known vocabulary, syntagmatic connections would occur between words that are further away from the core vocabulary and phonological associations between words even further remote from the central vocabulary (Wolter, 2001, p. 48). This model offers a different explanation of how words are organized in the mental lexicon. In Wolter's study the participants were 13 Japanese ESL learners and 9 native English speakers.

Most participants were university students or EFL teachers. Wolter used two different data collection instruments:

1. A word association test using the aural-oral method.

Words were presented in a random order. All responses were classified under paradigmatic, syntagmatic, clang-other and no response. Two lists of prompt words were used and the test was administered orally. Scores "were determined according to the results of past research indicating that a paradigmatic response is indicative of a higher degree of lexical or cognitive development than a syntagmatic response, which in turn, is indicative of a higher level of development than a clang or nonsensical response" (Wolter, 2001, p. 51).

2. A Depth of Individual Word Knowledge (DIWK) test to ascertain how well each of the prompt words were known to each participant. DIWK was assessed using the Vocabulary Knowledge Scale (VKS). The VKS scale was first developed in 1996 and used a self-reporting method for assessing how well a word is known to the participant (Wesche and Paribakht, 1996). The assumption was that DIWK scores would correspond with specific word integration into the mental lexicon (for example, well known words would give more paradigmatic associations). The results were inconclusive with regard to the hypothesis of the study. The native speakers gave a greater number of paradigmatic responses than the ESL group but they also had a high level of syntagmatic responses. As for the effect that depth of individual word knowledge has on the response type, there were some differences between the two groups, particularly when the cue word was well-known :

> "it would seem that contrary to what had been expected, the two groups did not produce data to support the notion that the L1 and the L2 mental lexicon are structurally similar in the case of words that were well-known" (Wolter, 2001, p. 57).

These results led the author to question the use of word association tests for measuring language proficiency and to suggest that:

> "the so called syntagmatic-paradigmatic shift is a misnomer, and, instead of describing this phenomenon, researchers have been dealing with a shift from semantically meaningless responses (i.e. clang and unclassifiable responses) to semantically meaningful responses, in the form of an increase in the proportion of paradigmatic and syntagmatic responses" (Wolter, 2001, p. 63).

This finding is particularly relevant for this study where the preliminary analysis of the results tends to corroborate Wolter's findings (see Chapter 5 of this thesis).
Wolter suggests that the results could reflect a difference between depth of word knowledge and vocabulary size. Paradigmatic responses tended to be synonyms. A native speaker has more synonymous knowledge than a L2 learner. He also mentions that the progression in depth of knowledge of individual words can be seen as evolving from the dominance of phonological responses to that of semantic connections. It could be argued that this may be partly dependant on the style of teaching. The test remains a useful example of a word association test and has influenced the design of the present study.

Another word-association test format has been adapted from Read's test by Schoonen & Verhallen in order to test younger first and second language learners' deep word knowledge in Dutch primary schools (Schoonen and Verhallen, 2008). It is based on depth of word knowledge, which is how much you know of a word and the fact that any new word has to be integrated into a network. It takes its inspiration from Read's word association format (Read, 1993) where a prompt word is followed by eight other words, four of them related to the prompt word and four not related. The examinee has to identify the correct four. Clearly, a language learner would be expected to score lower than a native speaker in this test. However, by including different categories of alternatives, a clearer picture of the type of knowledge the learner has is more evident. It must be noted that Read's test was aimed at university students whose knowledge of languages is more developed than that of children. The differences between the design of the Vocabulary Network Test in this thesis and that of Read are outlined in Chapter 4.

The Word Association Test (WAT) developed by Schoonen & Verhallen, as mentioned earlier, was based on Read's test but the interest for the present study was that it was aimed at young learners and his format was more suitable for children. It uses six possibly associated words rather than eight. It asks the children to connect the words in a web, picking three words out of six when only three of the words are directly related to the prompt words. However, it could be argued that the introduction of three so called unrelated words can create controversial choices as children can be very creative and imaginative in their connection of words. Furthermore, "there is no absolute boundary between correct and wrong answers" (Schoonen and Verhallen, 2008). The test has twenty five items, and does not select the prompt word from different word classes. However, as in the present study, the young age of the participants and the fact that the

list of words must be taken from a very limited beginner's vocabulary explains the impracticality of selecting these prompt words from a range of different word classes. In addition to the test, Verhallen added interviews with participants during which they were asked to define twenty five words and this was supposed to provide convergent information with the WAT. The conclusion was that "both tests `show a strong true correlation, but do not seem to measure exactly the same construct". The conclusion of the study shows that Dutch second language learners have a smaller breadth of vocabulary than L1 Dutch children and that the vocabulary that they know is not known as well as that of the L1 children.

The word association test designed for this study is indebted to the above research with regard to its composition (see chapter 4).

3.5 The Research and definitions which directly influenced the design of the Vocabulary Network Test

The notion of depth of vocabulary knowledge and its application to L2 acquisition has been divided by Read into three different lines of development:

- Precision of meaning.
- Comprehensive word knowledge, which includes orthographic, semantic, phonological, morphological, syntactic, collocational and pragmatic characteristics.
- Network knowledge that is the assimilation of a word into a lexical network and the ability to associate it with related words (Read, 2004, p. 212).

Read admits that the three divisions do overlap slightly but they are useful for the purpose of analysis. In the present study, the objective is to compare how differently or similarly the words in bilinguals, gifted and standard L2 learners' mental lexicons are not only organized but also linked together. Could there be group differences in the way in which the words are connected or associated within the mental lexicon?

A previous study of word association, reported a shift in responses occurring when L1 word association tests were used with participants of different ages resulting in a lower proportion of syntagmatic associates and a higher proportion of paradigmatic associates in adults (Brown and Berko, 1960; Erwin, 1961). It could be argued that there appears to be an important semantically based element contributing to the organization of the lexicon but can it be linked solely to age? Could the development of such mapping be

linked to the fact that 'successful learners' (either bilinguals or gifted linguists) organize and process their vocabulary more efficiently? It seems likely that a densely connected vocabulary would produce a different distribution of response patterns compared to a vocabulary with fewer connections. It seems logical to assume that the more proficient a person is, the greater the number of individual lexical items there are in his/her lexicon. However, are the patterns of the connections and, more to the point, the types of connection the same for all learners? Read includes in the definition of depth of vocabulary knowledge "the incorporation of the word into a lexical network in the mental lexicon, together with the ability to link it to, and distinguish it from, related words, which we can call network knowledge" (Read, 2004, p. 212). However it seems that Read's study concentrates more on categorization than on links. It is these links between words and the possible patterns that they might indicate which are the main subjects of this study. The use of a word association test seems to be the best method to investigate such a topic.

> "The principle of word association: to create the word associate format, requires the learners to select responses to a stimulus … a word associate item consists of a target word, together with six or eight other words, some of which are related to the stimulus word and some are not."(Read, 2004, p. 220).

As the purpose of the study is not to quantify the number of possible links to determine breadth of knowledge but to qualify the type of links being made, a wider selection of related words from different categories has been included. If, as suggested by the studies mentioned above, there are semantic differences in the way in which the lexicon is organized, it seems probable that there will be differences between young bilinguals, gifted linguists and L2 learners. The hypothesis is that bilinguals, who have a more densely developed vocabulary, will exhibit similar results to the native adults. Furthermore, YGLs should, although to a lesser extent, provide responses closer to the responses of adults than other L2 learners. Young L2 learners, on the other hand, will be at a disadvantage due to their limited knowledge of vocabulary and, a greater proportion of clang and other responses could be expected from them. In the second part of the test, bilinguals who have greater aural word recognition should score higher on meaningful responses and provide a greater number of paradigmatic and syntagmatic associates than the L2 learners. More specific details as to how the test differs from the previous studies seen above and how it was constructed can be seen in the following chapter on methods and design.

The use of learning strategies to assist with the encoding of lexis has been presented in the previous chapter. The method for investigating this use has mostly been through the administering of a questionnaire. This method has received some general criticisms. As the present research uses a questionnaire to assess the differences in the use of learning strategies between groups of learners, these general criticisms are relevant to this study and are reviewed in the following section.

3.6 Research into and criticisms of learning strategies and their influence on the design of the Vocabulary Learning Strategies Questionnaire

As seen in the previous chapter, a number of studies in this field concentrated on elaborating a taxonomy of strategies for learning a language with a view to categorising what made some learners more successful than others. To date this question remains unanswered.

3.6.1 Criticisms of learning strategies

One of the criticisms of the concept of quantifying strategies was that trying to produce taxonomies of communication strategies did not relate to clear criteria and led to a questioning of the psychological validity of such an enterprise. In his book *The Psychology of the Language Learner*, Dörnyei introduces the controversial nature of learning strategies and raises the question "Do learning strategies exist ?" (Dornyei, 2005, p. 162). Dornyei's argument is that the concept is difficult to define. In particular, he questioned the difference between ordinary learning and strategic learning and the confusing additional concept of motivation "because goal oriented, intentionally evoked, and effortful [learning] are three key features of motivation " (Dornyei, 2005, p. 165). His conclusion implies that learning strategies do exist but are difficult to define. A further criticism of the concept of learning strategies was linked with the inclusion of compensation strategies which could also be categorized as communication strategies and therefore should not be included in learning strategies. However, it could be argued that some compensation strategies, for instance, repeating or paraphrasing, can also help memorizing and learning. There are obvious overlaps but that does not imply that the concept of strategies is "fuzzy". It is clear that learning strategies could assist understanding the mechanisms of learning. Dornyei suggests that the design of the most

used inventory of learning strategies , the Strategy Inventory for Language Learning (SILL) (Oxford, 1990), is problematic because it contains scales relating to the frequency of use of highly specific items of a different nature. He suggests that strategy use is a goal directed activity. As my questionnaire (see Appendix G), which is based on the SILL, primarily investigates the use of strategies within the task of vocabulary learning, it is not at odds with the above view because the learning of vocabulary is a goal directed activity.

A concept which does not seem to have been the subject of research is the difference between implicit and explicit strategy use. Oxford & Cohen suggest that all strategies should be regarded as conscious (Oxford and Cohen, 1992, p. 1). This view seems logical as the term strategy implies a conscious plan of action, but this point is not the main focus of this thesis. However, the fact that the research uses a self-reported instrument, that is a questionnaire, would tend to suggest that the strategies reported to be used by the participants are conscious. The research targets CBs as well as young L2 learners, and very little empirical work has been done on bilinguals' use of strategies.

3.6.2 Learning strategies and bilinguals

One of the exceptions to this lack of empirical research is that of Purdie et al who looked at bilinguals' use of strategies in a social context. They suggested that the level of acculturation and proficiency influences the use of strategies (Purdie and Oliver, 1999). This possibly echoed the concern expressed by Lo Castro (1994) about the classification of learning strategies, as the results acquired through the piloting of large inventories might differ according to variations in teaching methods; thus strategy use may vary according to learning environment or background as well as social context. The design of the present study has tried to minimise these effects, as can be seen in the following chapter.

On the subject of bilingualism, other research, such as Whalton's, studied university students in Singapore, where four official languages already cohabit, and concentrated mostly on variables such as proficiency and genders (Whalton, 2000) . The present research by identifying and investigating a specific group of bilinguals and their use of vocabulary learning strategies compared with other groups of young learners, will contribute to the body of knowledge on successful learners' use of different strategies.

Vocabulary Learning Strategies (VLS) have been the focus of several studies but these were generally directed at students or adults. In a review of Language Learning Strategies, Dornyei attributes the paucity of research into this field to the fact that "the necessary theoretical clarification about the nature of the language learning concept did not happen" (Dornyei, 2005, p. 170). However Oxford defended the use of the SILL (Oxford, 1996) and a more in-depth study of her argument and the reasons for the choice of this method in the present study are set out in the following chapter on design and methodology together with a more detailed description of the questionnaire designed for and used in this study (see also Chapter 6).

Learning strategies are not the only variables associated with successful learning. "Nearly all of what must be learned and remembered must pass through working memory. Hence the capacity and effective functioning of working memory determines the rate and extent of learning"(Dehn, 2008, p. 2). The following section discusses the more recent studies on WM which have influenced and informed the present research.

3.7 The relevance of Baddeley's model and more recent WM studies to the learning of vocabulary.

Baddeley's model, which was presented in the previous chapter, was slightly modified in 2006 and, prior to introducing the change, it is useful to see the relevance of the various components of the model in the process of vocabulary learning.

3.7.1. Relevance of the model to the present study and its WM Test

The two systems which interact with the central executive system are the phonological loop and the visuospatial sketch pad. The phonological loop which retains verbal information for a limited period and processes it, is probably the part of the model which has been most investigated in the context of language acquisition and learning. Several studies have researched verbal span, that is the number of items or chunks, retained in the phonological loop, which can be recalled by a person (Gathercole and Baddeley, 1993, p. 47). Tests have included both digit span (how many numbers can be recalled) and word span. It must be noted that, in these tests, the addition of interference tasks renders the WM process less effective; for example, asking participants to decide whether a set of sentences is grammatical or not while trying to remember the last word

of each of the sentences introduces a distracting element which interferes with the recall of the words. This point emphasizes the importance of attention in learning. Success in language learning has been linked to WM span: "individuals with longer phonological spans are better at vocabulary and language learning than those with shorter spans" (Dehn, 2008, p. 17). Several factors have been cited as influencing memory span : word length (the longer the words are the more difficult they are to process), rehearsal speed (as this will influence processing speed) and prior knowledge.

The visuospatial sketch pad which temporarily stores visual and spatial information is also linked to language learning. It has an important role during reading as it is involved in the temporary encoding of the letters as well as temporarily recording the places where such written items occur, thus enabling the reader to go back. Gathercole et al also found that five year old children use visual memory to remember lists of objects rather than phonological memory but that "the capacity to retain non-verbal as well as verbal form does improve with age". (Gathercole and Baddeley, 1993, p. 37). The coordination of information by these two systems (the phonological loop and the visuospatial sketch pad) is executed by the central executive system which also controls attention. This is relevant to the present study as "tasks that introduce interference or a secondary processing task while requiring the retention of information will necessarily involve the central executive" (Dehn, 2008, p. 22). This is the case for the test designed for the present research where the participants have to retain the last word of a sentence while deciding whether the sentence is logical (see Chapter 4 for details of the test design). The additional element which was added to Baddeley's model of WM is the 'episodic buffer' which makes the link with long term episodic memory (focusing on specific events) and semantic memory (general knowledge: facts, concepts, rules) and searches it in order to construct a new representation based on the new information at its disposal. This additional element was added following research showing that short term memory depended on information and interaction with long-term memory (Logie, 1996, p. 39). This is relevant to the present study as

> "rapid vocabulary acquisition reflects the child's preparedness to store the word's phonological representation with preliminary hypotheses about its referents 'physical and syntactic-semantic properties" (Gathercole and Baddeley, 1993, p. 43).

This could also be extended to L2 acquisition where the learner already has prior knowledge of the word in his or her own L1. This section has shown the relevance of Baddeley's model to several aspects of language processing and, in particular,

vocabulary acquisition, comprehension and reading skills. However how can we explain the differences in vocabulary acquisition in both L1 and L2 learning and establish whether these differences are linked to differences in WM efficiency?

3.7.2 Individual and group differences in working memory

Research studies in WM are numerous and have different aims and perspectives. However, this study concentrates on learning which is defined as 'to gain or acquire knowledge'. Inevitably, this involves the storage and processing of information which, in turn, includes working memory. Performance in WM is subject to considerable variations and "individual differences in the capacity of working memory appear to have important consequences for children's ability to acquire knowledge and new skills" (Alloway, 2006, p. 135).

Individual differences in WM have been associated with scholastic success and with several aspects of language processing such as comprehension and reading as well as with second language aptitude (see Chapter 2). In reading comprehension, the ability to derive the meaning of obscure words from the context has been linked to WM capacity (Daneman and Green, 1986). In contrast to this, poor WM has been associated with learning difficulties in areas such as reading and maths (Bull and Scerif, 2001). However, as Baddeley et al linked WM capacity to the limited time in which sounds can be stored, that is two seconds, speed is of the essence and people with learning difficulties sometimes also display a language impairment which may have the effect of reducing the amount of material that can be stored in the WM and may be partly responsible for their learning difficulties. This lack of speed effect was also linked to differences in WM of people with different languages "Welsh children, for example have smaller digit spans than U.S. children because of the greater length of Welsh digits-average duration of 385 msecs per digit, compared to 321 msecs per digit"(Cook, 1997, p. 285). It must be added that the phonological system possesses a phonological store which is partly supported by the articulatory loop which enables the rehearsal of information and therefore lengthens the life of the information passing through the WM system. Thus, the longer the word the more time it takes to rehearse it in the articulatory loop during the two second span of time in which it can be held in the WM. This might be a possible reason for an L2 working memory deficit as it would take L2 learners longer to rehearse

a foreign word. This point will be further debated in Chapter 7 when the results of the Working Memory Test[5] will be presented.

In summary, there seem to be individual differences in WM affecting various domains such as scholastic success and also some group differences. The present study does not look at individual differences as such but concentrates on group differences. Group differences in WM have mostly been linked to age and, in particular, to ageing (Stoltzfus, Hasher and Zachs, 1996) . It was found that in ageing people

> "the efficiency of the inhibitory process that underlies selective attention is reduced. This decrement in inhibition allows more irrelevant information to enter the working memory, and once entered, it allows the irrelevant information to receive sustained attention. This then sets the stage for subsequent reduced rates of success in accessing required information from memory" (Hasher and Zachs, 1988, p. 219).

This inhibitory process has been positively linked to bilinguals' advantages in working memory.

3.8 Bilinguals' Working Memory

Research studies on memory and bilingualism have tended to concentrate on the organisational component of memory, that is whether bilinguals have one memory store or two (as mentioned in Chapter 1 with regard to vocabulary storage). Other research has indicated that bilinguals are better at tasks requiring controlled attention due to their ability to ignore one language in order to use the other (Bialystok, 1999). However not all researchers agree on this point. A recent study (Namazi and Thordardottir, 2010) reports a series of experiments on five year old children: fifteen French monolinguals, fifteen English monolinguals and fifteen early simultaneous bilingual children. The experiments tested their verbal working memory with a listening task adapted from the Daneman Competing Language Processing Task, their verbal short term memory with a test of non-word repetition and a digit span test, their visual WM with an adapted version of the Pattern Recall Task and their visual controlled attention (CA) with a version of a Stroop Test. They concluded that they had not found a bilingual advantage but that children with better WM scores also had better controlled attention. So, for them, the

[5] The Working Memory Test for this study was specifically designed and adapted from Waters and Caplan(1996) and Walter(2007) as explained in Chapter 4,

advantage effect related to WM and there was not a group effect advantaging the bilinguals (Namazi and Thordardottir, 2010). However, the study involved groups of monolingual and bilingual children who were matched apriori on non-verbal cognition and verbal short-term memory span. As there is an overlap between short-term memory span and WM, and given the way in which the children were selected, it is not altogether surprising that they did not find a group effect on WM or controlled attention. Short-term memory spans such as digit spans have been used in child assessment and are part of the Wechsler Intelligence Scale for Children; thus Namazi and Thordardottir's findings (Namazi and Thordardottir, 2010) further reinforce the link between short-term memory, working memory and academic success.

Another research study (Ransdell, Arecco and Levy, 2001), this time on forty-two adult multi-lingual speakers looked at the effect of WM load on writing quality and fluency. The study looked at long-term WM resources while writing in L1 and L2. The hypothesis was that proficient use of at least two languages is seen as a type of expert performance which helps reduce interference from a secondary task such as digit loads. This , in turn, would result in better access to long-term working memory knowledge which is used by writers to plan what to write, to produce sentences and to revise what they have written. The participants had to write five essays. The first two essays were single tasks, one in L1 and the other in L2. The second two essays were disrupted by a secondary task of L1 irrelevant speech. The final essay was in L1 with a secondary task of six digit loads. The fluency of writing was controlled by recording the number of words written per minute and the number of pauses taken. Multilingual participants fared slightly better than bilinguals but on the whole the conclusion was that "dual task interference effect were very limited in an 'expert population'"(Ransdell, Arecco and Levy, 2001). Although this result seems to confirm the multilingual and bilingual advantage of suppressing interference which has been associated with a long-term WM benefit, their experiment did not involve actual WM scores. It also related to adults who may have developed strategies for blocking interference. Finally, a research study involving forty-five seven year old children including twenty two bilinguals found that the bilinguals outperformed their monolingual peers on tasks which taxed WM (Feng, Bialystok and Diamond, 2009). However, it was based on twenty-two bilinguals with different L2 languages and backgrounds, and did not give a total WM score for them.

In summary, the majority of research studies on bilingualism and working memory have shown a relationship between bilingualism and controlled attention which relates to executive control (Bialysyok and Viswanathan, 2009). In turn, the executive function which is a "general purpose control mechanism that modulates the operations of various cognitive sub-processes, and therefore regulates the dynamic of human cognition" (Miyake et al., 2000) is composed of three abilities: 'inhibitory control, that is 'resisting distractions', 'working memory' and 'cognitive flexibility' which is the ability to adapt to changes. According to Miyake, these three components support one another . this advantage in controlled attention has been linked to cognitive development and academic success. Controlled attention has also been linked in adults to expertise in the subject of language (see above). It is therefore reasonable to hypothesise that if such an advantage exists, gifted or potentially gifted linguists as well as bilinguals could possibly, and probably to a lesser extent, also display this working memory advantage. This study, by introducing this additional element, will contribute to the body of research linking WM to cognitive development and bilingualism.

However, when looking at groups of learners, in order to present as coherent a picture as possible, it is necessary to take into account such variables as social class and learning circumstances. This point is particularly relevant for bilingual children who may have become bilingual as a result of immigration due to socio-economic or political circumstances or by deliberate parental choice. Bialystok recognised the difficulty of drawing conclusions from studies which do not consider these variables and present bilingualism as a unifying concept:

> "The problem is that the factors that define the social circumstances for bilingual children frequently impact on cognitive and linguistic development. For example, children's acquisition of literacy is strongly influenced by social conditions and educational expectations in the home" (Bialystok, 2001a, p. 221) .

Although social class does not preclude individuals from benefitting from being bilinguals, it is a fact that social context can change the learning environment and this, in turn, could affect the learning. The importance of socio-economic factors as well as the perceived parental support for language learning and the necessity to have as homogenous a group as possible are among the considerations developed in the methodology chapter.

3.9. Conclusion

This chapter has reviewed and discussed more recent studies and findings on language acquisition and language processing. It has presented arguments linking the acquisition of new vocabulary to complex tasks such as language processing, storage and retrieval. It has shown how Levelt's model of language processing has been adapted to cover bilinguals and how organisation and processing affect the storage of and access to new words. It has presented a rationale for the use of a word association type investigation and the next chapter will describe how and why the design of the Vocabulary Network Test differs from these previous tests. Chapter 3 further examined the critical debate on the use of learning strategy questionnaires and reviewed studies linking individual learning differences to working memory. It has outlined the more recent studies on bilingualism and WM. It has raised the question of whether processing tasks could be more efficiently accomplished by groups of learners who make greater use of vocabulary learning strategies, whose vocabulary network is better or differently organised and / or who have a higher WM score. These aspects are the ones which are at the core of the investigations described in the next chapter on design and methodology.

CHAPTER 4: RESEARCH METHODS AND DESIGN

4.1Methodological approach

4.1.1 Introduction

In choosing the design and methods for this thesis, prime consideration was given to the research questions and how best to address them, to the participants and also, to practical environmental constraints such as resources and the participants' time and availability.

The research, which uses quantitative methods, employs three investigative instruments. First, a Vocabulary Network Test (VNT) involving eighty-one young participants (although 115 originally took the MLAT-E Test) and thirty French native adults; thus at the outset, with the inclusion of 21 Choice Bilinguals, 166 participants contributed to the data collection phase of the study. The adults were recruited to provide a bench mark or a point of contrast with the young learners as, in view of their longer use of the language and deeper knowledge of vocabulary, they would represent an 'expert' group. Further details on the participants and the role of each group are given in section 4.3. The present research was informed by a small pilot study in order to highlight possible problems resulting from the choice of vocabulary or from technical malfunctions, (sees section 4.2.4). The research questions refer to the differences between various groups of learners which might influence their successful acquisition of lexis. As previously mentioned, this thesis investigates and analyses lexical storage and access in YGLs and CBs (aged 10-13), and compares these two groups with young L2 learners and also, in the case of this Vocabulary Network Test with French native adults. The second instrument, which is a questionnaire on the use of vocabulary learning strategies, investigates what strategies for learning vocabulary are employed by the groups of young learners and determines if and how parents' perceived attitudes toward language learning influence the use of strategies by the different groups. The same participants, with the exception of the adults, responded to this questionnaire. Finally, the Working Memory Test targets identifying the similarities and differences in WM between the groups.

In order to define the YGL group, the revised elementary version of the Modern Language Aptitude Test (MLAT-E) was used (Carroll and Sapon, 1959).

To investigate the points mentioned above, the study has to identify patterns within the storage of and access to lexis among the different groups of participants. The

methodology employed by other studies traditionally used fixed designs (see section 4.2). As Robson points out, "Fixed designs are usually concerned with aggregates, with group properties and with general tendencies" (Robson, 2005, p. 98). These studies of patterns, therefore, require the quantification of observations.

4.1.2 From research questions to methods

Three factors influenced the researcher's choice of methodology: the nature of the research problem, the fact that it is set within the Applied Linguistics field and, finally, ethical issues. The research problem which relates to the differences in the acquisition of new vocabulary between groups of learners involves investigating the strategies used to encode the words in the lexicon, the way in which these words are networked and whether differences in WM might be associated with more successful learners. According to Davies and Elder "Applied Linguistics is a coherent activity which theorizes through speculative and empirical investigations real world problems in which language is a central issue".(Davies and Elder, 2004, p. 11). Here the real world problem is the learning and acquisition of L2 lexis. Both the words 'speculative' and 'empirical' relate to this present research. Finally ethical issues linked with the participation of young learners are covered in section 4.6 of this chapter. Table 4.1 on the next page illustrates the relationship between the research questions and the methodological approaches taken.

Table 4.1 : Research questions and choice of methods.

Identification of groups and research questions.	**Methods or tests chosen.**
Identification of gifted or potentially gifted young linguists.	MLAT-E Test.
Identification of choice bilinguals.	Identified by teachers and vetted by the researcher.
What are the characteristics and differences in the storage of and access to L2 lexis displayed by gifted linguists and bilinguals as compared with L2 learners? (looking more specifically at word links and categorisation).	Vocabulary Network Test. This test is adapted from both Read and Schooner's tests (see Chapter 3) and also influenced by Meara's Lex 30 Test (see section 4.2.1).
How much is working memory implicated in the acquisition of the L2 lexis and how similar is it in CB and YGL groups?	Working Memory Test This test is adapted from C. Walter's WM Test
What strategies for learning vocabulary are employed by each of the groups?	Questionnaire (bespoke but adapted from the SILL)
To what extent are group differences related to beliefs about foreign language learning and perceived parental attitudes and how much do these attitudes and perceptions influence[6] the choice of strategies employed by the groups in the encoding of lexis in the mental lexicon?	Questions 54-60 in questionnaire.

As can be seen in Table 4.1, the identification of the YGL group was carried out using the MLAT-E Test (see section 4.4 for details of this test). The main research questions have been matched to two bespoke tests and a questionnaire. The following section describes the rationale for their design and how these tests and the questionnaire differ from those used in previous research.

4.2 Rationale for the choice of method and experiments

The study was informed by the literature on methods, experiments and tests. Dornyei defines an experimental design as "an intervention study which contains at least two groups: the 'treatment' or 'experimental' group, which receives the treatment or

[6] The impact of parental beliefs on a child's second language acquisition will be measured, via questions 54-60 of the last part of the questionnaire, by examining the correlation between the incidence of positive parental attitudes and that of above average linguistic potential as recorded in the MLAT-E test.

which is exposed to some special conditions, and the 'control group', whose role is to provide a baseline for comparison" (Dornyei, 2007, p. 116). This sort of experiment would apply if we were comparing two groups one of which had extra tuition in strategy use for instance. For the Vocabulary Network Test it was not possible to use this sort of experimental design because it was important for the thesis that all the groups should be treated equally. The method chosen in this study is a test rather than an experiment but it uses a quasi-experimental method of sampling as is explained in section 4.3. Testing has been widely used to investigate proficiency in a language or in the case of the MLAT to test aptitude for languages. Word association tests set in language learning contexts have been primarily employed for the construction of lexical tools such as thesauri, or to investigate the nature of inter-word relationships as, for example Bread – Food (hypernyms) or bread-roll (hyponyms) etc. The reason for using a bespoke test was that there was not an existing test which could be adapted to both the research question and the young age of the participants as is demonstrated in the next section. However, the factors influencing the design of this VNT are the test purpose, the participants and the requirements for scoring. The design and method used were greatly influenced by those of other researchers as can be seen in the next section. Similarly, the method selected for investigating the use of learning strategies follows the traditional method of enquiry by questionnaire survey, while the investigation of WM also uses a traditional method of assessing WM score, that is a WM test.

4.2.1 The Vocabulary Network Test

An important aim is to study the interplay between high potential linguistic abilities in L2 learning, namely those of CBs and YGLs, and the structural qualities of their lexicon compared with that of standard L2 learners, using adults as an 'expert'group. The methodologies which researchers working in areas of lexical categorisation (Read, Wolter, Meara etc.) seemed to favour were word association tests on the basis that:

> "the many lexical entries in our mental lexicon are not stored randomly, but are structured in a well-organised web with connections or pathways between the words; a structural system that enables us to retrieve words rapidly and with ease, because the access routes in the lexical store are varied and well established"(Henriksen, 2008, p. 22) .

Such methodologies can be analysed quantitatively. The downside of this approach is that it relies on the law of averages and eliminates individual subjective variety. This could be seen as limiting. However, the method has the advantage of being very focused.

4.2.2 The previous vocabulary tests which influenced and directed the choice of method and design.

In Chapter 3, a review of some previous research was presented. Building on this, the following section shows more specifically how the design of the VNT compares with and differs from these previous research studies. In choosing a methodological framework for this research, it was necessary to look not only at the methods of investigation but also at precisely what was studied in the past:

> "In order to make choices from among the range of measures available, it is necessary for the researcher to have some theoretical basis for classifying them. One distinction which is frequently made in the recent literature on L2 vocabulary testing is that of breadth and depth of knowledge."(Read, 2004, p. 211)

Although this may be a slight over-generalisation, if vocabulary breadth primarily refers to the quantity of words known by an individual and vocabulary depth relates to the quality of the knowledge that is not just relating to the meaning, but also to its use and associations then, the VNT test is more akin to tests relating to depth of knowledge. The theoretical underpinning behind the present study is based on the idea that the structure of the lexicon can differ according to certain factors. For instance, as seen in Chapter 3, it has been suggested that the lexicon's configuration and associations between words are subject to changes over an individual's lifetime as a result of exposure to more and more words (Ervin, 1961), (Brown and Berko, 1960) . Five research studies were selected as being particularly pertinent to the present study and its design:

1. The Brown and Berko Test.

Brown and Berko compare the word associations from English monolingual children and adults, and suggest that the responses of adults are more likely to belong to the same class of word than the responses of children. Their test is based on Woodrow and Lowell's test (Woodrow and Lowell, 1916). However, on closer inspection of this test, it is clear that a majority of the responses given by adults were antonyms (words with opposite meanings such as *day* and *night* or *black* and *white*) as seen in Table 4.2.

Table 4.2- Word Associations From Adults And Children from Table 1 (Brown and Berko, 1960, p. 3)

Stimulus	Response	Children	Men & Women
Table	Eat	358	63
	Chair	24	274
Dark	Night	421	221
	Light	38	427
Man	Work	168	17
	Woman	8	394
Deep	Hole	257	32
	Shallow	6	180
Soft	Pillow	138	53
	Hard	27	365
Mountain	High	390	246
	Hill	91	184

Whether they had been chosen by adults because they were antonyms or because they were from the same part of speech is unclear but it is also a fact that the majority of antonyms are from the same part of speech (man and woman are nouns, black and white adjectives). For this reason the number of antonyms in the test for this present study has been limited.

Brown and Berko's test (see Chapter 3) consisted of thirty six stimulus words and was so constructed that there were six words representing six parts of speech. However, as this study investigates differences between groups which include young L2 learners

with very small vocabularies, such large syntactical differences could not be investigated and therefore the stimulus words were all from the same part of speech. In the Brown and Berko's test, the inclusion of 'clang' words was based on the theory that

> "since children have less practice than adults in both verbal and non-verbal associations with words, they are more likely to respond to the immediate sound properties of the verbal stimuli"(Brown and Berko, 1960, p. 363).

In order to see if there are differences between CBs, YGLs and L2 learners, this has also been included in the present study.

In Brown and Berko's test, the testing was conducted orally but, in the VNT, it seemed a useful addition to create two parts: one written and one oral with a view to gaining a wider insight into the possible differences between the groups.

As well as the rationale for the inclusion of words in the test, there are also various methods which need to be considered when planning a word association test :

> "The respondents may be allowed to associate freely (free association test) or responses may be limited to semantic categories, to particular synonyms, to terms within a certain context, or to choose among alternatives (controlled association test)".(Nielsen and Ingwersen, 1999).

Brown and Berko's test was a free association test which meant that no possible choices were given after the stimulus word. This type of method is possible with monolinguals or with advanced students of a foreign language but could not be used in this study which addresses young L2 learners with limited vocabulary. Therefore, a controlled association test was deemed to be more appropriate and less stressful for young L2 learners. However, as can be seen from the above, this study does draw partly on Brown and Berko's methodology.

2. Ervin's study (Ervin, 1961)

Ervin's study also investigated differences by age of the frequency of various types of word association. Their list of associative words was also chosen from a range of grammatical classes but "since the work was done in conjunction with a study on learning antonyms, thirty nine of the items were so chosen that the primary response of the adults was coordinate or antonymous" (Ervin, 1961, p. 363). The study also included very young monolingual learners from kindergarten. Once again, the test was strictly oral and aimed at estimating vocabulary size. The study concentrated on syntagmatic, paradigmatic and antonymous responses. It consisted of a first test of free associations and this would not have been possible for the present study as, as mentioned

earlier, free associations in French would have been difficult for L2 near beginners. The second test had the choice between two responses to the stimulus, for example for *up* as a stimulus the words *high* and *sky* were the option therefore, only form class was the issue. However, using too many different word classes would have been too complicated for children with limited L2 vocabulary. Consequently, only nouns, verbs or adjectives were used in the present study but the idea of choosing words from similar thematic contexts was replicated.

3. Read's study

Like Ervin, Read devised a word association test. However, Read's study investigates depth of knowledge. According to Read, and as already mentioned in Chapter 3, there are three distinct lines of research within depth of knowledge. These are precision of meaning, knowledge of a word (which includes semantic, orthographic, phonological, morphological, syntactic, collocational and pragmatic characteristics) and the incorporation of the word into a lexical network in the mental lexicon.

Read describes the purpose of his study more accurately when he states that " in practice most depth tests reflect what the learner knows about the target vocabulary at the time they are administered"(Read, 2004, p. 212). He further elaborates on the purpose of his method by limiting the measurement of depth of knowledge to "measurement of declarative knowledge of individual words at a particular point in the learner's acquisition of an L2" (Read, 2004, p. 212), that is to say the factual knowledge stored in the memory. His test which he calls 'Word Associate Format' consists of a target word followed by eight other words, some of which are related to the target word and some are not. The test was designed for university students. The present study concentrates more on word links than knowledge of individual words and therefore, while keeping the framework of word associations elaborated by Read, its detailed design reflects this difference of objective.

4. The WAT test

Schoonen and Verhallen (2008) adapted Read's test and created the Word Association Test (WAT) in which children were asked to choose a fixed number of words associated with the stimuli words. Their population was Dutch children and Dutch/Turkish bilinguals. The test language was in Dutch and the children were aged between 9 and 11. As both groups were competent Dutch speakers from a variety of ethnic backgrounds, the effect of ethnicity on test results could be an issue. This effect is

not really relevant for this test (see Chapter 5). When constructing the test, I considered using a translated version of the WAT, as the test looks at word function within a semantic network. However, the WAT's function was to look at "a generalized knowledge of a word" and its word categorization. The example, which they gave in English, was, for the purposes of the present study, slightly too sophisticated. In their example the target word was **Banana** and possible words to associate with it were *fruit*, *monkey*, *to slip*, *yellow*, *peel* and *nice*. According to Schoonen and Verhallen the correct choices showing relationships found in a semantic network were: fruit (superordinate), peel (partonomic association) and yellow (perceptual feature). However, peel could also be seen as a syntagmatic response (from a different word class, that is, to peel) and the same for yellow (adjective /characteristic). Therefore the scoring for the adaptation of such a test might have been problematic. In addition, in the Schoonen & Verhallen experiment, the children are encouraged to answer in a particular way:

> "In order to introduce the format to the children, a test assistant works through two practice items on the blackboard, following a fixed protocol. For example, let us take the item based on the stimulus word foot. Through an interactive discussion which we shorten and paraphrase here, the assistant explains to the children that, in whatever way you look at it, *leg*, *toe* and *body parts* are related to *foot* because a foot is a body part, and is part of your leg, and toes are part of your foot. This does not apply to the other words: cup, hurt and large". (Schoonen and Verhallen, 2008, p. 218).

This control on the test prompted subjects to produce predetermined types of choice. Without guiding the participants towards a particular way of answering the question and with providing more possible meaningful connections such as *walk*, the results might have been very different. However, it seems that the researchers were, as explained above, more interested in deep word knowledge than in investigating a word web, because an additional test on a small sample of participants concentrated on word definitions. The use of mixed methods, a test and an interview, was considered for the present study but, given time constraints, the participants' young age and the likelihood of participants' fatigue, it was thought to be a too difficult and lengthy process. For the above reasons, the method used and the VNT differ from those used by Schoonen and Verhallen.

4. Meara's research

Many recent advances in the field of L2 vocabulary knowledge can be attributed to Meara (Meara, 2006; Meara and Wolter, 2004). However, one of his lines of research, as mentioned in the previous chapter is to evaluate the density of interword connections by estimating the possibility of finding a pair of associated words within a set of five words (Meara, 2007). In doing so, he is able to compare the density of connections between native and non-native speakers but not the type of connections. One of the aims of this study is to define whether the types of interword connections differ between CBs, YGLs and young L2 learners. However, Meara's concept of links greatly influenced the elaboration of the VNT and thus the choice of methodology. The test in the present study is an adaptation of the Read and Schooner's tests and the vocabulary used is based on the Francais Fondamental Premier Degré (Gougenheim et al., 1956) and the QCA's schemes of work for French at Key Stages 2 and 3. Although the majority of words chosen would have been covered by the schools' curriculum, the list was also submitted to the Modern Language Teachers of the pupils who participated in the study to eliminate or replace words which would be too difficult for their pupils and to ensure a degree of familiarity with a fair number of words chosen for the test. The detailed design of the test can be seen in section 4.4.2.

In conclusion, informed by the literature and previous studies, the Vocabulary Network Test is divided into two parts; one written and one oral. Each of these parts has fifteen stimuli words followed by six other words. These other words are chosen from the same thematic context as the stimuli words apart from one 'clang'or 'rhyming' word.

In addition to researching differences in the structure of the lexicon, the present study also investigates differences in the use of strategies for learning vocabulary (The Vocabulary Learning Questionnaire) and the differences in working memory (WM Test) between the three groups.

4.2.3 Employing a questionnaire as a method for researching the use of strategies for vocabulary learning.

The acquisition of L2 lexis is closely linked and enhanced by the use of learning strategies. In researching the learning strategies used by the two groups of learners, it is hoped that similarities will be uncovered which could be of interest to future curriculum designers. The choice of methods in studying learning strategies is varied. Strategy

assessment techniques include observations, interviews, think-aloud procedures, note taking, diaries and self-report surveys, and questionnaires. However, traditionally, the use of questionnaires or interviews has been favoured (Oxford, 1996). Therefore the choice of method in the present study has been informed by previous studies. Inevitably the questionnaire method is linked to quantitative analysis as it necessitates working with an observable social reality, in this case L2 and FL lexical acquisition, with a view to attempting to draw some general conclusions on specific areas which might influence their successful outcome. Strategies have already been extensively researched, but strategy applications specific to the acquisition of lexis and by both good learners and bilinguals, including the additional investigation on how similarly or differently the use of these strategies has been influenced by perceived parental attitudes on language do not seem to have been investigated to-date. The comparative nature of this study involving specific groups of learners and the inclusion of parental influence are novel features. It must be noted that "strategy use is not a fixed attribute of individuals, but changes according to the task, the learning conditions, and the available time"(White, Schramm and Chamot, 2007, p. 93). This is relevant in this study as it is task oriented, that is, the task of learning new vocabulary.

How does the questionnaire relate to the research questions and the learning environment? This study investigates the successful use of strategies for lexical acquisition and the working memory ability of the participants, as "one of the functions of transfer of procedural strategies that have become automatic is to free attention for more demanding aspects of the task that are required in comprehension or production"(O'Malley and Chamot, 1990, p. 146).

The questionnaire in this study is based on the SILL but, as it is task oriented, it sets out to determine the range of memorizing, cognitive and metacognitive learning strategies used by the young participants in the acquisition of lexis, to determine if such strategies have been influenced by perceived parental attitudes to language learning, and to compare the use of strategies by YGLs with those used by CBs using the remaining L2 learners as a control or base group. The reason for not including social and some affective strategies in this questionnaire was that these two categories are mostly associated with communicative strategies and the present research concentrates on vocabulary learning strategies.

For the purpose of this study, the choice of administering a questionnaire, as opposed to conducting oral interviews, observations, verbal reports, diaries or verbal recollections and computer tracking, is based on five points. First , the fact that the questionnaire matches the objectives of the study better than other methods. Secondly, the language learning environment (mostly classroom based) does not easily lend itself to administering an oral interview which would require more time, greatly interfere with normal teaching and interrupt the school timetable. Thirdly, the other techniques were less suitable for young participants. Fourthly, as this research uses most part of an already widely accepted instrument for measuring the use of learning strategies, concerns about reliability and validity of the chosen method are greatly diminished. Although this point has been disputed by some researchers (Dornyei, 2005) and a more in depth analysis of the arguments for and against the instrument was developed in Chapter 3 section 3.6. Finally , conducting interviews or using diaries or self-reports would have been less appropriate for such young participants, and questionnaires lend themselves more readily to data analysis (Dornyei, 2007, p. 101). Although the use of a questionnaire is not without its disadvantages and limitations, the choice was influenced by the needs of the participants and the enquiry itself.

The first perceived disadvantage of using a questionnaire might be the difficulty of phrasing questions in a manner which avoids introducing bias, and which is comprehensible to young learners. Also, this medium elicits less spontaneous and more limited responses which are more introspective as "questionnaire items referring to general behaviour (i.e.: what you tend to do) may elicit learner's beliefs about what they do, rather than what they actually do" (Cohen, 1998, p. 35). The inclusion of examples in this questionnaire is an attempt to avoid these types of responses. It could be argued that data obtained by the questionnaire method are retrospective and rely on the participant's self-report. However, the same criticism would apply to an interview. The use of examples in this study's questionnaire is meant not only to further define the questions but also to focus the participant on a particular type of learning (vocabulary learning). The qualitative method (interviews) was considered as it might have elicited more in depth and personal responses. However, certain elements of the research made the researcher choose a questionnaire. First of all, as mentioned earlier, the young age of the participants and the ethical issues associated with one to one interviews which included the need for an isolated room to conduct this method of enquiry was

complicated by the fact that, even though the researcher had been CRB checked, the schools were reluctant to provide such facilities. (This point is considered further in section 4.6 of this chapter). Secondly, it was felt that a questionnaire would provide a more structured and less threatening way of collecting data from children. Thirdly, a majority of researchers in the field of learning strategies had successfully used this method. In conclusion, for the purposes of this study, it was decided that the use of a questionnaire was likely to yield a quality of data equal to that of other techniques and to achieve the desired result more efficiently.

The questionnaire was constructed using matrix-rating scales with the exception of four questions in Part 4 (background questionnaire) which require yes or no answers. It was based on Likert scales but, moved from an 'agree-disagree' scale to a 'always do that- never do that' scale more appropriate to obtaining a view of the range of strategies used by young participants when learning a word. The decision to give a five point rating scale was taken in order to give sufficient discrimination of responses and to be more easily understood by the young participants (Oppenheim, 1992). As the questionnaire was taken individually and accessed through the Internet, this design avoided collusion (for example, when groups of children agree in advance how to respond to the questions). A short introduction for each part of the questionnaire was provided. The inclusion of examples limited the occurrence of participants' misunderstanding of a question. Confidentiality information was also included as well as a box to be ticked at the end of each part which asked the participants to confirm that they had read the information and agreed to take part in the study. The questionnaire was copied onto Survey Monkey and was uploaded onto the researcher's personal website, thus ensuring added confidentiality.

4.2.4. Using the Internet as a device for delivering the Vocabulary Network Test (VNT) and the questionnaire.

The use of the Internet to present and deliver the instruments was considered carefully. The advantages were that it provided an easier recruitment method for the adult native speakers group who took part in the VNT, as access to them was more difficult due to different geographical locations. It also provided a more effective and environmentally friendly method for collecting data. It presented a non-threatening and familiar medium for the young participants who would feel less inhibited in taking part in

the study. It introduced the instruments in a more uniform manner. It meant that each participant would be presented the same question in the same manner and this, in turn, would facilitate the attribution of different answers given to differences in the participants' groups. The researcher recognizes that there are also some disadvantages such as the fact that not everyone has the Internet. However, the majority of people have access if not at home at least at a neighbour's or an internet café. In the case of adults, the fear of new technology which used to be associated with the older generation is rapidly diminishing. Therefore, the adult participants were selected on the assumption that they would have Internet access. A more important limitation is the possibility of technological glitches as explained in the next section.

4.2.5. Limitations encountered by the pilot study

The pilot study was carried out to test the smooth functioning of the research procedures, adequate comprehension of both the instructions given and the contents, and to uncover any possible problems which had not been anticipated in the initial design. The tests and the questionnaire were piloted with a group of four French native adults (for the vocabulary test) four young French learners and also a small group of young French/ English bilinguals.

The pilot study did not encounter any major problems. However, a small technical problem with the VNT was noted as the audio files were considerably larger than the other files. Subsequently, they had to be divided into three pages instead of one in order to avoid delays when loading the test. The wording of one question in the questionnaire was simplified to make it more child-friendly and two words were changed in the WM test as they were synonymous. As alluded to above, system malfunction and loss of data could have been a possible drawback of using the Internet to deliver the tests. However, the use of a professional web designer to advise with the uploading of the documents and to design a system allowing the immediate transfer of the coded data, limited such possibilities while also ensuring data protection. Recruitment of adult participants was done offline. Ethical considerations were examined and the researcher took note of the AoIR (Association of Internet Researchers) recommendations in their ethics document (Ess, 2002).

The previous sections have shown how the designs for the VNT and the questionnaire were influenced by other studies but also slightly differ from them. The rationale for the choice of methods used for both studies was also given.

The third instrument investigates working memory (WM). Memory, and in particular WM, is intricately linked with the acquisition of lexis. As differences in WM between various groups are quantifiable, this study, in common with the work of Waters & Caplan (Waters and Caplan, 1996), Walter (Walter, 2007) etc., uses quantitative techniques to measure those differences.

4.2.6 The choice of the method for investigating WM

The methods used to investigate WM are divided into two main streams of research: the research investigating 'phonological working memory' (PWM) (Gathercole and Baddeley, 1993). These tests measure the capacity of a learner to remember lists of unrelated items, that is, words or digits; thus only testing the ability to store and recall information. The second method is reading span memory test (RSM) which asks participants to read sentences, to decide whether they are logical or correct, and to try to recall the final word of each sentence. This last test method requires both processing and storage as it involves not just recall, but also accessing real world knowledge needed to comprehend and make a judgement on the sentence while keeping hold of the final word of each sentence. The PWM only measures how well a participant can repeat a list of unrelated words. In addition "traditional span measures do not decline with age…whereas RSM does decline with age." (Juffs, 2005, p. 90) It seemed more appropriate for the purposes of the present study to follow a method which showed differences between groups of people and to adopt the theoretical framework of this method.

Language learning is similar to the acquisition of literacy where a connection is made between form and meaning (VanPatten, 2004) . It also requires the learner to maintain information in the WM while employing other cognitive abilities. Phonological short -term memory was found to be related to the ability to acquire new words (Papagno and Vallar, 1995). Given that WM relates to the ability to acquire new words, then WM capacity would have an impact on vocabulary learning. Ellis & Sinclair (Ellis and Sinclair, 1996) presented experimental evidence that rehearsing foreign language material had beneficial effects on learning foreign words. Therefore, the hypothesis was

that bilinguals and potentially gifted learners would have a higher score for WM or for some of its components than the standard L2 learners.

The present test uses a slightly modified version of Walter's WM test (Walter, 2004) as described below. WM combines both storage and processing. However, the previous research referred to above, had either been constructed for L1 subjects or for L2 advanced learners. In this test, one objective was to compare groups of young participant's WM performance in L1 and L2.

In the original research for her unpublished PhD thesis and subsequent journal article (Walter, 2004), Walter modified and used an instrument for measuring WM previously designed in English (Waters and Caplan, 1996). The modified version was in both languages: French and English. It combined three components. The first component measured the logicality judgements of the participants, that is, their ability to assess whether a sentence made sense. The second component was the reaction time recorded to make these judgements. Finally the third component was the recall measure, that is, how many end of sentence words were remembered. Therefore, Walter's test belonged to the second method of WM tests, that is, the RSM tests as described earlier in this section. These tests cover both processing and storage. Walter's modified version in French and English was administered to two groups of French native speakers from monolingual backgrounds who were learning English in two different schools: a college and a lycée. The age range in each school was quite wide (13.5-15.11 years for the college and 16.11 – 19.6 years for the lycée). This could have had an influence on the findings, as it has been shown that WM of children and young students improves with age. The aim of Walter's study was to compare the French and English WM results between themselves and also with regard to the L2 proficiency of the participants, their age and their achievement in school language subjects. In other words, do advanced learners have higher WM scores which correlate with their age and their end of year school marks for English and French and does that apply equally to WM in both languages and to the three components of the test? Walter hypothesized that differences in language proficiency would produce differences between L1 and L2 WM scores in so far as they lead to differences in efficiency of processing. She found no significant interactions for recall. However, deterioration in logicality judgements and an increase in reaction times for the younger and less proficient group were noted. Predictably, the overall WM score was significantly higher for the older and more advanced group. The difference between the

L1 and the L2 WM scores was much greater for the younger and less advanced group. There was also a strong correlation between WM scores and school marks, stronger in English than in French.

Walter was not alone in using bilingual WM tests. Several studies have used RSM tests in two languages (Osaka and Osaka, 1992). Osaka and Osaka examined the relationship between WM capacity of a relatively homogeneous group of Japanese university students who were advanced learners of English as a second language. They found significant correlations between English and Japanese WM scores. Subsequently they used a similar version of the Reading Span Test in French and German (Osaka, Osaka and Groner, 1993). They also found correlations between the German and the French WM scores but noted some significant differences between the two test results. Despite the differences found in the second study, they concluded that WM capacity is independent of any specific L1 or L2, but the extent to which this conclusion can be generalized has not yet been established. Other researchers have found weaker correlations (Harrington and Sawyers, 1992) which called into questions the strength of Osaka and Osaka's assertion that WM capacity is independent of any specific L1 or L2. In addition, the hypothesis that bilinguals might exhibit more efficient WM ability than monolinguals, potentially due to training of cognitive control by resisting interference (Bialystok, 2004) has also been put forward. In Osaka and Osaka's study they did not take into account aptitude and fluency which was particularly relevant as their participants were advanced learners of the L2 'at near bilingual level'. Their scoring was based on the number of words correctly recorded therefore only testing recall. Walter, as mentioned earlier, included sentence logicality judgements also testing processing ability which is instrumental in the acquisition of languages. Clearly, this additional component might increase the differences between the two languages and it would be expected that L2 scores would be lower than L1 among standard learners. The question of the independence of L2 WM from L1 is not fully resolved, and may vary between groups of learners, hence the interest of studying them both.

In this study, all the groups have similar ages (mean age 10.45 for the monolingual group and 10.7 for the bilingual group) and educational backgrounds. They follow the same curriculum in French. It is worth noting that they are at fairly near beginners' level and have not had examinations in the subject. If, like in Walter's study, levels of proficiency is an issue, that will be reflected in the logicality judgement scores (one of

the component of the test). Clearly, the bilinguals, who have opportunities to use their French outside of school, are more proficient in the language use. However it remains to be seen whether their bilingual advantage translates into higher WM scores and which component of this score, in which language, shows a significant effect. Similarly, for the monolingual groups, can potential aptitude for languages result in differences in WM or some of its components and is this the same for both languages?

Therefore, the test was constructed in English and French. In view of the age and limited span of vocabulary of the L2 learners only very simple sentences all in the present tense could be used. Care was taken to make sure that the pupils had been familiarised with the words used in the test. Possible cross-language interferences for CBs had to be taken into account and the two languages had to be clearly separated in the WM test. The test required the participants to change language after every other level of the task and, prior to each level, the language was clearly announced on the computer screen. The stimuli in English and in French consisted of sets of simple sentences which the participants had to rate as logical or illogical by using two keys on the computer keyboard. Their responses were timed and the researcher also noted their recall of the last words in each sentence. The design of the test followed the same pattern as Walter's test but the sentences had to be re-written as the original sentences were too complicated for beginners. A bespoke computer programme also had to be written for the WM test for this study.

In summary, this multi-set data examination method combining three instruments, which were devised and constructed by the researcher, aims to present as comprehensive a picture of the differences between the groups of young learners as possible. The two tests and the questionnaire were piloted, as mentioned earlier, with a small group of participants who gave their time freely. The participants for the main study are described below.

4.3 Participants

4.3.1. Sampling techniques

The decision to use a sample is based on the fact that it would be impossible for one researcher to gather data on the whole population in order to throw some light on group differences in vocabulary networking, use of strategies and WM scores. In

addition, there is an absence of secondary data that could have been used for this purpose. The population of the study comprises ten to twelve year old learners of French and CBs of the same age group. The study, as mentioned earlier investigates similarities and differences among groups of learners. "Quantitative researchers are less interested in individuals than in the common features of groups of people"(Dornyei, 2007, p. 33) .

In an ideal quantitative study, the cases would be selected randomly ensuring that all the cases in the population had an equal chance of taking part in the research. This approach is not always possible, particularly when the population has very specific and limited properties and therefore, "most actual research in Applied Linguistics employs non-probability samples"(Dornyei, 2007, p. 28) . However, "an acceptable compromise alternative is to characterize the population in terms of theoretically important variables. In this approach, rather than simple random cases the researcher is working towards a clustered or a stratified sample" (Gorard, 2001, p. 13). This was the first method considered by the researcher. The decision to use children from Independent schools was, as explained in Chapter 1, specifically related to the fact that these schools teach French from a younger age than State schools and with greater dedicated curriculum time; all of which provides the pupils with an L2 base sufficient to be able to participate in research in both languages at elementary level. Fortuitously, focusing on this subset of the population meant that the participants tended to come from the same socio-economic group, and so the issue of different socio-economic backgrounds distorting findings was unlikely to be significant.

There are over five hundred Independent schools belonging to the IAPS (Independent Association of Preparatory Schools) in the UK. Fifty-five of these schools are situated in Hertfordshire and Buckinghamshire (10%). The researcher looked at these fifty-five schools to isolate those with such specific characteristics as: similar age of the children, length of time that French was taught, and similar methods used to teach the subject. Therefore, to a certain extent, in view of the specificity of the research, part of the selection process was purposive.

> "In purposive sampling, researchers handpick the cases to be included in the sample on the basis of their judgement of their typicality. In this way, they build up a sample that is satisfactory to their specific needs". (Cohen, Manion and Morrison, 2007, p. 89) .

Letters were sent to ten schools. It must be noted here that it is becoming extremely difficult to gain access to young participants as explained in section 4.6 on

ethical issues. Three of the schools agreed to take part in the study (other schools also agreed for their French/English bilinguals and their parents to be contacted). These Preparatory schools did not rely on a formal academic assessment process to select their pupils. From the three schools (as well as other similar schools in the same area for CBs), three different types of participants who formed the three groups (YGLs, L2 learners and CBs) were drawn.

The question of the sample size was a difficult one : "A sample of thirty is held by many to be the minimum number of cases if researchers plan to use some form of statistical analysis" (Cohen, Manion and Morrison, 2007, p. 101) .The researcher decided to try to obtain thirty participants for each subgroup. In view of the relatively small number of CBs in the participating schools, due partly to the fact that they had to be bilingual in French/English, literate in both languages and with similar educational backgrounds to the other groups, this particular cohort is smaller than the other two. Supplementing the CB sample with pupils from state-supported primary schools which did not teach French would have compromised the homogeneity of the sample adding a variable which it was thought would have negated the benefit derived from having a larger sample.

At the three schools who had agreed to take part in the study one hundred and twenty two pupils in the ten to twelve year old age range were learning French; seven of these were French/ English bilinguals. The remaining one hundred and fifteen sat the MLAT-E test and thirty five were identified as gifted. From the remaining eighty L2 learners thirty were selected randomly. One boy from the YGL group was subsequently identified as bilingual Spanish/English and, as it was thought that it might distort the findings, was excluded from the study. Four more pupils who had been identified as gifted were, for various reasons, not available to complete all the tests, and so thirty pupils represented the YGL group. To the seven bilinguals from the three participating schools a further fourteen from other schools contacted were added to bring the total for the bilingual group up to twenty-one. Two more from two different schools could not be included as their command of French was not adequate. All of the CBs selected were able to converse freely in French with the researcher, and to read fluently a short French poem.

Thus, in order to be able to carry out the study a stratified sampling technique had to be employed. The population from which the participants were selected resulted from

a combination of curriculum (purposive sampling), geography (cluster sampling) and a willingness to participate (see ethical issues).

Finally, the expert group of adults for the first study (the Vocabulary Network Test) was recruited using snowball sampling. As the main requirements for the adult group were that they had to be native French speakers living in France who had access to the Internet, the researcher felt that this sampling technique would be adequate. The researcher is aware that the use of this method may cause certain restrictions in terms of generalizing the result for this sub-group. However, "this technique is useful when studying groups where access to group members is difficult" (Dornyei, 2007, p. 18). The reasons for this difficulty of access may be geographical (as in this case the adults had to be French native speakers living in France to constitute an 'expert' group;) or ethical, as when wishing to gain access to specific groups of the population. In the case of this study a certain element of trust had to be built up and respondents, who were taking part by filling in the test online on their own, had to be able to contact the researcher if they encountered any problems or if they wanted to clarify any details before starting the test. An obvious limitation of snowball sampling or convenience sampling is that respondents are likely to recruit persons who have similar backgrounds to themselves. This limitation can also be seen as an advantage in this study as it meant that this sample would be likely to be more homogeneous and come from similar socio economic group as the children in the study. In any case, the adults were not eliciting any views which might have been imputed to class distinctions. A pure random selection from the general population, if it had been possible, may have included persons with regional accents or vocabulary and this may have posed problems or, it might have included language specialists who may have been familiar with word association tests and their purpose therefore, possibly, introducing biases. The type of sampling used in addition to the known advantages of time and resources also allowed control over these two biases by making sure that the people recruited did not belong to either of the categories mentioned above. The criteria for recruiting adult respondents was only restrictive in terms of these two points, otherwise anyone from eighteen years of age onwards irrespective of age, sex or length of education was able to take part (the vocabulary used in the test was basic beginners vocabulary and therefore did not need a particular level of education to be understood). The purpose of the test was just to investigate differences between the four groups (YGLs, CBs, L2 learners and adults) in terms of the type of words which they linked

together. As well as the Vocabulary Network Test, the same groups of children participated in both the WM Test and the questionnaire.

Despite the inevitable caveats related to conducting school based research, the researcher believes that the findings from this study are likely to be sufficiently significant both to enable some general conclusions to be drawn and to act as an incentive for further research on this topic.

4.3.2 The adult group

In total, thirty adult native speakers completed the vocabulary test online. Twenty two females and eight males participated in the studies. The age range was:
25-35 = 4 participants (2 males & 2 females)
35-45= 3 females participants
45-55 = 13 females and 4 males
55+ = 2 males and 4 females.
The data from the adult group was gathered between April 2009 and June 2009.

4.3.3. The L2 learners and choice bilinguals

The three schools which most of the young participants attended all had similar teaching methods. The other fourteen bilinguals attended other independent schools whose French curricula were common to those used in most independent schools. The Head Teachers' and both parental and participants' consents were sought (see copies of letters sent in Appendices B, C, D and E). All the choice bilingual children, who took part in the research, were put forward by parents and teachers who confirmed that they were literate in both languages, and were interviewed by the researcher to ensure adequate and relatively uniform levels of bilingualism.

School 1 was an Independent Preparatory school for girls and only Year 6 pupils were involved. A total of thirty pupils volunteered and sat all the tests and completed the questionnaire. Parental and participants' permission was obtained.
The data collection took place between June and July 2009.

School 2 was an Independent Preparatory School for boys and only Year 6 were involved. Twenty-five boys sat the MLAT-E Test. Due to sport and other commitments only fifteen completed the vocabulary test and the questionnaire. Parents were informed

and had the possibility of withdrawing their children from the study. Pupils were also informed that they could withdraw from the research at any time.
The data collection took place between June and July 2009.

School 3 was an Independent Preparatory school for boys and girls. All the Year 6 (sixty pupils) sat the MLAT-E Test. Fifty pupils volunteered for the vocabulary test and questionnaire. The ten absences were due to illness or commitments in other activities (for instance individual music lessons). As it was not possible, due to time constraints, to test all fifty pupils, a random sample of twenty pupils completed the WM Test. Pupils were asked for their consent and given an explanatory letter to take to their parents. They were also informed that they could withdraw from the research at any time. The data collection took place between February and May 2009. This longer elapsed time was due to examinations and the Easter holidays preventing two of the classes from completing at the same time as the others.

A preliminary meeting during Assembly was arranged in each of the schools taking part during which the researcher gave a presentation about her research and what it meant to be a participant in that research. All the pupils were very cooperative and keen to learn about the research. The result of the MLAT-E Test identified the potentially gifted linguists (that is those whose standardised scores placed them in the first 10% of the MLAT-E standardized score range). The results for the three schools were as indicated in Table 4.3.

Table 4.3 Results of the E-MLAT Test per school.

Schools	**Number of pupils sitting the MLAT-E Test**	**Number of pupils scoring in the first 10%.**
School 1	30	13
School 2	25	9
School 3	60	13

The data analysis was carried out using SPSS for the VNT test, the WM test and the questionnaire.

In summary, the L2 learners were given a MLAT-E Test to determine their aptitude for language learning and to identify the potentially gifted linguists. VNT and WM tests, and a questionnaire on learning strategies were completed by both the monolingual L2 learners and the choice bilinguals to provide the raw data for the study.

4.4 Materials – Tests and questionnaire

4.4.1 The MLAT-E (Modern Language Aptitude Test-Elementary) (Carroll and Sapon, 2002)

This test is an adaptation of Caroll and Sapon's (Carroll and Sapon, 1959) previous test and is designed to give an indication of the probable degree of success which the examinees are likely to achieve. As already mentioned in Chapter 2 , Part 1 measures knowledge of English vocabulary and sound symbol association ability. Part 2 is designed to measure sensitivity to grammatical structures. Part 3 is a new addition to the original test and is an attempt to measure the ability to hear speech sounds. Part 4, which is learning the names of numbers in an artificial language measures the memory component. It has been established that, when the four parts of the test are used together, they provide high predictive validity with regard to language proficiency. "Despite its age, the MLAT continues to enjoy substantial discriminatory and predictive power" (Sternberg and Grigorenko, 2002, p. 150). The MLAT-E test measures certain learned capabilities of the child which are prerequisites of rapid progression and success in learning a foreign language. The use of this test is designed to help to identify the potentially gifted or successful L2 learners prior to investigating the strategies which they use to help them achieve their success.

4.4.2 The Vocabulary Network Test

The test is divided into two parts, each comprising fifteen sets which each contain a cue word and six words from which to choose (five related and one unrelated to the cue word as explained in section 4.2.2 of this chapter). All the stimulus words are from the same parts of speech, that is nouns, and the use of antonyms which, according to Wolter (Wolter, 2001), slightly clouded the results of previous studies by eliciting responses of similar parts of speech (men/ women, black/white) have been restricted. In view of the

limited vocabulary of the young L2 learners, it was impossible to completely avoid them but only three were included in Test 1 and four in Test 2.

In the first part, both the cue word and the six options for choice are presented in writing. The participants have to highlight the three of the six words which, in their opinion, they could link to or "go with" the cue word.

In the second part the options for choice are recorded. The participants have the cue words in writing each followed by six squares numbered 1-6. The participants have to tick the three numbers corresponding to the words which they have heard and which they associate with and link most closely to the cue word.

The material is presented as computer screen choices, and the participants access the web page from the Internet. It was decided to limit the number of unrelated words to one category to which the title rhyming has been given. As explained earlier, this test was informed by previous tests and, in particular, that of Read (2004) which had a choice of eight words four of which were semantically related to the target word and four of which were not. However, Read's study targeted university students. It was thought that eight words would be too difficult for children with limited vocabulary. In addition, Read's test as reviewed in previous chapters was principally aimed at establishing depth of knowledge of a word. In the present test, the use of 'clang' words gives an indication of either learners who associate words phonologically or whose knowledge of a word is poor. Considering that there were thirty target words and that each was followed by one 'clang' or rhyming word, this was deemed to be sufficient to give an indication about which group of learners chose their association phonologically. It is clear that, by only using one random word, the results will be determined by pre-existing links and could be seen as more restrictive but restriction is very important with limited beginner's vocabulary. One of the linguists who uses different word categories for his research on the network of meaning is Lyons. He focuses mainly on synonymy, hyponymy and incompatibility (Lyons, 1995). The importance of categorization in understanding lexical network organization has been recognized:

> "Categorization is an essential element of human cognition. In our everyday lives we tend to organize reality and the world around us into identifiable categories. A series of recent studies, mostly in the field of cognitive psychology, have shown that the way we do this is largely based on the lexical categories made available in our language" (Athanasopoulos and Kasai, 2008, p. 106).

In order to enlarge the search, six lexical categories have been chosen: paradigmatic coordinate and paradigmatic synonymic (as associations from these two categories have been claimed to be linked to adults or proficiency in the language (Erwin, 1961),(Lyons, 1995), syntagmatic and characteristics (which is a subset of syntagmatic). The addition of characteristics is to balance the test by offering two syntagmatic choices, rhyming (or clang word) and associative (metonymic). This last category does not seem to have been the subject of detailed investigations in the past and it is possible that adults and bilinguals, who have a wider vocabulary, may also categorise and link words according to this criterion.

Word associations contain elements that could make them an effective teaching tool but more needs to be learnt about the way in which effective learners organize their lexicon in order to possibly link this to effective learning. Only experience through an experiment will reveal whether this method is indeed applicable to beginners. It has the advantage of delimitating clearly the parameters to be studied. The repetition of two words under different headings and also the use of French and English cognates (which were not in the relevant list of the Français Fondamental but could nevertheless be expected to be recognised by the participants because they are French-English cognates) were seen as inevitable measures in view of the restricted vocabulary of the young learners of French as an L2. The decision to choose two series of fifteen sets was based on the fact that the WAT test had twenty five items but that these items were all presented in written form. In view of the young age of the participants and their limited vocabulary, thirty items were considered sufficient. Recorded material was used to throw some light on the role of phonology in the organization of the L2 and bilingual mental lexicons. If, as is stated, " aural word recognition predicts oral proficiency particularly well" (Daller, Milton and Treffers-Daller, 2007, p. 6), then it would follow that bilinguals who are proficient orally would provide a higher level of meaningful responses and possibly more akin to monolingual adults on the second part of the test than L2 learners.

Consideration was given to varying the stimuli in order to incorporate stimulus items from different word classes but this was found to be too difficult to achieve with a beginner's vocabulary. In order to provide a baseline on how to judge the performance of young children, thirty adult French speakers took the test first. Subsequently, results were analysed for three groups of participants. First, those who have been identified by

the MLAT-E test as potentially gifted linguists, secondly the choice bilinguals and thirdly the remaining participants who took the MLAT-E tests but were not identified as gifted linguists and therefore represent the standard L2 learners. As this last group was larger than the other groups, as previously explained, a subset chosen at random was used for the purpose of the analysis.

It was hoped that the results would give an indication of the similarities and differences in the organization and breadth of the vocabulary of the three groups. The hypothesis, as mentioned earlier, is that both CBs and YGLs would have a wider and more efficiently networked vocabulary than standard L2 learners. This, when combined with a more extensive working memory, would be expected to provide evidence of more competent access to and storage of the lexicon. It was also anticipated that there would be differences between the groups revealed by the use of aural testing in the second half of the vocabulary test because CBs would have better aural comprehension than near beginners.

4.4.3 The questionnaire design

> "Questionnaires can yield three types of data about the respondents: Factual questions which are used to find out certain facts about the respondents, such as demographic characteristics…Behavioural questions which are used to find out what the respondents are doing or have done in the past…Attitudinal questions which are used to find out what people think, covering attitudes, opinions, beliefs, interests and values."(Dornyei, 2007, p. 102)

The questionnaire comprises two sections. The first section consists of a series of rating scale statements where pupils are requested to indicate to what extent they do or never do what is said in the statement. This section aims to try to assess the strategies used by both groups of successful learners when learning new vocabulary. In view of the young age of the participants and the possible difficulties for them in expressing verbally some of the less evident cognitive strategies that they may be using, a structured survey based on the Strategy Inventory for Language Learning (SILL) (Oxford, 1990) was chosen with the intention of making it easier for young learners to convey what strategies they use and in which contexts. The first section of the questionnaire is therefore a simplified version of the SILL.

The SILL was developed with a view to expanding on the previous investigations which were mostly limited to cognitive and metacognitive strategies. The fact that this survey devotes a whole section to memorizing strategies is particularly relevant to this study. A further reason for using the SILL is that it is also

one of the rare instruments to have published reliability and validity data (Oxford, 1996, p. 27). It " was organized according to strategy groups using a factor analysis" (Oxford, 1996, p. 28). The instrument is divided into six subscales: memory, cognitive, compensation, metacognitive, affective and social strategies. For the present study only Parts 1, 2 and 4 have been retained and adapted, as they correspond more particularly to the task of vocabulary learning. These three strategy groups are used by both Oxford and Schmitt and include some of Schmitt's determination strategies such as 'analysing affixes and roots' into cognitive strategies as they had been originally classified by both O'Malley and Chamot, and Oxford.

The taxonomy used in the questionnaire for this study is shown in Figures 4.1, 4.2 and 4.3 below.

Figure 4.1 :Taxonomy of Strategies Covered in Part 1 of The Learning Questionnaire (adapted from (Oxford, 1990) and (O'Malley and Chamot, 1990)[7]

Part 1 : Using memorizing strategies such as:

a) Sound association with L2 (question 1.)
b) Meaning association between L1 and L2 (question 4)
c) Rhyming within L2 (question 5)
d) Pictorial representation (questions 6, 11)
e) Compound sound and image representation (question 8)
f) Using photographic memory (question 10)
g) Using context (question 3)
h) Using mimes or gestures (question 12)
i) Revision (question 13)
j) Grouping and filing vocabulary by topic (question 9)
k) Linking meaning to spelling (question 7)

Figure 4.2 lists the strategies covered by the second part of the questionnaire.

[7] See Chapter 6 for detailed analysis of the responses to the questions referred in Figure 4.1, 4.2 and 4.3.

Figure 4.2 :Taxonomy of Strategies Covered in Part 2 of The Learning

Questionnaire (adapted from (Oxford, 1990) and (O'Malley and Chamot, 1990)

Part 2 : Using cognitive strategies such as

a) Rehearsal/Repetition (question 14)
b) Using formulas and patterns (question 18)
c) Recombination i.e. using learned vocabulary in a variety of combinations (question 19)
d) Practising the four skills in realistic contexts (questions 21, 23, 24 & 25)
e) Resourcing i.e. using reference books (question 27)
f) Taking notes (question 28)
g) Summarising (question 29)
h) Deduction: Deducing meaning from context , applying rules (questions 16,26 & 35)
i) Analysing expressions and words (question 31)
j) Translation i.e., using translation to compare L1 and L2 (question 32)
k) Being cautious about word for word translating and direct transfer (question 33)
l) Looking for and using language patterns (questions 30 & 34)
m) Elaboration: adjusting your understanding according to new information (question 30)
n) Keyword method i.e., looking out for keywords (question 32)
o) Auditory representation ie. Planning back in one's mind the sound of a word, phrase or longer language sequence (question 22)
p) Transfer: using previous linguistic knowledge or prior skills to assist comprehension or production (question 30)
q) Inferencing i.e., using context to deduce meaning (question 36)

Finally Figure 4.3 details the strategies used in the construction of Part 3 of the learning questionnaire.

Figure 4.3 :Taxonomy of Strategies Covered in Part 3 of The Learning

Questionnaire (adapted from (Oxford, 1990) and (O'Malley and Chamot, 1990)

Part 3 : Using metacognitive strategies

3.1 Planning
a) Advance organization i.e., previewing (questions 37 & 43)
b) Directed attention i.e., paying attention to specific details (question 38)
c) Functional planning i.e., planning and rehearsing just before carrying out an upcoming language task (question 44)
d) Selective attention i.e., deciding in advance to attend to specific aspects of input ie: pronunciation.(question 39)
e) Self-management – understanding the relevant conditions required for successful language learning and arranging for these conditions to occur (question 41)
f) Organization – organizing oneself to learn by using note taking etc. (question 42)

3.2 Monitoring
g) Self- monitoring i.e., regularly checking one's knowledge (question 40)

3.3 Evaluation
h) Checking the outcome of one's learning against a pre-determined standard (question 46)
i) Noticing and learning from one's error (question 45)

To adapt the SILL to vocabulary learning, each of its questions was checked against the taxonomy to identify matches. Where there was no match, the question was discarded as it did not relate to vocabulary learning or acquisition. Those questions which did relate to vocabulary learning or acquisition were then modified to make them suitable for the young participants. Each part of the questionnaire is prefaced with a statement reminding the children that the questionnaire is concerned with the acquisition of vocabulary. The Vocabulary Learning Questionnaire (VLQ) uses multi-items scales and is coded from 1-5 (from 'I never or practically never do that' to 'yes I always or practically always do that').

The questionnaire follows Schmitt's (1997) lead in including such topics as use of media and interaction with native speakers which may not seem to fit with the narrow definition of word learning but do impact on the broader issue of vocabulary acquisition.

The second section, or background questionnaire, is designed to obtain some general information on the participant and his/her experiences (exposure to other languages, trips abroad, etc.). It also seeks to establish the attitudes of the participants

and, most importantly, their perception of their parents' attitudes towards language learning, as these features may have had an influence on the learners' assessment of their performance and may also influence their motivation for learning; as "more highly motivated learners use a significantly greater range of strategies than do less motivated learners…motivation is related to language learning purpose, which is another key to strategy use"(Oxford, 1990, p. 13). This last point illustrates one of the reasons why, in the background questionnaire, the questions on perceived parental beliefs and support, which might influence the learner's motivation, are relevant to the present research. As recommended by Dornyei, care was taken to limit the length of the questionnaire to try not to exceed 30 minutes completion time (Dornyei, 2007, p. 110) . The vocabulary used for the questions was deliberately simple and as 'child-friendly' as possible. The questionnaire was designed on Survey Monkey and the presentation involved four pages to be loaded onto the screen one at a time. The participants had to click on one out of five buttons (section 4.5, Chapter 6 and Appendix G for further details).

The WM Test, as mentioned earlier, was adapted from Walter's (2004) previous research. It was structured in the same way and had to be uploaded onto the researcher's personal laptop computer.

4.5 Research procedure

In the first instance, the participants were asked to:

1. Take the MLAT-E. The test is specific for this age group and answer books and CD-ROMs were obtained from the USA. In each of the three schools the test was administered by the researcher in the language class in the presence of another teacher. Only monolingual L2 learners took the test. The day following the MLAT-E test, the participants including the choice bilinguals were asked to take the vocabulary network test. Prior to the test, the researcher went through two examples of each part of the test in order to familiarise the participants with the procedure but did not suggest any possible or correct answers emphasizing that this was a personal choice and that there were no right or wrong answers. As mentioned earlier, the material was presented as computer screen choices, using specially designed webpages.

The test was administered online while the participants were in the computer room. The procedure was as follows. The participants were given a link to the website and a group : Group A for adult, B for CBs, C for YGL and D for L2 learners. The reason for

this separation was to facilitate the gathering of group data. The participants were told that they had to click on Part 1 (written part) and complete the page, but for Part 2 (aural) they had three pages to complete: 2a, 2b, 2c.due to the length of time taken to download the aural files.

In Part 1, the participants were given a written set of fifteen cue words each followed by a written list of six words (the order of the words in the list had been preliminary randomised). They were asked to tick the three words which they thought that they would most naturally link with the cue word ("which words do you link with the word on the left, which word goes with the word on the left"). In Part 2 the participants heard a recording through a loudspeaker at the front of the lab while looking at the cue word followed by six blank squares numbered 1-6 on the screen. The participants were asked to tick the three squares corresponding to the words that they had heard and which they would link to the cue-word. The titles of the word categories did not appear in the test (see Appendix F). Then the participants had to complete the questionnaire.

The questionnaire, as mentioned previously, had been designed on Survey Monkey.com and was accessible through the researcher's website. The participants were given the web address to access it. It was administered in the computer rooms of the respective schools in the presence of the researcher. In the first part of the questionnaire each question is followed by a choice of five possible answers corresponding to attitude statements based on the Likert scale (for a copy of the questionnaire see Appendix G). The participants had to click on one of the five buttons preceding each statement. Part 1: 'when learning a new word' had thirteen questions relating to the use of memory strategies. Part 2 'when I want to learn new words' had twenty-three questions relating to the use of cognitive strategies and Part 3 had ten questions relating to the use of metacognitive strategies. The questions were adapted from the SILL and the grouping and labelling of the questions followed O'Malley and Chamot's Taxonomy of Learning Strategies. In Part 4 background information on the participants was gathered.

Once the participants had completed the questionnaire, the last test could be attempted. They were asked to complete a short WM Test. The test was administered on an individual basis by the researcher in a room allocated for the task. It consists of a series of sentences ending in concrete nouns. These series get progressively longer. The participants had to complete two different tasks. First they were asked to decide whether

the sentence was logical (in illogical sentences the argument requirements of the verb were incorrect as in "the dinner cooks my sister"). Simultaneously they were asked to remember the last word of each of the sentences in the series. The test was stopped when the participants could not recall the last words in three series of a set. Participants attempted a set of five series in each language. The lengths of the series were from two sentences to five sentences (therefore five two sentences series, five three sentences series etc.) (See Chapter 7 for more in-depth details and Appendix F). Every effort was made to provide reassurance and to put the participants at their ease. They were given a practice session prior to attempting the test and were invited to raise any concerns. The time taken to judge the sentences was taken into account when calculating the WM score.

Finally, the young participants took part in a discussion led by the researcher and their teacher on techniques for the retention of vocabulary which is described in more detail in section 4.6. This discussion was not part of the study but was included in order to share benefits derived from the study. Care was taken throughout to follow proper ethical guidelines which are discussed in the next section.

4.6 Ethical Framework

BAAL's ethical guidelines were followed. Access to schools was obtained with a formal application to the relevant Head Teacher. Teachers and pupils were approached and parental and students' consents were sought. Assurances on anonymity and confidentiality of certain data were given to all concerned. Care was taken when handling the data to preserve the anonymity of the participants by removing names and replacing them by numbers or codes.

4.6.1 Ethical issues

The main ethical issues which were considered prior to the study taking place concerned the participants. The researcher, being a language teacher, had been recently subject to a Criminal Records Bureau check. As the participants were under age, the Head Teachers' consents were sought as well as the parents' consents (see appendices B and C). Informed consent from the children was sought after an initial meeting where the researcher outlined the aims of the research and explained how she would ensure the anonymity of those who decided to participate. The data collection method was explained (see foreword to the questionnaire). All legal requirements set down by the Data Protection Act (1998) were complied with and no particularly sensitive data was collected. The participants were also made aware of the possible cost which they might

incur if they decided to participate (namely the loss of approximately 4 x 3/4 hours of teaching time plus the last session which consisted of the whole cohort of participants taking part in a semi-structured discussion led by the researcher and their teacher on techniques for the retention of vocabulary). Completing the tests and questionnaire caused the participants to reflect on their learning techniques and the discussions which ensued facilitated the sharing of ideas and the acquisition of new strategies for learning. These discussions were not recorded and did not form part of the study. They were initiated at Head Teachers' requests in order to justify the study within the framework of the curriculum as well as to emphasize the benefits that they would derive from taking part (a better understanding of the process of vocabulary acquisition and of the strategies which they could use to enhance this process). No financial or other material incentives were offered. A letter explaining the purpose of the study and what it would entail for its participants was given to all the pupils (see Appendices B and C). This letter was also reproduced in the vocabulary test and participants had to tick a box to say that they had read 'the information sheet' before their answers were registered. The above mentioned letter included the researcher's e-mail address and the Institute of Education's address as well as the name of the researcher's supervisor. Participants were encouraged to voice their difficulties, questions or concerns about the various areas of the study and their right to withdraw from the research was pointed out. The children were asked if they wished to be informed of the findings. In such cases, a summary of their results was made available to them. All possible care was taken to ensure that the research complied with Articles 3 and 12 of the United Nations Convention on the Rights of the Child.

4.7 Conclusion

In conclusion the process of choosing the research method and design for this study took account of those used by other researchers in the field for similar work. It has also factored in the limitations of participants' knowledge, resources, time availability and geography. Due consideration was given to tailoring tests to cover the research questions. Care was also taken to ensure that the observations could be quantified in a manner compatible with the production of meaningful findings. The results of this process were that the MLAT-E test was chosen as a readily available and reliable means of identifying the YGLs. The remaining three components targeted to generate the comparative data were all designed by the researcher with computer screen choices and

two of them were conducted through the Internet. The questionnaire's main purpose was to throw some light on the use of learning strategies and beliefs. The Vocabulary Network Test aimed to give indications of the structure of the word web rather than the depth of word knowledge. The WM test was designed to provide comparative data on lexical storage and access. Finally, due consideration was given to the ethical aspects of all the research techniques employed.

The next three chapters present the analysis of the results from the MLAT-E Test and the three instruments.

CHAPTER 5 VOCABULARY NETWORK DATA COLLECTION AND ANALYSIS

5.1 Introduction

Lexical items do not just have a referent (an object or person to which the word refers), they also have a written and phonological representation and grammatical features. Therefore, the way in which they are networked with other elements of the lexicon is complex and may not even be static, evolving according to proficiency, knowledge, experience, time and the age of the learners, and possibly varying between different groups of learners. As already mentioned in Chapters 1, 3 and 4, this study looks at the learning of lexis and, in particular, how words are encoded and networked in the lexicon. It aims to broaden our knowledge of vocabulary acquisition by investigating how different groups of learners network and encode their vocabulary. This chapter summarises both the type of participants and the methods used to generate the data (see Chapter 4 for more detailed descriptions). However, the principal aim of this chapter is to present and examine the analysis of the results for the Vocabulary Network Test (VNT).

5.2 The participants

The composition of the sample has already been detailed in Chapter 4 section 4.3, however, in summary, it is worth noting that for this particular vocabulary test one hundred and eleven participants took part. Young L2 learners took part in the MLAT-E Test in their respective classrooms under examination conditions. All the instructions were given on a recording which was played to the pupils. Individual leaflets, pencils and rubbers were distributed to all pupils. The researcher reminded the participants of the purpose of the study and their right to withdraw at any time. The scoring of the test was done by hand and the results were standardized following the standardization procedures and norms given in the MLAT-E instruction manual. The MLAT-E was designed for learners from US Grades 3 to Grade 6. The United Nations Educational Scientific and Cultural Organization (UNESCO) recognizes seven levels of education in its International Standard Classification System (ISCED), from Level 0 (pre-primary education) through to Level 6 (second stage of tertiary education). UNESCO's

International Bureau of Education maintains a database of country specific education systems and their stages (IBE,2010-2011) . It shows UK children aged 10-11 years old correspond to Year 6 while US children 10-11 years old correspond to Grade 5. Thus, in this study, as both monolingual groups belong to Year 6, the scoring of the MLAT-E is based on US Grade 5. The Manual provides the percentile norms table for raw total scores of the test by sex and grade (see Appendix I for a copy of percentile norms for Grade 5). In the MLAT-E, girls were found to achieve higher scores than boys. For this reason, the researcher looked at whether the sex of participants had an influence on their use of vocabulary learning strategies (see Chapter 6 Table 6.41 p. 224). The difference was not significant.

From Appendix I one can see that the overall mean score for all boys in the norming group is 88.9 and for all girls it is 94.7. The L2 learners group in this study performed better than this with an overall mean score of 106.1. However, it must be noted that these norming scores are based on American learners at Grade 5. Most American children begin language learning in Middle School at the age of 14. "A monolingual English-only hegemony seems to dominate American society" (Spolsky,B. 2011). Thus, the higher mean for the standard British learner's group in this study may be the result of small cultural and educational differences. However, in the present study, we are not comparing American and British children's abilities at languages. The test's main purpose is to differentiate the two groups of monolingual learners.

Thirty pupils who were identified as potentially gifted at languages took part in the Vocabulary Network Test. A random sample of thirty children who had not been identified as gifted linguists formed the L2 group. All the pupils in the study had been learning French for a minimum of three years. The general level of their vocabulary corresponded to the end of Key Stage 2 and part of Key Stage 3. The three schools followed the same curriculum for French and used the same methods and course books. Most of the words used in the VNT were part of the French curriculum in the participating schools. However, a randomized list of vocabulary was given to the teachers several months prior to the test taking place, to ensure that they had the opportunity to incorporate the few exceptions into their lesson plans. Twenty-one choice bilingual participants also came from these three schools and from other private schools in the area. In view of the rarity of participants of this category, this cohort is smaller than the other three. Thirty adults, who were the group with the most advanced and

developed lexicon, were the reference or ‘expert’ group for this experiment. They were French native speakers resident in France.

Tables 5.1 and 5.2 overleaf have been included to show the spread of the sixty individual results of the MLAT-E test for the two groups of monolingual second language learners. The results for the YGL group are given in Table 5.1. The range on the test total extends from 116 to 125. The standardization and norms provided with the test are based on sex and grade. The raw score of each participant equates a percentile point. For example, a score of 125 has a percentile rank of 99 indicating that the participant’s score surpasses 99 per cent of the school children of that age.

Part 2: matching words tests sensitivity to grammar structure and Part 4 : number learning is testing auditory alertness and ability to remember. These are the two components showing the greatest variation of results. Harley and Hart (Hartley and Hart, 1997) have studied whether at different ages, different components of aptitude were the closest in predicting potential success. They found that these changed with age and that for younger children, the memory components were more relevant in predicting success. Part 4 has a memory component, and this result is therefore consistent with Harley’s findings. However, Part 2 (sensitivity to grammatical structures) also shows greater individual variation, indicating greater individual differences in syntactical development.

As mentioned above, Tables 5.1 and 5.2 overleaf detail the results of the MLAT-E for the two groups of monolinguals.

Table 5.1 : Results of the MLAT-E Test for the YGL group.

Results of the YGL group of monolingual learners					
ID	Part 1 Hidden Words	Part2 Matching Words	Part 3 Rhymes	Part 4 Number Learning	Total
70	29	26	45	25	125
71	28	26	45	25	124
67	29	24	45	25	123
72	28	25	45	25	123
62	27	24	45	25	121
88	28	23	45	25	121
89	26	25	45	25	121
63	28	22	45	25	120
64	27	23	45	25	120
69	25	23	45	27	120
82	26	24	45	25	120
87	25	26	45	24	120
79	28	21	45	25	119
90	25	24	45	25	119
66	25	24	45	24	118
75	25	23	45	25	118
83	27	23	43	25	118
85	27	21	45	25	118
68	26	22	45	24	117
73	26	23	44	24	117
74	29	24	44	20	117
77	26	23	44	24	117
81	28	19	45	25	117
61	28	18	45	25	116
65	29	23	45	19	116
76	26	22	45	22	116
78	22	25	44	25	116
80	26	23	45	22	116
84	24	24	45	23	116
86	26	22	44	24	116

Table 5.2 **Results of the MLAT-E Test for the L2 learners group**

Results of the MLAT-E for the L2 group of monolingual learners					
ID	Part 1 Hidden Words	Part2 Matching Words	Part 3 Rymes	Part 4 Number Learning	Total
102	25	20	45	25	115
107	21	24	44	25	114
101	25	22	43	23	113
95	23	22	45	22	112
110	23	20	45	24	112
113	22	22	43	25	112
118	20	22	45	25	112
96	24	17	45	25	111
114	24	20	42	25	111
91	24	16	45	25	110
100	25	20	45	25	110
108	26	16	43	25	110
120	24	24	44	18	110
97	26	23	45	15	109
98	15	25	45	24	109
94	20	23	41	24	108
103	16	27	45	25	108
119	18	23	44	22	107
109	21	22	43	20	106
117	15	21	45	25	106
105	22	22	44	17	105
106	25	19	43	17	104
116	21	14	45	24	104
99	25	21	45	11	102
93	23	19	45	13	100
115	20	15	41	21	97
112	14	17	41	23	95
104	17	18	45	12	92
111	15	11	43	22	91
92	24	15	42	7	88

Table 5.1 shows the results of the participants who achieved 90% or more in the test and therefore represent the top 10% of learners. The range of results is much smaller than that of the L2 learners (Table 5.2). A score of 88 would, according to the standardization and norms given with the test correspond to the percentile rank of 30. Therefore the percentile range for the L2 learners is from 85 to 30. Table 5.3 gives the descriptive analysis of the results.

Table 5.3 Mean of Total Aptitude Test per Group

Group	N	Minimum	Maximum	Mean	Std. Deviation
YGL	30	116	125	118.83	2.60
L2	30	88	115	106.10	7.16

As previously noted, the much higher standard deviation relates to the L2 learners group which shows a much greater variability in the scores than in the YGL group. In order to see the significance of the difference between the two groups an ANOVA has been calculated.

Table 5.4: ANOVA of Aptitude Scores for the Two Groups of Monolingual participants

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2432.07	1	2432.07	83.82	0.00
Within Groups	1682.87	58	29.02		
Total	4114.93	59			

F=83.82 with 1 degree of freedom $p<0.001$. This result is very significant; therefore, the two groups vary significantly in their mean aptitude scores. It now is a question of finding out whether there are other significant differences between them and how they compare with the CB group.

The next two sections detail the processes of data collection and the recording of variables prior to starting the analysis of the Vocabulary Network Test results.

5.3 Data collection

The Vocabulary Network Test, for the young participants, was conducted in school in the computer room with the teachers and the researcher present so that any queries could be addressed. This test was designed and constructed specifically for this study by the researcher (details of the test design and construction have already been given in Chapter 4. See also Appendix F). The test was uploaded onto the researcher's website. It was accessed online as computer choice screens and the results were coded and automatically sent to the researcher's mail box. As mentioned in the previous chapter, the test consisted of two parts: Part 1, which was written rather than aural, consisted of fifteen stimulus words each followed by six other words randomly listed. The participants had to select the three words which they would link or connect with each stimulus word. Given that the purpose of this test was to assess the differences in types of word connections, familiar vocabulary was desirable. Words were selected from the vocabulary themes normally studied in the first three years of learning French (Key Stages 2 and 3). The responses for this part were recorded under Test 1. In Part 2 the stimulus words were recorded in an audio format. The participants could hear the words and make their choices by clicking on a tick box. Boxes were numbered 1 to 6 in the text and participants had to select and tick three boxes corresponding to their choices. The responses for this part of the test were recorded under Test 2. The six choice words were classified using Read's categories (see section 4.2.2 for further details). The presentation of the six words was random so as to avoid repetitive patterns which might have influenced the type of responses given by the participants.

For this experiment, as the researcher is trying to identify differences in responses between groups, a design involving all the groups sitting the same experiment in similar experimental conditions (on line) was chosen as the one which would yield the most relevant results.

5.4 Recording of the variables

For the purpose of the analysis, each item in the dataset had to be given a specific variable name; some referring to information (name, sex, group etc.), and others to responses given to each stimulus word (paradigmatic, rhyming etc.). Applying this

framework, the researcher constructed a data base. The information was encoded in SPSS as follows:

Table 5.5 Data coding

Variable	**SPSS Variable name**	**Coding instructions**
Identification number	ID	Number assigned to each test
Group	Group	1= adults 2= CBs 3= YGLs 4= young L2 learners
Gender	Gender	1= male 2= female
Responses	Unique variable names for each test/word/category combination (eg: T1W1C1 = Test 1, word 1, category 1)	0= no 1= yes

The various categories were coded C1-C7

C1 = Paradigmatic Coordinate (words belonging to the same word class and the same taxonomy, for example dog / horse).

C2 = Paradigmatic Synonymic (synonymic responses from the same word class, for example sleepy / drowsy).

C3 = Syntagmatic (words from different word classes that are linked syntactically, for example read / book).

C4 = Rhyming or clang responses (words that are linked phonologically rather than by meanings, for example pain / drain)

C5 = Characteristic (descriptive or partonomic meaning constituents).

C6 = Associative metonymic. (closely associated words such as crown and royalty).

C7 = Missing (missing answers).

An example for the various categories can be seen below:

Stimulus word	C1	C2	C3	C4	C5	C6
Chemise	*pantalon*	*blouse*	*porter*	*cerise*	*confortable*	*costume*

5.5 Results and analysis

The quantitative results present the overall number of responses per category of words chosen; hence detailing the type of links made by the different groups of participants. The following tables and graphs were generated using SPSS which yielded the preliminary descriptive analysis of the variables in this thesis. In order to generate these tables the total number of responses for each group in each of the categories was recorded onto the database. Due to the negligible percentage of non-responses (attributed to two or three young participants who had not pressed strongly enough on the computer key), these responses were recorded as C7 and illustrated in Figures 5.7, 5.9 and 5.10. They were also included in the descriptive statistics but they were not used in the analysis in the study.

The following section presents the descriptive analysis of the results per category of association for the four groups of participants.

5.5.1. Descriptive analysis of results

This section describes the characteristics of the groups in relation to the type of responses chosen by them in order to verify the assumptions made by the research question which was that there are group differences in the way in which the learning vocabulary is networked. These differences will be analysed in this section, and judgements on the significance of observed differences between the groups will be made.

Table 5.6 shows the results of all the groups for the first part of the test, that is the written part, and the first category which is Paradigmatic Coordinate.

Table 5.6 Test 1 (Written) Number of C1 responses (Paradigmatic Coordinate).

Group	Word Category	Test	N	Mean		Std. Deviation
				Statistic	Std. Error	
Adult	Paradigmatic Coordinate (C1)	Test 1 (Written)	30	3.97	0.39	2.14
Choice Bilinguals	Paradigmatic Coordinate (C1)	Test 1 (Written)	21	5.10	0.58	2.66
Y-Gifted Linguists	Paradigmatic Coordinate (C1)	Test 1 (Written)	30	6.03	0.37	2.03
L2 Learners	Paradigmatic Coordinate (C1)	Test 1 (Written)	30	6.43	0.29	1.59

The number of participants was the same for each group that is thirty except for the CBs due to the difficulty in recruiting this sample within a limited geographical area (see Chapter 4).

The group with the highest number of responses for this category is the L2 learners as indicated by the mean: 6.43. In fact the younger participants seem to favour this type of response, linking *livre* (book) with *cahier* (exercise-book) rather than *lire* (to read). This could be due to the importance given to thematic relations when presenting L2 vocabulary in school. The CBs had less paradigmatic coordinate responses than the other groups of young learners. The adult group recorded the lowest percentage of paradigmatic coordinate responses. However, the standard deviation of all the groups indicates substantial variations within each group. This is to be expected as there are important individual differences in deep word knowledge and this would translate into differences in inter-word connections. So, for the written part of the test, we note a difference between the adult group and the young pupils with the choice bilinguals' responses closer to the adult group than those of the other two groups of young learners.

Table 5.7 Test 2 (Audio) Number of C1 responses (Paradigmatic Coordinate)

Group	Word Category	Test	N	Mean		Std. Deviation
				Statistic	Std. Error	
Adult	Paradigmatic Coordinate (C1)	Test 2 (Aural)	30	3.83	0.36	1.97
Choice Bilinguals	Paradigmatic Coordinate (C1)	Test 2 (Aural)	21	3.76	0.53	2.43
Y-Gifted Linguists	Paradigmatic Coordinate (C1)	Test 2 (Aural)	30	7.30	0.60	3.30
L2 Learners	Paradigmatic Coordinate (C1)	Test 2 (Aural)	30	7.97	0.55	3.02

This second table shows the results of all the groups for the first category of responses namely paradigmatic coordinate in the second part of the test which was the audio part. The young gifted linguists and L2 learners have the highest number of responses (mean number of responses of 7.30 and 7.97 for this category of word). There are also even more substantial variations within these groups as indicated by the standard deviation. The CB and adult groups have lower means than the other groups and their means are very close (3.76 and 3.83). Their respective standard deviations also indicate a more homogenous set of responses within their groups. Therefore, for the aural part of the test, there is a clear divide: adult and CB groups versus L2 and YGL learners. The third table shows the paradigmatic synonymic responses to Test 1; that is to say the written part of the test.

Table 5.8 Test 1 Number of C2 responses (Paradigmatic Synonymic)

Group	Word Category	Test	N	Mean		Std. Deviation
				Statistic	Std. Error	
Adult Choice Bilinguals	Paradigmatic synonymic (C2)	Test 1 (Written)	30	7.13	0.59	3.20
Y-Gifted Linguists	Paradigmatic synonymic (C2)	Test 1 (Written)	21	8.76	0.50	2.30
L2 Learners	Paradigmatic synonymic (C2)	Test 1 (Written)	30	10.20	0.38	2.06
			30	10.37	0.41	2.24

Once again, as seen by each of the means, the three groups of young participants are more prone to choose this category; linking *verre* (glass) with *gobelet* (goblet). However, in this particular example, the fact that *gobelet* and *goblet* are cognates may have increased the incidence of the young participants choosing this word. Nevertheless, they have a higher number of responses of this type when compared with the adults. However, the means of L2 and YGL groups are similar for this word category (10.20 and 10.37), as can be seen above. Whereas the CBs' mean number of responses is midway between the adults and the other two groups of young learners. The two groups with the highest number of responses for this category are the YGL and the L2 learners and the two groups with the least number of responses are the adults and the CBs which tends to confirm the divide exhibited on Table 5.7 .

A similar pattern is shown in Table 5.9 for Test 2 (aural).

Table 5.9 Test 2 (Aural) Number of C2 responses (Paradigmatic Synonymic)

Group	Word Category	Test	N	Mean		Std. Deviation
				Statistic	Std. Error	
Adult Choice Bilinguals	Paradigmatic synonymic (C2)	Test 2 (Aural)	30	10.83	0.38	2.07
Y-Gifted Linguists	Paradigmatic synonymic (C2)	Test 2 (Aural)	21	11.52	0.39	1.78
L2 Learners	Paradigmatic synonymic (C2)	Test 2 (Aural)	30	10.20	0.31	1.67
			30	9.27	0.32	1.74

In this table, adults and choice bilingual groups have the highest scores in category C2 (paradigmatic synonymic). Therefore, it would appear that the adults are helping us to understand the differences between choice bilinguals and young gifted learners by making a parallel between the responses of the adult group and those of the CB group when compared with the other two groups. However, the difference between the mean of the adult group and the mean of the YGL group is only 0.63. So, the YGL group is closer to the adult and CB groups than the L2 learners and there is a difference between L2 learners and YGL which might be significant. Further analysis in the next section of this chapter will test the significance of these differences. A much clearer picture will emerge when we aggregate all C1 and C2 choices (that is to say both types of paradigmatic choice) which will be presented in section 5.4.3 of this chapter .

The next two tables record the means of the choices of the C3 word category (syntagmatic) per group for Tests 1 and 2.

Table 5.10 Test 1 Number of C3 responses (Syntagmatic)

Group	Word Category	Test	N	Mean		Std. Deviation
				Statistic	Std. Error	
Adult	Syntagmatic (C3)	Test 1 (Written)	30	12.47	0.22	1.20
Choice Bilinguals	Syntagmatic (C3)	Test 1 (Written)	21	12.86	0.35	1.62
Y-Gifted Linguists	Syntagmatic (C3)	Test 1 (Written)	30	10.17	0.35	1.90
L2 Learners	Syntagmatic (C3)	Test 1 (Written)	30	9.03	0.46	2.51

The adult and the CB groups have the highest number of responses for this category (12.47 and 12.86 respectively) which means, for instance, that they linked *livre* (book) with *lire* (to read) more often than the other groups; that is they choose words from different word classes. It should be remembered that the test design avoided the use of antonyms (opposite words such as *man* and *woman* or *black* and *white*) which would have produced more paradigmatic responses (responses from the same word class). It is also worth noting that the participants were asked "which words can you link with the target word" possibly introducing a syntactical element to the test as opposed to a pure word association.

The group of participants which had the third highest number of C3 responses was the YGL group; the L2 learners, on average, had the least number of C3 responses (with a mean of 9.03). It should be noted that the L2 group have the highest standard deviation (2.51) showing more individual differences within the group than in any of the other three groups of participants. The statistical pattern of the choices made for this particular word category by the different groups can be more clearly visualized using Figure 5.3 on page 159. This further reinforces the pre-mentioned divide. The next table shows the C3 responses for the aural part of the test.

Table 5.11 Test 2 Number of C3 responses

Group	Word Category	Test	N	Mean		Std. Deviation
				Statistic	Std. Error	
Adult	Syntagmatic (C3)	Test 2 (Aural)	30	11.83	0.32	1.74
Choice Bilinguals	Syntagmatic (C3)	Test 2 (Aural)	21	9.95	0.43	1.97
Y-Gifted Linguists	Syntagmatic (C3)	Test 2 (Aural)	30	8.00	0.45	2.45
L2 Learners	Syntagmatic (C3)	Test 2 (Aural)	30	6.80	0.50	2.76

Table 5.11 follows the same pattern as the previous table. However, it is worth noting that the difference between the means of the YGL group and the L2 learners is greater in Test 2. This may be due to greater phonological development in the YGL group enabling this group result to be nearer to the CB group. This hypothesis will be further reinforced in the next set of tables when comparing the responses to the C4 (rhyming) category of words.

Table 5.12 Test 1(Written) Number of C4 responses (Rhyming or Clang)

Group	Word Category	Test	N	Mean		Std. Deviation
				Statistic	Std. Error	
Adult	Rhyming/Clang (C4)	Test 1 (Written)	30	0.43	0.18	0.97
Choice Bilinguals	Rhyming/Clang (C4)	Test 1 (Written)	21	0.90	0.27	1.22
Y-Gifted Linguists	Rhyming/Clang (C4)	Test 1 (Written)	30	2.17	0.32	1.72
L2 Learners	Rhyming/Clang (C4)	Test 1 (Written)	30	3.47	0.46	2.53

C4 or clang responses are semantically unrelated but they sound similar to the stimuli words, consequently they elicit a phonological association, as in linking the word *train* with *pain* in the test. The mean for the number of C4 or clang responses for Test 1 (the written part of the test) is higher for both the YGL group and the L2 learners than for the adult and the CB groups. Native speakers would tend to give less clang or nonsense responses and the number of clang responses tends to diminish with age as seen in previous studies (Ervin, 1961). A more in depth inspection of the data showed that the adult who had given most clang responses was partially sighted and relied more on the phonological aspects of words.

The next table shows the mean clang responses for each group for Test 2 (the audio part).

Table 5.13 Test 2 Number of C4 responses

Group	Word Category	Test	N	Mean		Std. Deviation
				Statistic	Std. Error	
Adult	Rhyming/Clang (C4)	Test 2 (Aural)	30	0.87	0.16	0.86
Choice Bilinguals	Rhyming/Clang (C4)	Test 2 (Aural)	21	2.29	0.53	2.41
Y-Gifted Linguists	Rhyming/Clang (C4)	Test 2 (Aural)	30	3.63	0.43	2.36
L2 Learners	Rhyming/Clang (C4)	Test 2 (Aural)	30	4.87	0.50	2.73

In Table 5.13 the differences between the means of the four groups for the audio part of the test show a higher level of responses from the three groups of children when compared with the adults who have more developed phonological processing and depth of word knowledge due to longer exposure to the language. Predictably, the CB group who had been exposed to the French language for longer than the other two groups demonstrated a greater ability to distinguish how sounds are combined in French. In this test, this phonological advantage results in them producing less clang responses than the other two groups of young learners. However, the standard deviations of all the three

groups of young participants are between 2.36 and 2.73 as compared with 0.86 for the adults showing much greater individual differences within the three groups of children.

The next table shows the mean responses of the C5 category (characteristic); such as choosing *transparent* in response to the stimulus word *verre* (glass).

Table 5.14 Test 1 Number of responses C5 (Characteristic)

Group	Word Category	Test	N	Mean		Std. Deviation
				Statistic	Std. Error	
Adult	Characteristic (C5)	Test 1 (Written)	30	8.60	0.46	2.50
Choice Bilinguals	Characteristic (C5)	Test 1 (Written)	21	7.29	0.43	1.98
Y-Gifted Linguists	Characteristic (C5)	Test 1 (Written)	30	7.27	0.44	2.42
L2 Learners	Characteristic (C5)	Test 1 (Written)	30	7.20	0.38	2.09

The highest mean score of responses for the written test in category C5 was recorded by the adults. However, the standard deviations of all the groups indicate substantial variations within each group. The mean scores for all the young participants were very close together suggesting no group differences in their responses of this category of word.

Table 5.15 shows the pattern of responses for the same category of word but this time tested orally. It repeats the division, seen previously, between the adult and CB groups and the other groups; further reinforcing the perception of a dichotomy between the adult and the CB groups and the other two groups of young learners.

Table 5.15 Test 2 Number of responses C5 (Characteristic)

Group	Word Category	Test	N	Mean		Std. Deviation
				Statistic	Std. Error	
Adult	Characteristic (C5)	Test 2 (Aural)	30	7.70	0.41	2.25
Choice Bilinguals	Characteristic (C5)	Test 2 (Aural)	21	7.81	0.36	1.63
Y-Gifted Linguists	Characteristic (C5)	Test 2 (Aural)	30	6.33	0.37	2.02
L2 Learners	Characteristic (C5)	Test 2 (Aural)	30	6.57	0.36	2.00

It would also seem that Test 2 shows a closer relationship between the adult and the CB groups on this category of response. This tends to suggest that easier word recognition, due to greater phonological knowledge, may have been responsible for this result, as this was also the case in previous responses to Test 2 (aural test). Both the adult and the CB groups have a greater knowledge of the words: their meaning, word class, usage and also their phonological properties. This would translate into more meaningful associations as well as more logical ones.

Finally, Table 5.16 (Test 1 Written) and 5.17 (Test 2 Aural) show the mean scores of the groups for the last category of word, namely C6 (associative/metonymic) for example, the association between *cuisine* (cooking) and *nourriture* (food).

Table 5.16 Test 1 Number of responses C6

Group	Word Category	Test	N	Mean		Std. Deviation
				Statistic	Std. Error	
Adult	Associative/metonymic (C6)	Test 1 (Written)	30	12.40	0.33	1.79
Choice Bilinguals	Associative/metonymic (C6)	Test 1 (Written)	21	9.86	0.55	2.50
Y-Gifted Linguists	Associative/metonymic (C6)	Test 1 (Written)	30	8.87	0.29	1.59
L2 Learners	Associative/metonymic (C6)	Test 1 (Written)	30	8.00	0.40	2.20

In Table 5.16 the group with the highest scores are the adults who, once again are using their depth of word knowledge to produce metonymic answers. However, in Test 2 (as can be seen below in Table 5.17), although both adult and CB groups 'scores are higher than those of the other two groups, the results are in fact very close.

Table 5.17 Test 2 Number of responses C6

Group	Word Category	Test	N	Mean		Std. Deviation
				Statistic	Std. Error	
Adult	Associative/metonymic (C6)	Test 2 (Aural)	30	9.93	0.31	1.68
Choice Bilinguals	Associative/metonymic (C6)	Test 2 (Aural)	21	9.57	0.41	1.89
Y-Gifted Linguists	Associative/metonymic (C6)	Test 2 (Aural)	30	9.33	0.31	1.71
L2 Learners	Associative/metonymic (C6)	Test 2 (Aural)	30	9.30	0.35	1.92

There was, therefore, very little group difference for this category of word.

In summary, this section has provided an introduction to the data analysis of the Vocabulary Network Test. It has highlighted the fact that there are group differences in the types of response given to the test and that for C1 (paradigmatic coordinate) Tests 1 and 2, C2 (paradigmatic synonymic) Test 1, C3 (syntagmatic) Tests1 and 2, C4 (clang responses) Test 1 and C5 (characteristic) Test 2 the mean of the responses from the CB and adult groups appeared to be the closest. However, more focused statistical analyses are needed to examine whether the differences between the groups are statistically significant. These differences will be examined in the next section.

5.5.2 T-test analysis

A series of independent sample t-tests was conducted to compare the mean scores of two different groups of people at a time and to explore group differences in response scores. The aim was to determine whether there was a statistical difference between the mean scores of two groups (for example, whether the YGL group differs significantly, in terms of their vocabulary connections, from the CB group). This is consistent with the research objective to identify similarities and differences between these two groups of successful learners of French in the storage of and access to lexis. As explained in Chapter 3, this storage and access is facilitated by an efficient vocabulary network. The adult native French speakers, who have developed a more advanced vocabulary network due to their greater depth of word knowledge, set the bench mark; whereas the L2 learners can be viewed as belonging to a group of standard language learners. In statistical terms the researcher is testing the probability that two sets of scores (for example adults and CBs) come from the same population. These tests also show the differences between written and oral connections for each word category. A table summarising all the tests can be seen on the following page (Table 5.18): However, there is a caveat. Each t-test calculates with 95% confidence. Thus in each test there is a 5% chance of a false positive finding significant differences between groups when none exists. Over many tests the probability of such errors multiplies, one must interpret the results with caution, treating each test separately and not as a generalised model. The summary table therefore represents an exploratory analysis. A much more in depth analysis using regression is shown on page 165.

Table 5.18 Summary of t-tests results

	Paradigmatic Coordinate		Paradigmatic Synonymic		Syntagmatic		Rhyming/ Clang		Characteristic		Associative/ metonymic	
Groups -	Tests		Tests		Tests		Tests		Tests		Tests	
	1	2	1	2	1	2	1	2	1	2	1	2
Adult/CB	NS	NS	NS	NS	NS	*	NS	*	*	NS	*	NS
Adult/GL	*	*	*	NS	*	*	*	*	*	*	*	NS
Adult/L2	*	*	*	*	*	*	*	*	*	*	*	NS
CB/GL	NS	*	*	*	*	*	*	NS	*	*	NS	NS
CB/L2	*	*	*	*	*	*	*	*	NS	*	*	NS
GL/L2	NS	NS	NS	*	NS	NS	*	NS	NS	NS	NS	NS

A=Adults, CB= Choice bilinguals, GL= Young gifted learners, L2= Young language 2 learners.

NS = The 2-tailed: p is more than 0.05, not statistically significant difference.

* =The 2-tailed: p is less than 0.05, statistically significant difference between the groups.

Comparing responses from adults and bilinguals, the majority of the results find no statistically significant differences between the two groups. One exception is C4T2 which corresponds to rhyming or clang responses which, as seen from previous studies, are more likely to be given by children and also more likely to occur aurally. For C3T2 (syntagmatic responses) in the audio part of the test, there are statistically significant differences between the adult and all the other groups. Similarly, in both C5T1 (characteristic) and C6T1 (associative/metonymic) there are differences between the adult group and the other groups. The adults who have a wider vocabulary are more likely to give a greater number of C5 and C6 responses. It would appear, therefore, in view of the distribution of responses that, for most types of responses, there is not a statistical difference in the mean scores for the two groups and, that adults and CBs do not differ significantly in their vocabulary connections.

The same could not be said of the other two groups. The L2 learners are statistically different from the adult group on all the categories of words except C6T2 the

metonymic category. This will be discussed later in this chapter with the analysis made using a regression model. The YGL and L2 learners are, for most types of responses, not statistically different. There are only two exceptions: for C2 responses (paradigmatic) in Test 2 which may be due to YGLs having greater depth of word knowledge enabling them to use synonyms and for C4 T1 responses (clang responses) where, as seen in the descriptive analysis of Table 5.12, the mean of L2 choices for C4T1 was higher (3.47 compared with 2.17 for YGLs). Further statistical investigation will follow in section 5.5.3 to corroborate these findings.

The following pie charts give a more visual impression of the results thus far. They show the frequency of responses for each category of word and for each group of participants. Here the results for both tests (Test 1 with the written stimuli and words and Test 2 with the audio file) have been added together in order to add more responses and have a clearer visual representation of the results. In order to help compare the groups, two pie charts per page have been included. It makes the dichotomy of the distribution clearer showing adult and CB groups (in blue and green) versus YGL and L2 learners groups (in beige and purple).

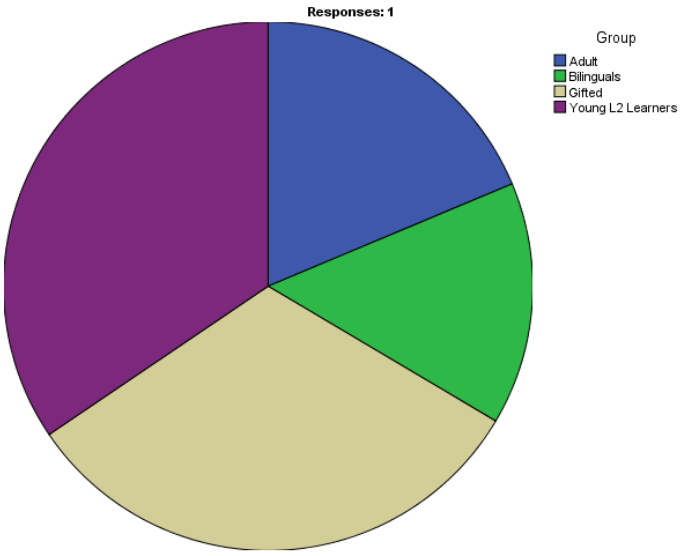


Fig 5.1 Frequency of C1 responses per group

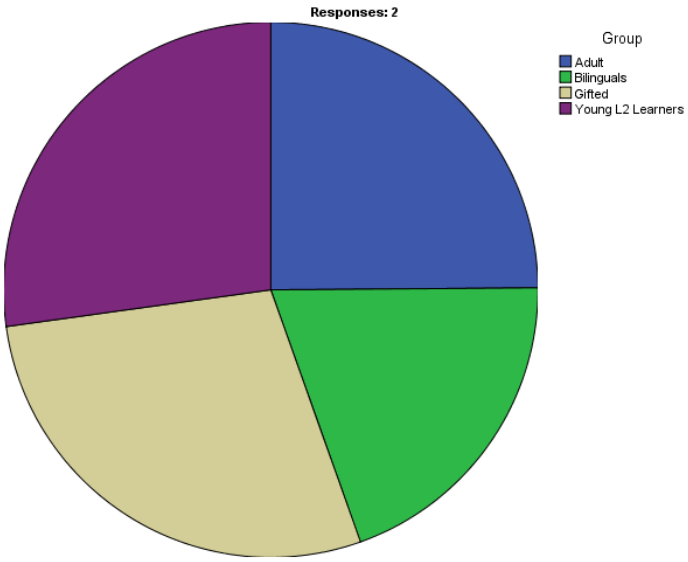


Fig 5.2 Frequency of C2 responses per group

The adult group (blue on the chart) and the CB group (green on the chart) show the smallest proportion of C1 and C2 choices (paradigmatic). The YGL (beige) and the L2 learners (purple) have the largest mean number of C1 and C2 responses.

The similarity is not so strong for C3 responses (see Figure 5.3) as we have already established that there was a difference of their mean choices in Test 2 (the aural part) where both the adult and the CB groups recorded the highest number of mean responses but in T1 (the written test) there was no statistically significant differences between the groups.

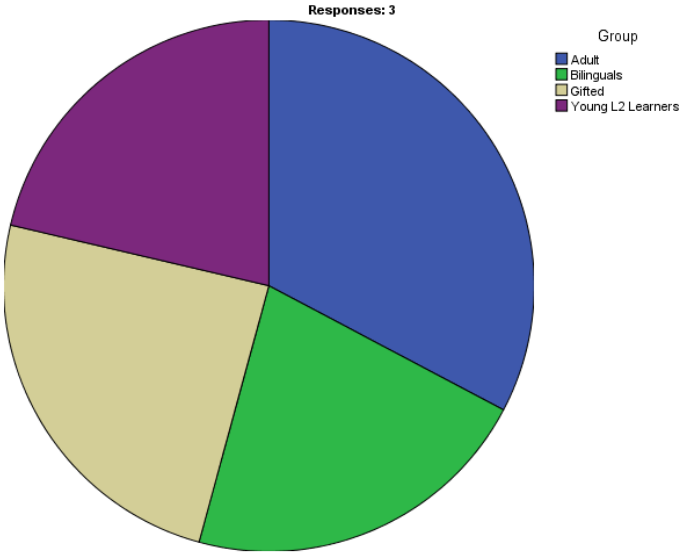


Fig 5.3 Frequency of C3 responses per group

It must also be noted that the smallest number of mean responses for this category was from the L2 group. This will be further discussed at the end of this chapter.

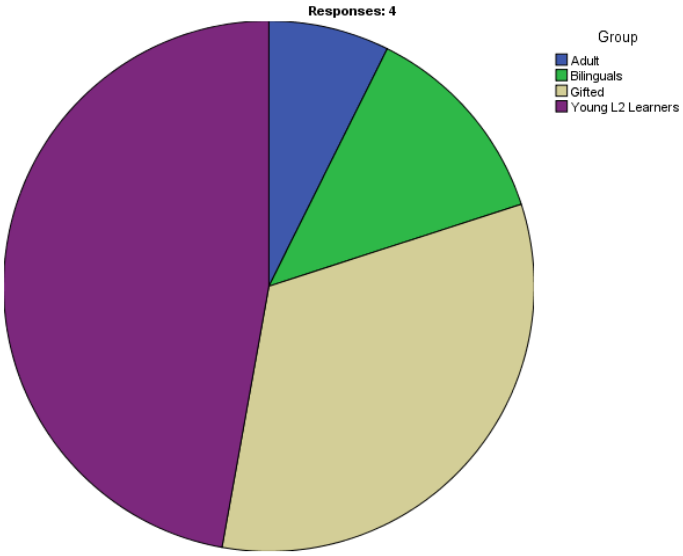


Figure 5.4 Frequency of C4 responses per group

Figure 5.4 (above) illustrates the frequency of C4 (Clang) responses. Predictably, as mentioned earlier (see page150-151), the adults and the CB group have the smallest

proportion of clang responses. It must be noted that the L2 learners have the largest proportion of clang responses. This suggests that an inferior ability to recognize phonemes has influenced the choice of responses. It also further reinforces the point made by Read who, when comparing native speakers and L2 learners, stated that "second language learners produce associations that are much more diverse and unstable; often their responses are based on a purely phonological rather than semantic link with the stimulus word" (Read, 1993, p. 358). However it is worth noting that the YGL group made less clang responses than the L2 group.

Figure 5.5 below illustrates the proportion of C5 responses (characteristic) made by the four groups of participants.

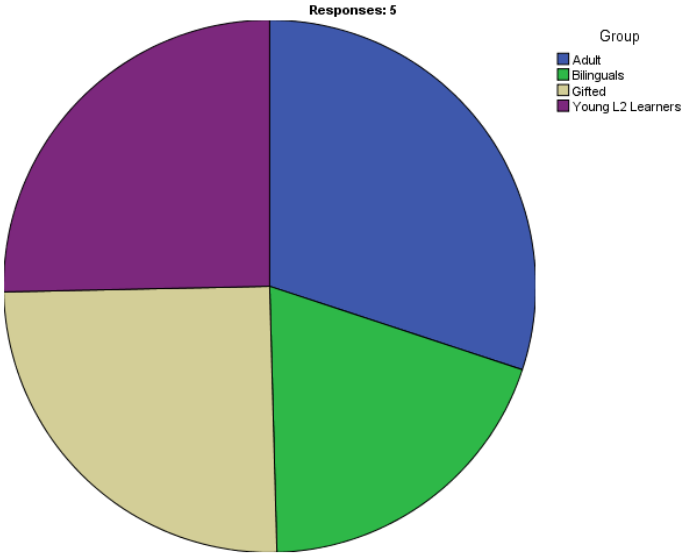


Figure 5.5: Frequency of C5 responses per group

The adults have the highest total mean number of C5 responses. As indicated in Table 5.14 and 5.15. The differences of mean responses between the three groups of young participants for Test 1 (written) were extremely small. However, for Test 2 (aural), the dichotomy between the adult and CB groups, and the YGL and L2 groups reappears; suggesting that a more extensive knowledge of vocabulary facilitates the linking of referents with their characteristics.

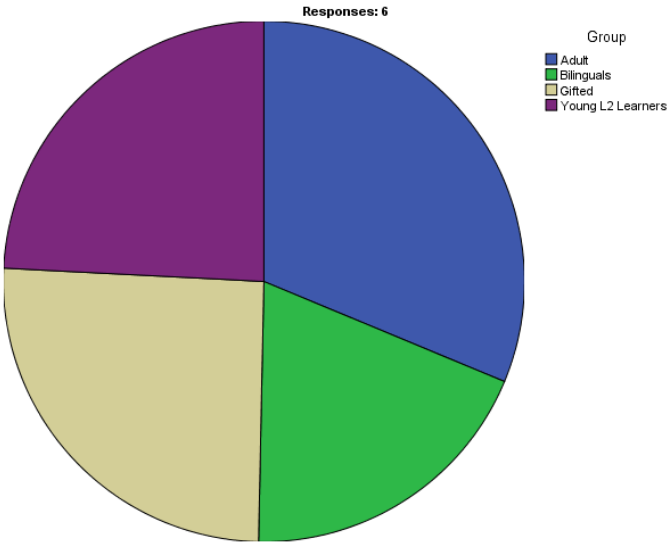


Figure 5.6: Frequency of C6 responses per group

The differences for C6 responses, as seen earlier, are mostly limited to Test 1 where the adults have a much higher mean (12.40 see Table 5.16) than the other groups. However, when Test 1 and Test 2 are combined the differences between the groups are not statistically significant (as illustrated in Table 5.17 and represented in Figure 5.6 above). The differences between the groups are clearer in the following sets of pie charts.

Figure 5.7 shows the responses of the adult group who have been used throughout as the reference/ 'expert' group. It illustrates more clearly the spread of responses per word category (C1 in dark blue, C2 in green, C3 in grey, C4 in purple, C5 in yellow, C6 in red and C7 in pale blue. The C7 category which was very small represents the non-responses.

By comparing Figure 5.7 and 5.8, it is interesting to note the similarity in the distribution of responses between the adult group and the CB group.

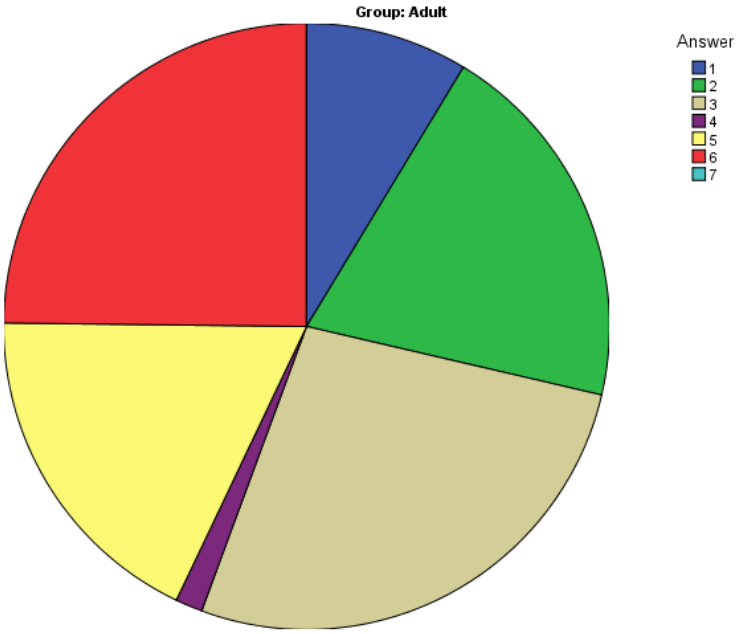


Figure 5.7: Frequency of responses for the adult group

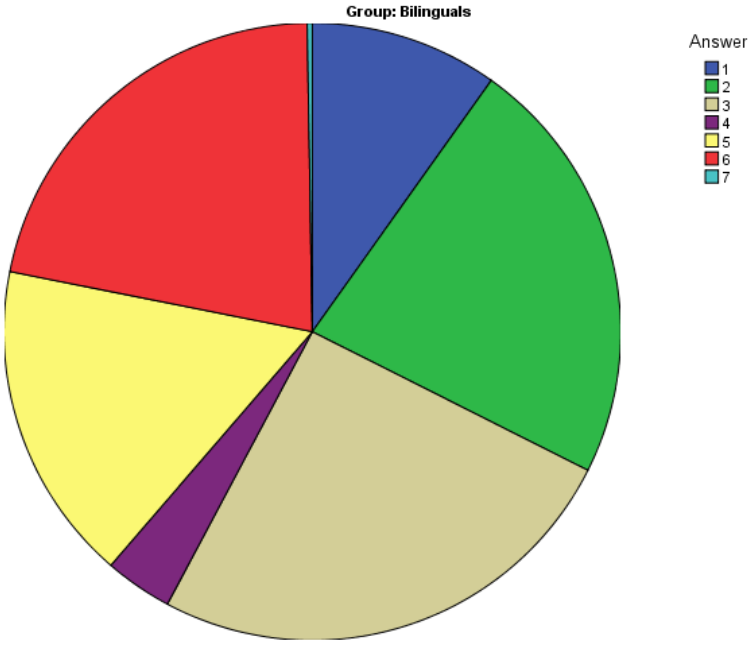


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Figure 5.8: Frequency of responses for the CB group

Similarly, the two pie charts from the YGL and the L2 groups can be seen overleaf.

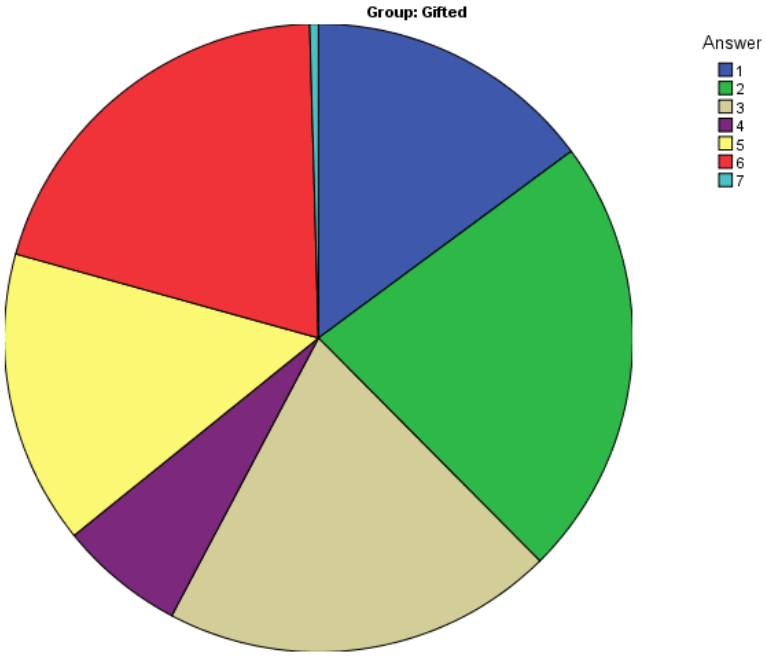


Figure 5.9: Frequency of responses for the YGL group

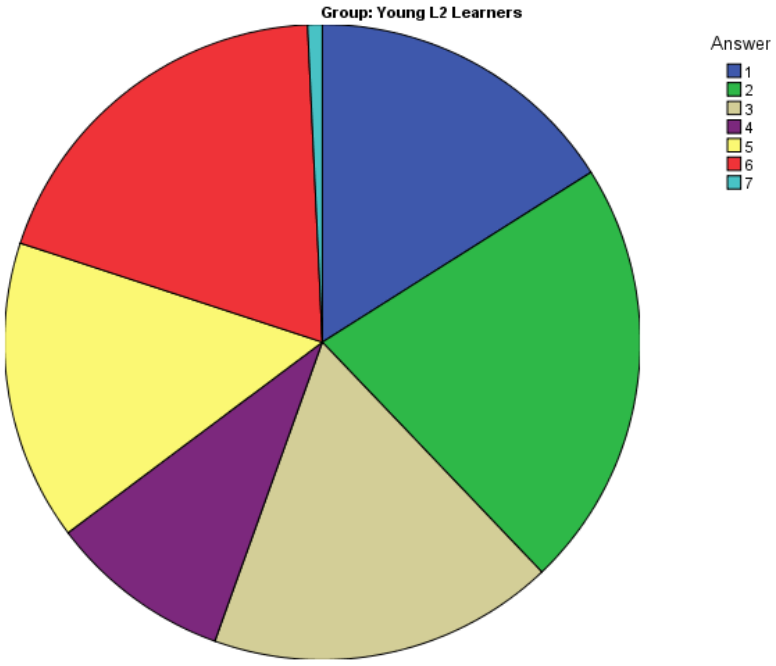


Figure 5.10 Frequency of responses for the L2 group

It is clear from the four charts that there are great similarities in the distribution of responses between the adult and the CB groups on the one hand and the YGL and L2 groups on the other. Although for most categories of response, when compared with the

L2 learners, the YGL group was closer to the CB group. This indicates a possible tendency for the YGL group to strive to organise their vocabulary networks closer to the way in which native speakers organise theirs. However, this could not be verified quantitatively from this sample as the differences were not statistically significant.

Finally, to conclude the analysis part of this chapter, for each response category, a regression model was set up on each of the variables to analyse the difference in response rate between groups. The reference group here is the French native adults as they are the group with the greatest depth of lexical knowledge and the best organised lexicons; French being their first language and the one which they use in their country of residence.

5.5.3 Summary of Regression models for each response category

The regression model enables the study to compare the responses from the three groups of young learners to the adult responses. It will tell the researcher what the effect of being in each of the groups has on the outcome, that is, on the choice of one particular type of response. Table 5.19 presents a summary of the results from the regression models.

Table 5.19 Summary of Regression models' results

		Paradigmatic (C1 + C2) Model 1	Syntagmatic (C3) Model 2	Rhyming / Clang (C4) Model 3	Characteristic (C5) Model 4	Associative Metonymic (C6) Model 5
Adults	B	REF	REF	REF	REF	REF
	Std. Err					
C-Bilingual	B	3.38*	-1.49*	1.89**	-1.21	-2.91***
	Std. Err	1.71	0.88	0.86	0.96	0.85
Y-Gifted	B	8.00***	-6.17***	4.50***	-2.70**	-4.13***
	Std. Err	1.56	0.8	0.78	0.87	0.77
L2 Learners	B	8.27***	-8.47***	7.03***	-2.57**	-5.07***
	Std. Err	1.56	0.8	0.78	0.87	0.77
CONSTANT	B	25.77***	24.30***	1.30**	16.30***	22.33***
	Std. Err	1.10	0.57	0.55	0.61	0.55
R2		0.26	0.57	0.46	0.11	0.31
N		111	111	111	111	111

Key

* Slightly Significant = P< 0.10

** Significant = P< 0.05

*** Very Significant = P< 0.01

For these first regression models, C1 and C2 responses were combined as they were subsets of the paradigmatic category and they were analysed together to give an average effect. The results for Test 1 and Test 2 were also combined.

Model 1: C1 and C2 responses

In the first model the reference group was the adults. Compared with the adults, the CBs had 3.38 more C1 and C2 responses. The YGL had 8.00 more responses than the adults and the L2 learners had 8.27 more responses than the adults. If the p value is greater than 0.05 then the coefficient estimate of B is not significantly different from 0. Therefore we cannot conclude that CBs are truly different from the adults in terms of C1 and C2 responses at the 5% level.

The young gifted learners have on average 8.00 more paradigmatic responses compared with the adult group. The p. value (sig) is less than 0.001, and so our coefficient estimate is statistically significant. Therefore YGLs are significantly different from the adults in terms of their C1 and C2 responses.

The young L2 learners have on average 8.27 more C1 and C2 responses than the adults. The p. value (sig) is 0.00. Therefore, young L2 learners are significantly different from the adults in terms of their C1 and C2 responses (paradigmatic).

In summary, two of the three groups of young learners (YGL and L2) are statistically different from the adult group in terms of their paradigmatic responses. All three give more paradigmatic responses than the adult group. The one group which is the closest but is still slightly statistically significantly different at the 10% level from the adult group is the CB group. This would suggest that the young learners link their vocabulary using mostly words from the same class as the stimuli words.

Model 2: C3 responses (Syntagmatic)

In Model 2, in terms of their C3 responses, all the groups of young learners scored less than the adults. Choice bilinguals had 1.49 less C3 (syntagmatic) responses than the adults. This is not statistically significant at the 5% interval (less than 0.05) but it is statistically significant at the 10% interval level as the p. value (sig) = 0.094. This borderline level of significance suggests relationships that might be significant with a larger sample size. Both the YGL and the L2 learners were very significantly different from the adult group at the 1% interval level. They used considerably less syntagmatic responses indicating that they do not link nouns with verbs and they mostly network their vocabulary according to word associations. The adult group and, to a lesser extent, the CB group seem to show a more advanced processing of vocabulary in terms of linking the words into meaningful communicative units by connecting a noun with a verb.

Model 3: C4 responses (Rhyming / Clang)

In Model 3 , in terms of C4 (rhyming / clang responses), the CBs have 1.89 more C4 responses than the adult group and the YGL group with 4.50 and the L2 learners with 7.03 have given more C4 responses than the adult group. This increasing pattern is to be expected because children are more prone to giving clang responses than adults simply because clang associations relate to the association of two words primarily based upon word sound and not upon any logical or semantic associations between the words. The high concentration of clang responses can therefore denote either a lower degree of lexical knowledge of a word or, in some cases, a lack of concentration. In this model, all the young groups are statistically different from the adult group. They all use more clang responses which shows a lower degree of understanding and / or a lower ability for phonological processing.

Model 4: C5 responses (Characteristic)

In Model 4 compared with the adults, the bilinguals had 1.21 less C5 responses. The p value (sig) = 0.21 which is considerably greater than 0.05 . The bilinguals are not significantly different from the adults in terms of C5 responses. The other two groups are significantly different. However, the scores for the YGL group and L2 learners are very close (-2.70 and -2.57); suggesting, as previously mentioned, that they may have been constrained by their limited knowledge of vocabulary. The adults who have a wider vocabulary will tend to elaborate on a particular referent by using more descriptive words and in particular adjectives.

Model 5: C6 responses (Associative / Metonymic)

In this model all the groups are statistically different in their responses to the C6 word category. The CB group had 2.91 responses less than the adults; the YGL group had 4.13 less responses than the adults and the L2 learners had 5.07 less responses than the adults. All the groups are statistically very significantly different from the adult group at the 1% level. The adult, and to a lesser extent the CB groups, have made the most associative responses. Again, the relative volume of retained vocabulary by the YGL and L2 learners may have been a contributing factor.

These regression models have enabled the study to interpret the different values, that is to say the different categories of responses given: paradigmatic, syntagmatic etc.

and therefore compare the outcomes from the young participants with those of the French native adult's group.

In summary, the differences between the YGL , L2 groups and the adult reference group vary for each model. For Model 1 the YGL and L2 learners have many more C1 and C2 (paradigmatic) responses. The researcher also tested the significance of the difference between the young participants' groups for C1 and C2 category of responses with an ANOVA. The YGL and L2 are not significantly different. The CB group have less C1 and C2 responses than the other two young groups. The CB and YGL groups are significantly different. The YGL group uses more C1 and C2 responses than the CB group. For Model 2, the differences between the YGL and L2 groups and the adult reference group are also large, but this time they are negatively so. The differences for Model 4 between the YGL and L2 learners groups and the reference group are small and negative. For Models 3 and 5 the magnitude of the differences between all the young learners groups and the adult reference category are somewhere between those of the other models, positively so in Model 3 and negatively in Model 5. Generally across all models the magnitude of the differences between choice bilinguals and adults are much smaller than those between the other two groups.

5.5.4. Reliability of the test

To conclude the analysis in this chapter, the reliability of the test items was estimated in terms of internal consistency. A Cronbach's Alpha coefficient for each category of response was calculated and the results are summarised in Table 5.20.

Table 5.20: Cronbach's Alpha for each response

Response		Test 1 (Written)	Test 2 (Aural)	Tests 1 + 2
1	Paradigmatic Coordinate (C1)	0.45	0.76	0.77
2	Paradigmatic Synonymic (C2)	0.62	0.31	0.54
3	Syntagmatic (C3)	0.63	0.69	0.76
4	Rhyming/Clang (C4)	0.71	0.75	0.81
5	Characteristic (C5)	0.42	0.27	0.49
6	Associative Metonymic (C6)	0.59	0.18	0.80
1&2	C1 + C2	0.75	0.58	0.80

Most tests show a reasonably high Cronbach's Alpha showing that the questions are reliably picking up the underlying constructs. The weakest reliability is shown for three of the constructs using oral tests. However, when both oral and written tests are combined, the reliability increases to acceptable levels for all constructs. This is because there are more scores to analyse and also, by using the two techniques, we are more likely to capture all the elements of the underlying constructs.

5.6 Limitations of the study

The researcher is aware of three possible limitations, namely:

• The adult sample could be described as a convenience sample . This was caused by the difficulty of recruiting French native speakers living in France rather than French native speakers living in England as these would have mostly been bilingual speakers. However, the only criteria for selection were that they were native speakers and the research was purely for applied linguistic purposes not sociological purposes.

• The sample size, which if larger, would have made it easier to find significant group effects. However, word association studies concentrating on words category, due to the high specificity of the topic and the groups being studied, do not tend to involve large numbers of participants which would make the control of some variables very

difficult. Brown and Berco (1960) used four groups of 20 subjects; Wolter (2001) used 13 Japanese speakers of English as a second language and 9 native English speakers. It would have been very difficult for a single researcher to find more YGL and CB participants than those in the study unless, like Schooner and Verhallen (2008), they came from different ethnic backgrounds and had different mother tongues.

• The fact that the study concentrates on receptive vocabulary. However, in language processing, both receptive and productive are intertwined.

5.7 Discussion on the results of the Vocabulary Network Test

The two parts of the test (written and audio) produced similar results, as explained above. However, it is worth highlighting the fact that Test 2 (the audio part) shows a quantifiably closer similarity between the adult and the CB groups. This finding follows Bohn and Fledge's view who, when studying perception and production of new vowel categories by L2 learners, stated that "the production of L2 sounds is easier and/or faster to learn than perception of the same sound" (Bohn and Fledge, 1997, p. 68). This difficulty in perceiving the phonemes (smallest sound units) and combining and transferring them into meaningful units is caused by the interference of previous linguistic experience with L1. Therefore, the L2 and YGL learners had more difficulty recognising the spoken words. This, in turn, resulted in more clang responses for Test 2 from these two categories of learners.

When studying previous research on word association, it must be noted that the initial studies were done on monolinguals and used a choice of words which mostly included antonyms. According to Meara,

> "Ervin (1961) had shown that young L1 speakers have a tendency to produce syntagmatic associations, but, when they get to seven or eight years of age, this tendency drops off, and older children are more likely to produce paradigmatic associations… Politzer argued (incorrectly in my view) that a similar shift occurs in L2." (Meara, 2009, p. XI).

As can be deduced from the above quotation, opinions are still divided. However, it would appear that the way in which previous tests were constructed and the words chosen were not the subject of in-depth scrutiny " too little consideration has been given to what word should be used as stimuli" (Meara, 2009, p. 23).). In the test for this study, the aim was not to investigate in-depth knowledge of a word but to study the vocabulary

as a network. That is to say, the way in which one word links to another. It could be that the dichotomy in terms of the different research studies is more due to the difference of emphasis between word associations (or the pairing of lexical units) and network links (which is a term more appropriate for the early processing of lexis).

The sixty young monolingual learners (30 young gifted learners and 30 L2 learners all aged 10-11) who took part in the study had relatively small vocabularies in French, and therefore, the words chosen were mostly from Key Stages 2 and 3 French. They were limited to content words (nouns and verbs), and referred to the topics covered in class. In each series of six words only one had a meaning which was unrelated to the other five. In previous investigations into vocabulary learning, the stimuli words have often been unrelated to other words on the list. The decision to avoid antonyms, the fact that only one word was unrelated to the other five and the specific instruction to link words were certainly significant in terms of the responses given by the participants. It would appear that, in such a scenario, adults and choice bilinguals tried to make links according to thought patterns or collocations (lexical units that co-occur more often than purely by chance). Michael Halliday (Halliday, 1966, pp. 148-162) gave as an example 'strong tea' which would occur more often than say 'powerful tea'), hence linking words in a more syntagmatic manner instead of grouping them according to similar lexical categories. Adding the notion of thoughts and construction of meaningful output to the concept of word associations creates a different dimension. Word associations are more a product of automaticity, particularly when antonyms are concerned: *black* will go with *white* and *man* with *woman* (these associations are all paradigmatic). In this test adults are defining a concept by linking train with travelling, that is how to use the word. They show their ability to use the word or to derive logical reasoning. Therefore, they endeavour to construct and process the vocabulary into meaningful outputs. Whereas the L2 children and to a lesser extent the YGLs who do not have a very developed linguistic knowledge of French and, in particular, syntactic knowledge, mostly limit their responses to the lexical level and link *train* to *metro* or *bateau* (boat).

5.8. Conclusion

The Vocabulary Network Test was intended to investigate differences in the way in which young learners network their French vocabulary. This chapter has presented the

analysis of the data from the VNT test. The researcher is aware that test validation is an on-going process. However, the Cronbach's Alpha results show reasonably high reliability coefficients. The results of the study confirm the hypothesis that there are statistical differences between the groups investigated. It shows that, predictably, choice bilinguals are closer to the adult group in terms of the way in which they link words together. It also shows some, although not statistically significant, differences between the YGL and the L2 groups suggesting a possible progression towards more semantico-contextual connections. In terms of the type of connections made, the overall results of the test may seem to contradict some earlier research. However, as explained above, that research had different objectives and used different instruments, making the difference in results wholly predictable. In this study, as the present test shows an increasing incidence of the use of syntactical connections from L2 learners through YGLs to CBs, it could perhaps be adapted for monitoring the progress of L2 vocabulary acquisition and processing.

This chapter has given an insight into the analysis of the responses to the Vocabulary Network Test and has allowed some conclusions to be drawn. The results analysed vindicate the decision to include an adult control group in the study as it seems to be highlighting the differences between CBs and YGLs in the organization of their vocabulary networks. It has also shown more minor differences between the YGL and the L2 groups. Analysis to a similar level of detail will follow on the questionnaire responses and the WM test responses. This, it is expected, will enable me to draw broad-based sets of conclusions targeted at responding to the study's research questions.

CHAPTER 6: QUESTIONNAIRE ON THE USE OF VOCABULARY LEARNING STRATEGIES: ANALYSIS OF RESULTS

6.1.Introduction

How learners consciously try to encode and process new material and what kinds of strategies are used to achieve this has been (as seen in previous chapters) the subject of a great deal of research. Similarly, the taxonomy of learning strategies has evolved from Rubin (1975) to Oxford (1990) to Cohen (1998) and issues attached to strategy training have been reviewed by Nation (2001). This study, as discussed in Chapters 2 and 3 used Oxford's (1990) and O'Malley and Chamot's (1990) learning strategies taxonomies and limited its scope to the items relevant to vocabulary learning (see Appendices G). Therefore, this study looks at a specific learning task, that of vocabulary learning by different groups of young learners. The Vocabulary Learning Questionnaire in the study investigates how belonging to a specific group of young learners might influence the use of vocabulary learning strategies. The Vocabulary Learning Strategies Questionnaire was administered to the same young participants who took part in the Vocabulary Network Test. The composition of the sample is described in more detail in section 6.4.4 of this chapter.

6.2. The Vocabulary Learning Questionnaire

The questionnaire devised for this study was adapted from the SILL Oxford (1990). During the construction of the questionnaire every effort was made to take into account the issues raised by Oppenheim (2005) and Dornyei (2007) regarding the construction of questionnaires. The language used was aimed at school children and was therefore kept simple and questions were followed by multiple choice answers. Prior to the data collection phase of the study, the questionnaire was piloted with a small group of children and a few changes were made mostly in the language used and also in the addition of clear examples. As mentioned in Chapter 4, the questionnaire is divided into four parts:

Part 1 covers memory strategies, Part 2 investigates cognitive strategies, Part 3 looks at metacognitive strategies, and Part 4 collates general information and investigates the

participants' perceived parental attitudes to learning languages as well as their own attitudes. As mentioned in section 4.4.3, each part of the questionnaire is prefaced with a statement reminding the children that the questionnaire is concerned with the acquisition of vocabulary.

The Vocabulary Learning Questionnaire uses multi-item scales and the responses are coded as follows:

1= I never or practically never do that.

2= Generally I do not do that.

3= I sometimes do that.

4 = Yes on the whole I do that

5= Yes I always or practically always do that.

6.3 The Database Construction and the Analysis of Results

The questionnaire had previously been uploaded onto Survey Monkey and its administration was carried out in the computer rooms of the participating schools in the presence of the researcher and the French teacher. The results of the questionnaire were transferred from Survey Monkey onto a data base in SPSS. The data was analysed to establish the mean frequency of reported vocabulary learning strategy use and analyses of variance (ANOVAs)[8] were carried out. In the data analysis of the first three parts of the questionnaire, this study examines the relationship between the use of specific strategies (memory, cognitive and metacognitive) and belonging to a successful linguistic group (either choice bilingual (CB) or young gifted linguists (YGL)). Missing data was coded as -99 and cases with missing data were dropped from analysis. However, the proportion of completed questionnaires with missing data was very low and has not impacted on the results.

The first part of the analysis of the data looks at the use of memory strategies.

[8] ANOVA (analysis of variance) compares the variability in mean scores of the different groups with the variability among individual scores in each group that is the variance between groups versus the variance within groups. Thus enabling the researcher to compare the variability among the group means with the variability occurring by chance.

6.3.1 Results on the Use of Memory Strategies in the Acquisition of French Vocabulary

As seen in the previous chapters, vocabulary learning strategies are derived from general learning strategies. Memory strategies include strategies for encoding and this will inevitably comprise associations, visual and auditory strategies, imagery, semantic and contextual encoding strategies as well as using knowledge of word structure , that is looking at the way in which the word is composed (prefixes and suffixes). For the outcome measure the average responses across all thirteen memory strategy questions have been taken. For a given memory strategy question a young participant whose response scores 1 'never' uses that strategy whereas at the other end of the scale someone whose response scores 5 'always' or 'practically always' uses this memory strategy. Using this scoring protocol yields the following group mean scores per question: 2.51 for the CB group, 2.61 for the YGL group and 2.6 for the L2 group. In order to test for differences between the means of the three groups, for the overall use of memory strategies investigated by the questionnaire, an analysis of variance (ANOVA) and Post Hoc Tests were conducted.

Table 6.1: Post Hoc Test: Multiple Comparison of Mean Memory Preference by Language Groups.

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% CI Lower Bound	95% CI Upper Bound
Choice Bilingual	YGL	-0.18	0.12	0.296	-0.47	0.11
	L2 Learner	-0.09	0.12	0.753	-0.38	0.20
Y-Gifted Linguist	CB	0.18	0.12	0.296	-0.11	0.47
	L2 Learner	0.10	0.11	0.666	-0.17	0.36
L2 Learner	CB	0.09	0.12	0.753	-0.20	0.38
	YGL	-0.10	0.11	0.666	-0.36	0.17
F = 1.146 with 2 degrees of freedom, p = 0.323						
Levene Statistic = 1.319 with (2,78) df, p = 0.273 (equal variances, uses Tukey se)						

Overall the model is not significant. F= 1.146 with 2 degrees of freedom p:0.323>0.05.

So belonging to a particular young language learner group does not affect the overall mean memory strategy use level in this sample. This may be due to the fact that the participants are very young and have not had the chance or training to develop their memory strategies or are not conscious of using memory strategies.

The questions in Part I of the questionnaire are linked to the use of specific memory strategies and are adapted to relate to vocabulary learning. Although overall there are no significant differences in the use of memory strategies between the groups, in order to compare associations between the answers to a particular question on the use of specific memory strategies and the different groups of learners, a series of frequency distribution tables and chi-square tests were calculated on SPSS. The use of Exploratory Factor Analysis was considered to test which were the underlying strategies for our sample of students. However the sample size was insufficient to look at the components. A sample size of at least 200 would have been required, and this was beyond the scope of this study. "It is comforting to have at least 300 cases for factor analysis". (Tabachnick and Fidell, 2007, p. 613).

Table 6.2 gives the percentage of responses to the use of sound association with a previously known word when trying to remember a new vocabulary word (for example: *dent* = tooth and *dentiste*). Cohen claimed that the use of association to learn a word resulted in better recall of that word a month later (Cohen and Aphek, 1980).

Table 6.2 : Memory Strategy: Sound Association with L2 (Q1).

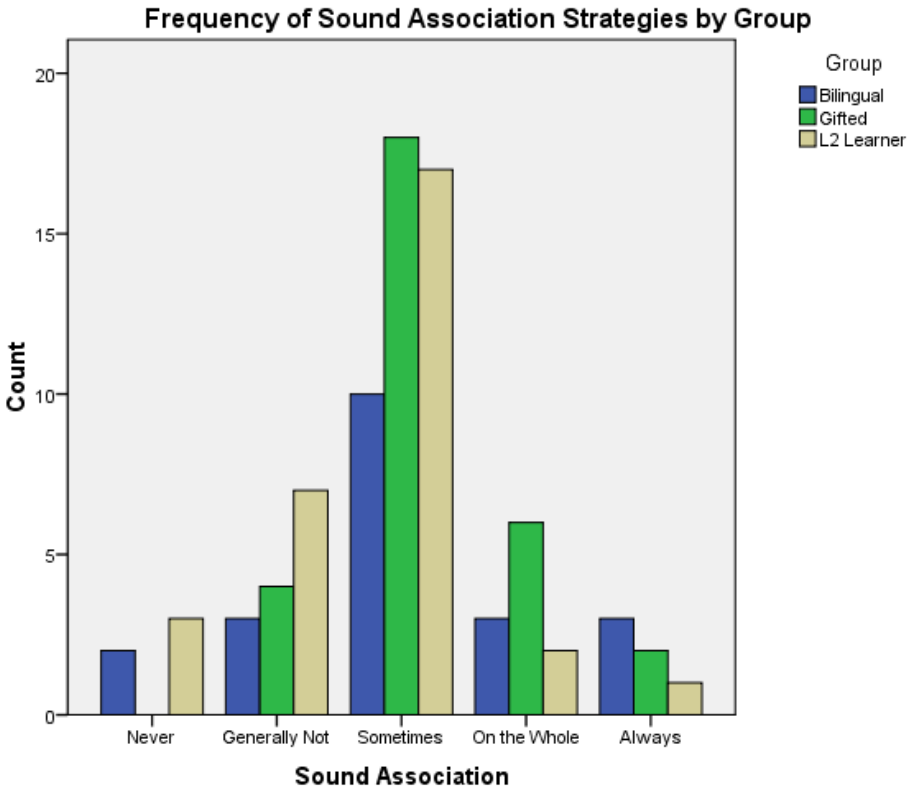
Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	9.5%	14.3%	47.6%	14.3%	14.3%	100%
Y.Gifted Linguist	0.0%	13.3%	60.0%	20.0%	6.7%	100%
L2 Learner	10.0%	23.3%	56.7%	6.7%	3.3%	100%
Total	6.2%	17.3%	55.6%	13.6%	7.4%	100%

χ^2= 8.322 with 8 degrees of freedom has a p value of 0.403

To take into account differences in sample size across the subgroups which the study sets out to compare, the frequency has been converted to percentages for displaying in the table. However chi-square was calculated using frequencies. There are no statistically significant differences between the groups in terms of responses to this question on the use of this particular memory strategy. In view of the small numbers of participants when divided into the different groups and the spread of possible answers on the Likert scale, the minimum expected frequency for each cell has not been reached. A Fisher Exact Test was considered but, in this case, as there are no significant differences between the groups, this would not have changed the results.

A bar chart showing the spread of responses can be seen below in Figure 6.1.

Figure 6.1:



The chart indicates a wider spread of responses from the CB group but, as mentioned earlier, we cannot say that there is a significant difference in the use of this memory strategy between the different groups of language learners. As noted after Table 6.2, it would seem that this strategy is used by all the groups to a similar extent showing a common approach to vocabulary learning by young learners.

Pursuing the investigation on the use of associations, the study examines the use of meaning associations between L1 and L2; for example, linking the French word *sac* (bag) with the sound of the English word *sack*.

Table 6.3a below shows the frequency of use of the association of sound and meaning strategy as percentages.

Table 6.3a : Memory Strategy: Association of Sound and Meaning (Q4).

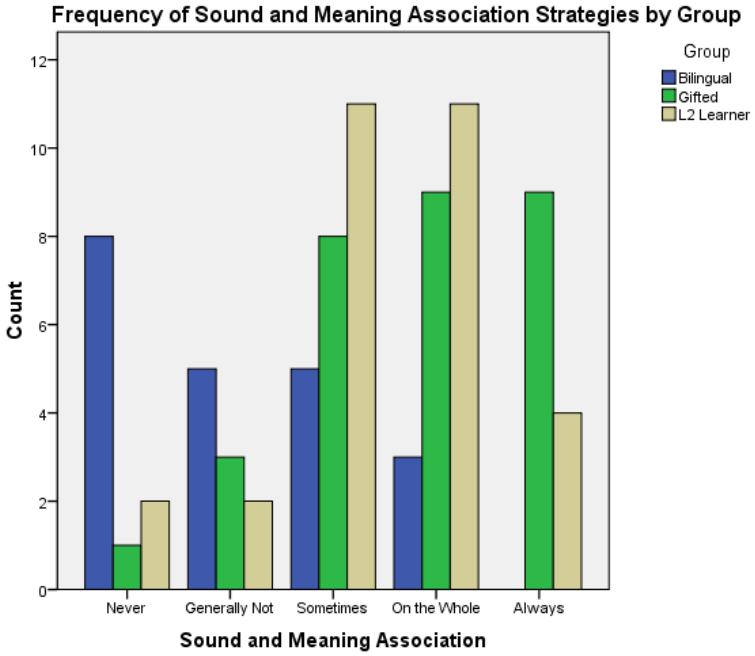
Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	38.1%	23.8%	23.8%	14.3%	0.0%	100%
Y.Gifted Linguist	3.3%	10.0%	26.7%	30.0%	30.0%	100%
L2 Learner	6.7%	6.7%	36.7%	36.7%	13.3%	100%
Total	13.6%	12.3%	29.6%	28.4%	16.0%	100%

χ^2=26.021 with 8 degrees of freedom has a p value of 0.001

As for Table 6.2 and for all the following tables in section 6.3.1, 6.3.2 and 6.3.3 of this chapter, to take into account differences in sample size across the subgroups which the study sets out to compare, the frequency has been converted to percentages for displaying in the tables. However chi-square was calculated using frequencies.

There is a significant difference between the scores of the different groups. Looking at Table 6.3a, it is noticeable that the L2 learners and also the YGL groups tend to favour this strategy compared with the CB group. It could be that, because the extent of their vocabulary knowledge in French is rather restricted, they are more likely to look for homonyms as was demonstrated in the previous chapter when analysing clang responses. The bar chart (Figure 6.2) on the following page illustrates this trend.

Figure 6.2:



As with Table 6.2, these results can only give an indication due to the small numbers in the sample when divided into subgroups. In order to give a clearer picture, Table 6.3b shows the same analyses when collapsed into two levels. In the data, Level 0 corresponds to answers 1 to 3 (low level of use of this strategy) and level 1 to answers 4 and 5 (high level of use of this strategy).

Table 6.3b: Memory Strategy: Association of Sound and Meaning.

% within group		Association Sound & Meaning		
		Low	High	Total
Group	Choice_Bilingual	85.7%	14.3%	100.0%
	Y.Gifted_Linguist	37.9%	62.1%	100.0%
	L2 Learner	50.0%	50.0%	100.0%
Total		55.0%	45.0%	100.0%

$\chi 2 = 11.721$ with 2 degrees of freedom has a p value of 0.003

Using this technique makes it easier to test the direction of the groups. It is clear that the YGL group use this strategy more than the other two groups. The CB group uses it the least. It could be that the bilinguals, who are more expert at keeping their two languages separate, have no need for this particular strategy. However, it also shows the

differences already observed in the Vocabulary Network Test where the CB group networked their vocabulary differently from both the YGL group and the L2 learners, and so, in addition to that, there seem also to be differences in their use of specific strategies.

The next strategy which the study investigated was that of using context to memorize a word, that is to say placing the word within a sentence in order to facilitate the recall of that word; for example, *une **cerise** est un fruit, je mange des **cerises** au dessert* (a **cherry** is a fruit, I eat **cherries** for dessert). This could be seen as a rather studious and academic way of learning as it is practised by teachers who want their students to recall the word in a realistic context. It could therefore, when used consciously by the learner, be not only a memorizing technique but also a cognitive strategy.

Table 6.4 shows the frequency of using context to memorize words.

Table 6.4: Memory Strategy: Using Context to Memorize a Word (Q3).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	14.3%	38.1%	38.1%	9.5%		100%
Y.Gifted Linguist	6.7%	43.3%	36.7%	10.0%	3.3%	100%
L2 Learner	16.7%	26.7%	36.7%	16.7%	3.3%	100%
Total	12.3%	35.8%	37.0%	12.3%	2.5%	100%

χ^2=3.938 with 8 degrees of freedom has a p value of 0.863

Although, as mentioned above, this technique is frequently used by teachers to present vocabulary, the majority of the young participants in the study did not make use of this strategy and the result is not statistically significant (p value 0.863› 0.05). Hence there is no statistically significant group effect in the use of this strategy. Once again, in order to make full use of this strategy, the participants would need a good knowledge of syntax which is more associated with advanced learners or adults than with children.

Table 6.5 shows the use of rhyming as a strategy for learning new vocabulary, for example :*Il s'appelle Bernard, il est* ***bavard***. This is often used in poems and songs presented to the pupils by teachers

Table 6.5: Memory Strategy: Using Rhyming (Q5).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	52.4%	23.8%	14.3%	4.8%	4.8%	100%
Y.Gifted Linguist	33.3%	50.0%	16.7%	0.0%	0.0%	100%
L2 Learner	43.3%	33.3%	20.0%	3.3%	0.0%	100%
Total	42.0%	37.0%	17.3%	2.5%	1.2%	100%

χ^2=7.933 with 8 degrees of freedom has a p value of 0.44

There are no significant differences between the groups in terms of the use of this strategy. In fact, 79% of participants in the survey reported that they do not use this strategy. Only 17.7% of YGLs sometime use this strategy. It could be that 11 year old school children find this strategy rather childish and inappropriate for their age group.

Table 6.6 investigates the use of the association of sounds and images. Echoic (auditory) memory is a technique used for encoding vocabulary in a number of audio guides for learning a second language. In the classroom, teachers often present a new word with a flashcard representing the object or animal in question. Pupils are encouraged to look at the image and repeat the word.

Table 6.6 : Memory Strategy: Compound Sounds and Images Representation (Q8).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	19.00%	28.60%	42.90%	4.80%	4.80%	100%
Y.Gifted Linguist		40.00%	40.00%	13.30%	6.70%	100%
L2 Learner	13.30%	26.70%	26.70%	30.00%	3.30%	100%
Total	9.90%	32.10%	35.80%	17.30%	4.90%	100%

χ^2=12.516 with 8 degrees of freedom has a p value of 0.13

There are no statistically significant differences between the three groups of learners. The majority of young participants do not consciously use this strategy. However, a higher proportion of the YGL (60%) and L2 groups (60%) tend to use it 'sometimes, on the whole or always' more than the CB group(52.5). Focusing both on an image and a sound, hence relying on the senses to remember a word can be viewed as both a memory strategy and a cognitive strategy as the divide between the two is, as explained earlier, rather tenuous.

Grouping and filing vocabulary by topics or themes in order to memorize the words is also a strategy that is investigated in the questionnaire where questions 9 and 2 gave similar results. The results for question 9 are analysed in Table 6.7 below.

Table 6.7: Memory Strategy: Grouping and Filing Vocabulary (Q9).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	66.7%	23.8%	9.5%	0.0%	0.0%	100%
Y.Gifted Linguist	23.3%	40.0%	30.0%	3.3%	3.3%	100%
L2 Learner	43.3%	33.3%	10.0%	13.3%	0.0%	100%
Total	42.0%	33.3%	17.3%	6.2%	1.2%	100%

χ^2=16.858 with 8 degrees of freedom has a p value of 0.032

This strategy can also be associated with contextual strategies as it aims to present the words within a context, for example, words associated with family members or words associated with transport. There are significant differences between the groups in terms of responses to this question. It is interesting to note that few participants use this strategy which is the one used by a majority of language teachers and language course writers to present the vocabulary. This is possibly the reason why L2 and YGL learners tend to use it slightly more than CBs (66% of CBs never use this strategy).

The use of photographic memory, that is remembering a word because of its position on a page, therefore using a spatial learning strategy, is analysed in Table 6.8 to see if there are significant differences between the groups. This type of memory is also referred to as eidetic memory (a visual recollection of material). It is not necessarily a conscious process. However, in the context of the study, the participants were asked for their conscious use of strategies to enhance their vocabulary learning.

Table 6.8: Memory Strategy: Use of Photographic Memory Strategy (Q10).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
C-Bilingual	28.6%	9.5%	23.8%	9.5%	28.6%	100%
Y.Gifted L	23.3%	36.7%	26.7%	13.3%	0.0%	100%
L2 Learner	26.7%	20.0%	33.3%	16.7%	3.3%	100%
Total	25.9%	23.5%	28.4%	13.6%	8.6%	100%

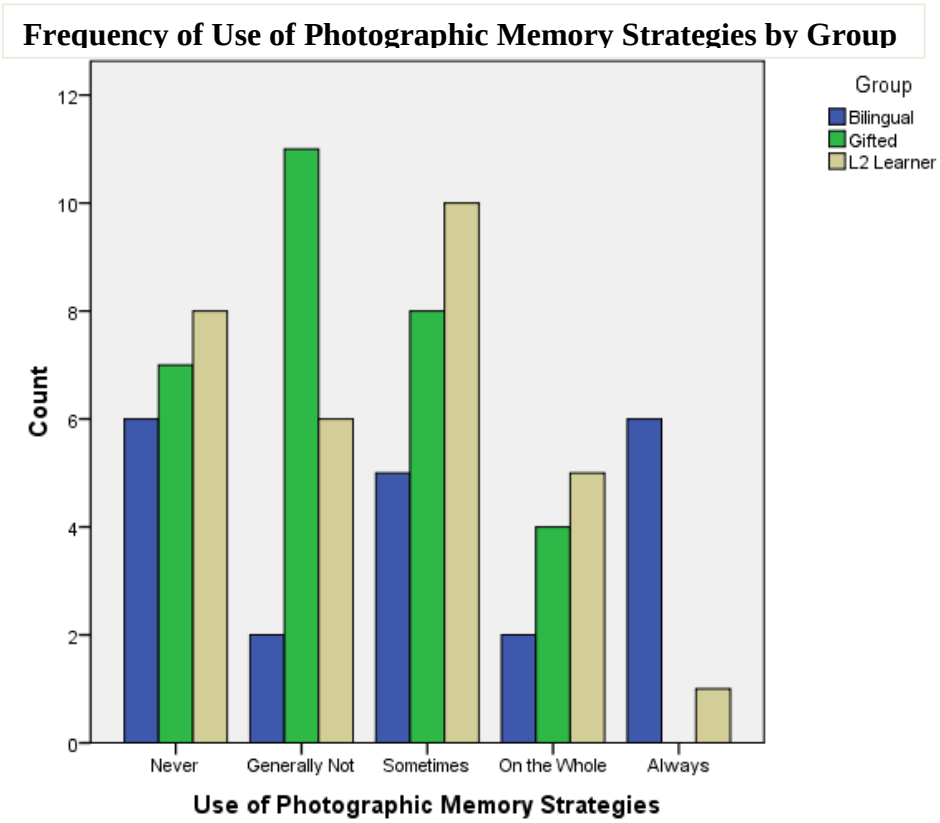
χ^2=19.231 with 10 degrees of freedom has a p value of 0,037

The chi-square test indicates that there is a significant difference between groups in terms of responses to this question (p value of 0.03‹ 0.05). The table shows that the percentage of CBs who always use this strategy is higher than that of the other groups. This is further illustrated in Figure 6.3. In order to get a clearer picture of the differences, the categories were collapsed into two levels instead of five. In the data, as before, low use of the strategy was coded as 0 which corresponds to : 'I never or practically never do that', 'generally I don't do that '. High use of the strategy, coded as 1, corresponds to: 'I sometimes do that', 'Yes on the whole I do that' and 'Yes I always

or practically always do that'. However, even with these simplified responses, the groups were not significantly different over these thresholds using χ^2.

Figure 6.3 below illustrates the analysis from Table 6.8 which shows that the CB group (in blue) uses this strategy more than the other groups.

Figure 6.3:



A possible reason for CBs using this strategy more than the other groups of participants might be linked to the fact that bilinguals have an advantage in enhanced attention control. They are more capable of focusing solely on the task in hand than the monolingual child (Bialystok,1999; 2004). They are, therefore, more likely to register where the information was situated (page, pictures etc.)

The present study looks at the strategy of linking meaning to spelling or using a visual representation of the word's referent; for example, writing the word and trying to memorize the spelling of that word . This is also a different type of associative strategy and the responses on the use of this strategy are presented in Table 6.9.

Table 6.9: Memory Strategy:
Using a Visual Representation of the Word's Referent (Q7).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
C Bilingual	0.0%	4.8%	28.6%	28.6%	38.1%	100%
Y.Gifted L	0.0%	16.7%	26.7%	40.0%	16.7%	100%
L2 Learner	0.0%	13.3%	46.7%	26.7%	13.3%	100%
Total	0.0%	12.3%	34.6%	32.1%	21.0%	100%

χ^2=8.460 with 6 degrees of freedom has a p value of 0.206

Although the table tends to indicate a slight increase in the number of YGLs and CBs (56.7% and 66.7%) who mostly or always use this strategy, it would seem that all of the groups find this strategy useful. The Chi-Square Test also shows that there are no statistically significant differences between the groups in terms of responses to this question. As for some of the previous analysis, an attempt at collapsing the categories into two rather than five was attempted. The result of the chi-square test was not significant χ2=3.968 with 2 degrees of freedom and p = 0.138) and so collapsing did not make the differences any clearer.

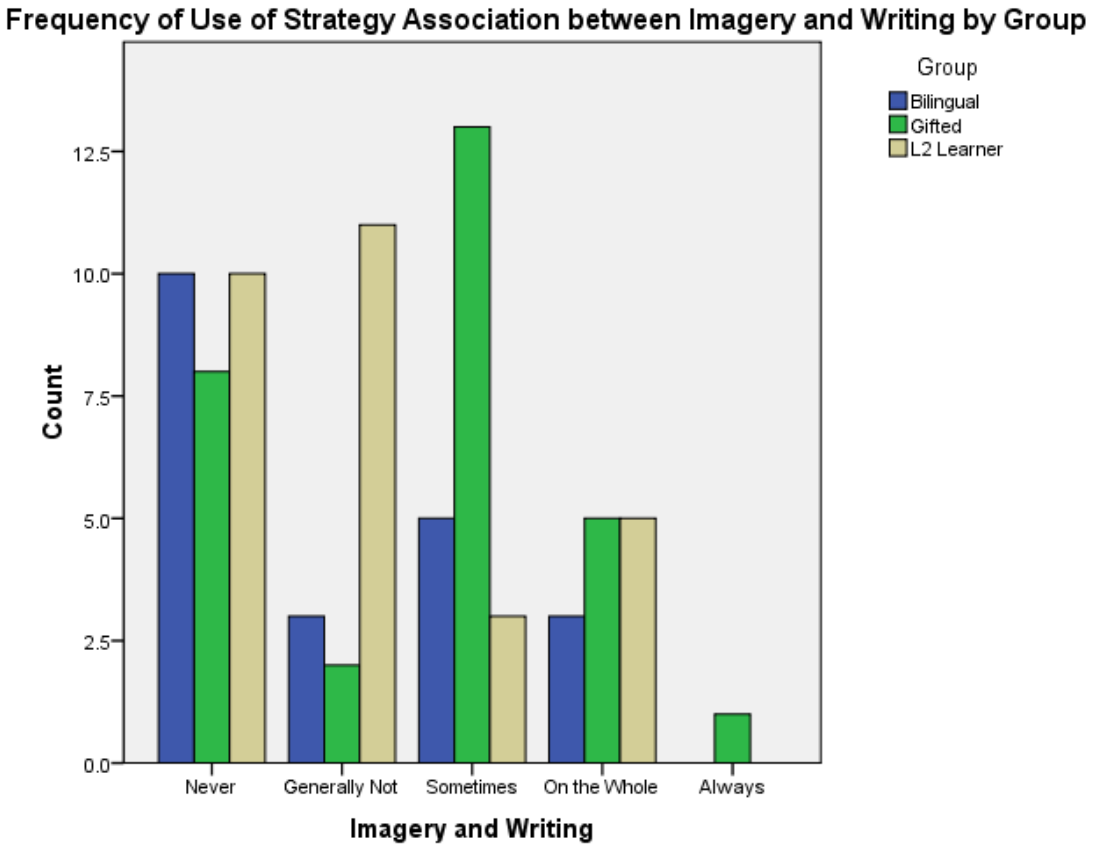
The Table 6.10a looks at the use of the association of imagery and written words.

Table 6.10 a: Memory Strategy: Using Imagery and Words (Q11).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
C Bilingual	47.6%	14.3%	23.8%	14.3%	0.0%	100%
Y.Gifted L	26.6%	6.9%	44.8%	17.2%	3.4%	100%
L2 Learner	34.5%	37.9%	10.3%	17.2%	0.0%	100%
Total	35.4%	20.3%	26.6%	16.5%	1.3%	100%
$\chi 2$=17.164 with 8 degrees of freedom has a p value of 0 .028						

The learning strategy of, for example using cards with a new word on one side and a picture representing the object on the other, is often used by teachers who also encourage young children to illustrate their work . The above table shows that there are differences in the use of this strategy between groups of learners. With a p value of 0.028, the difference is statistically significant. In Figure 6.4 and Table 6.10b differences between the groups are brought into sharper focus.

Figure 6.4:



The chart represents the differences in the use of this strategy in the sample. It seems that the YGLs tend to favour using this strategy more than the other groups. This is made even clearer when collapsing1, 2 / 3,4,5 as can be seen in Table 6.10 b.

Table 6.10 b: Memory Strategy: Using Imagery and Words (Q11).

% within group		Imagery & Words		
		Low	High	Total
Group	Choice Bilingual	61.9%	38.1%	100.0%
	Y.Gifted Linguist	34.5%	65.5%	100.0%
	L2 Learner	72.4%	27.6%	100.0%
Total		55.7%	44.3%	100.0%

$\chi 2 = 8.901$ with 2 degrees of freedom and $p = 0.012$

The percentage of YGL responses in the high category (65.5%) is more than double that of the L2 learners (27.6%), and nearly one and three quarters times that of the

CB group (38.1%). The YGLs group greater use of this strategy is perhaps a reflection of their more studious approach, as good language learners are generally actively involved in their own learning and use available resources and opportunity to learn as described in Naiman (1978). It may also be that the CBs rely more on auditory inputs rather than written words.

The use of actions or mime to help with memorizing words was also investigated but, as observed in Table 6.11 below, it was not a favourite strategy with 79% of the responses in the 'never' and 'I generally don't do that' categories.

Table 6.11: Memory Strategy: Using Action (Q12).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	52.3%	23.8%	14.3%	4.8%	4.8%	100.0%
Y.Gifted Linguist	33.3%	50.0%	16.7%	0.0%	0.0%	100.0%
L2 Learner	43.3%	33.3%	20.0%	1.0%	0.0%	100.0%
Total	42.0%	37.0%	17.3%	2.5%	1.0%	100.0%
χ^2=7.933 with 8 degrees of freedom has a p value of 0.44						

As can be seen above, 52% of choice bilinguals, 33.3% of gifted learners and 43.3% of L2 learners never use this strategy to memorize words. It could be that 11 years old participants find such public demonstrations embarrassing, or not appropriate in the context of a classroom.

The systematic use of revision or repetition to encode vocabulary is another example of a strategy that could be classified as both a memory strategy and a metacognitive strategy in so much as it involves a certain amount of planning. As mentioned in Chapter 3 of this study, there is a certain amount of overlap in the taxonomy of the different groups of strategies. The results of the analysis on the use of revision and repetition strategies can be seen in Table 6.12.

Table 6.12: Memory Strategy: The Use of Revision as a Memory Strategy (Q13).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	9.5%	4.8%	28.6%	23.8%	33.3%	100.0%
Y.Gifted Linguist	0.0%	3.3%	20.0%	46.7%	30.0%	100.0%
L2 Learner	0.0%	6.7%	33.3%	36.7%	23.3%	100.0%
Total	2.5%	4.9%	27.2%	37.0%	28.4%	100.0%

χ^2=9.279 with 8 degrees of freedom has a p value of 0.319

The above table shows that the YGLs were more prone to using this strategy. However, the chi-square test indicates no significant difference between groups in terms of responses to this question. All the groups are used to sitting examinations and tests (SATs, etc.) even at this young age and have been taught to revise. It is therefore not surprising to see that the majority of participants use this strategy.

In summary, the use of Memory Strategies does not, on the whole, differ significantly between the groups as seen in the ANOVA of mean memory preference by language group (Table 6.1). However, as indicated earlier in this chapter, there appear to be a number of differences in the extent to which the groups use some of the memory strategies. For instance, the YGL group is more prone to linking sounds and meaning than the other two groups. They also tend to make greater use of word and image associations. Whereas the CB group use more photographic memory strategies to remember a word than the other two groups.

The next section looks at differences between the groups in the use of cognitive strategies for vocabulary learning.

6.3.2 The Use of Cognitive Strategies in the Acquisition of French Vocabulary

This section investigates the cognitive strategies used by the learners with a view to determining whether there are similarities between the two groups of successful and potentially successful learners (CBs and YGLs) compared with the L2 learners. Some of

the strategies classified as cognitive could also have been grouped under memory or metacognitive strategies as there is a certain amount of overlap between the three categories. Cognitive strategies in this study include deduction and guessing as well as making good use of resources, looking for language patterns, practising new words in realistic contexts, rehearsing, inferencing, looking for keywords and using or resisting translation.

Table 6.13 shows the overall mean differences in the use of cognitive strategies between the different groups.

Overall Use of Cognitive Strategies by the Different Groups of Learners.

Table 6.13 Post Hoc Test (ANOVA) Multiple Comparison of Mean Cognitive Preference by Language Groups.

	(J) Group	Mean Difference (I-J)	Std. Error	Sig.
Choice Bilingual	YGL	0.473	0.130	0.001
	L2 Learner	0.535	0.130	<0.001
Y.Gifted Linguist	CB	-0.473	0.130	0.001
	L2 Learner	0.062	0.118	0.859
L2 Learner	CB	-0.535	0.130	<0.001
	YGL	-0.062	0.118	0.859

F= 9.547048 with 2 degrees of freedom, p = < 0.001
Levene statistic=0.903 with (2,78)df, p > 0.05 therefore we cannot reject the null hypothesis of equal variances and we use the Games Howell estimates.

The model is significant. F= 9.547048 with two degrees of freedom, p=< 0.001. With p <001 for the CB group, this indicates that we can reject the null hypothesis of no significant differences between the CB and L2 learners groups. Similarly with sig at 0.001 we can also reject the null hypothesis of no significant differences between the YGL and CB groups. The mean of the CB group's responses minus the means of the YGL group's responses is 0.473 which indicates that the CB group is using more cognitive strategies. However, there are no significant differences between the L2 and YGL groups. The mean of the L2 learners' responses minus the mean of the YGL group's responses is –0.623 which indicates that the YGL group are using slightly more

cognitive strategies than the L2 learners but this is not statistically significant. Overall the model is significant. The CB group's mean difference is statistically different from the other two groups. Hence belonging to a particular young language group does affect the mean cognitive strategy use in this sample.

In order to compare associations between the answers to a particular question on the use of cognitive strategies and the different groups, a chi-square test was calculated on SPSS. Question 14 investigates the strategies of rehearsal and repetition (writing a word several times in order to learn the spelling). Although these have been classified as cognitive strategies, they could also have been included in memory strategies, as there is once again an overlap between the different types of strategies and duplications are inevitable. A comparison between the different groups of learners and their reported use of this strategy can be seen in Table 6.14 below.

Table 6.14: Cognitive Strategy: Using Rehearsal/Repetition (Q14).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	14.3%	33.3%	33.3%	9.5%	9.5%	100.0%
Y.Gifted Linguist	3.3%	30.0%	23.3%	26.7%	16.7%	100.0%
L2 Learner	6.7%	20.0%	33.3%	26.7%	13.3%	100.0%
Total	7.4%	27.2%	29.6%	22.2%	13.6%	100.0%

χ^2=6.147 with 8 degrees of freedom has a p value of 0.631

As can be noted from the chi-square test there were no significant differences between the use of this vocabulary learning strategy by the groups. Collapsing the result into high and low use of this strategy did not show any significant differences between the groups in the use of this strategy although 69% of the YGL group and 73.3% of L2 learners favour high use of this strategy compared with 54% from the CB group, the difference was too small and the spread of answers too wide to show a group effect.

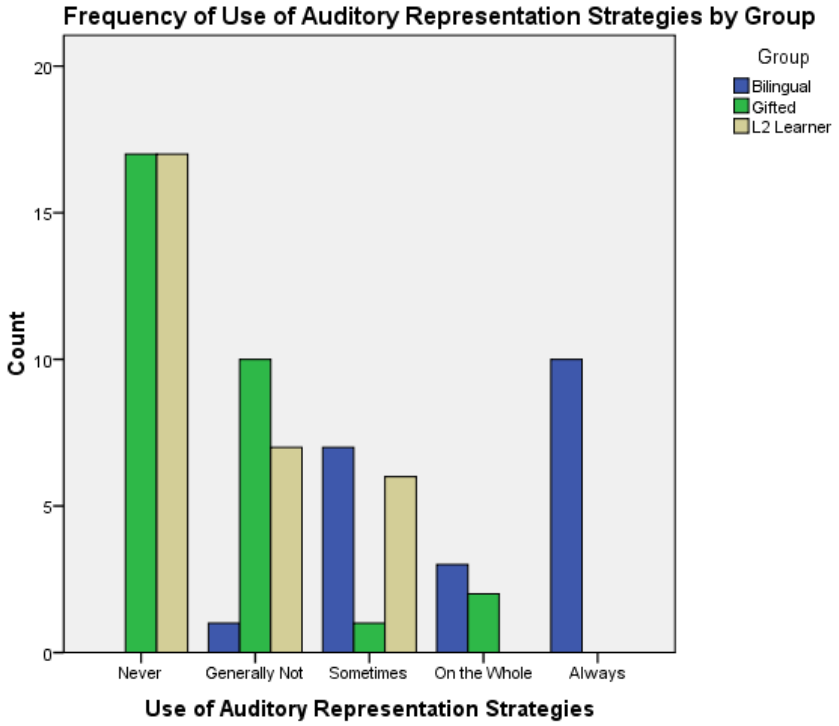
The next strategy investigated was the use of auditory representation (hearing in one's mind the sound of a word or a phrase).

Table 6.15: Cognitive Strategy: Using Auditory Representation (Q22).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	0.0%	4.8%	33.3%	14.3%	47.6%	100.0%
Y.Gifted Linguist	56.7%	33.3%	3.3%	6.7%	0.0%	100.0%
L2 Learner	56.7%	23.3%	20.0%	0.0%	0.0%	100.0%
Total	42.0%	22.2%	17.3%	6.2%	12.3%	100.0%
χ^2=55.774 with 8 degrees of freedom has a p value of 0.000						

With a p value> 0.001 there is a statistically significant difference between the groups in the use of this strategy, and this can be seen clearly in Figure 6.5.

Figure 6.5:



The CB group uses this strategy the most. As they are the group who have the most opportunity to practise French, it is understandable that they would favour this strategy which could also have been categorised as a communication strategy. For the YGL group 90% either never and generally do not use this strategy, and for the L2 learners group this percentage is 80%.

The teaching and learning of vocabulary has changed overtime to incorporate the use of new technologies. The study looked at the use of IT and audio visual means of learning new words and a summary of its findings are set out in Table 6.16 .

Table 6.16: Cognitive Strategy: Practising the Language Using IT and Audio Visual Means (Q21).

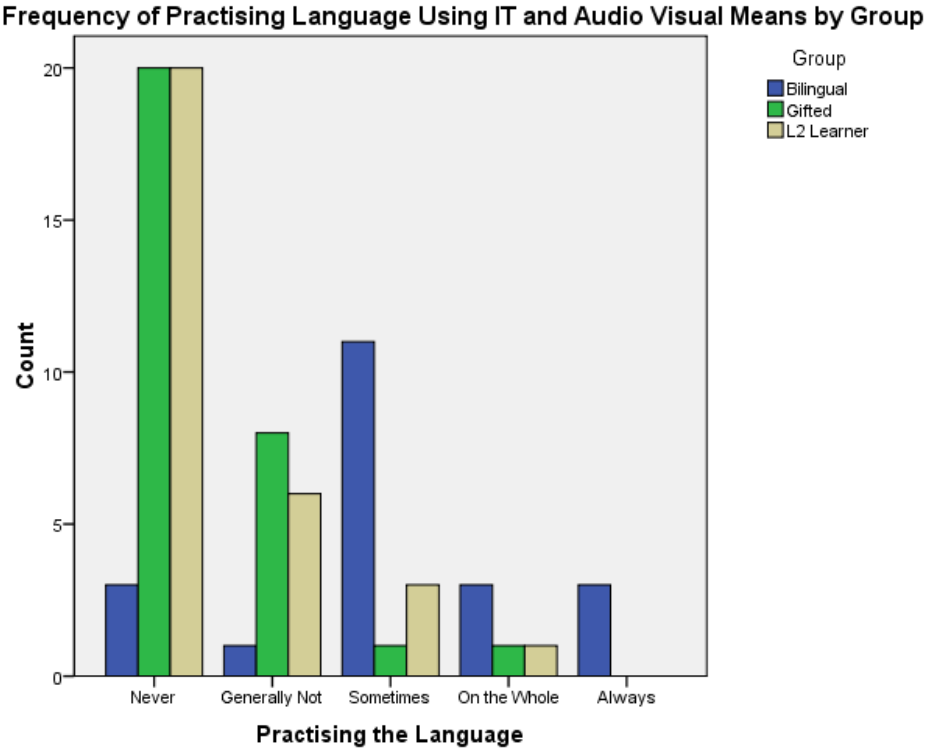
Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	14.3%	4.8%	52.4%	14.3%	14.3%	100.0%
Y.Gifted Linguist	66.7%	26.7%	3.3%	3.3%	0.0%	100.0%
L2 Learner	66.7%	20.0%	10.0%	3.3%	0.0%	100.0%
Total	53.1%	18.5%	18.5%	6.2%	3.7%	100.0%

χ^2=40.806 with 8 degrees of freedom has a p value of 0.000

The result shows a p value > 0,001 which indicates a highly significant difference between the three groups. Two thirds of both YGL and L2 learners reported that they never use this strategy. The CB group uses this strategy the most. It could be that both better opportunities than the other two groups to purchase IT programs and additional parental support might play a role in these sets of results. As mentioned in Chapter 1, parents of choice bilinguals do, on the whole, take an active role in ensuring that the French language is developed as much as possible in an English speaking environment. They are therefore, very likely to provide DVDs and computer programmes to reinforce the learning of the language and provide opportunities for practice. The possible role of parental support in increasing the use of learning strategies will be investigated in part 4 of this chapter. The differences between the groups of young learners in the use of IT and

audio visual methods as a strategy for learning vocabulary are represented more clearly in Figure 6.6 below.

Figure 6.6:



It is surprising to see, from the graph above, the high level of YGL and L2 participants who reported never using this strategy considering the fascination exercised by IT on young learners and the extensive IT facilities witnessed by the researcher in the schools which took part in the study.

The next strategy which the study investigated was that of practising the language in realistic contexts, for instance by attending French clubs or activities where French is spoken. The majority of young learners did not use this strategy as an aid to learning and, in particular, encoding their vocabulary. However, as can be seen from Table 6.17a on the next page, there were differences between the groups in the use of this strategy.

Table 6.17a: Cognitive Strategy: Practising the Language in Realistic Contexts (Q23).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	42.9%	14.3%	14.3%	9.5%	19.0%	100.0%
Y.Gifted Linguist	63.3%	30.0%	6.7%	0.0%	0.0%	100.0%
L2 Learner	53.3%	36.7%	6.7%	3.3%	0.0%	100.0%
Total	54.3%	28.4%	8.6%	3.7%	4.9%	100.0%
χ^2=18.701 with 8 degrees of freedom has a p value of 0.017						

P<0.05 hence the result is statistically significant. Predictably CBs use this strategy more than the other groups. They have a family environment and potential support to practise their language in realistic contexts. 63.3% of YGLs reported never using this strategy. Collapsing the results into low and high use of this strategy gives an even clearer picture of the differences as shown in Table 6.17b.

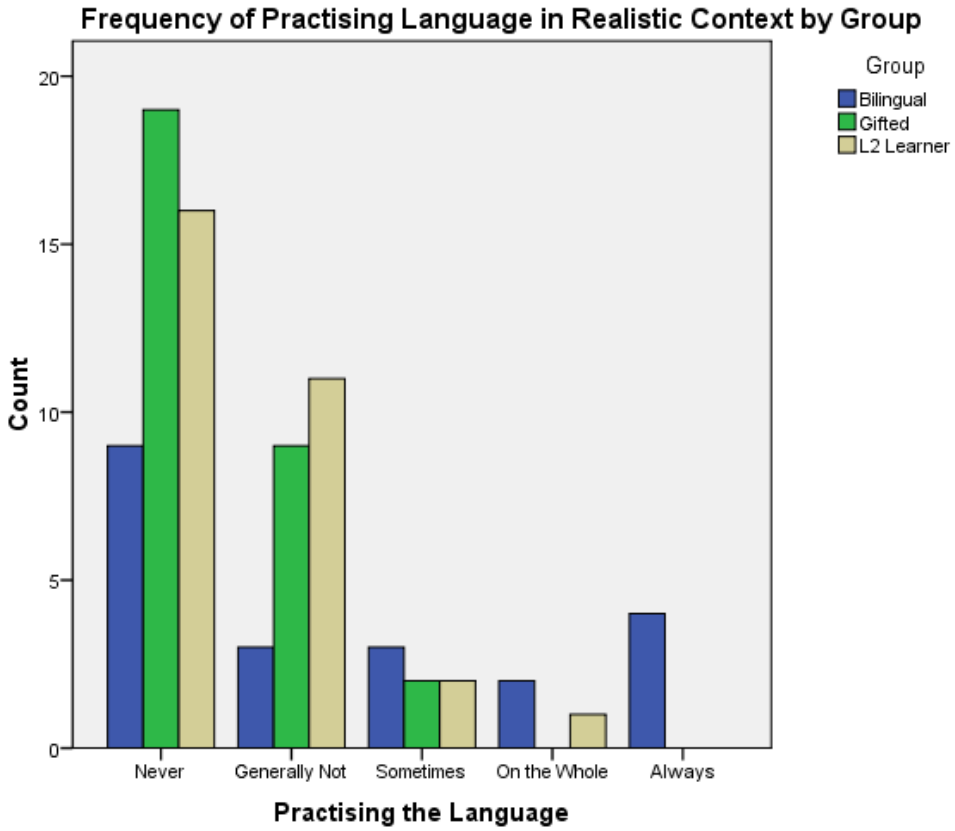
Table 6.17b Cognitive Strategy: Practising the Language in Realistic Context (Q23).

Group	Low	High	Total
Choice Bilingual	57.1%	42.9%	100.0%
Y.Gifted Linguist	93.3%	6.7%	100.0%
L2 Learner	90.0%	10.0%	100.0%
Total	82.7%	17.3%	100.0%
χ^2=13.085 with 2 degrees of freedom has a p value of 0.001			

It is interesting to note that only 42.9% of choice bilinguals reported making high use of this strategy. This does reinforce the fact that choice bilinguals do not have the same approach to French as say the bilinguals from Canada who have total or near total linguistic immersion in two languages.

The graph below shows the results reported by the participants on the use of this strategy.

Figure 6.7:



The spread of responses from the CB participants can be seen more clearly above. In fact, the section on practising the language through IT could also have been included in practising the language in realistic contexts in so much as the use of IT is now part of everyday life. Therefore, the results of the responses to these two questions were combined. The result of the chi-square test $\chi 2 = 34.497$ with 16 degrees of freedom and a p value of 0.005 shows a significant statistical difference between the groups. To clarify this difference, the two results had been added together and were collapsed into the dichotomous high and low categories as can be seen in Table 6.17c on the following page.

Table 6.17c: Cognitive Strategy: Practising the Language in Realistic Context (Q21&Q23).

Group	Low	High	Total
Choice Bilingual	52.4%	47.6%	100.0%
Y.Gifted Linguist	96.6%	3.5%	100.0%
L2 Learner	90.0%	10.0%	100.0%
Total	82.5%	17.5%	100.0%
χ^2=18.330 with 2 degrees of freedom has a p value of 0.000			

It can be said that there are highly significant differences in the responses given by the different groups although, once again, because of the spread of answers and the small number of participants when divided into subgroups, the chi-square tests requirements of minimum expected count per cell in Table 6.17a could not be met. Looking at Table 6.17c, nearly half of the CB responses fall into the high category which contrasts with the low level of high category responses from the monolingual learners (YGLs = 3.5%, L2 learners =10%). The CB group's markedly higher use of this strategy may result from their having much more opportunity to practise French in realistic contexts. The monolingual groups' low usage of this strategy could be due to the young age of the participants and their lack of strategy training or their inhibitions in practicing a foreign language. However, as more questions referred to this strategy, the results for Questions 21,23,24 and 25 were aggregated and collapsed to show the group differences as illustrated by Table 6.17d below.

Table 6.17d: Cognitive Strategy: Practising the Language in Realistic Context (Q21,Q23,Q24&Q25).

Group	Low	High	Total
Choice Bilingual	28.6%	71.4%	100.0%
Y.Gifted Linguist	93.3%	6.7%	100.0%
L2 Learner	86.7%	13.3%	100.0%
Total	74.1%	25.9%	100.0%
χ^2=30.912 with 2 degrees of freedom has a p value of 0.000			

The result was very significant and confirmed that the CB group use this strategy most. This result must be linked to the findings of previous research as seen in Chapter 3 section 3.6.2 of this thesis which reports that the level of acculturation influences the use of strategies. The YGL group uses this strategy the least but the difference between the YGL and L2 groups is less than 6%. The CB group which has more opportunity to practise the language in realistic context is significantly different from the others in the use of this strategy.

The next strategy which the study investigates is the use of resourcing (using reference books, dictionaries etc.). Two questions in the questionnaire related to such use.

Table 6.18a : Cognitive Strategy: Using Resources (Q27).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	19.1%	28.6%	28.6%	23.8%	0.0%	100.0%
Y.Gifted Linguist	3.3%	20.0%	36.7%	30.0%	10.0%	100.0%
L2 Learner	13.8%	6.9%	44.8%	20.7%	13.8%	100.0%
Total	11.3%	17.5%	37.5%	25.0%	8.8%	100.0%
χ^2=10.542 with 8 degrees of freedom has a p value of 0.229						

Question 27 investigates the use of textbooks and dictionaries to help the learners to research words and construct sentences. The chi-square test shows that there are no significant differences between the groups in the use of this strategy. However, looking Table 6.18a, it seems that the CBs are the participants who are least likely to always use this strategy. This is understandable as their depth of knowledge of the language is the most advanced. However, as mentioned earlier, two questions related to the use of this strategy and their results have been amalgamated. $\chi 2$=12.453 with 16 degrees of freedom has a p value of 0.712. The result is not statistically significant. Collapsing these results into low and high use of this strategy (see Table 6.18b) did not give a statistically significant difference between the groups.

Table 6.18b: Cognitive Strategy: Resourcing Strategies (Q17&Q27).

Group	Low	High	Total
Choice Bilingual	33.3%	66.7%	100.0%
Y.Gifted Linguist	23.3%	76.7%	100.0%
L2 Learner	35.7%	64.3%	100.0%
Total	30.4%	69.6%	100.0%
χ^2=1.168 with 2 degrees of freedom has a p value of 0.558			

From Table 6.18b we can see that the YGL group is using more resources than the CB and the L2 groups. It may be that the YGL group's more studious approach is responsible for this difference.

The next table investigates recombination, that is using new words or meaningful elements in a variety of combinations to make new sentences or words, for example *j'ai un parapluie, elle a un parasol, j'ouvre le parapluie, je ferme le parasol* (I have an umbrella, she has a parasol, I open the umbrella, I close the parasol).

Table 6.19a: Cognitive Strategy: Use of Recombination Strategies (Q19).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	14.3%	14.3%	42.9%	14.3%	14.3%	100.0%
Y.Gifted Linguist	20.0%	40.0%	26.7%	13.3%	0.0%	100.0%
L2 Learner	10.0%	26.7%	36.7%	23.3%	3.3%	100.0%
Total	14.8%	28.4%	34.6%	17.3%	4.9%	100.0%
χ^2=11.311 with 8 degrees of freedom has a p value of 0.185						

There are no significant differences in the responses to this question between the different groups. However, to be absolutely certain of this result, the same analysis was performed after collapsing the responses into two levels corresponding to low usage 1,2 : 'I never do that' and 'on the whole I do not do that' versus high usage 3,4,5 . The result of this analysis can be seen in Table 6.19b and shows a significant difference between the groups.

Table 6.19b: Cognitive Strategy: Use of Recombination Strategies (Q19).

Group	Low	High	Total
Choice Bilingual	28.6%	71.4%	100.0%
Y.Gifted Linguist	60.0%	40.0%	100.0%
L2 Learner	34.5%	65.5%	100.0%
Total	42.5%	57.5%	100.0%
χ^2=6.910 with 2 degrees of freedom has a p value of 0.045			

The CB group uses this strategy the most and the YGL group the least. This is a strategy which has been mostly associated with L1 learning.

The next strategy which the study investigates is the use of deductive strategies, that is to say applying and / or inventing rules to help with understanding or using the context or grammar to find the meaning of the word to be acquired. The average scores from responses to three questions were amalgamated and collapsed (see Table 6.20 below).

Table 6.20 : Cognitive Strategy: Use of Deductive Strategies (Q16,Q26 & Q35) - Aggregated Results).

Group	Low	High	Total
Choice Bilingual	9.5%	90.5%	100.0%
Y.Gifted Linguist	27.6%	72.4%	100.0%
L2 Learner	31.0%	69.0%	100.0%
Total	24.1%	75.9%	100.0%
χ^2=3.399 with 2 degrees of freedom has a p value of 0.183			

Although this is not statistically significant at 0.05 level, combining the three questions and collapsing the results makes it clearer to see that there are slight differences as the CB and YGL groups tend to use this strategy more than L2 learners. This strategy is associated with a mature approach to linguistic knowledge and it is a little surprising to see that such high proportion of young learners report using it.

Taking notes is a learning strategy which is more associated with school or college where such practices are encouraged. Table 6.21 presents the analysis of the responses for the use of this strategy.

Table 6.21: Cognitive Strategy: Taking Notes (Q28).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	23.8%	28.6%	28.6%	9.5%	9.5%	100.0%
Y.Gifted Linguist	50.0%	26.7%	16.7%	6.7%	0.0%	100.0%
L2 Learner	40.0%	36.7%	16.7%	3.3%	3.3%	100.0%
Total	39.5%	30.9%	19.8%	6.2%	3.7%	100.0%
χ^2=7.627 with 8 degrees of freedom has a p value of 0.471						

It could be said that this strategy could also have been categorized as metacognitive (part of planning and organizing the learning) showing once again the difficulty of keeping to a strict categorization. The chi-square test does not reveal a significant statistical difference between the responses of the different groups. There is a low use of this strategy by all the groups of young learners (52% in the CB group either never or generally don't use this strategy. This percentage reaches 76.7% for the YGL and the L2 groups). This could be as a result of the high proportion of oral work in the schools which is not conducive to the use of this strategy. The results for Question 29 (summarising one's learning) were similar. This may again be due to the young age of the participants and their lack of strategy training.

The next table investigates the use of the strategy which involves looking for and using language patterns such as suffixes or verb endings to help with the learning of new words. This can be associated with activating prior knowledge and is normally more evident among advanced students.

Table 6.22a: Cognitive Strategy: Language Patterns and Elaboration (Q30).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	9.5%	14.3%	38.1%	28.6%	9.5%	100.0%
Y.Gifted Linguist	16.7%	36.7%	36.7%	10.0%	0.0%	100.0%
L2 Learner	23.3%	30.0%	26.7%	16.7%	3.3%	100.0%
Total	17.3%	28.4%	33.3%	17.3%	3.7%	100.0%
χ^2=9.757 with 8 degrees of freedom has a p value of 0.282						

There are no statistically significant differences between the responses of the groups in the use of this strategy. However, as Question 34 was also associated with this strategy, both results were amalgamated to give a clearer view of the pattern of responses. The result, $\chi 2$= 17.05 with 16 degrees of freedom and has a p value of 0.382 is not significant and , this result can only be taken as an indication of a possible tendency as in view of the small numbers of participants when divided into the different groups and the spread of possible answers on the Likert scale, the minimum expected frequency for each cell has not been reached. The strategy investigated above is the use of patterns when learning a word, for example same endings for verbs at the imperative (*regardez, écoutez* etc). In order to summarise more clearly the type of responses given by the participants, the result was collapsed into high and low usage of this strategy and can be seen in Table 6.22b .

Table 6.22b: Cognitive Strategy: Looking for and Using Language Patterns (Q30 & Q34) - Aggregated Results.

Group	Low	High	Total
Choice Bilingual	45.0%	55.0%	100.0%
Y.Gifted Linguist	60.0%	40.0%	100.0%
L2 Learner	51.7%	48.3%	100.0%
Total	53.2%	46.8%	100.0%
χ^2=1.123 with 2 degrees of freedom has a p value of 0.570			

Although this is still not significant at the 5% level, combining the two questions allows us to see a slight difference in the CBs'percentage of answers when compared with the others. 55% of the CBs use this strategy. This may be because they are constantly comparing the two languages or they have a better in-depth knowledge of syntax. However, once again, this strategy is normally associated with more mature learners.

The next strategy is avoiding direct translation between L1 and L2.

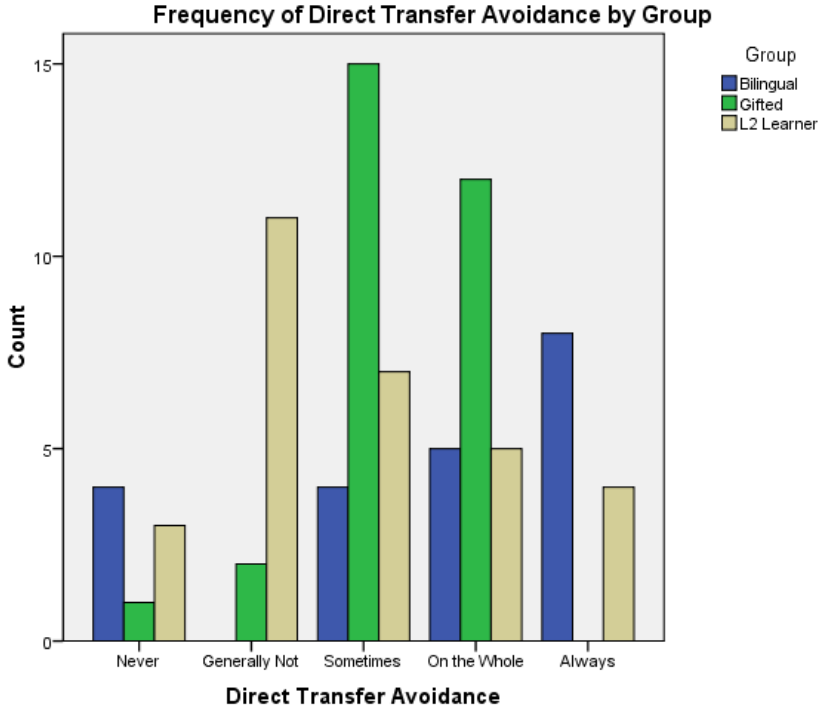
Table 6.23: Cognitive Strategy: Resisting Word for Word Translation (Q33).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	19.0%	0.0%	19.0%	23.8%	38.1%	100.0%
Y.Gifted Linguist	3.3%	6.7%	50.0%	40.0%	0.0%	100.0%
L2 Learner	10.0%	36.7%	23.3%	16.7%	13.3%	100.0%
Total	9.9%	16.0%	32.1%	27.2%	14.8%	100.0%
χ2=36.174 with 8 degrees of freedom has a p value of 0.000						

Looking at Table 6.23, it would seem that a higher percentage of CBs and YGLs do use this strategy (80.9% of the CB group and 90% of the YGL group report using this

strategy sometimes or more). The chi-square test indicates a significant difference between the responses of the different groups and this is more visually evident in the graph below.

Figure 6.8:



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It is possible that the bilinguals may have a more intuitive language learning pattern. However, it is interesting to notice the difference in terms of percentages between the YGL group and the L2 learners as 40% of the YGL group declared that on the whole they used this strategy compared with 16.7% L2 learners..

Table 6.24 shows the results of the use of inferencing by the different groups of learners that is to say using context to deduce meaning.

Table 6.24: Cognitive Strategy: Inferencing (Q36).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	19.0%	0.0%	23.8%	23.8%	33.3%	100.0%
Y.Gifted Linguist	0.0%	6.7%	50.0%	26.7%	16.7%	100.0%
L2 Learner	3.3%	16.7%	40.0%	26.7%	13.3%	100.0%
Total	6.2%	8.6%	39.5%	25.9%	19.8%	100.0%
χ^2= 16.997with 8 degrees of freedom has a p value of 0.030						

The p value is 0.030 and so there is a statistically significant difference between the groups in their responses to the use of this strategy. All the groups tend to use this strategy but the YGL group uses it more than the other two. Once again, this strategy tends to be associated with skilled or academic learning and is used and demonstrated to students by teachers of both Primary and Secondary schools. It may be that the YGL participants have a more scholarly approach to learning.

The next category of cognitive strategies which the study investigates is looking for keywords or words that are similar in English and in French, for example *age* and *date* . It is worth remembering that in Table 6.25, and in all the other tables, to take into account the differences in sample size across subgroups, the frequency has been converted into percentages but, prior to that, chi-square was calculated using frequencies.

Table 6.25: Cognitive Strategy: Transfer & Looking for Keyword (Q32).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	4.8%	14.3%	38.1%	19.0%	23.8%	100.0%
Y.Gifted Linguist	3.3%	3.3%	26.7%	36.7%	30.0%	100.0%
L2 Learner	3.3%	6.7%	26.7%	43.3%	20.0%	100.0%
Total	3.7%	7.4%	29.6%	34.6%	24.7%	100.0%
$\chi 2$=5.592 with 8 degrees of freedom has a p value of 0.693						

The difference between the groups for the use of this strategy was not statistically significant. Although the use of this strategy may be more associated with older learners, all the groups of young learners report using this strategy.

Making summaries (see Table 6.26) is a strategy which could also have been listed under metacognitive strategies as it involves organization and planning.

Table 6.26: Cognitive Strategy: Making Summaries (Q29).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	33.3%	33.3%	23.8%	0.0%	9.5%	100.0%
Y.Gifted Linguist	36.7%	30.0%	30.0%	3.3%	0.0%	100.0%
L2 Learner	31.0%	37.9%	20.7%	6.9%	3.4%	100.0%
Total	33.8%	33.8%	25.0%	3.8%	3.8%	100.0%
$\chi 2$= 5.510with 8 degrees of freedom has a p value of 0.702						

Most groups of learners reported a tendency not to use this strategy. It may be that training in the use of this strategy is not systematically given to young learners or that it is a strategy mostly used by advanced students. It is also less associated with vocabulary acquisition.

The next strategy reported in Table 6.27 is using formulae and patterns in order to learn more efficiently, for example using known expressions and their patterns (*C'est **à** droite, **à** gauche, **à** coté = it is to the right , to the left..*).

Table 6.27 : Cognitive Strategy: Using Formulas and Patterns (Q18).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	25.0%	10.0%	30.0%	5.0%	30.0%	100.0%
Y.Gifted Linguist	6.9%	27.6%	51.7%	6.9%	6.9%	100.0%
L2 Learner	10.0%	33.3%	36.7%	20.0%	0.0%	100.0%
Total	12.7%	25.3%	40.5%	11.4%	10.1%	100.0%
χ^2= 21.884 with 8 degrees of freedom has a p value of 0.005						

There is a highly significant difference between the three groups of learners. Once again the CB group seems to favour this strategy more, perhaps because of their more in depth knowledge of vocabulary. The YGL group uses this strategy more than the L2 group in this sample. As seen before, these young L2 learners may not have gained sufficient confidence in the language to use this type of strategy.

It is generally accepted that learning is a cognitive process and so it is reasonable to assume that successful learning may involve the use of learning strategies and that more successful or potentially successful learners may make more use of learning strategies. It must be said that the sample groups are young participants at near elementary level and Griffiths found that language learning strategies were mostly used by advanced students (Griffiths, 2003). However, in summary, overall there is a significant difference in the reported use of cognitive strategies by the three groups of

learners. When studied individually, it seems that the CB group tend to use cognitive strategies the most. In particular, the following strategies seem to be favoured by the CB group: auditory representation, using IT, practising the language in realistic contexts, recombination, using patterns and formulae and avoiding direct translation. The YGL group, although most of the time not statistically different from the L2 group, do tend to use more resourcing and inferencing strategies and also tend to avoid direct translation. These results confirm previous results by Byalystok that generally bilinguals use more cognitive strategies than monolinguals.

The third section of this chapter investigates the differences in the use of metacognitive strategies by the three groups of learners.

6.3.3. The Use of Metacognitive Strategies by the Different Groups of Learners.

The use of metacognitive strategies suggests a self-regulated learning approach. Metacognitive strategies have traditionally been divided into planning, monitoring and evaluating strategies. However, as seen previously with both memory and cognitive strategies, there is a certain amount of overlap. Planning which requires certain conscious thought processes could, in that sense, also be categorised as part of cognitive strategies. The study used the taxonomy of metacognitive learning strategies and adapted it to vocabulary learning. Concretely this means, for example, first planning how to approach learning a list of words by grouping them according to meaning or word function or theme, dividing the learning into manageable bite-size sections, making sure that the right conditions for learning are met, that is a good learning environment, secondly, monitoring the learning by testing knowledge of words regularly. Finally evaluating progress by comparing what has been achieved with goals to be met, like for example being able to list family members. Ten questions in the questionnaire relate to the use of metacognitive strategies.

In order to test for differences between the means of the three groups of participants for the reported use of metacognitive strategies investigated by the questionnaire, an analysis of variance test was used; see Table 6.28.

Table 6.28: Post Hoc Tests (ANOVA) Multiple Comparisons of Metacognitive Mean Responses

	(J) Group	Mean Difference (I-J)	Std. Error	Sig.
Choice Bilingual	YGL	-0.002	0.164	1.000
	L2 Learner	0.081	0.164	0.875
Y.Gifted Linguist	CB	0.002	0.164	1.000
	L2 Learner	0.083	0.149	0.842
L2 Learner	CB	-0.081	0.164	0.875
	YGL	-0.083	0.149	0.842

F=0.193 with 2 degrees of freedom, p=0.825

Levene Statistics= 0.012 with (2)df, p=0.988

For Levene test, if $P < 0.05$ we reject the null of equal variances and use the Tukey estimates. If $p > 0.05$ we cannot reject the null of equal variances and we use the Games Howell estimates. Overall the model is not significant.

In order to compare associations between the answers to a particular question on the use of metacognitive strategies and the different groups, frequency analyses and Chi-square tests were calculated on SPSS.

As mentioned earlier, the study divides metacognitive strategy use into three categories: planning, monitoring and evaluation.

Part 1 Planning

The first strategy investigated was the use of advanced organization such as previewing the material which needed to be learnt in order to adapt resources of time or attention to the task. Table 6.29 shows the percentage of use of this strategy by the different groups of learners as well as the result of a Chi Square Test calculated on frequency.

Table 6.29: Metacognitive Strategy: Use of Advanced Organization i.e. Previewing Lessons (Q37).

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	28.6%	9.5%	42.9%	9.5%	9.5%	100.0%
Y.Gifted Linguist	40.0%	20.0%	30.0%	6.7%	3.3%	100.0%
L2 Learner	40.0%	33.3%	16.7%	6.7%	3.3%	100.0%
Total	37.0%	22.2%	28.4%	7.4%	4.9%	100.0%
$\chi 2$=8.212 with 8 degrees of freedom has a p value of 0.413						

The p value of 0.413 indicates that there are no significant differences between the groups in the responses to the use of this strategy. However, looking at the spread of responses made by the three groups, 42.9% of CBs and 30% of the YGL group reported that they 'sometimes do that' against only 16.7% of L2 learners. The fact that the difference between the groups is not statistically significant does not mean that the groups make equal use of the strategy. Clearly both the CB and YGL groups claim to use it more than the L2 group. In order to get a clearer picture, and, as question 43 also refers to the same strategy, Table 6.30 combining and collapsing the responses to the two questions into high or low use of this strategy is shown below:

Table 6.30: Metacognitive Strategy: Advanced Organisation (Q37&Q43)

Group	Low	High	Total
Choice Bilingual	52.4%	47.6%	100.0%
Gifted Linguist	72.4%	27.6%	100.0%
L2 Learner	72.4%	27.6%	100.0%
Total	67.1%	32.9%	100.0%
χ^2=2.802 with 2 degrees of freedom has a p value of 0.246			

Although there is not a statistically significant difference between the groups (P >0.05), if one looks at the percentages, it is clear that the CB group uses it the most but that overall the majority of the participants do not favour this strategy. This, again, could be due to the methods of teaching used at this level of learning (mostly oral).

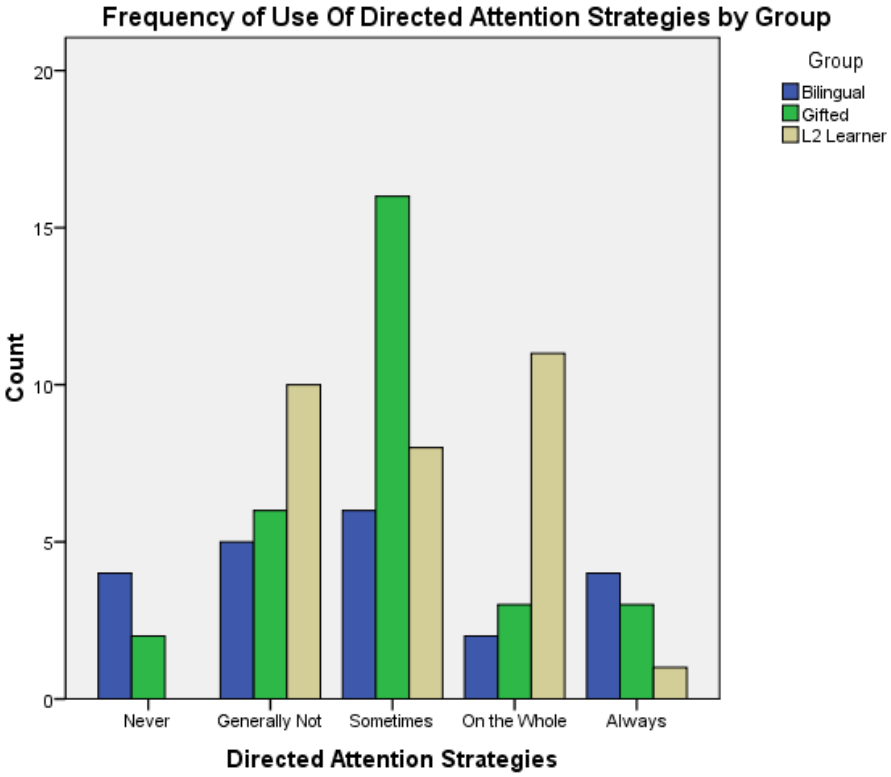
The next table investigates the use of directed attention, that is to say purposely focusing on the task in hand. It has been previously reported that this strategy was particularly prevalent among bilinguals and good language learners (see Chapter3). Table 6.31 shows the percentage of use of this strategy by the different groups of learners as indicated by their choice of answers to Question 38 (directed attention).

Table 6.31: Metacognitive Strategy: Directed Attention (Q38)

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	19.0%	23.8%	28.6%	9.5%	19.0%	100.0%
Y.Gifted Linguist	6.7%	20.0%	53.3%	10.0%	10.0%	100.0%
L2 Learner	0.0%	31.0%	27.6%	37.9%	3.4%	100.0%
Total	7.5%	25.0%	37.5%	20.0%	10.0%	100.0%
$\chi 2$=20.161 with 8 degrees of freedom has a p value of 0.01						

The p.value of 0.01 indicates that there is a significant difference between the groups in their use of this strategy. 73.3% of YGLs use this strategy at least sometimes and at most always. The second most frequent users of this strategy are the L2 learner group (57.9%). A more visual representation of the results can be seen in Figure 6.9 on the following page.

Figure 6.9:



Earlier research has suggested that bilinguals have a greater capacity to focus their attention than other learners (see Chapter 3 section 3.6.2). However, looking at Table 6.31, it would seem that the YGL group in this study used this strategy more than the other two groups. This confirms observations recorded by other researchers who listed among early signs of giftedness the "ability to attend or concentrate for a longer period than is typical of most children" (George, 2003, p. 9).

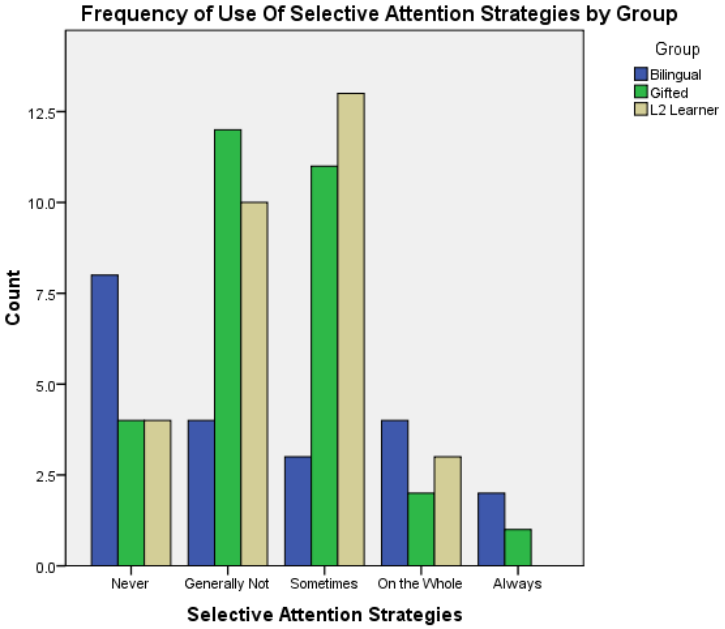
Another strategy closely related to directed attention was that of selective attention, that is only concentrating on specific parts of vocabulary learning such as the pronunciation of a word for instance. Table 6.32 shows the response patterns of the different groups of learners to question 39 (selective attention).

Table 6.32: Metacognitive Strategy: Selective Attention (Q39)

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	38.1%	19.0%	14.3%	19.0%	9.5%	100.0%
Y.Gifted Linguist	13.3%	40.0%	36.7%	6.7%	3.3%	100.0%
L2 Learner	13.3%	33.3%	43.3%	10.0%	0.0%	100.0%
Total	19.8%	32.1%	33.3%	11.1%	3.7%	100.0%
χ^2=14.626 with 8 degrees of freedom has a p value of 0.067						

p >0.05 indicates that the result is not statistically significant at the 5% level. The L2 learner group reported using this strategy the most (53.3% as compared with the YGL group with 46.7% and the CB group with 42.8%). As previous findings indicate that the CB and YGL participants tend to have a broader approach to vocabulary learning, it may be that they are less consciously aware of using this strategy and as a consequence report its use less than the L2 learners. Figure 6.10 on the next page gives a visual representation of the results for the use of this strategy.

Figure 6.10:



Despite the greater overall use by the L2 learners, only the CB and YGL groups profess to 'always' using this strategy and a larger proportion of CB participants report 'never' using this strategy. Once again it is worth mentioning that these young participants have not received any formal strategy training.

The next strategy investigated in the study is that of functional planning, that is planning and rehearsal just prior to carrying out a language task. In the context of vocabulary learning, this involves the participants practising in their heads what they are going to learn or say. Table 6.33 describes the use of this strategy by the three groups of participants

Table 6.33: Metacognitive Strategy: Functional Planning (Q44)

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	28.6%	14.3%	33.3%	9.5%	14.3%	100.0%
Y.Gifted Linguist	3.3%	10.0%	33.3%	40.0%	13.3%	100.0%
L2 Learner	3.3%	16.7%	33.3%	33.3%	13.3%	100.0%
Total	9.9%	13.6%	33.3%	29.6%	13.6%	100.0%
χ^2=14.637 with 8 degrees of freedom has a p value of 0.067						

The difference of use between the groups is not statistically significant but, once again, it is quite close to being significant at the 5% level. The YGL group (86.6%) reported using this strategy at least sometimes and at most always) whereas the CB group (57.1%) were the lowest users of this strategy. This could be caused by the fact that they may have more reinforcement when learning new vocabulary due to their family environment and therefore need to use rehearsal strategies less on account of a greater self-confidence. The YGL group might rely slightly more on memory strategy and, to a certain extent, some aspects of functional planning, such as rehearsal, could also have been included in memory strategies.

The next category is self-management that is to say understanding and making sure that the right conditions for successful learning are met for example using a quiet room, a comfortable setting etc. Table 6.34 shows the percentages of the choices of response on the use of this strategy.

Table 6.34: Metacognitive Strategy: Self-management (Q41)

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	4.8%	9.5%	19.0%	38.1%	28.6%	100.0%
Y.Gifted Linguist	0.0%	13.3%	36.7%	20.0%	30.0%	100.0%
L2 Learner	6.7%	6.7%	40.0%	23.3%	23.3%	100.0%
Total	3.7%	9.9%	33.3%	25.9%	27.2%	100.0%
χ^2=6.3 with 8 degrees of freedom has a p value of 0.614						

The result is not statistically significant as the vast majority of participants report that they understand and use this strategy when learning new words.

Finally, the last strategy of this section is the use of organisational skills such as note taking etc. as reported in Table 6.35.

Table 6.35: Metacognitive Strategy: Organisation (Q42)

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	23.8%	19.0%	19.0%	23.8%	14.3%	100.0%
Y.Gifted Linguist	3.4%	31.0%	44.8%	17.2%	3.4%	100.0%
L2 Learner	16.7%	30.0%	36.7%	16.7%	0.0%	100.0%
Total	13.8%	27.5%	35.0%	18.8%	5.0%	100.0%
χ^2=12.718 with 8 degrees of freedom has a p value of 0.122						

Once again the result is not statistically significant (p value 0.122) . Looking at the percentages, it would seem that the YGL group uses this strategy most and the L2 the least, but the differences are not very great. Organisation is a skill which has to be learnt in order to be applied to the relevant tasks. It requires practice and contributes to academic success.

This study concentrates on group differences in the use of strategies and, in the future, more research might need to be carried out to understand the possible causes for the variability in the use of some metacognitive strategies.

The next section covers the monitoring strategies.

Part 2 Monitoring

Table 6.36 illustrates the reported use of monitoring one's learning by, for example, practising the vocabulary at regular intervals.

Table 6.36: Metacognitive Strategy: Self-monitoring (Q40)

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	23.8%	14.3%	33.3%	14.3%	14.3%	100.0%
Y.Gifted Linguist	20.0%	40.0%	30.0%	10.0%	0.0%	100.0%
L2 Learner	16.7%	40.0%	30.0%	10.0%	3.3%	100.0%
Total	19.8%	33.3%	30.9%	11.1%	4.9%	100.0%
χ^2=9.073 with 8 degrees of freedom has a p value of 0.336						

The participants were asked whether they regularly checked their knowledge and the accuracy of the words that they had learned. The result was not statistically significant as on the whole participants either do not or only 'sometimes do' use this strategy (between 71.4% and 90%). It could be that at their age it is thought that this strategy is not yet appropriate, and that they have not received any training in it.

Finally the third section investigates the use of evaluation strategies.

Part 3 Evaluation

The strategy investigated in this section is that of evaluating one's learning by comparing and judging the outcome and noticing and learning from one's errors. This, again, is verging on cognitive strategy as well as metacognitive and requires a certain maturity from the learner.

Table 6.37 presents the results the different groups' responses to evaluating their progress by noticing their errors.

Table 6.37: Metacognitive Strategy: Noticing and Learning from one's Errors (Q45)

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	0.0%	9.5%	33.3%	33.3%	23.8%	100.0%
Y.Gifted Linguist	0.0%	6.7%	36.7%	33.3%	23.3%	100.0%
L2 Learner	6.7%	13.3%	30.0%	33.3%	16.7%	100.0%
Total	2.5%	9.9%	33.3%	33.3%	21.0%	100.0%
$\chi 2$=4.704 with 8 degrees of freedom has a p value of 0.789						

Once again the result is not statistically significant as the majority of the learners make use of this strategy. There are therefore no group differences although it must be noted that the L2 learners seem to use it less than the other two groups (20% generally do not or never use this strategy).

Finally the last strategy analysed is that of checking the results of one's learning and evaluating it against some predetermined goals, that is to say making a judgement on the general progress achieved thus far.

Table 6.38: Metacognitive strategy: Checking the Outcome (Q46)

Groups	I never or practically never do that	Generally I don't do that	I sometimes do that	Yes on the whole I do that	Yes I always or practically always do that	Total
Choice Bilingual	9.5%	9.5%	52.4%	14.3%	14.3%	100.0%
Y.Gifted Linguist	0.0%	20.0%	43.3%	33.3%	3.3%	100.0%
L2 Learner	3.3%	6.7%	46.7%	30.0%	13.3%	100.0%
Total	3.7%	12.3%	46.9%	27.2%	9.9%	100.0%
$\chi 2$=9.47 with 8 degrees of freedom has a p value of 0.304						

As most participants (84% of the total sample) seem to use this strategy, the result is not statistically significant ($p>0.005$) and thus it is not possible to determine a group difference for this strategy.

In summary, it was only for one use of metacognitive strategies that the study found a statistically significant difference between the groups at the 5% level. This was directed attention where both the CB and YGL groups used this strategy more than the L2 learners group. However, the reported use of two strategies was significant at the 10% level; they were selective attention which was favoured by the L2 learners and, functional planning which was mostly used by the YGL group. As mentioned earlier, this type of strategy use is acquired gradually:

> "good language learners **develop** metacognitive skills which enable them to manage their own learning, thereby rendering themselves less dependent on others and on the vicissitudes of the learning situation" (Anderson, 2008, p. 108)

The participants in the study were all young school children who may not have had the time, the practice or the training to develop such skills. Therefore, as seen in the the result of the ANOVA (Table 6.28), there are no statistical differences in the overall use of metacognitive strategies by the three groups of participants.

In order to investigate the reliability of the questionnaire in determining the overall use of memory, cognitive and metacognitive strategies among the different groups of learners, a Cronbach's Alpha Test was carried out (see Table 6.39 below).

Table 6.39: Cronbach's Alpha for the Vocabulary Learning Strategy Scales

Scale	Cronbach's Alpha	Number of Items in the Scale
Use of Memory Strategies	0.599	13
Use of cognitive strategies	0.800	23
Use of Metacognitive Strategies	0.718	10

There is a high level of internal consistency for each of the elements of this scale showing that the questions are reliably picking up the underlying constructs. The weakest reliability is shown in the memory scale where it is difficult to pinpoint memory strategies that would be used by 10 to 12 year old children who have not had the benefit

of strategy training nor the maturity necessary to consciously develop certain strategies. However, overall a reasonably high Cronbach's Alpha for each scale was recorded. The Cronbach's Alpha is also affected by the number of items in the scales and so, all things being equal, we would expect a higher Cronbach's Alpha for the cognitive strategies section as it has double the number of items in the scale when compared with the memory strategies section.

Having investigated the use of vocabulary learning strategies by the three groups of learners, the last section of this chapter gives more information on the composition of the sample and on the importance of self and perceived parental attitude towards learning French in order to see if this influences the use of strategies by a particular group of learners.

6.4 General Information on the Composition of the Sample and the Importance of Own and Perceived Parental Attitudes towards the Learning of a Foreign Language.

There have been several studies on learners' attitudes to L2 learning (William, Burden and Lanvers, 2002). However, perceived parental attitudes to L2 learning combined with the use of learning strategies by young learners do not appear to have been the subject of many studies, and both attitudes towards learning and perceived parental attitudes could influence motivation (Oxford and Nyikos, 1989). In this study, as explained below, the participants are young school children. An aim of this part of the questionnaire is to obtain a better understanding of the relative importance of the motivational effect of perceived parental attitudes on this age group.

6.4.1 The Composition of the sample

As already mentioned at the beginning of this chapter and in Chapter 4, the same participants who took the Vocabulary Network Test also answered the Vocabulary Learning Questionnaire (with the exception of the adult group who only took part in the Vocabulary Network Test as an 'expert' native group). Thirty-four boys and forty-seven girls took part in the study. Table 6.40 below illustrates the gender and group of the participants and gives the percentage of boys and girls in each group.

Table 6.40: Composition of the groups according to gender

	% within Group			
Gender	Choice Bilingual	Y.Gifted Linguist	L2 Learner	Total
Boy	52.4%	40.0%	36.7%	42.0%
Girl	47.6%	60.0%	63.3%	58.0%
Total	100.0%	100.0%	100.0%	100.0%

In view of the differences in gender within the sample and therefore also in the composition of the groups, a series of cross tabulations was calculated to see if these gender differences had an influence on the mean responses of the groups for the use of the three categories of strategies (memory, cognitive and metacognitive). Table 6.41 gives the means for the overall use of each type of strategies per gender.

Table 6.41: Use of strategies per gender

Gender	Strategies	N	Mean	Std. Deviation
boy	Memory averaged	34	2.68	0.44
	Cognitive averaged	34	2.73	0.46
	Metacognitive averaged	34	2.96	0.53
girl	Memory averaged	47	2.57	0.42
	Cognitive averaged	47	2.63	0.53
	Metacognitive averaged	47	2.89	0.60

The results show that gender is not a deciding factor on the use of strategies by the different groups of learners, and so the use of strategies is not affected by the gender composition of the group.

A question specifically aimed at CBs revealed that 33.3% had English as their home language and 66.7% had French. This is clearly due to the fact that the children in the group generally only had one parent speaking French. This emphasizes the point made earlier in Chapter 1 that, in order to enable them to become bilinguals, a more explicit learning approach to the language has been necessary, which places their

learning experience somewhere between that of foreign language learners and that of native bilinguals.

6.4.2 Participants' attitudes and their parents' perceived attitudes towards French

In an attempt to clarify the participants' attitudes towards the subject, the three groups were asked if they enjoyed learning French. The point of this enquiry was to establish whether there was a link between success at language learning and attitudes towards the subject. Erler and Macaro, in a comprehensive study covering decoding ability in French and language learning motivation looked at 'positive feelings' about the subject among a large sample of 11-14 years old and found that they "correlated fairly strongly and significantly with the decision to continue with French" (Erler and Macaro, 2011, p. 95). In this study, there was not a great deal of difference between the YGL and the L2 group's responses although the L2 group seem to enjoy the subject slightly more than the YGL group. However, it was clear that all the CBs in the sample reported a positive attitude towards the language (see Table 6.42).

It is worth remembering that, in such studies, it is rather difficult to distinguish whether the participants really think positively or whether they are giving the answer which they think the researcher would like them to give. Also, in the case of CBs, a positive attitude may stem from their ability to excel in French which may not be the case in other subjects.

Table 6.42 Participants' Enjoyment of the Language.

Question	Answer	% within Group			
		Choice Bilingual	Y.Gifted Linguist	L2 Learner	Total
Do you enjoy learning French?	yes	100.0%	70.0%	72.4%	78.8%
	no	0.0%	30.0%	27.6%	21.2%
Total		100.0%	100.0%	100.0%	100.0%

As can be seen in Table 6.42, 100% of CBs report that they enjoy the French language.

Another question asked was "how important is it for you to be able to speak French?" The results give a slightly different picture as reported in Table 6.43.

Table 6.43 Participants' Attitude towards the Language

Question	Answer	% within Group			Total
		Choice Bilingual	Y.Gifted Linguist	L2 Learner	
How important is it for you to learn French?	Very important	71.4%	6.7%	13.3%	25.9%
	Important	19.0%	63.3%	40.0%	43.2%
	Not very important	9.5%	23.3%	43.3%	27.2%
	Not at all important	0.0%	6.7%	3.3%	3.7%
Total		100.0%	100.0%	100.0%	100.0%

The CB group still has the most positive attitude with 71.4% reporting that it was very important for them to speak French but the most striking difference was between the YGL and the L2 groups where 43.3% of the L2 learners thought that it was not very important. In contrast, only 23.3% of the YGL group thought that it was not very important. The study compares these results with the responses given on the parents' perceived attitude towards French (see Table 6.44).

Table 6.44 Parents' Perceived Attitudes towards the Language

Question	Answer	% within Group			Total
		Choice Bilingual	Y.Gifted Linguist	L2 Learner	
How important is it for your parents that you should speak French?	Very important	90.0%	0.0%	17.2%	29.1%
	Important	10.0%	66.7%	41.4%	43.0%
	Not very important	0.0%	33.3%	34.5%	25.3%
	Not at all important	0.0%	0.0%	6.9%	2.5%
Total		100.0%	100.0%	100.0%	100.0%

The participants were asked "How important is it for your parents that you should be able to speak French?" Predictably 90% of the CB group reported that it was very important to their parents. The parents who reportedly attached the least importance to their children's second language ability belonged to the L2 group. This result shows a possible reason for the lack of motivation towards French language learning reported by the L2 group. The question is whether this lack of motivation results in a decrease in the use of vocabulary learning strategies. To see if there is a relationship between the parents' perceived attitude towards the language and the use of the different strategies by

the different groups of participants, a crosstabulation was calculated using SPSS (see Table 6.45) between the parents 'perceived attitude and the participants' mean score for each category of strategy use (see section 6.3.1 for an example of how the mean score for the use of each category of strategy was calculated).

Table 6.45: Participants' Mean Scores for each Strategy Use and Perceived Parents' Attitude to French

		Mean Score for Each Strategy Section		
		Memory Score	Cognitive Score	Metacognitive Score
Parents' Language Importance	Very Important	2.51	2.95	2.93
	Important	2.67	2.68	3.01
	Not Very Important	2.67	2.41	2.80
	Not at all Important	2.23	2.22	2.75

This table compares the use of different strategies with the importance parents place on the learning of the language. It would appear that, when parents reportedly think that the learning of the language is very important, this corresponds to the participants using more cognitive strategies. Similarly, when parents reportedly feel that the learning of the language is important, this corresponds to the participants using more metacognitive strategies. Finally when the parents are reported to attach no importance at all to language learning, the average use of strategies is lower than in the previous categories. Therefore, there seems to be a correlation between the perceived parental attitude and the use of language learning strategies. The same analysis was repeated looking at the children's attitude to French (Table 6.46).

Table 6.46: Participants' Mean scores for each Strategy Use and their Attitude to French

		Mean Score for Each Strategy Section		
		Memory Score	Cognitive Score	Metacognitive Score
Children's Language Importance	Very Important	2.52	2.87	3.04
	Important	2.66	2.79	3.02
	Not Very Important	2.63	2.35	2.67
	Not at all Important	2.59	2.25	2.70

This table compares the use of different strategies with the importance participants place on the learning of the language. It is noticeable that the young participants who place great importance or just importance on the learning of the language tend to use more cognitive and metacognitive strategies. Those who do not attach any importance to the learning of the language generally use fewer strategies apart from memory strategies. So in this instance too, there seems to be a relationship between the children's attitudes towards the language and their strategy use. The next table describes the frequency of responses to these two questions. It must be noted that two participants (one choice bilingual and one L2 learner) failed to register their answers to these two questions. Therefore the analysis is based on seventy-nine participants. Table 6.47 below compares the frequency of responses on both perceived parental attitudes and children's attitudes

Table 6.47: Frequency of Participants and their Perceived Parents' Responses to Attitude to Language Learning

Frequency		Childrens' Language Importance			
		Very Important	Important	Not Very Important	Not at all important
Parents Language Importance	Very Important	17	6	0	0
	Important	4	22	8	0
	Not Very Important	0	7	11	2
	Not at all Important	0	0	1	1

Table 6.47 gives the number of participants who indicated their attitude to language learning and their reported parents' attitude. Only three participants said that being able to speak French was not at all important to them but only one of these reportedly believed that it was also unimportant for his/her parent. The majority of participants' responses match their perceived parents' responses. Percentages give a better understanding of the relationship between participants' and parents' perceived attitudes towards language learning and this is the reason for the inclusion of Table 6.48.

Table 6.48: Total Percentages of Participants and their Perceived Parents' Responses to Attitude to Language Learning

		Children's Language Importance			
Total %		Very Important	Important	Not Very Important	Not at all important
Parents Language Importance	Very Important	21.5	7.6		
	Important	5.1	27.8	10.1	
	Not Very Important		8.9	13.9	2.5
	Not at all Important			1.3	1.3

21.5% of all the participants believed that their parents found the learning of the language very important whilst at the same time finding the language very important themselves. For the most part, the children's attitude towards the language correlates with their parents' perceived view of the importance of the language. However, 10.1% of the participants think that it is not important to be able to speak the language whilst knowing that their parents find it important.

Table 6.49: Children's Perceived Parents' Attitudes as Percentages of their own attitudes towards the Language

row %		Children's Language Importance			
		Very Important	Important	Not Very Important	Not at all important
Parents Language Importance	Very Important	73.9	26.1		
	Important	11.8	64.7	23.5	
	Not Very Important		35.0	55.0	10.0
	Not at all Important			50.0	50.0

This is a cross tabulation comparing the participants attitude to language learning with their perception of their parents' attitudes. This table illustrates a strong correlation between the parents perceived and children's positive attitudes towards language learning.

Finally, the study looks at each group of learners to determine if there are differences between them with regard to their and their parent's perceived attitude to the learning of the language.

Table 6.50 Frequency of the CB Group's Responses on their and their Perceived Parents' Attitude to Language Learning

Choice Bilinguals		Childrens Language Importance			
		Very Important	Important	Not Very Important	Not at all important
Parents Language Importance	Very Important	15	3		
	Important		1	1	
	Not Very Important				
	Not at all Important				

As can be seen from Table 6.50, of the twenty sets of responses recorded from CBs, twenty (100%) felt that their learning French was either very important or important to their parents and nineteen (95%) saw learning French as either very important or

important to them. This confirms at a group level the general correlation identified in the previous cross tabulations. A similar table was drawn to compare the results for the YGL group.

Table 6.51 Frequency of the YGL Group's Responses on their and their Perceived Parents' Attitudes to Language Learning

Gifted Linguists **Total**		Childrens Language Importance			
		Very Important	Important	Not Very Important	Not at all important
Parents Language Importance	Very Important	2	16	2	
	Important				
	Not Very Important		3	5	2
	Not at all Important				

Table 6.51 shows that, of the thirty sets of responses recorded fromYGLs, twenty (66%) perceived that their parents believed that the learning of French was very important and twenty one (70%) saw learning French as either very important or important. Again this indicates a strong correlation between the responses from this group and their perceived parents' responses. The next table repeats the calculation for the L2 group.

Table 6.52 Frequency of the L2 learners group's responses on their parents' perceived attitude to language learning

L2		Childrens Language Importance			
		Very Important	Important	Not Very Important	Not at all important
Parents Language Importance	Very Important	2	3		
	Important	2	5	5	
	Not Very Important		4	6	
	Not at all Important			1	1

As shown in the Table 6.52, seventeen (59%) of the twenty nine sets of responses recorded by the L2 learners indicated that they felt that their parents believed that their learning French was either very important or important and sixteen (55%) saw learning French as either very important or important to them. Although the sets of responses from this group are less positive, there is a strong correlation between them.

In summary children's attitude towards language learning does seem to correlate with their parent's perceived attitude. There are group differences as the CBs and, to a slightly lesser extent, the YGLs have a more positive attitude towards the language which correlates with their parents' perceived attitude.

This chapter has looked at the use of vocabulary strategies by the three groups of learners as well as the relationship between the different groups of learners' attitudes towards French and their parents' perceived attitudes with a view to answer the question: "To what extent are group differences related to beliefs about foreign language learning and perceived parental attitudes, and how much do these attitudes and perceptions influence the choice of strategies employed by the groups in the encoding of lexis in the mental lexicon?" Beliefs have been linked to motivation and, parental beliefs could also be seen as a motivating factor. Motivation, as seen earlier, has been strongly associated with success. It has been suggested that learners' beliefs, perceptions, attitudes and metacognitive knowledge are contributory factors to success (Breen, 2001) .
When responding to questions on both their and their parents perceived attitudes to language learning, the two most successful groups of learners in the study gave predominantly positive responses. There was also a relationship between the use of strategies, and in particular cognitive and metacognitive strategies, and positive self and perceived parental beliefs about language learning. Therefore, despite the fact that all the participants were in a highly motivated school environment, there were group differences which seemed to suggest that more successful language learners have a more positive attitude towards the language which matches their parents' perceived attitude.

6.5 Conclusion

This chapter has presented the analysis of the data provided by the vocabulary learning strategy questionnaire. It has attempted to investigate the hypothesis that some of the variance in vocabulary learning could relate to group differences and be attributed

to differences in the use of strategies and learner's and learner's parents perceived attitudes to language learning.

It must be mentioned that one perceived limitation of the study stems from the fact that the results obtained in the first three parts of the questionnaire were based on the use of a taxonomy of learning strategies which is still not totally satisfactory as there are some overlaps between the three main types of strategy studied. However, thus far, there has not been a consensus in the strategy research field on a perfect taxonomy of learning strategies. Nevertheless, the step by step approach of reviewing specific strategies has enabled the researcher to highlight not just the differences between the groups but also the strategies which were less used by the young learners. The fact that the study uncovered some statistically significant differences for overall use of cognitive strategies (see Table 6.13) and that CBs in particular tend to favour this type of strategy, seems to parallel the results of separate studies on Canadian bilinguals mentioned in Chapter 2 and 3. Although in some cases the CB group's greater use of cognitive strategies may relate to opportunity and environment, for example practising the language in realistic contexts, in others for instance resisting word by word translation, it may point to different vocabulary access techniques which, perhaps, stem from a difference in vocabulary networking. It may be that the bilinguals' parallel organization of their two (French and English) lexicons makes direct translation more remote. This is an area of research which would need to be further developed in the future.

Although the differences for the overall use of memory and metacognitive strategies were not statistically significant, the percentages calculated showed that, as in Chapter 5, there was a tendency for the YGL group to use more strategies than the L2 group. In particular, the YGL group made significantly greater use of inferencing and the metacognitive strategy of directed attention. These strategies involve more control and a more studious approach to learning. It would also appear from the results that there is a relationship between the parents' perceived attitude to French and the children's use of learning strategies (see Table 6.45). Similarly, the children's attitude towards the language seems to correlate with their use of strategies (see Table 6.46).

An ultimate goal of the study is to add to the pool of research on vocabulary learning and processing in order to assist in improving vocabulary teaching in schools. The use of strategies versus group differences was one facet of the research. The next chapter presents the data and analysis from the Working Memory Test in order to

investigate whether success or potential success at languages and in particular at vocabulary acquisition could be attributed to group differences in WM scores.

CHAPTER 7

WORKING MEMORY TEST, DATA ANALYSIS, SUMMARY AND DISCUSSION OF RESULTS.

7.1 Introduction

When a new item of vocabulary is acquired, the process of acquiring the word requires creating a representation that links the word's referent to a meaning, a new sound pattern and to syntactic structures. Working Memory (WM) is likely to play a crucial role in this process, as unfamiliar sound patterns must be stored and rehearsed so that a more permanent representation can be constructed (Baddeley, Gathercole and Papagno, 1998).

In the first instance, this chapter sets out to re-situate the test from this study in its context of temporary accessibility and manipulation of information, and, to this end, it gives a brief resume of how the test was designed (for a more detailed description see Chapter 4 of this study), and how the results are scored. Its second objective is to present the analysis of the results in the light of possible similarities or differences between YGLs and CBs compared with L2 learners. The test used to generate the data was adapted from an instrument already devised by Walter (2004). It measures the Working Memory of young French-English CBs, YGLs, and L2 learners in both languages for the reasons explained in section 4.2.6. The L2 group is used as the basic reference group. Could differences in acquiring a second language be explained by differences in the ability to hold information in the mind in order to guide reactions or behaviour while faced with interfering inputs or distractions?

The capacity of WM is thought to be limited and to decline with age (Craig,1994). However, recent research contradicts these findings and suggests that WM can be improved (Jonides et al., 2008), (Jausovec and Jausovec, 2012). If that is the case, and if it could be said that WM efficiency is in some way linked to aptitude in a second language, then it would be important to determine which group or groups of language learners could be helped by an increase in WM efficiency. As noted in Chapters 3 and 4, the present experiment is adapted from Waters and Caplan (1996), and Walter (2004) who used the instrument to explore the correlation between the WM scores of two groups

of French participants learning English and their age and school assessments. This study, as mentioned above, uses the instrument to record the differences or similarities in WM scores between the three groups of participants.

7.2 The Working Memory Test

The instrument combines three components and gives equal weight to recall and processing. The first component measures the logicality judgements of the participants, that is, whether the sentence makes sense. The second component is the reaction time recorded for making correct judgements, and the third component is the recall measure, which records how many correct recall sets of last words were given. The test had to be adapted to accommodate the young age of the participants and the limited level of proficiency in French of the young L2 learners. Therefore sentences had to be rewritten both to eliminate tenses other than the present tense in French and to keep the vocabulary as basic as possible. However, apart from these relatively minor changes the test remained identical in concept to the one used by Walter (2004) and the same methodology was used to administer and score it.

As WM scores have been correlated with age (Gathercole et al., 2004) as discussed in Chapter 3, the fact that all the participants are from a similar age group means that differences in their WM scores must be correlated with other factors. The aim is to see whether belonging to a different group (CB, YGL or L2 learners) may throw some light on differences in group WM scores and whether these group WM scores further differ according not only to groups of participants but also to languages used as well as proficiency or potential in those languages. This implies that both parts of the test (the English and the French parts) have to be as similar as possible in both languages in terms of language difficulty (see Chapter 4 for more detailed comments on the design of the test).

7.2.1 The Participants

Due to unforeseen circumstances, 5YGL and 5 L2 learners, from the original participants who took part in the Vocabulary Network Test and Questionnaire could not

take part in the W M Test[9]. As a result, the total number of participants for the test was as follows:

Choice Bilinguals: 21

Young Gifted Liguists : 25

L2 learners: 25

7.2.2. Design of the Working Memory Test

One hundred unrelated and simple declarative sentences were written in each of the two languages. Each sentence ended in a different concrete noun. Half the sentences were grammatically incorrect with the role requirement of the verb being violated example: *the sofa sits on the dog*; the participants were told that these sentences were 'illogical'. For each language, the two lists of logical and illogical sentences were combined into one list with sentences randomly ordered. This list was then subdivided into five sets each of two, three, four, five and six sentences. A few adjustments were made after the pilot study to ensure that the last words of each set of sentences were not phonologically similar. The sentences were then entered into a bespoke computer programme. It had not been possible to use the psycope programme (Cohen, 1993) used by Walter as it was no longer compatible with Microsoft Word. Consequently a similar bespoke programme had to be written and care was taken to ensure that it was written using exactly the same parameters in terms of presentation and content. The sentences appeared on the screen, one sentence at a time preceded by the titles: English two sentences, three sentences, four sentences or, French two sentences etc. This was to limit activation of the other language.

In order to ensure randomized and parallel treatment for the two languages, there were four versions of this presentation produced according to the following parameters: In each language, the order of the original randomised list of sentences was reversed to produce another list which was also divided into groups of five sets as per the original list. The participants received the original or the reversed order.

A compromise had to be made between keeping the experimental conditions equal between the two languages and potential difficulties caused by unwanted language

[9] Undertaking a school base research is notoriously challenging in view of the necessity to rely upon the collaboration of teachers, the presence of pupils on a particular day and location etc. Dornyei, Z. (2007), *Research Methods in Applied Linguistics*. Oxford: Oxford University Press.

activation. In effect, if a participant completed all the tasks in one language first, he or she might have performed better in the other language due to a beneficial practice effect or, on the contrary, there could be a negative fatigue effect. However, frequently alternating L1 and L2 would not take into account the eventual problems caused by the other-language interference. In order to balance these two points this study follows exactly the composition of Walter's test by changing language after every other level of the task and by announcing the change of language on the screen. The participants did a practice set prior to attempting the WM Test. Two sets of sentences in English and two sets of sentences in French where shown on the screen. The participants had to press the 0 key if the sentence was not logical or the 1 key if the sentence was logical (these two keys were chosen as they are remotely located and could not have been mistaken for one another). The participants then had to remember the last word of each sentence: sets of two sentences meant two words to recall, sets of three meant three words etc. up to six words. The fact of having to retain a list of items while engaging in another activity, that is, making logicality judgements meant that they engaged in both storing and processing tasks (see Chapters 3 and 4 on storage and processing tasks).

7.2.3 The Scoring of the Working Memory Test

The test measures three elements:

1. The logicality judgement (if the sentence made sense or not).
2. The time taken to make this judgement.
3. The recall (the number of words remembered per set).

The English and French sections of the test are marked separately. The test starts with five sets of two short sentences each. The participants had to recall the last word of each sentence, that is, two words. This was followed by five sets of three sentences etc. as explained above. In the case of both languages the tests were terminated when a participant failed to correctly recall at least three of the last words of a set of five sentences. This was firstly because the nature of the test means that it increases in difficulty and those participants who had failed to correctly recall at least three of the five sets of words had probably already reached their maximum recall and their subsequent results would then constantly score zero which would not change the results of the statistical analysis. Secondly, in order to avoid discouraging the participants with low

levels of recall as it could be potentially unethical to pressurize or discourage young participants[10]. Therefore, when a participant failed to recall three sets of words in a language, he or she continued with the logicality judgement and with the recall in the other language.

7.2.3.1: Recall Results

Each recall set where the participant had correctly recalled the last word of at least three out of the five groups of sentences was awarded one mark. An example of a participant's recall marks is set out in Table 7.1. He or she correctly recalled the last words of three or more of the five two sentence sets and, as a consequence, scored one mark. This was also the case for the five three and four sentence sets, but the participant failed to correctly recall the last words from three of the sets of five sentences. Consequently, he or she failed to score a mark. As a result of this failure, the six sentence sets were not attempted.

Table 7.1 : Example of scoring for recall

No. of sets	No. of sentences per set	No. of correctly recalled last set of words	Score
5	2	5	1
5	3	4	1
5	4	3	1
5	5	1	0
5	6	Not attempted	0

This method of scoring follows exactly the scoring methodology of previous studies Waters and Caplan (1996), and Walter (2004).

[10] Anyone involved in sociological research has "a responsibility to ensure that the physical, social and psychological well-being of research participants is not adversely affected by the research" The British Sociological Association (March 2002)

7.2.3.2 Logicality judgement.

After the participants had chosen key 1 for logical or key 0 for illogical, the mean of all correct logicality judgements for all the sentences attempted was calculated. The analysis of the results can be seen in section 7.3 of this chapter.

7.2.3.3 Reaction time

Similarly, for reaction time, the mean of the times taken to read the sentence and make the logicality judgement in milliseconds was also calculated and is analysed in section 7.3.

7.2.4. Data base construction:

The programme used to administer the test was designed with automatic coding (except for the recall part of the test). The data and scoring was transferred from the bespoke programme onto SPSS. A spreadsheet of responses to the logicality questions was generated for each child in SPSS. This contained identifying information on the student (each participant had been given an ID number), the logicality judgement given for each sentence, and the time that they took to respond. The recall score which had been recorded separately was added to the spreadsheet manually. A data base was compiled in SPSS for each student in 'wide' format (one row per student) Sentences were entered in alphabetical order onto the database.

In order to get a WM score for each participant, all time values were standardised (standardised across both languages that is for English and French combined). These values were labelled T1 to T200 (corresponding with the un-standardised time rates measured in milliseconds). The time was standardized within all time values and multiplied by -1 so that a more positive value was associated with a more positive outcome (in line with the other two measures).

For the logicality judgement the variable was coded L1 to L200 and the responses were given a numerical value: 0 = illogical and 1 = logical. The logicality responses were standardised. The recall variable was renamed R1 to R100 for French and R101 to R200 for English. The scores were calculated as illustrated in Table 7.1. These scores were then standardized. The recall and logicality judgement scores were also standardized within all recall and within all logicality values. All the French sentences were picked out to give a mean standardized value for French for each participant. All

the English sentences were also highlighted and treated in the same way. The mean standardized scores for each of the three components were then calculated per group and per language. The results can be seen in Table 7.8. However, prior to studying the standardized scores, descriptive analyses were used to present a more detailed examination of the mean scores for the three components of the WM Test for the three groups, separating the French and English mean scores as illustrated in the following six tables.

7.3 Analysis of Results

7.3.1 Analysis of mean scores for the three components of the WM Test.

This first section of the analysis gives an overview of the differences of the mean scores for the three components of the WM test. These differences will be analysed in section7.3.3, and judgements on the significance of observed differences between the groups will be made.

Table 7.2 shows the details of the mean scores of the total correct responses for the English logicality judgement test.

Table 7.2: Mean (by Group) of the 'Total Correct Responses for English (Logicality)'

		Correct English logicality judgements	
Group	N	Mean	Std. Deviation
Choice Bilingual	21	93.57	6.67
Y.Gifted Linguist	25	98.00	1.35
L2 Learner	25	96.64	3.64

It is important to note that, although the YGL score is higher than the L2 the difference between them is small (1.36). The gaps between CB and the monolingual groups are larger. However, it must be stressed that the three groups are very close together in terms of scoring. The standard deviation for both CB and L2 learners were higher showing a much larger spread of responses or greater variations within these two groups which seems to give credence to previous research:. "performance in working memory tasks is subject to large degrees of individual variation" (Alloway and

Gathercole, 2006, p. 135). Alloway et al based this finding on an experiment with 709 monolingual children attending state primary schools in England. However, in the present study, it is the group effect which is under scrutiny and more focused analysis on the differences will be presented in the next section of this chapter.

Table 7.3 shows the mean of the total correct responses for French logicality judgements.

Table 7.3: Mean (by Group) of the 'Total Correct Responses for French (Logicality)'

	Correct French Logicality Judgements		
Group	N	Mean	Std. Deviation
Choice Bilingual	21	91.19	7.76
Y.Gifted Linguist	25	90.96	7.85
L2 Learner	25	86.48	9.04

The highest mean is, unsurprisingly the CB group, which is more proficient in the language than the YGL group and the lowest mean is that of the L2 learners. The standard deviations of both the CB and YGL groups are very close together showing less variation in the spread of responses whereas the L2 learners have a wider spread of scores. Therefore, the L2 learners group shows greater individual variation in this part of the test. However, performance in the logicality judgement would indicate that the French sentences were not too difficult to process for the L2 learners (86.48% of correct judgements)

It is noteworthy that the standard deviation for all of the groups is high indicating larger degrees of individual variations than was the case for the English logicality responses. Also, the closeness of the standard deviations for the CB and YGL groups is in marked contrast with their standard deviations for the English logicality responses. Clearly, when using a second language the YGL group shows a much wider range of individual processing differences than in their L1; whereas the CB group shows a similar level of within group differences for both languages. However, the CB group's lower mean and higher standard deviation than the monolingual groups in the English logicality test seems to suggest that, at this age, their proficiency in French has tended to limit their competence in English.

The mean logicality judgement reaction times for the English responses are described in Table 7.4.

Table 7.4: Mean (by Group) of the 'Mean Response Time for English (Logicality)'

		Response Time For Correct English Logicality Judgements	
Group	N	Mean	Std. Deviation
Choice Bilingual	21	2819.79	822.84
Y.Gifted Linguist	25	2798.17	648.77
L2 Learner	25	2675.33	444.54

The highest mean was from the CB group who took longer to make the logicality judgements in English. It may be that, despite the precautions taken in designing the test, they were still experiencing some interference between the two languages (see Chapter 3 section 3.3). The fastest mean response time came from the L2 group with the YGL group in between. However, it must be said that the differences between the three groups were not really noteworthy considering that these differences were measured in milliseconds. A mean difference which was of 0.1 second between the YGL and the L2 learners and 0.021 of a second between the CB and YGL groups is too small to allow any conclusion to be drawn as such small mean time differences between groups could be explained by the smallest of distractions.

The next table shows the mean response times in French.

Table 7.5: Mean (by Group) of the 'Mean Response Time for French (Logicality)'

		Response Time For Correct French Logicality Judgements	
Group	N	Mean	Std. Deviation
Choice Bilingual	21	3128.26	1131.73
Y.Gifted Linguist	25	5165.96	2263.70
L2 Learner	25	5847.15	2178.97

In the case of French, the results are reversed. The fastest mean response time was recorded by the CB group, the YGL came next and the L2 learners took the longest time

to make their logicality judgement. When compared with the previous table on mean response times for English, the results on the mean response time for French show a wider difference between the CB groups and the other two groups. It is likely that higher proficiency and more frequent use of the French language played a part in explaining the faster mean response time from the CB group.

The following table shows the mean scores for recall in English.

Table 7.6: Mean (by Group) of the Recall Scores for the English Recall.

Group	N	Mean	Std. Deviation
Choice Bilingual	21	3.14	1.01
Y.Gifted Linguist	25	3.64	0.95
L2 Learner	25	2.60	0.76
Total	71	3.13	1.00

In Table 7.6, the highest mean score was that of the YGL group with 3.64 (the maximum score was five as shown in Table 7.1). The CB group had the second highest score with 3.14. Finally, the L2 learners had the lowest mean score for recall with 2.6. It must be noted that the scores are close together particularly between YGL and CB groups showing the superiority of these two groups over the L2 learners on the English recall scores. It may have been expected that L2 learners' score in English recall would have, at least, matched that of the CB group. The higher mean recall score for the CB group may indicate a possible beneficial effect of bilingualism on WM. Could a high recall score correlate with a high working memory score? This will be investigated in section 7.3.5.

The next table shows the mean score for recall in French.

Table 7.7: Mean (by Group) of the Recall Scores for the French Recall.

Group	N	Mean	Std. Deviation
Choice Bilingual	21	2.71	1.15
Y.Gifted Linguist	25	2.28	0.98
L2 Learner	25	1.54	0.78
Total	71	2.16	1.07

Predictably, possibly due to a combination of their greater proficiency in the language and their superiority in control and attention (Bialystok, 1999) the CB group had the highest score, followed by the YGL group and finally the L2 learners. Therefore,

for the French recall, both the CB and YGL mean scores were higher than those of the L2 learners suggesting a possible connection between recall and aptitude in a language. Thus, a combination of aptitude and proficiency in a language could be responsible for these differences. Section 7.3.3 will present the tests carried out on the variability of the mean scores of the different groups, and will help to highlight a possible group effect.

Table 7.8 summarizes the previous analysis in order to make more in-depth comparisons of results so far.

7.3.2. Summary of Mean Scores Analysis

In this table the mean total for each of the components of the WM final score are presented for the three groups of participants. These components, as previously mentioned, are: recall, logicality judgement and reaction time.

Table 7.8: Mean Scores for the Three Components of the WM Test for the Three Groups in French & English

		Choice Bilingual		Y.Gifted Linguist		L2 Learner		Total	
Measure	Language	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Recall	English	3.14	1.01	3.64	0.95	2.60	0.76	3.13	1.00
	French	2.71	1.15	2.28	0.98	1.54	0.78	2.16	1.07
Logicality Judgement	English	93.57	6.67	98.00	1.35	96.64	3.64	96.21	4.60
	French	91.19	7.76	90.96	7.85	86.48	9.04	89.45	8.44
Reaction Time	English	2819.79	822.84	2798.17	648.77	2675.33	444.54	2761.31	640.00
	French	3128.26	1131.73	5165.96	2263.70	5847.15	2179.00	4803.11	2242.44

In the early stages of the acquisition of a language, a diminished efficiency in language processing caused by a lower proficiency in the L2 language may be responsible for the differences between English and French (Gilabert and Muñoz, 2010, p. 28), particularly with regard to recall and reaction time. It would seem that the mean of the results of the YGL and CB groups are relatively close but the standard deviation is higher for the CB group. This can be partly explained by the fact that the YGLs have been identified by the MLAT-E test for their potential ability in languages, as they scored within the top 10% (see Chapters 3 and 4 of this study), whereas the CBs presumably come from a normal population. Their mean score for the recall in French is higher; whereas the YGL group have a higher mean recall score in English and smaller

standard deviation indicating less individual differences between the participants which would be expected from a group with more homogeneous abilities in language acquisition.

In terms of logicality judgements, the results do not show a vast difference between the groups, which indicates that the vocabulary used which corresponded to the end of Key Stage 2 beginning of Key Stage 3 was not too difficult for the groups. There are greater variations within the CB and L2 learners groups as indicated by their standard deviation.

For the French reaction time, the mean was, as expected considerably higher for the monolingual groups than for the CB group who were the fastest. However, the mean for English was lower for the L2 learners but it must be noted that the scores for the three groups for the English logicality judgement are very similar, as was the case with mean reaction times which were expressed in milliseconds and the differences were very small. Once more, there were great variations with regard to the spread of the response times from the three groups as indicated by the high standard deviations. These differences will be further analysed in the next section.

7.3.3. ANOVA Models for components of the WM score

For each of the three components, a one way between group ANOVA was calculated to see if there was a statistically significant group effect for the different component scores.

Tables 7.9 and 7.10 show the results of the ANOVA for the French recall test.

Table 7.9: ANOVA for French Recall Test

French Recall	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18.29	2	9.15	9.49	0.00
Within Groups	65.57	68	0.96		
Total	83.86	70			

$F = 9.49$ with 2df sig < 0.001. The model is significant. Therefore, there is a group effect on the French recall test. This model tells us that at least one of the means is statistically different from at least one of the others but it does not tell us which one. A

Post hoc test will produce multiple comparisons which describe in more detail the differences between the groups of participants. This can be seen in the next table

Table 7.10: Difference in Mean Between Groups For French Recall

(I) group	(J) group	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Choice Bilingual	Y.Gifted Linguist	0.43	0.32	0.37	-0.34	1.21
	L2 Learner	1.23*	0.30	0.00	0.50	1.97
Y.Gifted Linguist	Choice Bilingual	-0.43	0.32	0.37	-1.21	0.34
	L2 Learner	0.80*	0.26	0.01	0.18	1.42
L2 Learner	Choice Bilingual	-1.23*	0.30	0.00	-1.97	-0.50
	Y.Gifted Linguist	-0.80*	0.26	0.01	-1.42	-0.18

*. The mean difference is significant at the 0.05level.

The Multiple Comparisons analysis above show more precisely where the significant differences occur. The YGL and CB groups have closer mean scores in the French recall part of the test although the choice bilinguals have a mean difference of 0.43 higher than that of the YGL group. This could be attributed to the CB group's greater ease at deciphering the graphemes. L2 learners have a lower mean. Although there are differences between choice bilinguals and gifted linguists, the statistically significant difference occurs between the CB group and the L2 learners. Here the fact that there is a larger gap in terms of proficiency in the language may explain this difference. Additionally, the haste shown by L2 learners in responding to the logicality judgement part of the test may also be a factor to consider when looking at these results.

The next table shows the results of the ANOVA for the English recall part of the test.

Table 7.11: ANOVA for English Recall

English Recall	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	13.53	2	6.76	8.17	0.00
Within Groups	56.33	68	0.83		
Total	69.86	70			

F= 8.17 with 2df sig < 0.001. Therefore, the model is statistically significant. Table 7.12 below throws some light on the precise differences between groups as noted below.

Table 7.12: Difference in Mean between Groups for English Recall

(I) Group	(J) Group	Mean Differene (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Choice Bilingual	Y.Gifted Linguist	-0.50	0.29	0.22	-1.21	0.21
	L2 Learner	0.54	0.27	0.12	-0.11	1.20
Y.Gifted Linguist	Choice Bilingual	0.50	0.29	0.22	-0.21	1.21
	L2 Learner	1.04*	0.24	0.00	0.45	1.63
L2 Learner	Choice Bilingual	-0.54	0.27	0.12	-1.20	0.11
	Y.Gifted Linguist	-1.04*	0.24	0.00	-1.63	-0.45

*. The mean difference is significant at the 0.05 level.

Only the YGLs and the L2 learners' scores are statistically significantly different. The mean of the YGL group is significantly higher than that of the L2 learners. It could be that the reading comprehension of the YGL group may be superior, thus facilitating the recall. Text comprehension is a complex exercise which necessitates the creation of a mental model of the text. Although we are dealing with short sentences here rather than more extensive text, the principle is, to a certain extent, the same. WM has been associated with comprehension:

> "working memory capacity is related to skills important for comprehension, such as the resolution of pronouns, memory for facts, and the inference of unknown word meanings from context" (Cain, Oakhill and Bryant, 2004).

A lack of vocabulary in the long term memory store can also reduce the understanding of a sentence. The YGL group, who have more potential for language skills, may therefore be more advanced at reading comprehension. This, in turn, would explain why they can better process and recall information. Thus, it would appear that, on the whole, the recall scores do show significant differences between the groups emphasizing the obvious and potential facilities for French of the CB and YGL group , and the possible differences in terms of comprehension and memory between the YGL group and the L2 learners.

The following table shows the ANOVA for the mean logicality judgement scores for French.

Table 7.13: ANOVA for French Logicality Scores

French Logicality	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	341.139	2	170.57	2.498	0.09
Within Groups	4642.438	68	68.271		
Total	4983.578	70			

The model is not significant. With a sig value of 0.09, the variance between groups, as mentioned above, is not statistically significant at the 5% level. Figure 7.1 illustrates some small differences between the groups. The Multiple Comparison analysis (Table 7.14), which gives the results of the post-hoc tests, highlights some differences, as shown and commented on the next page.

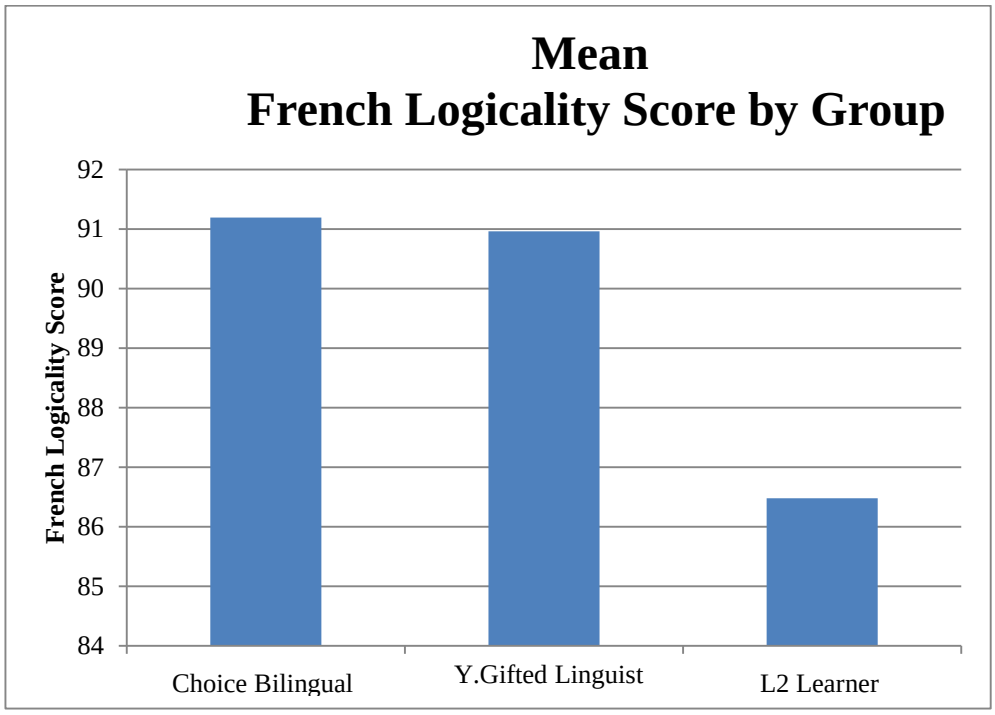
Table 7.14: Difference in Mean between Groups for French Logicality Judgments

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Choice Bilingual	Y.Gifted Linguist	0.23	2.31	0.995	- 5.37	5.83
	L2 Learner	4.71	2.48	0.150	- 1.30	10.72
Y.Gifted Linguist	Choice Bilingual	-0.23	2.31	0.995	- 5.83	5.37
	L2 Learner	4.48	2.39	0.158	- 1.31	10.27
L2 Learner	Choice Bilingual	-4.71	2.48	0.150	-10.72	1.30
	Y.Gifted Linguist	-4.48	2.39	0.158	-10.27	1.31

*. The mean difference is significant at the 0.05 level.

A clearer picture of the mean differences between the groups is evident from Figure 7.1overleaf.

Figure 7.1: French Logicality Judgement Score per Group



The CB group has a slightly higher mean score for the French logicality component than the YGL group and the L2 learners. There is a greater difference between the mean scores of the YGL group and the L2 learners. Therefore, for the French logicality score, the spread in responses follows the logical pattern of CB then YGL and finally L2 corresponding to relative facility and skills in the French language.

Table 7.15 illustrates the results of the ANOVA for logicality in English.

Table 7.15: ANOVA for English Logicality Scores.

English Logicality	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	230.928	2	115.464	6.277	0.003
Within Groups	1250.903	68	18.396		
Total	1481.831	70			

F = 6.277 with 2 df . Sig = 0.003

The model is significant at the 5% level which confirms the group effect on the logicality judgement score in English. A Post Hoc analysis in the next table shows this group effect in more detail.

Table 7.16: Difference in Mean between Groups for English Logicality Judgments

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Choice Bilingual	Y.Gifted Linguist	-4.43*	1.48	0.018	-8.15	-0.70
	L2 Learner	-3.07	1.63	0.160	-7.08	0.94
Y.Gifted Linguist	Choice Bilingual	4.43*	1.48	0.018	0.70	8.15
	L2 Learner	1.36	0.78	0.203	-0.55	3.27
L2 Learner	Choice Bilingual	3.07	1.63	0.160	-0.94	7.08
	Y.Gifted Linguist	-1.36	0.78	0.203	-3.27	0.55

*. The mean difference is significant at the 0.05 level.

The Multiple Comparisons analysis indicates that, although the model is statistically significant, the only significant difference is between the YGL and CB groups with the YGL group mean score being 4.429 higher than the CB group score. The bilinguals may have had a lower reading comprehension level in English and this would explain the marked differences. " Reading in the second language cannot be predicted simply on the basis of oral fluency, and the bilinguals who appear to be equally proficient in both languages may nonetheless be possibly inefficient in reading texts" (Bialystok, 2001a, p. 179). Correlations between reading comprehension and WM scores have been established (de Jonge and De Jong, 1996). However, further research would need to confirm whether this variable could explain the above differences between the two groups. It must be noted that the YGL group's and L2 learners' mean difference is very small (1.36). Considering that both groups are English monolinguals, this is a logical outcome.

The next four tables refer to the ANOVA carried out on the effect of the time taken to make the logicality judgements in French and English and the group effect for these two components.

Table 7.17: ANOVA for Reaction Time in French.

French time (milliseconds)	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8.945	2	4.472	11.6	0.001
Within Groups	2.625	68	3861025.65		
Total	3.52	70			

F=11.6, p= 0.001

The model is significant, emphasizing a group effect and a Multiple Comparisons analysis will show the differences in greater detail.

Table 7.18: Difference in Mean between Groups for French Reaction Times

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Choice Bilingual	Gifted Linguist	-2037.69*	515.72	0.001	-3297.49	-777.90
	L2 Learner	-2718.89*	500.91	0.000	-3941.47	-1496.31
Gifted Linguist	Choice Bilingual	2037.69*	515.72	0.001	777.90	3297.49
	L2 Learner	-681.19	628.40	0.529	-2201.04	838.66
L2 Learner	Choice Bilingual	2718.89*	500.91	0.000	1496.31	3941.47
	Gifted Linguist	681.19	628.40	0.529	-838.66	2201.04

*. The mean difference is significant at the 0.05 level.

The Post-hoc comparisons analysis shows that there is a group effect. Predictably, the CB group's mean time was faster than that of the YGL and the L2 groups. The YGL group was not significantly different from the L2 learners. Considering they are both beginners in the language, this is not altogether surprising.

The next two tables show the group effect for the English reaction times.

Table 7.19: ANOVA for English reaction times.

English time (milliseconds)	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	290583.24	2	145291.618	0.35	0.71
Within Groups	28390000	68	417438.478		
Total	28680000	70			

F= 0.35, p = 0.71 meaning that the model is not significant.

There is no group effect for the mean logicality judgements reaction time in English. This is probably due to the fact that all the groups are fluent and use English most of the time. However, quick reactions do not necessarily result in correct answers.

7.3.4 The Working Memory Score

In order to obtain a composite WM score for each participant, their scores for the three components were standardized and all French sentences were picked out to give a mean standardized value for French for each participant. All the English sentences were also highlighted and added in the same way.

The means and standard deviations for combined recall, logicality judgment scores and reaction times per group are summarized in Table 7.20.

Table 7.20: Means of the Participants' Standardised Scores per Group and per Language.

Group		N	Mean	Std. Deviation
Choice Bilingual	English Mean Standardised	21	0.17	0.22
	French Mean Standardised	21	0.07	0.24
Y.Gifted Linguist	English Mean Standardised	25	0.26	0.10
	French Mean Standardised	25	-0.26	0.40
L2 Learner	English Mean Standardised	25	0.25	0.10
	French Mean Standardised	25	-0.46	0.44

The difference between the English and French WM scores is smallest in the CB group and greatest in L2 learners' group. This is showing greater consistency within the

CB WM scores from which the conclusion can be drawn that, within this group, the WM score is probably not significantly affected by which language they use. There was not a great deal of difference between the YGL group and the L2 learners in terms of the English WM scores. The CB groups' results for English were lower than for the other two groups. However their combined scores, English plus French, as seen earlier, show a much higher overall memory score than the ones of the other two groups; illustrating the possible beneficial effect of bilingualism on WM. Bialystok links the beneficial effects of bilingualism to executive functions which "control attention, determine planning and categorising, and inhibit inappropriate responding"(Bialystok, 2007, p. 219). Certainly control attention and resisting interference are associated with WM. It is also interesting to note that the combined English and French mean standardized scores for L2 learners is negative showing the importance of the language used at beginners' level in the calculation of WM scores. These preliminary points of discussion will be developed further at the end of this chapter.

Table 7.21 shows the result of a one way between group ANOVA to see if there is a group effect for the English WM scores

Table 7.21: ANOVA English means standardized.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.110	2	0.055	2.558	0.085
Within Groups	1.461	68	0.021		
Total	1.571	70			

F=2.558 p=0.085

A sig value of 0.085 which is greater than 0.05 indicates that the group effect for English is not significant at the 5% level. This is understandable in view of the fact that the participants are from the same age groups and live in an English speaking environment.

The same analyses were carried out for the French WM scores.

Table 7.22: ANOVA French WM Means Standardized.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.32	2	1.66	11.53	0.00
Within Groups	9.79	68	0.14		
Total	13.11	70			

F=11.53 p ‹ 0.01

Table 7.22 shows the result of a one way between group ANOVA to determine whether there is a group effect on the French WM scores. With a sig value lower than 0.001, there is a significant difference between the groups' French WM scores. In order to determine the nature of this effect, a Post-hoc Multiple Comparisons analysis was carried out (see Table 7.23 below)

Table 7. 23 Multiple Comparisons for WM Scores in French

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Choice	Y.Gifted Linguist	0.34*	0.10	0.003	0.10	0.57
Bilingual	L2 Learner	0.54*	0.10	0.000	0.29	0.79
Y.Gifted	Choice Bilingual	-0.34*	0.10	0.003	-0.57	-0.10
Linguist	L2 Learner	0.20	0.12	0.227	-0.09	0.49
L2 Learner	Choice Bilingual	-0.54*	0.10	0.000	-0.79	-0.29
	Y.Gifted Linguist	-0.20	0.12	0.227	-0.49	0.09

*. The mean difference is significant at the 0.05 level.

In Table 7.23 we are comparing average scores between groups to see if there are significant differences between them. There is a significant difference between the CB group and the YGL group. There is also a significant difference between the CB group and the L2 learners. A statistically significant difference between the YGL group and the L2 learners is not shown. These results appear to indicate that on average the choice bilinguals have more efficient working memories in French than the monolingual groups. However, by doing a post-hoc comparison, we are setting more stringent criteria for

significance and, for a relatively small sample, it is often difficult to find a significant result. It may be that with a larger sample, a difference between the YGL group and the L2 learners would become evident.

Thus far the analyses have been concentrated on the mean scores of the different groups. In order to examine the relationship between the variables the method of correlation analysis has been used as described in section 7.3.5.

7.3.5 Correlations between French and English Responses

Pearson product-moment correlations were carried out between the three components (logicality judgement, reaction time and recall) and the WM measures for French and English to try to establish whether one particular component could have predicted the overall measure (see Table 7.24 below).

Table 7.24: Correlation Between English and French Scores for the WM Score and its Components

	Correlation	N
WM F & E	0.46**	71
Logicality F &E	0.24*	71
Recall F & E	0.59**	71
Time F & E	0.16	71

Table 7.24 summarises the results of four correlations for the seventy one participants. The results of these correlations are discussed below.

The first Pearson correlation in Table 7.24 is between the overall memory scores for French and the overall memory scores for English. With r = 0.46 it shows a fairly strong positive and highly statistically significant correlation. This indicates that for the whole population of the sample working memory scores for one language will be similar for the other language.

The next three lines of the table above show the correlations between languages for each of the components of the overall working memory score.

The results for the Pearson correlation on the logicality judgement are given in the second row of Table 7.24 above. The correlation between the logicality judgements in English and in French is positive and is r = 0.24 which indicates a small correlation,

significant at the 5% level[11]. Therefore, for the whole population of the sample, a link between the logicality judgements in both languages exists but is weaker than that for the overall WM.

Row 3 of Table 7.24 shows r = 0.586 which indicates a rather strong positive correlation between the French recall scores and the English recall score. P<0.01 indicates that the result of this correlation is highly statistically significant. Recall scores in French are closely linked with recall scores in English.

Row 4 of Table 7.24 shows the correlation for the time taken to make the logicality judgements in English and in French for all the participants. The fact that r =0 .156 and that p> 0.05 shows that that there is no evidence of a statistically significant correlation between the English and French times taken to make a logicality judgement. Hence the time taken to make an English logicality judgement cannot be directly associated with the time taken to make a French logicality judgement. The following tables look at this in greater depth to see whether there are group differences.

The next table shows the correlations between the English and French WM scores of the different groups.

Table 7.25: Correlation between English and French Standardised Mean Scores for WM by Group

Group	Correlation	N
Choice Bilingual F & E	0.50**	21
Gifted Learner F & E	0.05	25
L2 Learner F & E	-0.08	25

* Correlation is significant at the 0.05 level (2-tailed)

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

There is a fairly strong positive correlation between the French and English WM scores for the CB group. As they use both languages fluently and on a daily basis, it seems reasonable to think that their WM scores for both languages would be on a similar level. Lexical access and phonological encoding would have been at least partially automated. The fact that there is no correlation between the WM scores for the other two groups could possibly be imputed to a lack of proficiency in French. Similarly, Walter

[11] The Pearson rxy is used to describe the linear relationship between two quantitative variables.

found in her study a significantly lower correlation for her lower intermediate participants when compared with the higher intermediate group Walter (2007p.28). A recent study also found that "fluency and lexical complexity correlated significantly with working memory "(Gilabert and Muñoz, 2010)

To what extent does the variation in logicality judgement, recall and response time affect the overall working memory results for each group of participants?
The next three analyses attempt to answer this question, as an analysis of the results of each component of WM by group will clarify whether the same relationship for each of the types of students exists. The following three tables summarize the results per group.

Table 7.26 Correlation between English and French logicality judgement scores per group.

Group	Correlation	N
Choice Bilingual	0.46*	21
Gifted Learner	0.45*	25
L2 Learner	0.14	25

*. Correlation is significant at the 0.05 level (2-tailed).

This correlation is between English and French logicality judgement scores between groups. All the results in the table show a positive correlation which indicates that a good score in logicality judgement in one language would coincide with a high score in the other language, as opposed to a negative correlation where a low score in one language would result in a high score in the other.

This Pearson correlation indicates a group effect showing a closer relationship between English and French scores in the CB and YGL groups than in the L2 learners with regard to the logicality judgements. This could, in part, be the result of a successful transfer of reading comprehension skills between L1 and L2.

R = 0.46 for choice bilinguals' English vs French logicality judgements. There is an average positive correlation; with $p < 0.05$ this is statistically significant. Therefore, the CB groups' logicality judgements in both languages are closely linked.

R=0.45 for YGL's English vs French logicality judgements also indicates an average positive correlation and with $p < 0.05$ this is statistically significant. Thus the linkage for logicality judgements between the two languages for the YGL group is very similar to that of the CB group.

R =0.14 and $p > 0.05$ for L2 learners' logicality judgements. This correlation, although positive, is not statistically significant, so we can conclude that there is no correlation between the French and English logicality scores for this group of learners. This could be due to the lower general linguistic proficiency of this group or, more specifically, their lesser ability to decode written French.

Table 7.27 shows the correlations between the groups on recall.

Table 7.27 Correlations between English and French standardized recall scores per group.

Group	Correlation	N
Choice Bilingual	0.51*	21
Gifted Learner	0.74**	25
L2 Learner	0.39	25

* Correlation is significant at the 0.05 level (2-tailed).

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

R= 0.51 for the choice bilinguals correlation on recall scores in English and French showing a positive and relatively strong correlation. $P < 0.05$ indicates that this correlation is statistically significant. Therefore, for the CB group, as was the case with the logicality judgement scores their recall scores in both languages are closely related.
R= 0.74 for the YGL group showing a strong positive correlation. With $p < 0.01$ the result is very significant. Thus for the YGL group the link between the recall scores for both languages is even stronger than that for the CB group.

R=0.39 for L2 learners $p > 0.05$ showing a small positive correlation. The relationship between the two variables is not significant, and so for this group the link between their recall scores for the two languages is weak.

Table 7.28 shows the correlations between the groups on time taken to make logicality judgements

Table 7.28 Correlation between English and French response times per group.

Group	Correlation	N
Choice Bilingual	0.61**	21
Gifted Learner	0.19	25
L2 learner	0.06	25

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

R= 0.61 for the choice bilinguals indicating a strong positive correlation between their French and English times. P<0.01 shows that the result is very significant. As bilinguals are fluent in both languages, the time taken to make a logicality judgement in one language should correlate with the time taken in the other language.

The result of the correlation for the YGL group with r = 0.19 shows a small positive correlation which is not statistically significant, and for the L2 learners there is no correlation. Thus, for the monolingual groups, there is little or no relationship between the response times for the two languages. For them the times taken to access and process lexis in the two languages are very different (see Tables 7.4 and 7.5). Walter found that "lower-intermediate learners' problems with comprehension reflect problems of access to the comprehension skills that the learners possess" (Walter, 2007, p. 31). It is likely that their faster response times in their mother tongue reflect a certain degree of automatic processing which the CBs are able to replicate in French.

All the analyses so far have uncovered some group differences in certain components of the Working Memory. A correlation for the overall WM scores per group in English and in French is presented in Table 7.29 which shows the correlations between French and English overall WM scores between groups and also takes into account the three components: recall, logicality judgements and reaction times. The aim of this analysis is to determine where exactly the variation of the WM measure is in this test. In order to establish whether a single component is a good predictor of the WM measure for one or more of the groups.

Table 7.29 : Pearson Product-moment correlations between overall Working Memory Scores and the three components of these scores.

	French				English			
	All	C.B.	YG.L	L2	All	C.B	YG.L	L2
Recall	0.89**	0.86**	0.89**	0.80**	0.76**	0.79**	0.78**	0.67**
Logicality Judgement	0.56**	0.62**	0.32	0.61**	0.05	0.25	-0.02	0.05
Reaction Time	0.61**	0.52 *	0.51**	0.68**	0.20	0.60**	0.04	0.10

* $p<0.05$

For this WM analysis (Table 7.29 above), data was exported to an Excel spread sheet for standardisation. Each score component (recall, logicality and time) was replaced by a standardised value. Values were standardised within the components of the test, for example each time value was standardised within all-time values. These standardised values were imported back into SPSS. The standardised scores were averaged by language and component giving six scores as follows:

1. English recall
2. French recall
3. English logicality judgement
4. French logicality judgement
5. English response time
6. French response time.

These scores were further aggregated into French means and English means by taking an average across the three components.

The above method for generating overall WM scores was chosen from a number of possible methods. For example, a second way of generating the scores could be to aggregate scores across all values, so the English WM score would be the mean of all standardized English recall, logicality and response times scores. The advantage of the method chosen for this study is that it is not unfairly weighted by individual components.

That is, the fact that response time and logicality answers had many more components means that they would have had more impact on the final score. In addition, the response time scale is more granular and thus more able to pick up differences between individuals than the other categorical measures for recall and logicality judgements. Therefore, this method gives equal weight to each of the components and so is a more balanced reflection of the data. Comparing WM scores in English and French, the overall WM score for all the participants shows a medium-strength correlation, $r = 0.46$ significant at 5% level. This confirms that a WM score in one language is related to a WM score in the other language (see Table 7.24).

In Table 7.29, the analysis illustrates the correlation between the overall WM score and its three components per group. The analysis shows us that both the French and English correlations for all the participants taken together and in all the three components are positive. In French, the correlations are strong and significant at the 5% level.

The CB group scores show strong correlations for all the components of the French WM score that is:

- The correlation between the overall WM score and the French recall score ($r = 0.86$) indicating a strong positive correlation significant at the 5% level.
- The correlation between the overall WM score and the French logicality judgement score ($r = 0.62$) also showing a strong positive and significant correlation at the 5% level.
- The correlation between the overall WM score and the French reaction time score ($r = 0.52$) indicating a strong positive correlation significant at the 5% level.

There are also positive correlations between their overall WM score and the three components of their English WM score.

The YGL group shows a strong positive and significant correlation between the overall WM score and the French recall score ($r= 0.89$) and reaction times ($r = 0.52$) and a weaker positive correlation, which is not statistically significant, between the overall WM score and their French logicality judgement score. There is also a strong positive correlation between the overall WM score and their English recall score ($r= 0.78$) but a very weak negative and statistically non-significant correlation between the overall WM score and their English logicality judgement score and a very weak positive correlation with the reaction times. Therefore, it seems that recall and reaction times for the YGL group correlate more strongly with the overall WM score, as do all of the French

components of WM, and in English only their recall score correlates strongly with their overall WM score.

The L2 learners group shows a strong positive correlation between their overall WM score and the three French component scores (recall r=0.80, judgement r= 0.61, reaction time r= 0.68). On the English side, only their recall score (r= 0.67) correlates positively and significantly with the overall WM scores. The other two components, logicality judgement and reaction time, only show a very weak positive but not statistically significant correlation with the overall WM score.

It would seem that the CB group is the only one to show a positive and significant correlation between WM score and all its components for both languages (except English logicality judgement which was not significant at the 5% level). For both YGL and L2 only the recall component in English correlates with the overall WM score.

This analysis shows that the main variations within the overall WM scores occur in the logicality judgement and reaction time components, and predominantly in the English version. This leads to the conclusion that high recall scores in general, and particularly in French, correspond with high overall WM scores. This demonstrates the link between an efficient WM and efficient language recall which may be attributable to efficient lexical organisation (see Chapter 5). It should be noted that the CB group which displayed the strongest recall correlations with the overall WM score (r= 0.86) also had high and similar reaction times correlations in both languages (r = 0.52 for French as compared with r = 0.60 for English). Thus, as the CB group had the highest combined mean standardized WM score (see Table 7.20), it can also be concluded that, as well as there being a link between WM and recall capacity, there is also a link between WM and processing speed.

The next section compares the variability in scores for overall WM between the different groups.

7.3.6 Comparing overall WM scores between groups

After investigating the components of the WM scores we now test how the scores differ between groups using an ANOVA.

Table 7.30: ANOVA for overall WM score

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	2.80	2	1.40	11.63	<0.001
Within Groups	8.19	68	0.12		
Total	10.99	70			

Table 7.30 gives an F value of 11.63 showing that the groups are very significant in explaining variation between individuals in the overall WM score. A more detailed analysis is shown in Table 7.31:

Table 7.31 : Between group Multiple Comparisons of WM score (Post Hoc Tukey)

ANOVA	(I) group	(J) group	Mean Difference (I-J)	Std. Error	Sig.
	Choice Bilingual	Gifted Learner	0.14	0.11	0.40
		L2 Learner	0.48*	0.10	0.00
	Gifted Learner	Choice Bilingual	-0.14	0.11	0.40
		L2 Learner	0.33*	0.10	0.00
	L2 Learner	Choice Bilingual	-0.48*	0.10	0.00
		Gifted Learner	-0.33*	0.10	0.00

*The mean difference is significant at the 0.05 level

Table 7.31 indicates that the CB group's score is 0.48 more than L2 learners group showing a significant difference between the two groups. Similarly the YGL group's score is 0.33 higher than the L2 learners also showing a significant difference between the two groups. Therefore both CB and YGL have a significantly higher overall WM scores than the L2 learners.

The CB group has on average a 0.14 higher score than the YGL although the difference between the two groups is not statistically significant at the 5% level.

7.4 Aptitude and WM scores

Sawyer and Ranta (Sawyer and Ranta, 2001) claim that WM, as measured in a reading span test like the one used in this study should be part of a language aptitude test. In fact, if WM is at the heart of input processing and therefore part of the cognitive process, and if, as is the case here, there are individual or group differences in that area, then WM could be seen as a component of aptitude. To see if that is the case in this sample, the descriptive analysis of the aptitude scores for the two groups of monolingual learners who took the WM test is shown in table 7.32 below.

Table 7. 32 Descriptive Analysis of Aptitude Test Scores of Participants of the WM Test.

Group	N	Minimum	Maximum	Mean		Std. Deviation
				Statistic	Std. Error	
YGL	25	116	125	119.20	0.53	2.66
L2	25	88	115	106.52	1.32	6.60

The standard deviation of L2 learners is much greater than that of the YGL group showing a wider distribution of scores. An analysis of variance below shows the significance of this difference.

Table 7. 33 Anova of Aptitude Scores for Monolingual Participants of the WM test (25 YGL and 25 L2 participants)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2009.78	1	2009.78	79.32	0.00
Within Groups	1216.24	48	25.34		
Total	3226.02	49			

F=79.32 with one degree of freedom $p < 0.001$ therefore the difference within the two groups is very significant. So the two groups are very different in terms of aptitude but do their scores in the aptitude test correlate with their WM scores? In order to answer this question the aptitude test scores were standardised and a correlation was calculated between the standardised aptitude scores and the standardised English WM scores of the two groups of monolinguals. It is presented in Table 7.34.

Table 7.34 Correlation between the standardised aptitude scores of monolingual participants and their standardised English WM scores.

Group	Correlation	N
YGL	0.43*	25
L2	0.13	25

*. Correlation is significant at the 0.05 level (2-tailed).

There is a significant (p= 0.034) and fairly strong and positive correlation between the YGL standardized aptitude score and their standardized English WM score(r= 0.43). There is a weak correlation for the L2 learners (r=0.127) which is not significant (p=0.54). Therefore, for the YGL who have a higher aptitude mean, their standardized aptitude score correlates with their standardized WM score. This lends credence to the view that WM is a good indicator of language aptitude.

7.4 Summary and discussion

Word learning is the first building block in the acquisition of a language. Research based on L1 acquisition has focused on this process. However, in the past two decades, new research has begun to look at vocabulary acquisition from the perspective of both first and second language learning. In Chapter 5 this study looked at the web of words and how different groups of learners differ in the way in which they link words together in French. Chapter 6 looked at differences in the use of strategies for learning a language. The current chapter has looked at WM as, in order to understand the processes involved in vocabulary learning, it is necessary not only to look at how we memorise words but also at how we store and retrieve them.

> "Learning is concerned with registering and storing information. Given that information is stored, however, its efficient use must depend on access in the right form at the right time"(Baddeley, 2002).

This study has compared overall WM scores and scores for the three WM components between the three groups of young participants for both English and French.

7.4.1 The results for English.

The results of the descriptive analyses of the components of the WM scores in English have shown higher mean responses from the YGL and the L2 groups in English logicality judgements with a superior score for the YGL group. The one-way between groups ANOVA with Post-hoc tests shows a significant difference between the YGL and CB groups. The mean reaction times for the English part of the test and for the three groups are very close with L2 learners and the YGL groups taking slightly less time than the CB participants. However, there are group differences in mean reaction times for the French part of the test. The one-way between groups ANOVA with Post Hoc Multiple Comparison shows a significant difference between the CB group on the one hand and the YGL and L2 groups on the other. The comparison between the groups in the English recall scores shows higher mean scores for the YGL and the CB groups than for the L2 learners and the mean difference between the YGL group and the L2 learners is significant (Table 7.12).

On the whole, the English WM scores show no significant differences between the three groups (see Table 7.21). This is, to a certain extent, an expected outcome as all the groups are fluent in English and are from the same age group. However, the difference in the recall scores and in particular the significant difference between the YGL group and the L2 learners may indicate that the YGL group's potential for modern language learning extends to English (their first language). Further research would be needed to establish this.

7.4.2 The results for French

Looking at the French components of the WM test, the descriptive analyses show that, for the French logicality judgements, the CB group have a higher mean score than the YGL and L2 groups with the YGL group's mean score being higher than that of the L2 learners. Exactly the same pattern occurs for the recall part of the test. The ANOVA with Post-hoc tests showed a significant group effect between the CB group and the L2 learners for the French recall, and the CB and the two other groups for the reaction times in French. The WM scores in French showed a significant group effect between the CB group and the other two groups.

Finally, the correlations between French and English WM scores and their components are all positive and significant for the CB and YGL groups except for the

YGL group reaction time (see Table 7.28). For the same analysis , no significant correlations were recorded by the L2 learners and their overall correlation between French and English memory scores was negative.

7.6 Conclusion

Table 7.8 shows that there are differences between the three groups of participants and, predictably, that the CB group do stand out on the French results as different from the other two groups. In both the English and French components of the WM scores, the YGL mean scores were superior to those of the L2 learners except for the English reaction time.

Tables 7.9. 7.10, 7.11and 7.12 show that the CB group's recall results were statistically significantly different and superior to those of the L2 learners in French but not in English, and the YGL group's results in recall were superior to the L2 learners in both languages. However, there were no significant differences in either language between the CB and YGL groups. The fact that the CBs who were not selected for their language potential, matched the YGLs in both languages lends credence to the view that bilingualism has beneficial effects on WM (Bialysyok and Viswanathan, 2009).

From Tables 7.15 and 7.16, it can be seen that there was a statistically significant difference between the CB and YGL groups in English logicality scores with the YGL group achieving superior results. This can be explained by the fact that the YGL group were selected for their language potential which was not the case for the CBs.

Predictably, Tables 7.17 and 7.18 show statistically significant differences between the CBs and the other two groups in French reaction times.

It must be noted that the correlation between overall English and French WM scores was positive for the YGL group and negative for the L2 learners. The correlation between English and French logicality judgement scores was positive and significant for the YGL group but not significant for the L2 learners. The correlation between English and French recall was positive and very strongly significant at the 1% level for the YGL group and small and not significant for the L2 group. Thus, we can conclude that despite the fact that there were no statistically significant differences between the two groups overall WM scores in both languages, the significant differences in component scores namely recall in both languages shows that a key component of WM differentiates the

YGLs from the L2 learners which tends to reinforce the correlation between language aptitude test results and WM scores. This point is reinforced by the analysis shown on Table 7.34. For the YGL group there is a significant correlation between the language aptitude standardised score and the standardised English overall WM score which lends further support to earlier claims (Sawyer and Ranta, 2001) that WM is an indicator of language aptitude.

In summary, the absence of differences between the CBs and YGL groups' in the recall component of the WM test further reinforces Bialystok's view on the benefit of bilingualism on executive control (Bialystok and Martin, 2004). The significant difference between the YGL group and L2 learners, which compared with Gathercole's findings on memory skills and educational attainment (Gathercole et al., 2004), tends to extend the association to the hypothesis that potential ability in language learning could be linked to differences in WM and its components.

The analyses in this chapter have highlighted the correlation between WM and recall capacity, and have also pointed to a link between WM and reaction times, suggesting that lexical capacity, organisation and access are associated with WM efficiency.

The last chapter of this study combines the results from the three analysis chapters to discuss the findings, link them to the original research questions and draw conclusions from the present research.

CHAPTER 8 : DISCUSSION OF FINDINGS AND CONCLUSION

8.1. Introduction

Over thirty years ago Naiman and Rubin published their research on the 'good language learner'. It highlighted the difficulties of defining a general set of characteristics for good language learners and of drawing conclusions on whether they have specific characteristics predisposing them to become successful linguists. One of the reasons why it is not easy to define the distinguishing attributes of these learners is the fact that there are many different language learners and that their progress takes place in many different settings. The difficulty in trying to make one model fit all suggests that the topic needs to be approached from a different perspective, that is, through investigating groups of learners rather than individuals and concentrating on a particular task, for example, as in this study, the acquisition of vocabulary. This study presents an original investigation on young groups of learners who, due to their young age and the difficulty of sourcing them, have not previously been the subject of comparative research of this kind.

This chapter reviews, more succinctly, the main issues discussed in this thesis and the investigations which stemmed from them. It set out the implications of the findings of the various sections of the study, points to possible pedagogic applications in relation to young language learners, and summarizes the responses to the research questions which stem from the study's findings.

8.2 The link between research questions and research design and the difficulties encountered on the way

Chapter 1 introduces the objectives of the research, that is, to investigate whether there are specific differences and similarities between two groups of successful and/or potentially successful young learners in the learning, storage of and access to L2 lexis compared with standard young L2 learners.

The acquisition of lexis is, as explained in Chapter 1, a multi-facetted process. Therefore, the main research question: What are the differences and similarities in the encoding, storage of and access to lexis by young gifted learners and choice bilinguals?, led to the investigation of several domains which may contribute to the differential between these groups of successful or potentially successful learners. The motivation for

the research was a professional concern to improve the acquisition of vocabulary and stems from my experience and first hand observation of both groups (YGLs and CBs). Providing a clearer understanding of the vocabulary learning process of these groups of learners contributes to the body of knowledge on the acquisition of L2 lexis which is of fundamental importance to L2 language learning. The first chapter also defines the different groups of learners targeted by the study. The French/English bilinguals who have been the subject of previous research mostly came from bilingual communities (Quebec) or from bilingual institutions (the Lycée Français, the British School in Paris etc.). The term choice bilinguals, as defined in Chapter 1, refers to young bilinguals who do not live in a community which uses one of their parents' languages, but speak a second language at home with at least one of their parents. The fact that they are both fluent and literate in the second language stems from their parents' choice to provide explicit language support both at home and through the use of external resources, for example language clubs, and their choice to put in the effort necessary to develop their language skills. These choice bilinguals are a subgroup which has been understudied and this thesis endeavours to address this lacuna.

On a global basis choice bilinguals represent a growing minority of populations and, in the UK, inward migration has increased their numbers substantially. Among children who are linguistically isolated "few of these who have learned to speak other languages in a family or a community context will become literate in these languages" (McPake, Tinsley and James, 2007, p. 102). They have, therefore, had to receive explicit language support. Choice bilinguals often come from professional families who are well equipped to provide this necessary support. Therefore, although choice bilinguals may be linguistically isolated in their country of residence, they are not linguistically isolated children because of their parents' awareness of the importance of language proficiency (see Chapter 6). This explicit support distinguishes them from community or heritage language speakers. Thus, they are a distinctive understudied group with specific learning needs.

Young gifted linguists are also an understudied group as success in languages has mostly been linked with proficiency in the language rather than potential. Therefore, previous studies mostly investigated university students or older secondary school students whereas this study specifically focuses on early learners displaying aptitude for language learning. It is hoped that the findings of this study will contribute to further

developing pedagogic strategies which more effectively develop this potential, and that of all young language learners.

Finally, the first chapter gives an overview on the structure of the thesis and the content of the following chapters.

The literature review reported in Chapters 2 and 3 was structured with the aim of providing the necessary background information for setting up investigations into the possible reasons for differences and similarities between the groups. It presents the rationale for conducting a much wider study than the ones which have previously been conducted to investigate vocabulary acquisition. It provides the context for the need to include research on vocabulary network, strategies for learning, perceived parental support and working memory ability in order to research the group differences and similarities in vocabulary learning and processing. Facilitated by the findings of earlier research, the tests and questionnaire used were designed to investigate the structure of vocabulary learning abilities and aptitude. The present study has drawn upon the conclusions of Naiman's study (Naiman et al., 1978) (as discussed in Chapter 2 pp. 60,61). It has also considered, in Chapters 1 and 2, the parallel made by Skehan between the aptitude and processing stages (Skehan, 1998) linking input with phonemic coding ability, which is the reason for including an aural section to the Vocabulary Network Test. It has reported on the different models of language processing as they throw some light on the processing components of the language and the parallel production system of bilingual learners. It also links to how words are selected (de Bot, 2007). It has reviewed the literature on interference between L1 and L2 and, has taken this into account when constructing the WM test, by ensuring that the two languages were clearly separated in order to avoid unwanted other language activation.

The study aims to investigate the topic of vocabulary learning as comprehensively as possible, covering the vocabulary network in a novel way using a bespoke test and targeting understudied groups. The study looks at strategies used for learning vocabulary, as some reflect language analytical ability which, according to Skehan, is an aptitude component linked to the central processing. Differences in working memory are also examined as they may explain some of the differences in encoding and recall. Finally, the study investigates the implications of perceived parental attitudes to language learning at a time when the importance of languages in the curriculum has been eroded (FL teaching is no longer a compulsory subject after Key Stage 3) and "the dominant role

of English as a world language has had a detrimental effect on language learning" (Lawes, 2007, p. 96). The study views these perceived attitudes as motivational factors to L2 learning.

The methodology chapter (Chapter 4) explains how the researcher recruited the sample. It also mentions the difficulties which confronted the researcher. These difficulties were primarily associated with conducting research targeted at young school children; partly due to the understandably strict school policies on child protection and also because of timetable constraints. These two factors made it difficult for the schools to allow research studies to be carried out or to grant any extra time for their execution. This has made the present study a rare occurrence. The necessity to find thirty YGLs also presented a challenge as it meant that one hundred and fifty children had to take the MLAT-E test.

In addition to giving an explanation of how and why the participants were recruited, this chapter describes how the rights of the participants were respected and how the BAAL ethical guidelines were adhered to. It also explains how, in cooperation with head teachers, the study became the introduction to strategic training for learning at the schools which took part in the research (see section 4.6 on ethical issues).

Finally, Chapter 4 shows how the design of the two tests and the questionnaire match the research questions. It also highlights that, although they were constructed taking account of previous research designs, they present a different and original approach to research on vocabulary acquisition, as explained in section 8.3 below. The main empirical findings are chapter specific and have already been summarized in the respective empirical chapters (Chapter 5: Vocabulary Network Test , Chapter 6: Questionnaire on Vocabulary learning Strategies, Chapter 7: Working memory test). The three sub-sections of section 8.3 below examine the findings of the study.

8.3 Discussion and implications of the findings

8.3.1 The Vocabulary Network Test

The study on the vocabulary network as introduced in Chapter 1, and explained in Chapters 3 and 5, investigates differences in the storage and network of French lexis by the three groups of young learners being studied. It uses a test adapted from Read's Word Association Test (Read,2004) (see Chapter 3) which originally looked at depth of

knowledge, that is to say how well the words are understood and incorporated into the lexicon. It was also influenced by Meara's Lex 30 Test (Meara and Milton, 2003) which looks at possible word connections. The test in this study is specially designed to relate to the first subsidiary research question: "What are the characteristics and differences in the storage of and access to L2 lexis displayed by YGLs and CBs?". It looks more specifically at word links and categorisation. It differs from previous tests both in the participants it targets and in its concept. Earlier word association tests were devised for monolinguals comparing monolingual adults with children using free association tests, that is to say that there was no choice of possible responses (Brown and Berko, 1960) or controlled tests (Ervin, 1961) where a limited choice of responses follow the stimulus word. These tests led to the claim that word associations evolve with age and that there is a shift from syntagmatic to paradigmatic responses. They were based on collocations and antonyms, that is words that normally occur together, or are opposites. As explained in Chapter 3, this led to the suggestion that the shift from syntagmatic to paradigmatic responses was more a representation of differences between semantically meaningless responses and semantically meaningful responses (Wolter, 2001). Read designed a controlled test to investigate depth of knowledge. It was also in English for university students and therefore had more choice words (Read, 1993). Meara (2003) looked at the density of interword connections and commented on the lack of scrutiny of choice of words in association tests. This study, mindful of Meara's and Wolter's comments on the choice of words in association tests, deliberately avoided antonyms. This is a unique feature of the study. The controlled test method enabled the researcher to provide words from the same subject domain, for example transport, food or clothing etc., which were from topics studied at Key Stages 2 and 3. Thus, the response words were of stronger relevance to the stimuli words. As explained below, a significant finding of the study is that the results from this new method of enquiry into word connections appear to show more than intuitive associations.

Initially, when considering the results of the test, it is worth noting that the incidence of differences between Test 1(written) and Test 2 (aural) warranted the inclusion of the aural test. Again this was a novel addition when compared with many other word association tests where the vocabulary was presented either exclusively in written form or, exclusively in aural form. Using this innovative methodology to design the test presented some technical challenges. As it was conducted through the medium of

the Internet, it necessitated the building of a website with a direct link to the researcher's mail box. The pilot study revealed that downloading the audio files which initially were written to a single page was an unacceptably lengthy process. To overcome this problem, the audio test had to be written to three different web pages. The results indicated that aurally, for most categories of word, there was little or no difference between the adult group and the CB group in their choice of responses. This, in turn, stresses the importance of phonological knowledge. In addition, the results also show an increase of clang responses in all the young learners' groups but particularly in the L2 group who may have had difficulties recognising phonemes and understanding how they combine into meaningful units. On the whole, choice bilinguals have had longer linguistic training in social contexts than L2 learners and are therefore more accustomed to hearing different sounds, combining them to recognize words that they know or associating them with words that they know in order to infer a meaning. Therefore it is logical that their choices were more akin to those of the adults and also more meaningful, that is, they made less clang associations than the other young groups.

This study, in addressing the first research question uncovered similarities and differences between choice bilinguals, young potentially gifted linguists and standard L2 learners which could assist the development of better targeted vocabulary training in language classrooms. It is likely that more explicit phonological training combined with a communicative approach to learning would improve L2 phonological development resulting in better recognition of spoken words. The descriptive analysis of the results shows that the mean responses of the YGL group were closer to the mean responses of the CB group than the L2 learners group on all categories of words except for C5 T2 (characteristic in the aural test). Therefore there appeared to be a progression from L2 learners to YGL, but this was not statistically significant for most categories except for paradigmatic coordinate (Test 1), clang responses (Test 2) and associative (C6) responses (both tests) where there were no statistical differences between the CB group and the YGL group. The overall similarity between the YGL group and the L2 learners suggests that these two groups of monolingual learners were using more similar age-appropriate organisation of L2 lexis than the CB group which was a more linguistically advanced group. The responses of the young monolingual learners mostly remained at a semantic level linking content words with paradigmatic coordinates, for example linking '*chien'* (dog) with '*cheval'* (horse), hence remaining on a thematic level. They also gave more

clang responses. In contrast, the adults and the CB group showed more advanced vocabulary processing based on explicit understanding of the subject domain. It could also be that a larger sample would have yielded more significantly different results between the YGL group and the L2 learners. However, the Vocabulary Network Test results demonstrated a clear difference between the adults and the CB group on the one hand and the YGL group and the L2 leaners on the other. The young monolinguals' response patterns probably resulted from vocabulary being taught thematically (Nation, 2000). This suggests that a contextualized and communicative approach to vocabulary learning and teaching would be of benefit to learners in processing new vocabulary. It is possible that the way in which the Vocabulary Network Test was designed using thematically related words and requesting the participants to connect them does in some way predict the rate of acquisition of syntax of more advanced learners. This could be the subject of further research into methods for investigating the progressive use of syntax by young L2 learners. However, this study has shown that the design of word association tests directly influences the responses given by the participants. They do not just test depth of word knowledge by checking the type of associations made with synonymous or opposite word types hence showing the semantic development, but they can also show how words are networked or connected with others, that is to say the processing development. This should be taken into account when drawing conclusions and implications on previous and current research in this field.

Having researched connectivity within the lexis, the study then addresses the question of how the use of learning strategies may have influenced the encoding and storage of vocabulary.

8.3.2 The Vocabulary Learning Strategy Questionnaire

The Vocabulary learning questionnaire was key to answering the third research question as there has been relatively little research on the use of learning strategies by young learners. Most research has concentrated particularly on secondary, A level, or university students, therefore on participants who have already reached a good level of academic performance. "In much of the earlier research, the good language learner was often used synonymously with the advanced language learner" (Grenfell and Macaro, 2007, p. 15). If the use of strategies, as generally recognised, enhances learning, then one should be able to detect this use across all levels of learning. Chapter 2 reviews both

the criticisms which were levelled at previous research and the classification of learning strategies. It notes that "researchers have identified and classified various patterns or configurations of vocabulary learning strategies" (Nyikos and Fan, 2007, p. 254). Based on previous work by O' Malley and Chamot and Oxford (O'Malley and Chamot, 1990a) (Oxford, 1996), vocabulary learning strategies when isolated from the broader mix of learning and use strategies, are identified and subdivided into memory, cognitive and metacognitive strategies. This study, while recognising that there were overlaps between the three subdivisions, finds that this classification is a sound basis for the adaptation of the more general learning strategy questionnaire, SILL, to a task specific questionnaire on vocabulary learning rather than adapting the Language Strategy Use Survey which investigates different language skills but is not task specific .

The first three parts of the questionnaire were designed to answer the third research question. The results of the analysis of the responses can be summarised as follows. The analysis of the data from the first part of the questionnaire, that is the use of memory strategies, reveals that there are no statistically significant differences in the overall use of this strategy between the three groups of young learners. However, when investigating each memory strategy mentioned in the questionnaire, the step by step systematic approach has enabled the researcher to highlight not only the differences and similarities between the groups but also the strategies which were less used by young learners. In particular, the strategies which were used less frequently by young learners were using context to memorize a word, and visual associations such as associating sound with images. Learning vocabulary thematically prejudices the ability to memorise using context, and the more contextualised and communicative approach suggested above would allow better use of this strategy. More effective use of IT in the language classroom could develop the use of visual associations.

In the second part of the questionnaire the analysis showed a statistical difference in the overall use of cognitive strategies with the CB group being statistically different from the other two groups. This supports the findings of other research on bilinguals which claimed that the level of acculturation influences the use of strategies (Prudie et al Chapter 3 section 3.2.2). It also highlights some similarities between the CB group and the French/English Canadian bilinguals studied by Bialystock (2007). However, this study shows that such strategies as taking notes and grouping and filing vocabulary are little used by all the groups of young learners. This may stem from a lack of strategy

training for this age group. It may also be the result of difficulties associated with the French orthographic system "the relative opaqueness of the correspondence between its spoken system and its written system" (Erler and Macaro, 2011, p. 497) may prevent young learners from using these strategies as they find it difficult to decode the spoken phonemes, and associate them with their written representation. It is likely that focused strategy training would be beneficial for all young learners.

In the third part of the questionnaire which investigates the use of metacognitive strategies, the analysis of the data shows no statistically significant differences in the use of these strategies between the three groups. However, here again, there were some notable differences in the use of directed attention with both the CB and the YGL groups using this strategy more than the L2 group. In contrast, low usage of self-monitoring was reported by all the groups of young learners. This, in view of the young age of the participants, may stem from a lack of maturity. This part of the research had a specific aim, namely to investigate whether certain groups of learners use more or different strategies. It shows that, even at a young age, and, at a relatively low level of proficiency, there are group differences. Although when grouped together as a category, the results for metacognitive strategies did not reveal any statistical effect, the analysis suggests that there is evidence of differences in the use of individual vocabulary learning strategies and that a cluster of specific strategies are used more by the YGL group than by L2 learners, for example directed attention, self-management and functional planning. It is therefore likely that potential giftedness for second language learning could be related to higher usage of specific strategies. This would also suggest that the standard L2 learners would benefit from strategy training. In addition, the low usage of certain strategies would need further investigation to determine whether this is as a result of embarrassment, for example caused by the use of rhyming, or a dislike for this type of strategy, and whether effective methods for overcoming these concerns can be developed. This is important because, for example, using rhyming is useful for the development of phonological awareness. The lack of use of certain cognitive and metacognitive strategies has implications for teachers of Modern Languages in developing strategic training in the classroom so that students can learn to learn more efficiently.

Finally, the last part of the questionnaire looked at the relationship between the use of strategies and the learners' perceived parental attitudes towards learning French. It

relates to the fourth research question "To what extent are group differences related to beliefs about foreign language learning and perceived parental attitudes and how much do these attitudes and perceptions influence the choice of strategies employed by the groups in the encoding of lexis in the mental lexicon?" How young learners view the importance of language learning and their parents' perceived attitudes to language learning can be a motivational factor as they are affective variables and as such have been directly linked to achievement (Gardner and MacIntyre, 1993). All the choice bilinguals and over 70% of the other two groups of young participants reported that they enjoyed learning French. However, a large proportion of L2 learners (43.3%) reported that speaking French was not important to them. This result correlated with their parents' perceived attitude to the language (41% thought that their parents believed that it was not important or not at all important). Could this perception have an implication for their children's success with language learning? If we think that strategic learning is in some way linked with success in language learning, then, if there is a relationship between the learners' perceived parental attitude and the use of language learning strategies, this would suggest an association between this motivational factor and success. The results show that, in this sample, a perception that parents believed language learning to be important had a positive effect on the use of strategies by their children (see Table 6.45 in Chapter 6 page 227). This suggests that, if parents were persuaded of the value of language learning and the importance of transmitting a positive attitude to their children, learning outcomes for children of any level of potential could be improved. Thus there may be a case for more communication between schools and parents on strategy learning and the effect of attitudes on motivation. However, school / parent communication and parental attitudes towards language learning are part of a broader societal issue, and tackling the language learning elements of this issue in isolation may be difficult.

The facility in the way in which learners encode vocabulary using vocabulary learning strategies, the storage of this vocabulary within a structured network system and their capacity to keep hold of words in the immediate memory despite other distracting elements are all interlinked factors contributing to the successful acquisition and processing of language. As seen in Chapter 3, new information held in the WM could activate items of vocabulary in the vocabulary network (this is the point made by Logie that short term memory depended on information and interaction with long term memory (Logie, 1996)). This further reinforces the interdependency between the three main

elements of the study. Sections 8.3.1 and 8.3.2 looked at the key findings from the vocabulary network test and the vocabulary learning strategy questionnaire. Chapter 7 presented and analysed the results of the investigation on the working memory of the different groups studied and the key findings are reviewed and discussed below.

8.3.3 The Working Memory Test

The analysis in Chapter 7 links with the literature reviewed in Chapters 2 and 3. It presents how WM has been associated with some areas of language processing such as comprehension and reading. As, in the context of these areas of language processing, the function of WM is both to store and to process information. Similarly, in this study, trying to comprehend the meaning of a French and/or English sentence, deciding whether this sentence is logical while remembering the end words of several sentences involves both holding certain information in mind while performing cognitive tasks. Hence, it involves using both storage and processing. The review of previous research shows that individuals differ widely in WM span. Individual differences in WM with regard to age, expertise, and/or scholastic success have all been the subject of previous research (see Chapter 3 section 3.7.2). However, the results of the present study do present some new insights into the WM of different groups of young linguists.

In addition, research has been carried out on the parallel organisation of memory among bilingual learners. However, the groups on which this study focuses have not been the subject of research of this nature. Comparing the WM of a group of more advanced learners (the CB group) with that of both the YGL group and L2 beginners is designed to address the second research question on the role of WM in the acquisition of lexis and the differences and similarities between the groups of learners. In order to compare them, a WM test had to be adapted for this age group and a computer programme created to present it (see Chapter 4). The test compares working memory capacity in French and English, examining the relationship between the WM scores in L1 and L2 and between the components of those scores. It investigates whether group differences in WM scores can be attributed to expertise in two languages or potential aptitude in language learning. The higher recall score of the CB group corroborates Bialystock's findings (Bialystok, 2004) on the benefit of bilingualism on executive control; that is to say, the ability to maintain continuous control on activation of one language while resisting the interference from the other. Thus, bilinguals are used to performing complex cognitive tasks.

Therefore, if we accept the claim that WM is linked to cognitive processes, then it is not unreasonable to hypothesize that the YGL group, which shows aptitude for the learning of languages would also have a higher WM score than standard L2 learners. The YGL group's WM mean score was superior to the L2 learners' but the difference was not statistically significant. However, the significant difference between the YGL group and the L2 learners on English recall indicates that, although the result was in their own language, there may be a relationship between a potential for languages and superior recall. The lack of significant differences in WM scores between the two monolingual groups may have stemmed from less effective phonological decoding for both groups at near beginners level in French. In models of working memory, two systems, the visuospatial sketch pad and the phonological loop, are responsible for the processing and maintenance of information (Baddeley and Hitch 1974). The rehearsal of sounds using internal speech facilitates the storage of information. It is also necessary for comprehension to combine phonemes and associate sounds and meanings (Gathercole & Baddeley 1989). More research on phonological as well as semantic information components may help to explain the lack of significant differences at this level of learning for this age group. In addition, the findings from the result on the bilingual group's WM scores, as they came from a group used to performing complex cognitive tasks involving executive functions, tends to give credence to the claim that WM improves with training. The previous finding in Chapter 6 that the YGL group made greater use of directed attention strategies than L2 learners may also explain the slight difference in the WM scores between the two groups. The results of the present study contribute to the body of knowledge on this topic by investigating differences in both WM components and overall WM scores between these understudied groups.

The key findings of this test, which answers the second research question, were that the CB group had a higher overall working memory score than the other groups. The YGL group had a slightly higher WM score than the L2 group but this was not statistically significant at the 5% level. The component which is determinant in the WM score variation is the recall. At first sight, this is slightly surprising as Walter found that logicality judgement was the differentiating factor in her sample (Walter, 2004). However, her study investigated older participants at different levels of proficiency and at different ages. It could be that a combination of proficiency and maturity affects the logicality judgement scores. In this study, the significant correlation between working

memory score and aptitude score for the YGL further reinforces the importance of the role of working memory in the acquisition of L2 lexis (see Table 7.34).

The inclusion of the study on WM capacity in this research assists the understanding of the reasons for including three different investigations to explore group differences in vocabulary acquisition. Working memory, as explained earlier, involves holding information in the mind in order to execute such tasks as reasoning and comprehension. Therefore, WM enables items of vocabulary to be made available for information processing. Specific strategies such as phonological awareness and attention, coupled with vocabulary knowledge, are necessary for the efficient functioning of WM. An integral part of vocabulary storage and access is vocabulary processing, that is auditory, phonological and language processing. These subsets of vocabulary processing lead to the need to carry out combined studies in the three areas of research investigated here. The processing of L2 vocabulary requires auditory awareness and phonological processing, that is recognizing and associating sounds in order to interpret them as meaningful units and processing them in the lexicon, that is referencing them and linking them to other words or phrases. To do this efficiently requires the use of strategies. If WM is affected by cognitive abilities, such as attentional control, the use of cognitive strategies will increase central executive efficiency. In this study, this point is borne out by the fact that the CB group uses more cognitive strategies than the other groups and have a higher overall WM score. In addition, the use of memory strategies, including categorization, will increase the ability to recall vocabulary; as indicated by the YGL group's greater use of grouping and filing strategies and their high recall scores in both languages.

Inevitably with a study of this breadth essential decisions on its scope and the detail of the research have created limitations. Limitations specific to the study's three areas of research have been raised in the course of the three analysis chapters. Some more general limitations are considered in subsection 8.3.4 below.

8.3.4. Limitations of the study

One of the limitations of the research stems from the nature of the study that is the process of vocabulary learning, as opposed to vocabulary use, which means that it concentrated on receptive skills rather than communicative skills. However, restricted vocabulary directly constrains both the comprehension and production of language.

As the present research concentrated on groups of learners rather than individuals, the study of personality factors was not included nor was the study of learning style. The participants were selected not because of individual variations or proficiency levels but because of potential ability and a specific language learning environment. The YGL group were identified from their superior performance in the MLAT-E test and the choice bilinguals all benefitted from specific language support outside of the school environment. The aim of the research was not to measure success but group differences that may influence success. Embracing this wide area of research was made more manageable by the deliberate focus on one learning task and three areas of language acquisition.

Despite the above limitations, linking the three investigations has enabled the study to not only find differences and similarities between the groups but also to extract some pedagogical implications and recommendations which may improve the efficient encoding and recall of lexis.

8.4. Pedagogical implications and recommendations for further research

The analyses of the results of the two tests and the questionnaire have all reported various statistical differences between the groups studied. This gives a positive confirmation to the original enquiry and shows that, in this sample, there are group effects associated with the encoding, storage of and access to lexis.

The higher proportion of clang responses given by L2 learners, particularly in the aural part of the vocabulary learning test, their lower use of sound association strategies and the lack of significant differences in the overall WM score between the L2 and the YGL groups compared with the CB group, all point to a probable need to put in place more phonological training at an early stage for second language learners. Examples would be the greater use of audio equipment to acquaint young learners with different phonemes and the use of rhyming to link similarly pronounced words.

The analysis of the Vocabulary Network Test reveals a dichotomy in the results with the adult and CB groups forming more communicative and syntactic links between the words, for example choosing to link '*book*' with '*interesting*' and '*read*' rather than associating the word with ones from similar lexical categories such as '*manual*' or '*notebook*'. This suggests that, as proposed in Chapter 1, teaching and practising vocabulary using a more contextualised approach rather than grouping words into lists of

synonyms and antonyms would help with the processing of new words in the lexicon. Teaching techniques and materials which introduced new vocabulary in the form of a variety of word types rather than as thematic links would facilitate the early production of meaningful statements which would generate a number of benefits including encouraging the development of lexical networks more akin to those of native speakers.

The lack of use of certain cognitive and metacognitive strategies by young L2 learners would suggest that benefits, in terms of improved recall and more efficient processing of vocabulary, could be derived from introducing strategy and WM training at an early stage. The latter is provided, as remedial therapy, to children with a variety of developmental disorders which cause WM impairment (Minear and Shah, 2006). The techniques employed in this training for L1 could be adapted for more general use with young L2 learners. However, before implementation, the effectiveness of the proposed changes would need to be confirmed by further empirical research.

Furthermore, the correlation between parents' perceived attitudes to second language learning, their children's attitudes and use of strategies shows the importance of this probable motivational factor. More communications between parents and schools on motivation and strategy training would help to spur standard L2 learners into reaching their full potential in the subject. However, the researcher is aware that there is a much broader debate around attitudes to second language learning which raises complex cultural and societal questions.

The results have also indicated that certain issues need further investigation. Firstly the results of the Vocabulary Network Test have raised the issue of whether using thematically related words in word association tests does, in some way, predict the rate of acquisition of syntax by indicating greater processing ability. The test was designed for young learners using simple French vocabulary. Further research could be carried out using a more sophisticated instrument aimed at monolinguals from a range of age groups and levels of proficiency to help to answer this question. Positive findings would facilitate assessing the level of syntactical development of learners.

The low usage of certain strategies, such as rhyming or associating sounds and images to learn a word, requires more investigations to determine whether they should belong to learning strategies or teaching strategies. This point further emphasizes the need for further research to provide a sharper classification of strategies.

Finally, more research on differences in phonological aptitude may explain some of the differences in vocabulary categorization and storage, and in WM scores. This would help to inform decisions on the possible introduction of more specific phonological training at beginner's level as mentioned above.

8.5 Conclusion

This thesis set out to identify the differences and similarities in the encoding, storage of and access to lexis by young gifted learners and choice bilinguals, to examine any findings and their pedagogical implications. The specific groups chosen for the research have particular relevance to current trends in the UK. On the one hand, Modern Language Education is in crisis as previous educational policy decisions in the UK have resulted in declining numbers opting to study Modern Languages and, presumably in an attempt to redress this, the government has announced its intention to include language teaching from the age of seven in its 2014 revision of the Primary National Curriculum. On the other hand, increasing immigration into the UK, particularly from the EU, is expanding the number of choice bilinguals in the country. In using this new and increasing constituency of language learners in a comparative study, this thesis has highlighted a societal phenomenon which should be taken into account in future pedagogical policy decisions.

A key motivational factor in studying these two groups of successful or potentially successful language learners was to try to identify elements which contribute to their relative success and which could facilitate more efficient acquisition of lexis by standard L2 learners. Examining these group differences and similarities contributes to the understanding of how bilingualism affects the development of WM through more efficient executive control components, such as directed attention, and gives additional support for previous research. It also suggests that WM could be improved by practice and training. The comparison between the groups, in the way in which their vocabulary is networked, highlights the importance of test design and its effect on the pattern of responses for categories of word associations. The study's methodology was novel both in terms of the coordinated use of the three research instruments to draw together findings on the multiple aspects of vocabulary acquisition and processing, and in the use of new test designs and bespoke computer programmes, focussed specifically on

vocabulary acquisition and conceived uniquely for young learners. This cross-referencing between data drawn from different aspects of vocabulary learning has provided a new insight and a more general view of group differences in vocabulary learning and processing, aptitude and the influence of attitudes to language learning. In particular, it draws attention to the specific learning strategies used by choice bilinguals which assist better recall. The study also points to areas which could be the subject of further research including using vocabulary network tests to monitor syntactical development and researching techniques for improving phonological awareness. These findings contribute to the body of knowledge on bilingualism and aptitude for L2 learning and have identified some pedagogical developments which could assist struggling L2 learners. It is hoped that focussing on these aspects at the beginner's level would contribute to a better understanding of Early Language Learning at Key Stage 2 and improve outcomes at the secondary level and beyond.

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Appendix A

Table 1.1: Summary of differences between general and specific giftedness derived from Sternberg's Triarchic Theory of Intelligence.

	Componential	Experiential	Contextual
General Giftedness: Individuals in this category	MUST 1.have excellent metacomponential functioning. 2.excel in the execution of performance components . 3.have a superior ability in using knowledge acquisition components (encoding,selective combination and selective comparison)	HAVE 1. the ability to cope with novelty involving major intellectual insights 2. greater speed than average at moving from novelty to automization.	WILL Generally "excel in all objective criteria of later life success" (with the possible exception of those with very high IQs, over 180).
Specific Giftedness Individuals must	1. possess minimal metacomponential skills. 2. have superior performance-componential functioning in one area/topic. 3. have an expert ability at applying knowledge acquisition components (encoding,selective combination and selective comparison)	1. the ability to cope with novelty but here, the insights require a great deal of prior knowledge. 2. a more rapid domain specific automatization.	Excel in one field (unless environment, values and motives prevent them from reaching their potential)

Appendix B

8, Orchard Close
Chorleywood
Herts
WD3 5QW
Tel: 01923283882
e-mail: mstacey@ioe.ac.uk

Dear Head Teacher,

As part of research for my PhD at the University of London, I am looking into acquisition of Modern Foreign Languages and cognitive ability. I am doing a comparative study between gifted linguists and bilinguals up to the age of 13.

As your school has a great deal of success in Modern Foreign Languages, I wondered whether you would be willing to allow me to conduct some research at your school during the next academic year. I know that teachers have a busy schedule and would do all I can to minimize disruption to the day to day running of the school. I am a teacher myself with thirty years' experience of both Primary and Secondary schools. Ideally I would like to meet you and the Modern Foreign Languages teachers at the beginning of Spring Term to discuss my study and questionnaire requirements etc. Any information about individual participants would, of course, be totally confidential and only be used for the purpose of my research and any publications or presentations resulting from it. No names will be mentioned in the reporting data. If and when necessary, letters requesting parental permission and children's consent would be drafted for your approval.

I hope that you will be able to view my request favourably and will be happy to provide any further details of the proposed research which you may require.

Yours sincerely,

(Mrs. M-N. Stacey)

Appendix C

Parents' Letter

Institute of Education, University of London (Faculty of Culture and Pedagogy)
Marie-Noelle Stacey
Email:mstacey@ioe.ac.uk
Title of Research: The Same Destination but Different Journeys: A comparative study between young gifted linguists and bilinguals which explores the learning, storage and retrieval of lexis.

This is a research study for a doctoral thesis carried out under the supervision of Dr. Catherine Walter – Senior Lecturer in Education, Higher Education Academy National Teaching Fellow.

Dear Parents,

I am a language teacher who, after many years of teaching at both State and Independent Schools, has decided to study for a PhD. As part of my research at the Institute of Education (University of London), I am looking into modern language acquisition and cognitive ability. I am doing a comparative study between gifted linguists and bilinguals up to the age of 13.

I am writing, with the Head Teacher's approval, to ask you to give your permission for your daughter/son to take part in this study. Taking part will involve the children filling in a questionnaire and completing a few exercises in class or in the computer room in the presence of their teacher and myself. Only one short set of exercises will be taken individually in the presence of the researcher. I know how busy the school timetable is and, every effort will be taken to minimize disruption. Four short sessions between half and three quarters of an hours' duration will be all that will be required. The timing of these sessions will be organised so as not to clash with any school or outside examinations. Any information about individual answers will remain totally confidential and will only be used for the purpose of the research and any publications or presentations resulting from it. No names will be mentioned in the reporting of data. Taking part in this research would give the children an opportunity to reflect upon how they learn and, I hope that the discussion, which will be the fourth session, will give them some ideas for improving their learning skills in the future. The children's participation is totally voluntary: your child does not have to participate if he/she does not want to, or if you do not want him/her to. This school is going to be one of several schools taking part in this research.

I hope that you will be able to view my request favourably. Please inform the school office if you prefer that your daughter or son does not take part in this study.
Please do not hesitate to contact me if you would like further information. You can also contact Dr. Catherine Walter with requests for information or complaints on c.walter@ioe.ac.uk.
Thank you for your time.

Yours sincerely,

Mrs. M-N.Stacey

Permission Form

Please sign one of the two copies to indicate whether you agree for your daughter/son to participate in this research, and return to the French teacher.

My daughter/son (name)……..has / does not have* my permission to participate in this research.

*Delete as appropriate

Signature……

Date……..

Please print name…….

Appendix D : Participants' Information Sheet

Institute of Education, University of London (Faculty of Culture and Pedagogy)
Marie-Noelle Stacey
Email:mstacey@ioe.ac.uk
Title of Research: The same destination but different journeys: A comparative study between young gifted linguists and bilinguals which explores the learning, storage and retrieval of lexis.

This is a research study for a doctoral thesis carried out under the supervision of Dr. Catherine Walter – Senior Lecturer in Education, Higher Education Academy National Teaching Fellow.

Dear Pupil,

I am a language teacher who, after many years of teaching at both State and Independent Schools, has decided to do a PhD on how similarly or differently young people at school and bilinguals learn a foreign language. For my research I want to understand what helps you to learn. It is your opinion I would like, not that of anyone else.

If you agree to help (please note that it is entirely voluntary), I will ask you to fill in a questionnaire in class and to complete a few exercises (the exercises are mostly in English and there are no right or wrong answers so, please do not worry). Your teachers will not see your answers, and, although you are asked to write a name and number, this is only so that I can make sure that your answers to Part 1 will be put together with the other parts of the research which you will complete later. When the three parts have been completed, I will erase your name and just keep the number. I will analyse the information from all participants' exercises for overall reports and presentations about the research.

You are free to withdraw from the research at any time. Taking part in this research will mean that you will lose some teaching time, as the three parts to be completed, will take approximately three-quarters of an hour each and another three quarters of an hour will be used for a discussion. However, the questionnaire and exercises will benefit you by providing an opportunity to think about how you learn and, the discussion which will follow will give you some ideas for some tricks that other people use to remember and learn their vocabulary.

Your school is going to be one of several schools which I will ask to take part in this study. However, I shall not mention any of the school names in my research reports and presentations.

Please do not hesitate to e-mail me if you have any questions or, if you have any complaints or concerns relating to this research, you can contact my supervisor, Dr. Catherine Walter at c.walter@ioe.ac.uk

Many thanks and very best wishes,

Mrs. Marie-Noelle Stacey

Appendix E: Information pour les participants à la recherche

Institute of Education, University of London (Faculty of Culture and Pedagogy)
Marie-Noelle Stacey Email:mstacey@ioe.ac.uk

Titre de la Recherche: The Same Destination but Different Journeys: A comparative study between young gifted linguists and bilinguals which explores the learning, storage and retrieval of lexis.
Ceci est une recherche pour une thèse de Doctorat faite sous la direction de Dr. Catherine Walter – Senior Lecturer in Education, Higher Education Academy National Teaching Fellow.

Madame/ Monsieur,

Je suis professeur de langues en Grande Bretagne et, après de nombreuses années d'enseignement, j'ai décidé de reprendre les études dans le but d'obtenir un Doctorat. Mes recherches ont pour sujet l'acquisition des langues. Je fais une étude comparative entre les enfants doués pour l'apprentissage des langues étrangères et les enfants bilingues. Je voudrais vous demander de bien vouloir prendre part à cette recherche. Votre participation vous engagera à compléter un petit test de vocabulaire. La durée de ce test ne devrait pas excéder quinze minutes. Il n'y a pas de bonnes ou de mauvaises réponses Toutes informations sur des réponses individuelles restent confidentielles et ne seront utilisées que dans le but de la recherche et pour les publications ou présentations qui en résulteront. Aucun nom ne sera mentioné lors de la publication des résultats.

J'espère que vous serez favorable à ma requête.

N'hésitez pas a me contacter si vous avez besoin de renseignements complementaires. Vous pouvez egalement contacter ma directrice de thèse Dr. Catherine Walter à l'adresse suivante: c.walter@ioe.ac.uk.pour toute information ou plainte ayant trait à cette recherche.
Je vous remercie pour votre compréhension.

Mrs. M-N.Stacey

Veuillez signer une des deux copies pour indiquer si vous acceptez de prendre part à cette

recherche.

Nom……..accepte/ refuse * de prendre part à cette recherche.

*Rayez la mention inutile.

Signature……

Date……..

Appendix F : Vocabulary Network Test

Part 1

Please look at the Key Words in the first column and, for each key word in the first column , choose and tick three out of the six words from the other columns. Your three chosen words should be the ones that you think that you can link to or associate with to the key word.

Key Word						
Salle à manger	Manger	Danger	Familiale	Chambre	Repas	Cantine
Bouche	Mouche	Cavité	Rouge	Nez	Baiser	Parler
Chemise	Porter	Confortable	Costume	Cerise	Blouse	Pantalon
Verre	Vin	Boire	Père	Gobelet	Assiette	Transparent
Maison	Garage	Habiter	Appartement	Saison	Famille	Adresse
Train	Voyager	Pain	Bateau	Vacances	Métro	Rails
Classe	Leçon	Bureaux	Tableau	Etudier	Place	Salle
Jardin	Vert	Fleurs	Terrain	Jouer	Copain	Parc
Yeux	oeil	Regarder	Oreille	Lunettes	Personnel	Bleu
Poulet	Bec	Poule	Ferme	Canard	Manger	Mollet
Chambre	Confortable	Dormir	Membre	Nuit	Salle	Dortoir
Ville	Acheter	Bruyant	Monument	Mille	Campagne	Village
Bus	Puce	Camion	Conducteur	Voyager	Car	Billet
Cuisine	Piscine	Chaud	Nourriture	Cantine	Cuisiner	Pièce
Livre	Etude	Intéressant	Lire	Manuel	Cahier	Vivre

Part 2

Please look at the target words in bold in the first column. Listen to the tape and choose and tick three boxes corresponding to the numbers of the words that you have chosen. These three words should be the ones that you think are most closely linked with the target word.

Key Word	Word 1	Word 2	Word 3	Word 4	Word 5	Word 6
Cochon						
Nez						
Fromage						
Pluie						
Rugby						
Cahier						
Mère						
Pain						
Téléphone						
Flute						
Gymnastique						
Tarte						
Tête						
Etats Unis						
Légumes						

Part 2 (Transcript of test)

Key Word						
Cochon	Bouchon	Porc	Cheval	Gros	Grogner	Sale
Nez	Mouchoir	Museau	Oreille	Respirer	Thé	Rouge
Fromage	Yaourt	Salé	Produit Laitier	Manger	Dommage	Biscuits
Pluie	Douche	Vent	Tomber	Parapluie	Lui	Humide
Rugby	Equipe	Football	Chemise	Rubis	Jouer	Tennis
Cahier	Ecrire	Stylo	Carnet	Cartable	Professeur	Billet
Mère	Frère	Aimer	Dame	Douce	Bises	Père
Pain	Main	Manger	Baguette	Doré	Sandwich	Croissant
Téléphone	Numéros	Plastique	Badminton	Parler	Ordinateur	Portable
Flute	But	Musique	Jouer	Violon	Piccolo	Tube
Gymnastique	Fatigant	Fantastique	Natation	Exercises	Sauter	Education Physique
Tarte	Sucrée	Gâteau	Glace	Carte	Restaurant	Goûter
Tête	Chapeau	Jambe	Bête	Visage	Etudier	Ronde
Etats Unis	Fini	Voyager	Grand	Dollars	France	Amérique
Légumes	Végétal	Parfume	Manger	Viande	Dîner	Plantes

* The six words after each target word have been randomised.

Appendix G: Vocabulary Learning Strategies Questionnaire (Transcript)

1. Learning strategies questionnaire Part 1

This survey is confidential and your name and result will not be given to anyone. When the study is completed, the researcher will remove the names and replace them with numbers.

I would like to ask you to help me in my research by answering the following questions about foreign language learning. The object of the questionnaire is to improve our understanding of the way English boys and girls and bilingual children learn a foreign language. There are no right or wrong answers and it is your opinion that I am interested in. Please give accurate answers about what you do, as the success of the study depends on this. Finally, thank you very much for your help.

Think of the tricks that you use when learning French. Read the statements above the buttons and click on the ones which most accurately says what you do.

PART 1

When learning a word

Q1 – I link the word to what I already know.

For example, I know that ‘dent’ means ‘tooth’ and this helps me to remember that ‘dentifrice ‘ means ‘toothpaste.

I never or practically Never do that	Generally I don’ t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q2 – I group in my mind words from the same topics.

For example, I link ‘doigt’ (finger) with ‘main’ (hand) because one is part of the other.

I never or practically Never do that	Generally I don’ t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 3- I put the new word in a sentence so that I can remember it.

I never or practically Never do that	Generally I don’ t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q4 – I link the sound of the word to another word that I know.

For example, I link ‘sac’ (bag) with sack.

I never or practically Never do that	Generally I don’ t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 5 – I use rhyming to remember.

For example, ‘il s’appelle Rachid, il est timide’.

I never or practically Never do that	Generally I don’ t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 6- I remember the word by drawing a picture.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 7 – I try to remember the spelling in my head.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 8- I use both sounds and images to remember a new word.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 9 – I write down all the other words that I know that belong to the same group as the new word and I make a kind of map, for example a family tree.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 10- I remember where I have seen the word in the book.
For example top left hand side of the page next to the picture of an elephant.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 11- I use cards with the words on one side and a picture or what the word means in English on the other side.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 12- I mime or act out the new word when I learn new words and phrases.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 13- I keep going back and revising things that I have already learnt

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

End of Part 1. Please press continue

PART 2

When I want to learn new words

Q 14- I say or write new words or phrases again and again when I am learning them.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 15- I imitate the way French people talk.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 16- I read a passage several times until I can understand it.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 17 – I check and revise what I write in French to try and improve.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 18 – In class I use expressions in the new language.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 19 – I use words that I know in different combinations to make new sentences when I am speaking or writing in French.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 20 – I sometimes start a conversation with my friends or parents in French.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 21- I watch DVDs or play computer games in French.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 22 – I try to think in French.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 23 – I go to French clubs or take part in other activities where French is spoken.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 24 – I sometimes look at a book or magazine in French.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 25- I write messages or stories in French.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that. .

Q 26- I look for small details in what I hear or read. For example I look for 'le' or 'la ' in front of a word.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 27 – I use textbooks or dictionaries to help me work out sentences.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 28 – I take notes in French during French lessons.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 29 – I make summaries in French.
For example, I list the hobbies of the family members in the text.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 30 – I use rules that I know when I learn something new.
For example, I change the endings of an –er verb as for the verb 'aimer'.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 31- I find the meaning of a word by dividing the word into parts that I can understand.
For example, 'parapluie' = 'para' meaning against and 'pluie' meaning rain.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 32- I look for things that are similar in French and English.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 33 – I try to understand what I have learnt or read without translating word-for-word into English.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 34 – I look for patterns in French.
For example, when a teacher asks the class to do something, the instruction always ends in -ez, e.g. 'regardez', 'écoutez', 'dessinez', etc.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 35 – I form my own opinion about how the language works even if I sometimes have to change my views when I understand something new.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 36 – When I don't know the meaning of a word in French, I sometimes guess it because it makes sense with what I am reading or hearing.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

End of Part 2. Please press continue

PART 3

If I want to improve on the way I learn.

Q 37 – I look in advance at the next lesson in the book.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 38 – When someone speaks in French, I try to concentrate on what they are saying and to ignore everything else that is going on around me.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 39 – I decide in advance to pay attention to specific things.
For example, I decide to watch how French people pronounce the letter R.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 40 – I organise myself to practise my French at regular times, not just before a test.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 41 – I make sure that I have a good place to do my learning.
For example, I find a quiet and comfortable place to revise.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 42 - I organize my exercise book or file to make notes of important information.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 43 – I plan my own learning (that is , what I want to reach and when I want to reach it).

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 44 – I practise in my head what I am planning to say before I speak to someone in French.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 45- I learn from my own mistakes when I speak in French.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

Q 46 – I make my own judgement on the general progress that I have made in French.

I never or practically Never do that	Generally I don' t do that	I sometime do that	Yes, on the whole I do that	Yes I always or practically al- - ways do that.

End of Part 3. Please press continue

PART 4 : General information

Q 47 – Are you a boy or a girl?

Boy ☐

Girl ☐

Q 48 – How old are you?

9 years old ☐

10 years old ☐

11 years old ☐

12 years old ☐

13 years old ☐

Q 49 – What is your home language? (if English go to question 52)

English ☐

French ☐

Spanish ☐

Russian ☐

Other ☐

Q 50 - How well do you speak it?

As well as I speak English.

Not quite as well as I speak English.

I have difficulty in finding the right word.

Ionly speak a few words.

Q 51 – How well can you write the language?

I can write letters and stories.

I can write a few words.

I can copy from a book.

I cannot write it.

Q 52 – How long have you been learning French?

1 year

2-3 years

4-5 years

6-8 years

Over 8 years

Q 53 – Would you say that you can speak it

Well. ☐

Enough to get what you want. ☐

A little. ☐

Not at all. ☐

Q 54 – How important is it for you to be able to speak French?

Very important. ☐

Important. ☐

Not very important ☐

Not at all important ☐

Q 55 – Do you enjoy learning French?

Yes ☐

No ☐

Q 56 – How important is it for your parents that you should be able to speak French?

Very important. ☐

Important. ☐

Not very important. ☐

Not at all important. ☐

Q 57 - Do your parents speak more than one language?

Yes ☐

No ☐

Q 58 - Do your parents help you when you have homework in French?

Yes ☐

No ☐

Q 59 - Have your parents taken you to a country where French is spoken?

Yes ☐

No ☐

Q 60 - Would you say that your parents are keen for you to learn French?

Yes ☐

No ☐

Q 61 – If yes why are they so keen?

They are interested in French. ☐

They have a house in a French speaking country. ☐

They think that it is important for travelling. ☐

They think that it is important for university or for a future job. ☐

Other (please specify)

What is your survey name or number?

Thank you very much for taking part in this study.

Appendix H : Transcript of Working Memory Test version 2 (Recall)

Name:……..

Logical illogical Last word

Français 2 phrases

Il aime faire du ski à la montagne.

Je regarde le journal de mardi.

La fenêtre ouvre l'ami de mon père.

Elle n'aime pas beaucoup travailler à la maison

Ses films regardent beaucoup de frères.

Il est allergique au lait et aux oeufs.

Il y a un message pour le chef.

Le cartable bleu est dans le livre.

Il porte un jean et un blouson.

Le bus est dans le conducteur.

English - 2 sentences

The walk went for a long family.

All the answers are in the book.

I usually meet the library at my cousin.

The party danced all night at her sister.

The cake ate half of my brother.

Just put everything on the table.

Your book is on the hall table.

She wore these awful old green trousers.

In the evening the television watches my dad.

I haven't met the new French teacher.

English - 3 sentences

Ellen gave the child some more biscuits.

I woke up several times last night.

I don’t really believe his silly story.

Tom and Rosie are never on time.

Most photos like to take tourists.

We have got Rocky II on video.

An enormous lunch ate the three students.

There’s something in front of the door.

Her bedroom chose light blue for my sister.

My sister is afraid of dogs.

Stories like to tell most children.

It always feels cold in that room.

It’s very important to be on time.

It's the biggest shop in the street.

Jeremy has broken Mum's favourite lamp.

Francais - 3 phrases

La carotte mange le gros lapin.

J’arrive à la maison avant la nuit.

Le grand appartement habite dans Madame Martin.

Le gros chat noir est sur le lit.

Le frère de ma mère travaille à la poste.

La natation aime faire de son ami.

La table est sur le gâteau à la crème.

Le matin je mange un croissant.

Elle a un chat noir et deux chiens.

Le chien noir promène la femme.

Une lettre écrit à ma correspondante.

Brigitte donne à Claire un beau cadeau.

Il arrive aujourd'hui en France en train.

Le parking est dans la petite voiture.

La géographie déteste ma petite soeur.

Francais - 4 phrases

Elle ne mange pas d'oeufs et de poisson.

Le film sur les Simpson n'aime pas les filles.

La tasse bleue est dans le thé.

Mon animal préféré est le chat.

Pierre met l'omelette dans les oeufs.

J'arrive au collège et je parle avec mes copains.

L'ambulance arrive très vite à l'hôpital.

Je n'aime pas lire les magazines.

La musique écoute mon cousin.

Le grand jardin est dans le garage.

Le nez rouge a le bonhomme de neige.

Aujourd'hui à l'école nous écoutons un concert.

La trousse est dans mon crayon.

Asseyez-vous vite dans le fauteuil.

Les saucisses mangent les petits enfants.

La belle voiture répare le mécanicien.

Le docteur arrive à quinze heures.

La bouteille d'eau boit le touriste.

Le téléphone parle beaucoup au docteur.

Le journal aime lire le policier.

English - 4 sentences

The table put the bag on the woman.

Oh, please don't open that door.

The dogs read a book about girls.

Please have another bowl of soup.

Italy worked in her son for six months.

I spent the grandmother with my summer.

This homework took me over two hours.

Sometimes, English just can't understand my sister.

Yesterday we had a metre of snow.

Dad is having some problems at work.

In my dream she drove a bus.

Lucy never got the correct answer.

All the boys are at the pool.

The airport was late arriving at the plane.

The beach drove us to my uncle.

Lisa has got her father’s eyes.

A week spent us at our aunt's house.

Sarah lived in Germany for two years.

This shirt bought me at that new shop.

We usually meet the pub at the singers.

English - 5 sentences

A pullover made my cousin for her boyfriend.

The supermarket buys its lunch at my son.

Don’t put your feet on the desk.

A poem was thinking of Jane about birds.

Mum, David’s eaten all the cheese.

Cara had a brilliant party yesterday evening.

On Friday the museum visited our class.

First, I’ll tell you the good news.

The explosions don't yet know about the people.

A really big house lives in my doctor.

He’s only interested in her money.

Our cats are writing an article about teachers.

The book slowly opened the dentist.

Two of her flutes play the cousin.

His nose broke that boy in a fight.

The ticket paid ten dollars for the secretary.

On Saturdays basketball plays my brother.

At the weekend my bedroom painted my father.

I think that note is writing a man.

Mrs Green is coming for lunch.

On Fridays the dinner cooks my husband.

The garden ran into the little boy.

Some coffee drank Dad before leaving for work.

My bicycle repaired me at the weekend.

I can't find my new shoes.

Francais - 5 phrases

En hiver j'aime bien le patinage.

Vincent n'aime pas beaucoup sa cousine.

La grosse dent répare le dentiste.

J'aime le théâtre mais je préfère le cinéma.

Le portrait dessine l'artiste de son fils.

Trois euros coûtent les chaussures.

Les chaussettes rouges portent les garçons.

Le Portugal va au garcon cette année.

Il fait chaud et Daniel ouvre la fenêtre.

Son école habite à côté de Claire.

La boulangerie achète Marie à la baguette.

J’ achète un croissant et un pain.

Je vais à la piscine avec mon amie.

Le sandwich est dans le jambon.

Le frère de Martine a un grand vélo.

Il est à la maison avec sa mère.

La porte ferme lentement le monsieur.

Elle mange un gros gâteau pour son anniversaire.

La sauce est allergique à ma grand-mère.

L’école est dans la salle de classe.

Les petits poissons adorent les chats.

Nous écoutons beaucoup de musique.

Le sofa est assis sur le chien.

Le jardin chante dans les petits oiseaux.

Le grand piano joue du musicien.

Francais - 6 phrases

Nous allons en vacances en juillet.

Christophe est content de sa belle montre.

Le gros fromage mange la souris.

Elle entre et ferme la porte.

Il y a un oiseau bleu dans le jardin.

Les glaces au citron préfèrent mes cousines.

A Noël nous décorons le sapin.

Mireille a les cheveux longs et de grands yeux.

Je range le cahier dans le cartable.

Devant le bus arrive la pharmacie.

Nadine mange toujours beaucoup de fromage.

La salle à manger est dans la table.

Nicolas entre dans le salon avec sa tante.

L'école arrive en retard à mon professeur.

Il y a une ceinture avec la jupe.

Isabelle travaille beaucoup avec son frère.

L'hôpital arrive très vite à l'ambulance.

Sa mère travaille le matin au collège.

Elle joue dans le jardin avec les filles.

Le professeur demande beaucoup de réponses.

Les grandes lunettes portent des élèves.

La balle joue à la fille.

J’ai des crayons de couleur dans ma trousse.

La télévision a le grand-père.

Paul ouvre son livre de maths.

La voiture rouge est dans le parking.

Le bureau ne travaille pas sur ma mère.

La gare arrive dans le train.

Je ne bois pas de café au lait.

Les petits oiseaux chantent le matin.

English - 6 sentences

The key put Jack on the kitchen table.

Mike plays football four times a week.

They live very near the church.

Oh dear, I can’t remember the number.

Oh, I’ve made a terrible mistake.

Tonight we're all going to the cinema.

The shop walked to me to buy milk.

John wants to be an airline pilot.

The new hospital works at his uncle.

Those languages can speak five boys.

There’s something green under that table.

It’s the smallest house in the street.

Bruno and I are going to play tennis.

The chair sat down suddenly on the girl.

Tomorrow I’m going to sleep until midday.

My film saw that cousin last week.

The office left Susan at seven this evening.

Do come and stay for a few weeks.

I can see someone behind that tree.

The office was late arriving at my boss.

My little brother’s first word was “daddy”.

Her hotel manages a five-star brother.

The soup ate all of the boys.

John wrote his answers in pencil.

Her daughter has a job in a bank.

The church was not married in a couple.

The new house moved into us last year.

We swam in the ocean every day.

John's textbook left him in the taxi.

This must be Mrs White’s book.

THANK YOU FOR TAKING PART IN THIS RESEARCH.

Appendix I : MLAT-E Grade 5 Raw Scores and Percentiles

Norms for students in Grade 5 on the MLAT-E raw total scores corresponding to designated percentiles (adapted from Carroll & Sapon MLAT-E Manual 2002)

Percentile	Raw Scores Range : Boys	Raw Scores Range: Girls
99	123-130	124-130
97	120-122	122-130
95	116-119	119-121
90	113-115	116-118
85	109-112	113-115
80	106-108	111-112
75	104-105	109-110
70	101-103	107-108
65	98-100	104-106
60	96-97	101-103
55	93-95	99-100
50	90-92	97-98
45	87-89	94-96
40	84-86	91-93
35	82-83	89-90
30	79-81	86-88
25	75-78	82-85
20	71-74	78-81
15	65-70	73-77
10	58-63	63-72
5	47-57	53-62
3	37-46	44-52
1	0-36	0-43
N	495	500
MEAN	88.9	94.7
SD	20.6	19.2