The interplay between lexis and learning

A study of second language vocabulary profiles and learning style

Paul Booth

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Abstract

This study examines the relationship between second language vocabulary and learning in terms of productive vocabulary and learning style. Overall, second language learners tend to follow a predictable pattern when they acquire vocabulary. More common words are acquired before less frequent ones. However, individuals display idiosyncratic paths in lexical development. In this study learning style is examined in order to understand whether lexical developmental patterns can be associated with particular learning strengths and weaknesses. The central argument put forward in this thesis is that learning style can help to understand how L2 learners differ in their acquisition of lexis for productive use.

Learners were tested for a pre-disposition towards memory or analysis in learning style and their vocabulary was measured via written texts for lexical rarity and the extent to which learners avoid repetition (diversity). The main findings show that at low proficiency memory correlates with lexical rarity, but at higher proficiency and greater analysis there is less variability of function words. Lexical diversity, which is influenced by sentence structure, is more stable with learners who are strong in language analysis. Over time, analytical learners tended to gain rarer words. Individual lexical trajectories over several points in time highlight the variability and stability of lexical profiles in relation to memory and analysis. Task topic influences lexical rarity whereas diversity is relatively independent. There was no direct relationship found between holistic quality ratings of texts and quantitative measures of lexical frequency or diversity; however, the results suggest an indirect relationship with language analysis.

The discussion of the results brings to light the heterogeneous nature of L2 lexis and how this interacts with learning style. The results also lend support to a Dynamic Systems Theory of SLA (de Bot *et al*, 2007); in particular, how variability is a developmental phenomenon which helps us to understand how lexis is assembled in response to local task conditions in real time. The pedagogical implications of these findings are also discussed and recommendations are made to help learners notice and restructure their language.

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In memory of my mother

Shirley Booth

Contents

1 Introduction to lexical profiles and learning

The central theme of this thesis is to understand the nature of productive second language English vocabulary from learner texts in relation to learning style. Typically, when vocabulary is measured in terms of frequency, not surprisingly, the more frequently a word is used, the more likely it is to be known by second language learners (Milton, 2007). This means that learners tend to know more words at the high frequency levels than the rarer lexis at low frequency. According to Milton (2007, p.51), it indicates "the salience of frequency of occurrence as an influence on the learnability of words". Typically, this trend can be observed in groups of learners but glosses over the variability in lexical profiles that occur with individuals (Larsen-Freeman, 2006). Research tends to focus on central tendencies which obscure individual variability and ignore the individual differences which could potentially be a rich source of data (e.g. Laufer and Nation, 1995). Behind the central tendencies in what de Bot *et al.* (2007, p.14) term as "grand sweep" projects, we find that there is considerable variability.

There are many factors which contribute to the degree of heterogeneity found in the second language vocabulary that a learner knows or can produce, such as age, aptitude, motivation, attitude, learning style, learning strategies, etc. Learning style is examined in this thesis because very little is known about how this variable interacts with L2 vocabulary acquisition. Learning style as opposed to, for example, learning strategies is one of the more fixed learner differences (Skehan, 1998, p.267). Therefore, this research investigates the relationship between learning style and second language vocabulary. If learning style is indeed a contributory factor then it may help to understand the non-straightforward patterns we find between the group versus the individual. We may also have a clearer understanding of how learners develop in vocabulary and also start to question some of the assumptions that have been made in the literature of lexical profile development based on the findings from groups of learners (e.g. Laufer and Nation, 1995). The key hypothesis in this thesis is that variability in lexical profiles could be related to learning style. Accordingly, this introduction brings together some of the main themes developed in this thesis which are addressed in the empirical research and the literature review. Following that, this thesis presents an outline of how the empirical research unfolded and subsequently, an outline of the chapters.

1.1 Lexical profiles

The vocabulary considered in this study is second language (L2) English, elicited mainly from fairly formal written texts. The words which learners produce can be classified according to an external frequency list to obtain a profile. Therefore, second language vocabulary profiles are a representation of lexical knowledge. A typical L2 profile is skewed towards highly frequent words. Studies of groups of L2 learners (e.g. Laufer and Nation, 1995) have shown that in writing, at the lower levels of proficiency learners tend to use a greater proportion of high frequency lexis than more proficient learners. However, this type of approach tends to disguise the fact that when we look at individual profiles we find variability which group profiles can mask. On a micro level, words do not seem to be learned in a systematic manner from one frequency level to the next (Schmitt and Meara, 1997). In other words, within the lexical system we have what appears to be randomness at the individual level but which is nevertheless part of an interconnected system. This explains why grouping the data from many different individuals will uncover linear patterns, whereas on an individual level the development tends to be non-linear.

How the lexicon[1] atrophies in a non-linear way has been studied by using computer modelling (Meara, 2004). Although these individual lexicons are predictable in the long-term, how they behave in the intervening term is highly unpredictable, given a relatively simple set of parameters used in the modelling. For example, a plotted graph of the mean attrition rate of modelled lexicons does not show the level of complexity and subtlety which underlies the individual lexicons. These computer simulations and empirical work using graph theory (Wilks and Meara, 2007, pp.173-175) highlight the inherent nature of variability in the aspects of the lexicon and accentuate the need for empirical research that focuses not only on the group but also on the individual.

[1] Lexicon: the lexical items of a language. The mental lexicon refers to all the lexical items stored in a person's mind, including their organisation.

1.2 Lexical knowledge

It is not straightforward how we define lexical knowledge. The degree of word familiarity has often been used to help define lexical knowledge (Melka, 1997, p.84). As Melka points out, though, degrees of familiarity or knowledge are imperceptible. Therefore, Chapter 2 teases apart some of the different levels of lexical knowledge which helps us to understand the type of lexical knowledge represented by the profiles in my empirical work. In describing lexical knowledge, researchers have referred to receptive and productive knowledge. At one end of the spectrum is receptive knowledge in which the word is not available for retrieval, whilst at the other end is productive knowledge in which the word is available for use (Melka, 1997). Learners typically know and recognise more lexis than they can use productively. Therefore, the type of tasks or tests which are used to elicit lexical knowledge from the learner influence the words which are obtained (Mondria and Wiersma, 2004). Consequently, the methodology used to obtain lexical profiles has a very strong effect on the words obtained from the learner. Lexical profiles which draw on production will require more levels of knowledge than profiles obtained from receptive knowledge of words. My research uses mainly productive tasks in obtaining lexical profiles from the participants. The implication of using productive or receptive lexis is discussed in Chapter 2.

One of the reasons why lexical profiles are actually more complex than is at first apparent is that they are related to other subsystems of language (syntax, phonology, semantics). Systems interact with other systems so that changes in one system will impact on all or some of the other systems. This is why development over time is unpredictable. The lexical system continues to change and develop in an unpredictable manner and so a static "snapshot" or measurement of the system does not capture the dynamic nature inherent in the system. Accordingly, in my analysis of lexical profiles there will not only be static "snapshots" but also the tracking of lexis over time in order to capture the process of change.

1.3 Lexical development

Lexical development is an ongoing process which is learner-driven to complexify language in order to maintain development. A useful metaphor is to view language as "organic" i.e. a living organism in which its form is regenerated (Rutherford, 1987, p.37) to develop in complexity. It is termed organic by Rutherford in the sense that language is in a constant state of "change and growth" because of the "developing interactions among humans", the growth potential and "cyclical interconnections" (Rutherford, 1987, p.36-7). This means that there are no overarching rules for lexical development but rather lexis is sensitive to feedback and the context of the environment. Lexis evolves in an organic manner driven by the process of restructuring.

The process of restructuring is learner-centred in that it is the learner who constructs meaning through language. McLaughlin describes this process mainly in relation to morphological development in which the learner goes through a U-shaped development from an initial appearance of the correct verb form (e.g. *went*) that is subsequently regularised (e.g. *goed*) before the correct form appears again. McLaughlin argues that lexical development through restructuring indicates a move from an exemplar-based to rule-based representations (McLaughlin, 1987, p.118). Although simplistic, it represents the variable nature of linguistic development and the drive for complexification of language. In semantic development within the lexical domain, the restructuring process consists of mapping the lexical and conceptual systems onto each other. Ijaz (1986, p.441) explains that the restructuring process can be difficult for language learners if the linguistic categorization in the L1 is different in the L2. If this is the case then conceptual restructuring is necessary because of the lack of exact conceptual mapping of L1 and L2 form. In her study prepositions were problematic for language learners and for this reason they can be difficult to learn and use in a target-like manner. This would lead to a process of integration which Mandler (1980, p.255) describes as "...the stability and invariance of structural relations among the featural constituents of an event". Restructuring reflects an organisational process in which the item becomes more organised and stable within the system as a whole. One of the consequences of restructuring could be that lexis becomes more salient and therefore more likely to become part of the learner's active vocabulary. This drive for restructuring and then lexical integration over time could be related to lexical frequency. Empirical studies show that over time when we examine learners' L2 texts we tend to observe less reliance on words at the 1,000 frequency level and a greater use of lexis beyond the 2,000 level (Laufer, 1995). In other words, as learners develop they tend to be less reliant on high frequency lexis. Although frequency of a lexical item per se is not mapped linearly into the integration value (Mandler, 1980 p.259), it is the learner's internal restructuring processes which may drive forward the integration of rarer lexis. The concept of restructuring occurs throughout the later empirical chapters and is key to our understanding of how lexis is dynamic and why it is variable. Driving this process of development is learning style.

1.4 Learning style: Memory and analysis

Intrinsic learner differences play a central role in this research. The model of learning style, memory and analysis, is taken from Skehan's (1998) own theoretical framework which is based on empirical and experimental research from psycholinguistics. The participants are tested for learning style as defined by the memory-analysis construct. They are categorised by their pre-disposition towards this construct and compared and contrasted in relation to their lexical profiles. Non-native speakers are the focus in this thesis and it is their patterns of lexical profiles in relation to learning style which is the central aim which runs throughout the empirical work.

Das (1988, p.102) defines learning style as "a general, habitual mode of processing information" when applied to practical, educational or training applications. Much research has been carried out into learning or cognitive style dimensions, but as yet little has been applied to second language acquisition. Although much of the research in learning/cognitive style has been fragmented, the model of learning style in this thesis is examined in relation to language learning. In this case learning style is not one particular approach to learning but a dual-mode system: one which relies on processing language as chunk-based and idiom (memory) and the other which relies on structure and rule (analysis). This theory of learning comes from a variety of studies: cognitive science

(Carr and Curren, 1994) and empirical studies using aptitude profiles (Skehan, 1986 and Wesche, 1981).

In cognitive science, experiments have been conducted in how people learn sequentially structured sequences. In these experiments participants learn false grammars or letter strings. The question is how learning is mentally represented. The issue is whether structured sequences are represented as generalisations across stored examples (i.e. exemplars) or as a set of abstract rules (Carr and Curren, 1994, p.210). This dichotomy in language use has been illustrated by Sinclair's (1991) idiom versus open choice principle. In spoken and written texts, the user has available a number of preconstructed multi-word combinations adhering to the idiom principle, versus word-for-word combinations (i.e. grammatical creation) making use of the open choice principle.

In second language learning, Skehan (1998, pp.88-9) also argues in favour of a dual-mode system. At one extreme language is coded and represented as exemplars that require minimal computational demands on the learner, the cost being that the system may not be so easily adapted for the expression of complex meanings. This is because such lexical elements are stored as units longer than a word and not broken down into constituent parts. At the other extreme learning is rule-based in which language is analysed into parts and produced from rules. The operation of this system is more costly in terms of processing burden, but the benefit is the language system is more open to complexification. I do not suggest that these operations occur separately, rather the learner switches between the two.

The memory-analysis framework is understood to be representative of the complexity which underlies a memory-based and rule-based system and is not intended to capture all of the complexity clustered within these domains. This dual-mode of learning is categorised as memory and analysis and is the basis on which learning style is conceptualised and tested.

1.5 Main aim and evolution of the research

The main aim of my work is to explore the relationship between productive lexical profiles and learning style.

The key themes present within my work have been highlighted. They are:

1. the complex and variable nature of L2 lexical profiles.
2. the relationships between lexical development and learning style.

A series of empirical studies were conducted to explore the different aspects of the relationship between lexical profiles and learning style. In the course of this work it became clear that the lexical profiles were variable in nature and therefore different from one point in time to the next. The first three studies are synchronic in that lexical profiles were taken from respondents at one point in time. Subsequently, it became evident that it was the process of lexical development which was more interesting rather than static "snapshots" of lexical profiles. In other words, it was the previous state and how it related to the next state which became important. Consequently, I designed two subsequent studies which were diachronic in order to capture this dynamic process.

Another related factor which became evident as time went on was the inherent variability in the group profiles. This meant that profiles taken at one point in time would not necessarily be similar at another point. There were various reasons for this, one of which was the inherent complexity when dealing with human subjects. As a result, the focus of the research was magnified to look not only at group but also individual profiles. As Thelen and Smith explain, there are two perspectives when looking at behaviour. There is the view from above which is "a global structure" that is integral to the individual acts and there is the view from below which is "messy, fluid and highly context-dependent" (Thelen and Smith, 1994, pp.215-6). My empirical work has tried to give both perspectives; each perspective is intended to inform the other.

The findings from the studies encouraged me to interpret them in relation to Dynamic Systems Theory (Thelen and Smith, 1994). One of the central features of a DST approach is that it focuses on the underlying developmental patterns rather than simply testing them (de Bot *et al* 2007, p.14). Various researchers have interpreted findings in cognitive development in the light of DST (e.g. van Geert, 2003) and more recently in relation to second language acquisition (de Bot *et al*, 2007 and Laarsen and Freeman, 2009). This theory captures the developmental and variable nature of systems and is relevant if we view L2 lexis as a system in development nested within other systems, one of which is the intrinsic learner variable of learning style. The work in this research project concerns itself with variability and development in lexical profiles and how they may be associated with learning style.

The empirical research has evolved out of the central aim of understanding second language vocabulary acquisition through the productive use of lexis in relation to learning style. By focussing on what eventually became the process of lexical variability, I have, for the purposes of this research project, put to one side some of the other possible variables which could have become central (e.g. differences between short- and long-term memory on lexical profiles) but at the same time, I have made it possible to concentrate on the emergence of variability over various time frames and how it relates to complexity within a developing L2 lexical system.

1.5.1 The main research questions

To examine:

1. whether there is a relationship between group lexical frequency profiles, as elicited through word recognition, and learning style (memory: a predisposition to exemplar-based processing versus analysis: a predisposition to rule-based processing);
2. whether there is a relationship between group lexical frequency or diversity profiles, as elicited through the production of texts, and the learning style of second language learners;
3. whether lexical development over time beyond the 2000 frequency level is related to sub-groups of learners categorised by learning style;
4. whether individual lexical frequency and diversity profiles tracked over time represent a linear or non-linear process in relation to learning style;
5. whether patterns of variability of lexical production can be attributed to learning style.

1.5.2 Outline of the methodology

The elicitation techniques to obtain vocabulary profiles changed over time. At first, lexis was obtained by a Yes/No test which simply asked if a respondent knows the word presented. This method proved to be unsuitable for the aims of the research so it was subsequently changed to a productive method of elicitation which overcame the problems associated with the first method. Another change was needed in how vocabulary was measured in order to capture a fuller range of lexical richness.

In this research, the measurement of word rarity and diversity are the two main approaches adopted. Lexical rarity measures the frequency of a word in a particular context. This method of word rarity is based on using external frequency lists. Lexical rarity has been an important factor in measuring and understanding L1 development (Malvern *et al,* 2004) and L2 development (Laufer, 1995). Less proficient students tend to make more use of the 1,000 and 2,000 frequency lexis, whereas more proficient students use a greater percentage of lexis found beyond the 2,000 frequency level (Laufer and Nation, 1995, p.316). Words classified as rare are now generally accepted as those words occurring "beyond 2000" most frequent words (Laufer, 1995). However, because lexical rarity measures do not take into consideration repetition of the same word it has also been necessary to use another means of assessing lexical use, namely, diversity.

Lexical diversity is based not on external frequency lists but on an internal measure, what Skehan (2009, p.198) coins as "the extent to which the speaker avoids the recycling of the same set of words." Traditionally, it has been measured by calculating the ratio between different words (Types) and total words (Tokens) which is the Type-Token Ratio (TTR). Because this measure (and other mathematical calculations derived from it) is a function of text size, a new mathematical model entitled "parameter *D*" (*D* for diversity) has been used which overcomes the problems associated with TTR (Malvern *et al,* 2004). Lexical rarity and diversity measure lexical richness and are how lexical profiles are measured in my empirical research studies. Both gave insights into how the context plays an important role in this research. A quantitative approach is taken supplemented with a more qualitative enquiry based on holistic quality ratings.

Learning style was tested via two language aptitude tests: LAT B, a memory test of pairs of words, one known and the other unknown; the other test, LAT C, is for grammatical sensitivity (Meara *et al*, 2001). Lexical production was controlled in that all the written texts were carried out under timed conditions and participants were denied access to dictionaries to help ensure that the words were genuinely acquired.

1.6 The outline of the study

This thesis is firstly organised around a literature review of previous work which lays the foundation for the empirical work found in chapters 4-8. In the literature review, several methods of obtaining lexical profiles are critically evaluated. Learning style is also reviewed in relation to second language acquisition. The empirical work examines lexical profiles and learning style from several levels: receptive and productive vocabulary, lexical frequency and diversity, holistic quality ratings of texts, learning style from a memory and analysis framework, group versus individual perspectives and time dependent studies. Chapter 9 discusses the implications of the findings on a more macro level. Conclusions and further research bring the thesis to a close.

Chapter 2: The issues and mechanics of lexical profiles.

The main aim in the second chapter is to survey and critique some of the extrinsic measures of lexical frequency profiles and intrinsic measures of lexical diversity. This chapter introduces lexical profiles and reviews various studies which have used lexical profiles as a way of measuring second language lexical knowledge. More recent studies are reviewed. The use of rare lexis and the relationship to academic ability is critically discussed (Morris and Cobb, 2004). Milton's (2007) research into learning strengths behind learner profiles is reviewed and the methodology is used for my initial pilot study. Because my empirical work uses different measures of vocabulary, measures which calculate the repetition of words are discussed i.e. lexical diversity. The second part of this chapter focuses on the methodological issue of measuring lexis. The nature of receptive and productive lexical knowledge in relation to the research tools used in my empirical work is examined.

Chapter 3: Intrinsic learner differences: learning styles

Some of the most relevant models of learning style are critically reviewed in relation to SLA. Because these models and tests lack relevance to second language acquisition, I also review foreign language aptitude and how the validity of these tests has been obtained from their predictive quality in foreign language success. Aptitude has been influential in identifying learner "types". Studies which use aptitude tests to identify learner "types" (Wesche, 1981 and Skehan, 1986) are reviewed. Further insights are drawn from psycholinguistic research in which exemplar- and rule-based processing of structured sequences provide another perspective on how languages are represented and processed. Skehan bases his learning style framework, memory and analysis, on the dual-mode model of processing of language. The measurement of this construct is discussed. I explain why two tests: one for memory of paired associates (Memory) and the other for grammatical sensitivity (Analysis), are used to classify learners for learning style.

Chapter 4: Lexical profiles and learning style: a pilot study

The starting point for my empirical work follows up Milton's (2007) study to determine whether profiles and learning style can be associated. The first empirical study is concerned with ascertaining whether there is the relationship between lexis and learning style. These results are discussed in relation to the methodology used in the measurement of lexical profiles.

Chapter 5: Lexical frequency profiles and their relationship to learning style

The second study continues with the relationship with lexis and learning style but this time the method of elicitation is productive lexical frequency profiles. The results from this study are discussed in relation to the restructuring of lexis which encompasses issues of proficiency and variability of lexis.

Chapter 6: The variability of lexical diversity profiles and its relationship to learning style

The third study examines the patterns of variability found in lexical diversity when examined through the lens of learning style.

Chapter 7: Macrodevelopment paths of lexical profiles in relation to learning style

This chapter looks at how lexis changes over time and the relationships with the learning style construct (memory-analysis). The study looks at whether there is any lexical development beyond the 2,000 frequency level over one semester and whether any developments are related to Memory and Analysis.

Chapter 8: Microdevelopment paths of lexical profiles in relation to learning style

In this study, individual lexical profiles are obtained over several points in time to capture the dynamic nature of L2 lexis which had been apparent in the previous two studies. As well as lexical rarity, lexical diversity is measured in free written production. From a quantitative perspective, mean lexical diversity and rarity show a non-linear pattern during an intensive English language learning programme. In order to complement a quantitative approach taken so far, a qualitative evaluation of learners' texts was carried out. It examines the relationship between lexical production and qualitative ratings of the texts so as to obtain a more complete idea of learners' lexical production. The results are discussed in light of the shape of the trajectories in relation to learning style and task topic. A qualitative perspective is also discussed in relation to text quality and first language background.

Chapter 9 Discussion: inferences, conclusions and further research

This chapter opens up the themes from the previous chapters to discuss the findings in the light of other research. The dynamic nature of L2 lexis is discussed and how this relates to lexical processing for the emergence of complexity. Lexical transparency and opaqueness and how development can be measured are also discussed. The second part discusses how the results inform Dynamic Systems Theory (DST) in relation to SLA. The wider implications of learning style are discussed in relation to pedagogy and in particular to encourage learners to restructure their language in relation to words they need to use. The conclusions state what has been learnt through the work carried out in this thesis. Finally, possible directions are given for further research.

The next two chapters form the literature review; the aims are as follows:

1. To critically examine the concept of lexical profiles in relation to second language learners.
2. To explore, if possible, the best method of obtaining lexical profiles.
3. To examine learning style in relation to second language learning.

2 The issues and mechanics of lexical profiles

A lexical profile can give an indication of vocabulary knowledge. However, it is likely to be superficial unless we know what is behind a lexical profile. At face value, a lexical frequency profile can tell us what percentage of words and at what frequency band learners use or know, but it may be difficult to generalise from the findings when there is much variability in the data. Therefore, this chapter critically reviews key studies on lexical profiles and aims to highlight some of the gaps in the research. The first part of this chapter focuses on the Lexical Frequency Profile (LFP) (Laufer and Nation, 1995) because it has been widely used as a research tool to measure lexical knowledge. The authors claim that this tool is a valid and reliable test instrument. This chapter examines the claims made by Laufer and Nation in the light of the empirical work conducted by those authors.

2.1 Lexical richness: frequency profiles

The rationale for Laufer and Nation's study (1995) was to introduce, validate, and establish the reliability of the Lexical Frequency Profile (LFP) as a measure of lexical richness in free written production of second language learners. Lexical richness is the degree to which a writer is using a varied and large vocabulary. The aim was to establish whether there is a significant difference in lexical richness between the LFPs of learners of three different proficiency levels. The results from the LFP are correlated with another measure of productive lexical knowledge, namely, the active version of the Vocabulary

Measures Test (Nation, 1983) for validity. In order to establish the reliability, the profiles were analysed across two different pieces of work from learners of the same proficiency level. The resulting profiles were expected to be similar.

The LFP shows the percentage of words used at various frequency levels. The LFP is calculated by a computer program that compares vocabulary lists against a text which has been typed in. The frequency levels are: the first 1,000, the second 1,000, the University Word List (836 word families that are not in the second 1,000 but are frequent across various academic disciplines), and "not-in-any-list". The English *Web VocabProfile* (see Cobb, 2002), which was later available on the Internet, is based on the LFP. The profile shows the proportion of word families a learner uses at different frequency levels in their writing.

Altogether, there were 65 second language learners of English who were used in this study. The proficiency levels were categorised as follows: Group 1: Victoria University students (lowest proficiency), group 2: first semester Israeli students, group 3: end of second semester Israeli students (highest proficiency). Two 300-350 word, one-hour compositions were written within one week. The title of the first composition was identical for all learners, whilst for the second composition the learners had a choice of topics. The learners were also given the active version of the Vocabulary Levels Test which tests learners' productive knowledge of the second 1,000 words, the third 1,000, the fifth 1,000, the University Word List, and the tenth 1,000.

Differences were found between each proficiency group for the first composition. There was a sliding scale: the lowest proficiency group 1 tended to use most words from the highest frequency (86.5% mean), group 2 fewer words (79.7%) and group 3 used the fewest (77%). Results from the second composition tended to accentuate the differences between each proficiency group. Overall, the lower the proficiency the greater the reliance is on the first 1,000 words. Significant differences also emerged from the highest proficiency learners using a greater percentage of sophisticated words i.e. UWL and "not-in-the-lists".

The LFP of the compositions were then correlated with the scores of the same learners on the active version of the Vocabulary Levels Test (Nation, 1983). Positive correlations of between .6 and .8 were found of the rarer words (UWL and 'not-in-the-lists') and the Levels Test. Negative correlations of 0.7 were found between the first 1,000 and productive vocabulary knowledge from the Levels Test because the greater the vocabulary knowledge, the fewer high frequency words are used. There was no significant correlation between the second 1,000 and the Levels Test.

The two sets of compositions were then analysed by matched t-tests for the individual frequency levels and MANOVA for the proportions between the levels. Groups 1 and 2 displayed stable, i.e. non-significant differences, profiles over two compositions, whilst group 3 displayed differences in mean scores at the first 1,000 frequency level, the UWL, and the proportions. The authors suggest that for advanced learners, profiles may not be stable across different samples of writing because the lexis becomes too varied.

Because this study focused on the validity and reliability of the LFP in terms of measuring lexical richness, the authors decided to analyse data beyond the first thousand frequency level. Their reasoning was that the most basic vocabulary and most of the function words occur in the first 1,000 frequency band and that "the true measure of lexical richness is determined by the proportion of all the other lexis at the more advanced frequency levels" (Laufer and Nation, 1995, p.318). The data was then reanalysed using the same procedures but this time with only the words beyond the first 1,000[2]. The results showed that none of the differences were statistically significant.

The authors' conclusions of the study were that the LFP provides stable results (i.e. non-significant) over two pieces of work by the same learners. Moreover, the LFP discriminates learners of different proficiency levels in the proportion of words they use at the various frequency levels. The LFP also correlated well with an independent measure - the Vocabulary Levels Test. The authors conclude that the LFP is valid and reliable.

The Lexical Frequency Profile analyses the words used in a text. The output is a profile of the percentage of lexis at various frequency bands. Words are analysed individually regardless of whether they form part of what Wray (2002, p.200) terms as a "holistically learnt string". For example, the software would analyse "I don't know" word by word rather than as a complete whole. This type of analysis may not give a true reflection of how the lexis is stored and retrieved by the learner. The learner may have a

[2] For group 1, between the second 1,000 and a combination of UWL and 'not-in-the-list'.

wide repertoire of formulaic chunks stored as complete units i.e. unanalysed pieces of language (lexicalised language). As such, categorising the productive vocabulary from a learner's written text into various frequency levels on a word by word basis may give a false impression if the various lexical items are formulaic chunks of language composed of words at various frequency levels. As Laufer and Nation (1995, p.313) claim, "the LFP is largely independent of syntax and text cohesiveness" which may be one of its weaknesses. Foster (2001, p.81) criticises this aspect of the LFP in that a computer program "...cannot distinguish language which is lexicalised" i.e. "...any combination of words stored in the memory as fully or partially formed sequences as opposed to words that are brought together on a particular occasion" (Foster, 2001, p.81). This dual processing of lexis is particularly pertinent to the memory-analysis framework (Skehan 1998) of learning style. In Chapter 5 lexical frequency using a version of the LFP will be examined in relation to memory and analysis.

The other problem (as highlighted by Bogaards, 2000) is that a word is defined in the program as a base form with its inflected and derived forms. The result is that the program does not pick up wrong derivatives or inflections. A learner who constantly overuses the present tense and is able to communicate the past purely through time markers is not differentiated from a learner who is able to grammaticise her language to communicate meaning:

Example:

Yesterday I *work* at home.

Yesterday I *worked* at home.

The program is not able to distinguish whether the learner knows different word types from the same word family. So a learner who simply repeats the same token from the same family e.g. "technology" is not distinguished from a learner who is able to use the different derived forms rather than "technical" or "technique". In my later empirical chapters, both rarity and the lexical derivations are measured, which is another form of lexical richness. Therefore, a purely quantitative analysis of texts may miss some of the important fine-grained nuances of grammar and lexis which give a text its quality. In Chapter 8 learners' texts are analysed qualitatively as well as quantitatively in order to understand how words are used in relation to grammar and coherence.

The LFP was able to highlight the more advanced learners' productive knowledge of rarer words. In this study paired t-tests were carried out to measure the differences in the first and second composition within each frequency level and MANOVA tests were carried out to measure the differences in proportions among the frequency levels. Interestingly, when the analysis focused on all the frequency levels i.e. including the first 1,000 frequency level, the differences of the learners across two compositions were only statistically significant for group 3 (the highest proficiency group). These results suggest that for advanced learners, i.e. post Cambridge First Certificate, their use of lexis is sensitive to differences in topics. However, when Laufer and Nation reanalysed the data of all words beyond the 1,000 level (i.e. the second 1,000, the UWL, and not-in-the-list) none of the differences were significant. The authors argue that since the first 1,000 words contain all the basic lexis and most of the function words, it is lexis beyond the 1,000 frequency level which is a true indication of lexical quality. Accordingly, the use of different topics makes it difficult to compare lexical profiles of learners at advanced level unless the measure starts at beyond the first 1,000 frequency level. At the lower levels, however, learners only have a limited resource of lexis in which to express themselves and so differences in topics may not affect their profiles to such an extent.

For my own research, learners' compositions will be used for lexical profiling. It is not always possible to use texts which are all on the same subject. Even when learners write about the same topic it is unrealistic to expect the topic to be treated in the same manner. Learners are individuals who will interpret a particular topic very differently unless there are strict guidelines on what to include and what not to. To take an analogy, two newspaper articles on the same topic can produce two very different stories and so this will be reflected in differences in range, frequency and register of the lexis. Consequently, it may be unrealistic to expect learners to focus on the same sub-topics in their writing even when they all write about the same main topic. As Laufer and Nation's results have suggested, when the first 1,000 frequency level is included, there are differences in vocabulary between two compositions; but when the first 1,000 frequency level is not included then the differences in vocabulary are not statistically significant.

The implication Laufer and Nation give is that the non-significant finding is indicative of no difference between the two compositions. However, the variability in the lexical profiles could have made differences non-significant. The authors could have missed differences within the groups by focusing instead on central tendencies (c/f variability Chapter 6) between groups. Central to the focus of my thesis is that individual differences may have cancelled out any differences in lexical profiles by concentrating on the mean (i.e. t-tests). See also Meara's (2005) criticism of Laufer and Nation's conclusion in that it is based on the null hypothesis which he argues is confirmed by chance data.

Laufer and Nation's study examined lexical profiles in relation to different proficiency groups. The proficiency level of the learners in a research study is another tricky issue. More proficient learners are likely to produce rarer words. However, it is not at all clear cut as how to distinguish learners of varying proficiency levels. An in-house test was used in Laufer and Nation's study but no details were given of the format and content. In-house tests may lack the validity and reliability to generalise the results to a larger population. One of the problems is that learner differences may also influence the test results. A learner who is more extrovert can score highly on speaking tests but perform badly on a test of grammar. Likewise, a learner who is more introverted and more studious may perform better on pen and paper tests of grammar but be very hesitant in communicating in real time in a speaking test. In-house placement tests that score different skills may give a better indication of proficiency than tests which simply give a single overall score.

It would have been helpful if the authors had given details of what the word lists for the first and second thousand were based on. The authors state that the LFP uses a computer program called the *VocabProfile* package which consists of the program and the three accompanying word lists. The General Service List (West, 1953) is widely used as a basis for word lists but, because of its age and lack of coverage of words beyond the two thousand frequency band, has caused some authors to doubt its adequacy (see Engels 1968, cited in Neufeld and Billuroğlu, 2005). Hence, we get the omission of words like "television" and "internet" which are common everyday words yet do not appear in the first or second thousand frequency band. Therefore there may be some lexis which is simply not on the General Service List but which nevertheless should be included because of its relatively common occurrence in speech and texts (see Neufeld and Billuroğlu, 2005, p.6).

My empirical work will also look at productive vocabulary profiles; the focus will examine the profiles in relation to learning style because as we have seen lexical profiles are susceptible to change and changes may be related to individual learner differences. The next part of the review will discuss how L2 lexis change happens over time.

2.2 Lexical development

In understanding lexical profiles it is necessary to understand development so the next section discusses how restructuring by the learner fosters lexical development. In light of the process of restructuring, some of the pitfalls of measuring lexical production are discussed. Development is further examined in a review of Schmitt's (1998) study of incremental word knowledge, as well as in Laufer's (1994) study, which focuses on lexical development beyond the 2,000 frequency level.

2.2.1 Restructuring

Lexical development is not simply being able to use more words, although "[t]he basic dimension of lexical competence is size" (Meara, 1996, p.36). The qualitative shift, which happens in the learner's interlanguage, is a process of restructuring (McLaughlin, 1990). There have been several studies which have looked at formulaic and rule-based language whereby learners progress from exemplar-based processing to rule-based in which learners start to analyse their production in order to complexify their language for more sophisticated communication.

Myles, Hooper, and Mitchell (1998) tracked the utterances of 16 child beginner learners of French for two years to study the contribution of rule-based creative language to the learners' developing interlanguage. The children's utterances were elicited through unplanned oral production tasks with their peers and with the researchers. Myles *et al* studied the emergence of three language chunks: *j'aime* (I like), *j'adore* (I love) *j'habite* (I live). They found that initially unanalysed chunks did break down and this was linked to the emergence of a developing pronoun system which was triggered by the need to establish reference (p.358). However, the children did not immediately drop their formulaic chunks but started modifying them; and the authors suggest that the learners use them as a database for hypothesis testing (p.359). What this study seems to suggest is that lexis is the starting point for grammaticisation whereby the learner starts to segment language for more creative use. However, by looking at this change on a purely frequency-based perspective may be simplifying the changes in the emerging interlanguage which were taking place. When their well practised routines became inadequate the pupils' realisation caused them to break the formulaic chunks into their constituent parts, but rather than dropping them they were worked into their more creative language. In other words, the learners were becoming more accurate in their use of the language, in this case pronouns, while still using formulaic chunks. My empirical work in later chapters will explore the qualitative nature of learners' vocabulary production in relation to purely quantitative measures.

This qualitative shift is what McLaughlin (1987, p.118) also describes as lexical development: "...movement from formulaic to rule based representations" in terms of L1 restructuring. In L2 acquisition the restructuring process involves "the mapping of two lexical and conceptual systems onto each other" (Ijaz 1986, p.405). Ijaz found that advanced ESL learners had to restructure their L1 concepts and define new semantic boundaries. For example, ESL learners approximated native speakers in the meaning they gave to the central meaning features of *on* and *over* but not the non-central meaning features. Interestingly, *on* was over or under used by learners in contexts where the meaning was non-central (Ijaz, 1986, pp.440-1). Words which are semantically similar are a problem for second language learners. In Chapter 9, the possibility of under or overuse of semantically opaque words is put forward in the light of variability patterns.

2.2.2 Production without analysis

Melka (1997) explains that in the first stages of recognition, imitation or reproduction can occur without the assimilation of meaning. This production without comprehension could be a phenomenon which is related to lexicalised or formulaic expressions. The meaning and form of the individual items remains under-analysed. A more precise definition of analysis is given by Bialystok (2002, p.153) who refers to the process of analysis as "the level of explicit structure and organisation that is represented with knowledge". With analysis of the representational structure, the level of explicit structure and organisation that is represented with knowledge becomes greater.

However, the "mechanical" production of unanalysed formulaic language may be only a sign that the learner has noticed i.e. has available for verbal report (see Schmidt, 1990) a lexical item without full integration into the learners evolving interlanguage. That is to say, a learner may have explicit i.e. declarative knowledge in the sense that the learner may have factual information about an L2 item but that it has not been fully integrated into the learner's lexicon. Johnson (1996, p.100) observes that neither first language acquisition nor second language learning invariably proceed in the order of declarative to procedural (available for automatic and unconscious use) but often starts from procedural. This poses the problem that productive use of a lexical item may not always signal that it has been fully analysed and integrated into the learner's developing L2.

2.2.3 Avoidance

The reverse may also be possible. Learners may choose not to use words that they are able to use productively. Teichroew (1982, p.17) describes how productive knowledge might be sometimes hidden. That is to say, in an L1 context, a male adult may avoid female vocabulary, although Teichroew does not make explicit what these differences in vocabulary actually are. This brings into view the role of context and how it may encourage or discourage certain lexis. In measuring productive vocabulary profiles the role of context may be a significant factor in influencing what lexis the learner produces. For example, if learners can rely on the context to make the meaning explicit they may bypass syntax (Skehan and Foster, 2001, p.187). The implication is that they may also bypass rarer lexis, too.

Learners may also feel inhibited by being judged on their L2 performance, especially in a formal test environment. Learners may actually avoid certain lexical items for fear of making a mistake. Teichroew (1982, p.18) describes how learners avoid certain words because of the orthography, pronunciation, meaning and grammatical environment. Sjöholm's (1998) work showed how Finns avoided semantically opaque phrasal verbs in English more often than Swedes because phrasal verbs tend not to exist in Finnish but do in Swedish. However, this trend was only true in the early stages of learning and not at the more advanced stages. We will come back to Sjöholm's study in light of my findings in Chapter 9.

2.2.4 Effects of word frequency

What appears to be missing here are the effects of word frequency. Research by Forster and Chambers (1973) highlighted the positive effects of frequency in a lexical decision task. Laufer supports the effects of frequency on acquisition (1997, p.145) insofar as "[i]n English...shorter words of Anglo-Saxon origin are more frequently used than longer words of Latin origin...what can account for better learnability is not the word's length, but the learner's frequent exposure to it". Whilst this may be feasible for open class words, Bradley, Garrett and Zurif (1980) cited in Gleason and Ratner (1998) found no frequency effects for closed class words (i.e. function words) in a lexical decision task. Moreover, Vidal (2003, p.83) qualifies the effects of word frequency on acquisition by conducting research into listening and acquisition and concludes that "mere repetition [frequency of word occurrence] does not always seem to be enough;

more attention, effort and consequently deeper processing of the word seem to be necessary in order for a higher vocabulary gain to take place".

2.2.5 Depth of cognitive processing

Laufer (1998) argues that vocabulary knowledge is not an all or nothing phenomenon, but involves degrees of knowledge. Productive knowledge requires deeper knowledge than receptive. The implication is that receptive knowledge is subsumed in productive knowledge. Read (2004) defines depth of lexical knowledge as: precision of meaning, comprehensive word knowledge, and network knowledge. But how do L2 learners achieve depth of knowledge? This could be an important factor in determining what lexis becomes available for productive use. Craik and Lockhart (1972) emphasise cognitive depth as a crucial factor in learning, i.e. the amount of "meaningfulness" which a learner associates with learning. They (*ibid*, p.675) emphasise that depth of processing "...implies a greater degree of semantic and cognitive analysis". They argue that it is the type of attention devoted to the stimulus which will determine whether or not it will be remembered. Deeper analysis, they argue, leads to a more persistent memory trace. This could simply be through repeated exposure to lexical items or, perhaps more importantly, greater attention devoted to the lexical item. Clearly, the type of processing that the learner devotes to the lexical item is a determining factor in how deep the learner's knowledge is. All things being equal, the deeper the processing of a lexical item, the greater the chance it will become available for productive use. The analysis of dimension of learning style in my later studies will play an important role in its relationship to lexical diversity.

2.2.6 Depth of lexical knowledge

A study which explored how individual word knowledge develops was conducted by Schmitt (1998), who tracked the acquisition of 11 words over the course of a year for three adult learners of advanced proficiency in English. Schmitt measured four kinds of word knowledge: spelling, associations, grammatical information, and meaning. In this study meaning was measured productively by elicitation and receptively by giving prompt words design to elicit additional senses not given productively. The vast majority of meaning senses stayed at the same state of knowledge (72%). Schmitt concluded that knowledge of meaning sense has a certain amount of inertia and does not change easily. This stability means that there is not a large amount of forgetting either. In the 74 cases of progression (out of a possible 366), meaning knowledge moved from receptive to productive and from unknown to receptive a similar amount of times (p.301). In addition, the study did not show evidence of a developmental hierarchy for word knowledge types. Thus, Schmitt's study points to the idea that with advanced L2 English speakers, lexical development may be inert and slow to move from receptive to productive. What this means is that an independent measure of vocabulary size may show gains but lexical use may remain static.

Schmitt's study focuses on individual word knowledge which is elicited from the learner rather than obtained from words in use. In Schmitt's study, words are disaggregated from context which could make the study reductionist in nature and therefore ignore how lexis is actually understood and used by the learner. In other words, it runs counter to a dynamic view in which complex, dynamic systems "soft-assemble" into stable behavioral modes under different conditions (Thelen and Smith, 1994, p.60).

In language terms, "[h]umans "soft assemble" their language resources in order to respond in an intentional way to the communicative pressures at hand" (Laarsen-Freeman and Cameron, 2008, p.6). There may be word patterns which emerge that are lost through the elicitation techniques used in Schmitt's study. The nature of lexical development is revisited in my empirical work. In Study 5 (Chapter 8) individual lexical profiles are tracked over time to examine whether the profiles are inert or are variable in relation to learning style.

Lexical development was also studied by Laufer (1994). This study is important because she used the Lexical Frequency Profile which is also used in this thesis but in a more recent incarnation i.e. *Web VocabProfile*. Laufer makes use of the beyond 2000 measure which is argued to be where lexical development occurs. I will consider Laufer's (1994) study in some detail in the section below.

2.2.7 Production beyond 2000

The rationale for Laufer's (1994) study was to present the Lexical Frequency Profile (LFP) in a revised form, i.e. as a measure of productive lexis beyond the basic 2,000 frequency band in order to capture lexical development beyond basic words i.e. below the two thousand frequency band. Normally, profiles are calculated at the first and second thousand frequency bands, plus the University Word List and "not in the lists". In this study vocabulary free production beyond the 2,000 frequency level is a mark of progress towards native speaker like levels of vocabulary knowledge. The rationale for examining profiles beyond the 2,000 measure is to give a single measure of lexical richness in free production so as to correlate the percentage score with other variables such as passive vocabulary size, grades on a test, etc. The author also explains that a basic and beyond-basic measure also makes it possible to compare profiles from different languages. The study aims to determine whether there would be an increase in the productive lexicon of advanced learners of English over one academic year in a university in Israel.

The Lexical Frequency Profile was used in its condensed form. In Laufer's (1994) study the participants were 48 first-year university students from an Israeli university enrolled in the Department of English Language and Literature and whose first language was either Hebrew or Arabic. Their L2 English proficiency level was similar to the Cambridge First Certificate of English (i.e. intermediate). The compositions were written at three different points in time: Time 1 was the entrance exam i.e. a choice of three statements from which the students wrote for or against type essays (all learners, n=48); Time 2 was at the end of the first semester i.e. the same essay again (group one, n=23); Time 3 was at the end of the second semester i.e. the same entrance exam (group two, n=25).

The results show that the mean percentage of beyond 2000 words for group one grew from 9.96% to 13.17% (3.21% increase). Group two grew from 8.48% to 10.04% (1.56% increase). T-tests showed significance at: p= .01 and .03 respectively.

In Laufer's study, the post-test of the first group of learners after one semester showed a greater increase than the post-test of the second group of learners after two semesters, which seems strange. Logically, the post-test after two semesters should show greater gains. This may be one of the problems with related sample testing. The first group of learners may have simply been more effective or more motivated learners of English than the second. The relatively small sample of both groups, n= 23 and 25, may not have been large enough to cancel out factors of individual differences which may have affected the findings.

It is not clear what effect the composition topics had on the learners' lexical profiles. The first group had the same statement for the post-test as the one they had for the entrance exam. This begs the question of whether the learners knew about this in advance and so had the opportunity to swot up on a better answer for the second attempt. The second group was "given the composition of the entrance exam" (Laufer 1994, p.25). It is not clear whether they could choose a different statement or not. Although the LFP is stable across two compositions written by the same learners i.e. non-significant differences in percentages of words from the second thousand frequency level, UWL and "not-in-the lists" words (Laufer and Nation, 1995), it is still unclear how the differences in question topics influence the frequency profiles. In Chapter 8 the influence of task topic is examined in relation to lexical rarity and diversity, as well as how it may influence the use of L1 cognates in L2.

Rarer, academic lexis is examined further below because Morris and Cobb (2004) suggest that knowledge of rarer lexis may be analogous with academic performance. This study is somewhat controversial because it infers a style over content issue; however, it is one worth exploring because it has parallels to lexical knowledge indicating a certain type of academic aptitude.

2.3 Lexical profiles: an indication of academic performance (Morris and Cobb, 2004)

In this section I consider a study by Morris and Cobb (2004), who also examined a sub-set of words from a web-based version of the LFP. They examined whether use of words from the Academic Word List (AWL) can predict academic performance. If lexical knowledge can give insights into academic performance then there may be parallels between lexical knowledge and learning style. Academic performance promotes an analytical, problem-solving approach to learning. How this relates to vocabulary profiles remains unclear, so the following study is worth considering in that this relationship is explored.

Morris and Cobb (2004) set out to ascertain the value of the *VocabProfile* (Cobb, 2002) as a predictor of academic performance for undergraduate TESL programmes. The informants were 122 Canadian TESL trainees who were enrolled in either a 4-year BEd or a 1-year Certificate program in a Quebec university. This population comprised of 14 different first language backgrounds apart from English L1 or English-French L1. All were classified as bilingual or multilingual and all reportedly had native speaker or near-native speaker competence in spoken English.

Morris and Cobb examined the participants' lexical production of English for academic purposes (EAP) using the *VocabProfile* software. This instrument provides breakdowns from the one thousand most frequent words (K1), the next thousand most common words (K2), the Academic Word List (AWL) (Coxhead, 2000), off-list words (OL), and function words (F) which form a subset of the most frequent thousand words and "...whose role is mainly to express a grammatical relationship" (Nation, 2001, p.206). The profiler also calculates type/token ratio[3] (TTR).

Vocabulary profiles were taken of essays written by the candidates. They had to produce a timed, discursive unaided essay of at least 500 words. However, the topics given to the candidates varied over the period of admissions tests. The first 300 words of each text were entered into *VocabProfile* to establish vocabulary profiles. The profiles were correlated with grades obtained from two obligatory grammar courses of their training programme. The grades obtained were from two sets of marks which were used to establish the participants' academic success. One was taken from a grammar course (G1) that is described as knowing about grammar. The other was from a pedagogical grammar course (G2) that is described as how to teach grammar. Correlation analyses were measured between the frequency ranges of the profiles and the different grammar course results. Differences between NS and NNS profiles were assessed with ANOVAs.

The analyses showed that the highest correlation ($r = 0.37$) was found between words on the Academic Word List (AWL) and the grades on the pedagogical course (G2). Two other significant correlations were found (both at $r = -0.34$). One was between K1 (most frequent words) and G2 (the pedagogic grammar course). The other was between F (function words) and G2. Therefore, participants who used a greater number

[3] The ratio between different words and every word or "running words".

of K1 frequency words and F (function) words tended to do worse on their G2 course than those who used fewer K1 and F words.

The second set of data showed that native speakers outperformed non-native speakers. Native speakers obtained higher grades for their essays, they relied less on K1 and F words, and they used more words from the AWL. Another set of data was collated which highlighted NS and NNS profiles in relation to successful essay grades (i.e. grade C or above). The findings established the following standards: a K1 score of below 85%, an AWL score of over 5%, and an F score below 50%. The NNS were approximately only half as likely as NS to reach all of the above standards. These standards were then compared to scores of students who dropped out. Of the 14 participants who dropped out, 11 had vocabulary profiles that did not meet the lexical profile standards i.e. K1 scores of over 88% and an AWL percentage of under 5%.

They conclude that vocabulary profiling, when used in conjunction with interviews and past academic records, could be a good predictor of academic performance in TESL teacher training courses. In addition, vocabulary profiling could be an effective means of evaluating English language skills, particularly for high proficiency NNSs. Morris and Cobb also conclude that trainees with high levels of knowledge and access to academic register and a wide vocabulary range might perform better on metacognitively demanding courses. They go on to interpret the correlation between the best command of AWL words and the ability to make judgments about what should be done in the classroom (G2). Morris and Cobb suggest that vocabulary profiles may be indicative of something more than simply declarative knowledge. In other words, profiling may offer a means of assessing the ability to apply grammatical knowledge in a pedagogical setting.

Because of the correlation made with vocabulary profile scores on the AWL and the academic grades for the G2 exam scores, one of the controversial claims made by Morris and Cobb is that a formal academic register and an ability to access that register leads to "something other than straightforward declarative knowledge of grammar" (p.84). The implication, which is highlighted in the literature review, is that linguistic knowledge links to higher level thinking skills that university students and teachers need to be successful.

For example, research by Corson (1997) cited by Morris and Cobb (2004) highlights the fact that Canadian second language learners of English often fail to gain access to the higher level academic words as used by their native speaking peers because they do not have a broad enough base to support the acquisition of the less frequent academic words. Therefore, they encounter more difficulties as the reading and writing demands increase. Olson (1994) cited by Morris and Cobb (2004) makes the link between the acquisition of higher level language skills and the types of higher level cognitive skills needed not only at university, but also for future teaching. The notion is that as the learner gains control over a greater variety of lexical items, then there is a greater explicitness and so language is able to provide an unambiguous representation of meaning. The language provides the scaffolding needed for higher order intellectual and metacognitive development.

A danger is that there may be a misplaced emphasis of style over content. In this study an ability to use lexis from the AWL may have simply influenced the marker into awarding higher marks for the G2 exam. There have been several studies into the marking of students' written work (e.g. Shi and Cumming, 1995) in which the marking has been highly idiosyncratic. All other things being equal, an essay written in a formal register may score higher than one written where the writer does not have access to this type of register. This leads us to question whether an assessment in the form of an exam is valid.

The "successful" student in this study is one who performs well in the G2 exam. Morris and Cobb claim that to do well in this exam is indicative of an ability to apply grammatical knowledge in a teaching context. Part of the problem seems to be that they conflate language teaching pedagogy with procedural knowledge. It is not known how the ability to teach grammar relates to procedural knowledge. An ability to teach grammar relies on a whole range of skills, with knowledge of, and ability to use, a formal academic register being only a part of those skills. A formal exam that attempts to ascertain whether a candidate can teach grammar is only half the story. The other half would be through classroom observations. Indeed, any serious teacher-training course attempts not only to educate the trainee in pedagogy but also to develop the trainee's teaching skills so as to teach grammar to language learners.

Although AWL scores may only weakly relate to the ability to teach grammar, the *VocabProfile* may be a useful indicator of grammatical knowledge. In order for the testee to achieve a high lexical score a high degree of grammatical knowledge must also be presumed because of, as Bogaards (1996) argues, the way lexical knowledge is inextricably linked to grammatical knowledge. NSs may have an advantage in that they achieve higher profile scores and acquire greater procedural knowledge of how language items are used; however, high proficiency NNSs may have greater declarative knowledge in that they have more knowledge about the language and how it is constructed because they may have learnt the language in a formal (i.e. classroom) setting in which declarative knowledge is normally prioritised. However, this test does not assess grammatical knowledge *per se*, either declarative or procedural.

The *VocabProfile* measures the percentage of function and content words in the one thousand frequency band. By correlating all the profile scores with exam scores, the authors claim that a low percentage of function words (less than 50%) is associated with exam success (grade C and above). Surprisingly, Morris and Cobb seem to ignore the fact that this finding runs counter to a study of ESL learners from high beginner to high intermediate language level. Morris and Tremblay found the greater the proficiency, the greater the percentage of function words; the most proficient learners displayed a function word percentage ranging from 53 to 60% (Morris and Tremblay, 2002, cited by Morris and Cobb, 2004).

The authors of this study highlight the benefits of the *VocabProfile* as differentiating the gap between NSs and NNSs: the NNSs are only half as likely to achieve benchmark scores for success similar to NSs. Native speakers typically know and can productively use significantly more word families than non-native speakers (NNS), but NS productive lexical profiles from written texts may not reflect this. Native speaker lexical profiles may not be very dissimilar from non-native speaker lexical profiles. Even native speakers at university may lack the incentive or need to use rarer lexis in their writing assignments. Booth (2010) also examined the lexical profiles between native and non-native speakers in a university context. The findings in this study point towards the greater variability shown by NNSs in terms of lexical diversity rather than differences in profiles per se between NSs and NNSs.

Overall, the *VocabProfile* is a useful assessment tool of both native and non-native speakers because it can give useful breakdowns of productive vocabulary knowledge. However, Morris and Cobb seem to have overestimated the value of this tool in linking greater access to a formal register as indicative of sound pedagogy by trainee teachers. A more promising line of research by Milton into how lexis may give us a window on learning style is reviewed next.

2.4 Lexical profiles: an indication of learning style (Milton 2007)

A different approach taken by Milton (2007) was to examine whether lexical profiles can tell us anything about learning style. Rather than associating lexis of a certain frequency or register with academic competence, Milton's work examines whether irregularities in profiles are associated with different approaches to learning. In this study, though, the method of obtaining profiles came from word recognition rather than word production. The issues surrounding receptive and productive vocabulary knowledge will be discussed later in this chapter.

Milton designed the first part of his research study to test the commonly held view that in learning a second language, many of the most frequent words are acquired first. He highlights the profile of a typical language learner as having greatest knowledge of words in the highest frequency (first 1,000 words) and then progressively lower in the less frequent bands. Milton also suggests that there could be other factors which influence the type of word which the learner acquires; for example, part of speech, concrete versus abstract words, cognates in L1 and L2, type of teaching text, and so on. This research introduces one other factor, which has received very little attention in relation to vocabulary acquisition, namely, learning style.

Firstly, this study sets out to investigate learners' lexical profiles and whether the acquisition of words matches the regular profiles described above or whether they display variability in this idea. By doing so it tests whether there is merit in the idea that frequency of occurrence of words is a reliable predictor of acquisition. Secondly, it examines the variability of acquisition. A sub-group of learners is examined individually to determine the variability of profiles within the group. Milton then examines whether a regular vocabulary profile, which he speculates may be indicative of an analytic learning style, can give an advantage to vocabulary acquisition and ultimately language proficiency.

There were 227 participants, aged between 7 and 14 years, from a private school in Greece who were learners of English as a second language. No information is given on the learners' first language but it is presumed to be Greek. They were grouped by level and years of learning English, ranging from beginners to Cambridge FCE level. In total there were 7 proficiency groups, each containing around 30 students.

The tests were taken at the end of the school year so that even the beginners had some knowledge of vocabulary. All students took the same vocabulary recognition

Yes/No test, *X-Lex* Swansea Vocabulary Levels Test (Meara and Milton, 2003a), based on 5 levels of vocabulary. Level 1 corresponds to the 1,000 most frequent English words, level 2 the second thousand most frequent words, and so on. The test comprised of 20 real words from each of the 5 frequency bands. In addition, a set of 20 false words were added to act as distracters. Correction for guessing is made by deducting the errors from each score in the profile. Meara and Milton (2003b) suggest that error scores of 0-5 are broadly acceptable, while error scores of 6 and over call into question the reliability of the testees' scores. The scores are then scaled up to a maximum of 5,000. Vocabulary profiles are given as percentages for each frequency band.

Results from the mean scores of all the groups demonstrated that the learners' profiles do in fact match Meara's (1992) description of learners insofar as the frequency of words is related to their order of acquisition. When the vocabulary profiles are analysed by groups, the results show that the learners' knowledge of words at the first frequency band (the most frequent 1000 words) seems to flatten out after 400 hours of teaching. What is more, the greatest progress made by students is in the first 400 hours of teaching. Results also showed that there is huge variability in the scores at each level. Some students have a greater knowledge of vocabulary after one year than others after six.

The mean score profile of these learners tended to hide the huge variability of individuals, so Milton analysed a sub-group of 29 learners. One type of profile, in which learners have a higher mean score of vocabulary knowledge at each successively higher frequency level, could be broadly described as regular. There were 11 students matching this profile. Milton suggests that these learners may be more adept at using strategies which help them to overcome any deficiencies in their language learning environment. He notes that they seem to have a high proportion of words in the highest frequency band, which he suggests is the band in which structural vocabulary occurs, i.e. "...a word whose role is largely or wholly to express a grammatical relationship" (Nation, 2001, p.206).

Milton further speculates that these learners may have a relatively high grammatical knowledge and that they may be identified as "analysers". Although learning style or cognitive style has been interpreted in various ways by different researchers, Milton categorises learners into "analytic learners" and "memorisers". This categorisation is based on Skehan's (1998, p.205) learning style construct, in which Skehan describes analysis-oriented learners as having to "develop differentiated, organised, and rule-based representations of language, with possibly, no great need to have more than a parsimoniously organized, single-representation lexical system". Skehan describes memory-oriented learners as having "a wide range of lexicalized exemplars, considerable redundancy in their memory systems, and multiple representations of lexical elements" (*ibid*, p.205).

Milton argues that analysers may be predisposed towards grammar in so far as they have a propensity to analyse the structure of language and so be at an advantage where correctness of syntax is important. Moreover, Milton suggests that analysers may acquire more of the highest frequency words because function words appear in the higher frequency bands.

Another type of profile (irregular) displayed relatively large lexical deficiencies at the 2,000 frequency band. There were 10 students in this sub-group who matched the level 2 deficit profile. Milton speculates that this type of deficit is influenced by the frequency of lexis in beginning learning texts which students encounter in class (Milton and Vassiliu, 2000). Typically, textbook writers include large quantities of infrequent lexis i.e. nearly half of the lemmas[4] fell in or below the three thousand frequency band (p.453). However, Milton observes that after around 200 hours of language input this type of deficiency disappears.

The idea of how learning styles (analytic- and memory-based) may influence what and how vocabulary is acquired became the basis of a second part of Milton's study. Meara and Milton (2003b) hypothesised that learners with a level 1 or level 2 deficit may be indicative of a predisposition for a memory-based learning style because they may acquire more easily less frequent words. Learners with a normal profile may reflect an analytic-based learning style because they may more readily acquire the structural/functional words which tend to be in frequency band 1 or 2.

21 learners with between 5 and 6 years of English who displayed stable profiles were then tested on two of the language aptitude tests (LAT) Meara *et al* (2001). Milton

[4] A headword and its main inflected and reduced forms (Nation 2001, p.7)

analysed the results to see whether the "normal" and level 2K deficit profiles were linked to certain learning styles.

These tests are from the Meara *et al* (2001) series of language learning aptitude tests which are described more fully in the next chapter. Although designed mainly to measure aptitude, they were used to determine the language learning style of the participants which is categorised as a memory-analysis framework. Learners with normal profiles scored higher on the analytical dimension and were broadly confirmed as being more predisposed towards an analytical learning style. These learners are presumed to have acquired more structural words (grammar words) which are at the top end of the frequency scale and so do not show any deficit. Learners with level 2 deficit profiles scored higher on the memory dimension and so were broadly confirmed as being more predisposed towards a learning style that relies heavily on memory. These learners are presumed to not have acquired as many of the structural words because of their predisposition to memorise language chunks (i.e. lexical phrases) and so not notice and acquire the small grammatical words which fall into the high frequency ranges. Milton concludes that there is a strong relationship between the frequency of occurrence of vocabulary items and the probability of it being acquired. Cognates and whether a word is concrete or abstract do not tend to alter this general trend.

For some learners, variability in acquisition of vocabulary items appears to happen more often in the earliest stages of language learning. However, some of this variability with learners tends to disappear over time. Within this variability, there appears to be a particular shortcoming in lexical knowledge at the 2,000 frequency word band, which might be attributable to the lexical distribution in teaching texts. Milton

(2007, p.52) explains this anomaly in that learners who are able to compensate for lexical shortcomings, and so display a regular profile, are thought to be analytical in their learning style because of their predisposition to acquire structural vocabulary, which typically falls within the 2,000 most frequent words. However, it is still not clear how they manage to accomplish this particularly early on in their language learning. I will postpone comments on this study and *X-Lex* as a research tool until Chapter 4, which presents my own study that uses the same method as in Milton's (2007) work.

Milton's study explored the relationship between second language learners' lexical profiles and their learning style (memory-analysis). But lexical knowledge from *X-Lex* is only one type of knowledge i.e. whether or not a learner recognises and knows the meaning of a word in isolation. This contrasts with productive knowledge in which production of appropriate words in a context is required. Clearly, the two types of knowledge are different and this has a significant impact on the testing of lexical knowledge and the profile of lexical knowledge. The two previous studies have measured lexical knowledge in two fundamentally different ways. After the interim summary, the next section will explore the implications this has for testing vocabulary profiles.

2.4.1 Interim summary

A review of the selected literature so far in this chapter has helped to define what lexical profiles are and some of the issues which underlie them. Laufer and Nation's Lexical Frequency Profile managed to overcome some of the difficulties which had dogged previous measures of lexical richness; however, it has also thrown up new issues. Issues such as profiling of learners' vocabulary give us some predictable patterns which come out of the data but this data are highly variable and susceptible to context. It has become apparent that we need to look at not only static "snapshots" but also lexical development as way of understanding L2 lexis. One of the reasons why lexical profiles are variable in nature is that L2 lexis interacts with the intrinsic cognitive factors of the learner.

Depth of processing highlighted the notion that knowledge for production could require deeper processing than receptive knowledge. Nevertheless, evidence of lexical production is not evidence that the learner has mapped lexical and conceptual systems onto each other. Formulaic language may give the impression the learner has internalised the vocabulary, but creative use of the lexis may reveal gaps in the knowledge. Likewise, the learner may choose to hide his/her knowledge by avoiding certain lexical items.

In this review, two studies were highlighted in which the learners' profiles were studied in the light of cognitive ability and learning style. The latter used a test of discreet vocabulary items (*X-Lex*) which can be an effective way of estimating vocabulary size but, as will be discussed later, may be susceptible to large variability in projections based on small differences in scores. These and other factors call into question the validity and reliability of the tests. What is clear is that the type of test will influence the results obtained from the same learner. Therefore, the next section will focus on measuring L2 vocabulary: receptive versus productive lexis and intrinsic versus extrinsic measures of lexical richness.

2.5 Measuring vocabulary knowledge

The aim of this section is to critically review measures of L2 lexis. In doing so, various research tools which were introduced previously will be put under scrutiny. At the beginning of this chapter, L2 vocabulary knowledge was discussed in relation to lexical profiles. One main issue is whether to test receptive knowledge with a test such as Meara's *X-Lex* which relies on word recognition, or productive knowledge which can be tested by the Lexical Frequency Profile (Laufer and Nation, 1995). This section discusses some methodological issues of how to measure L2 vocabulary. Then intrinsic differences between words are discussed which lead into intrinsic measures of lexical richness which are fundamentally different to *X-Lex* and *VocabProfile* in that they do not use external frequency lists as criteria. This has important implications in the future direction of the empirical work.

2.5.1 Receptive and productive knowledge: the implications for testing.

What are the implications of obtaining vocabulary profiles from an instrument such as the Swansea Vocabulary Levels Test (*X-Lex*), which is a receptive approach compared to an instrument such as the *Web VocabProfile,* which is a productive approach? The *X-Lex,* which simply asks learners whether they know the meaning of a word or not, gives us a limited idea of what type of word knowledge is tested. The *Web VocabProfile* analyses learners' written production of lexis into various frequency bands. The latter test is more demanding because the learner has to produce the lexis rather than simply indicate whether he/she understands the lexis. This has implications on the types of profiles obtained from the learners. Learners of high proficiency can obtain flat profiles from Yes/No tests because of the ceiling effects of the format in which words are presented to the learner. My first empirical study, which used *X-Lex* as an elicitation tool for learners' lexical knowledge, came up against this problem. This was why for the following study the research tool was changed to the *Web VocabProfiles*. Learners cannot obtain flat profiles from the *Web VocabProfile* because the lexis is not presented to the learner; rather, the lexis is produced by the learner and is categorised into various frequency bands. So in order to discuss the implications of testing understanding and production of vocabulary, I will firstly set out some of the issues surrounding receptive and productive knowledge and how lexical knowledge differs in terms of difficulty for the learner.

2.5.2 *What is involved in knowing a word?*

Firstly, Nation (2001, p.27) gives a comprehensive summary of what is involved in knowing a word and how this relates to receptive (R) and productive (P) knowledge.

Table 2.1: What is involved in knowing a word

Form	spoken	R	What does the word sound like?
	spoken	P	How is the word pronounced?
	written	R	What does the word look like?
	written	P	How is the word written and spelled?
	word parts	R	What parts are recognisable in this word?
	word parts	P	What word parts are needed to express meaning?
Meaning	form and meaning	R	What meaning does this word form signal?
	form and meaning	P	What word form can be used to express this meaning?
	concept and referents	R	What is included in the concept?
	concept and referents	P	What items can the concept refer to?
	associations	R	What other words does this make us think of?
	associations	P	What other words could we use instead of this one?
Use	grammatical functions	R	In what patterns does the word occur?
	grammatical functions	P	In what patterns must we use this word?
	collocations	R	What words or types of words occur with this one?
	collocations	P	What words or types of words must we use with this one?

	constraints on use (register, frequency...)	R	Where, when, and how often would we expect to meet this word?

From the Table 2.1 it is clear that receptive and productive use are different; however, it is not so straightforward as to why they are different. One of the explanations Nation gives as to why productive learning and use is more difficult than receptive learning and use is that productive knowledge requires extra learning of new spoken or written outputs (p.28). Using Nation's description of word knowledge, profile scores from the *X-Lex* enables us to know that for each L2 word presented the testee at least:

recognises what the word looks like

recognises that the word is made up of parts

knows what meaning this word form signals

knows what concept is behind the word

Frequency profiles from the *Web Vocabprofile* enables us to know that for each word inputted the testee:

knows how the word is spelled

knows what word parts are needed to express meaning

knows what word form can be used to express a certain meaning

knows a concept that a certain item can refer to

knows how to use the word correctly in a sentence (if not then the word is deleted from the input)

The comparison between receptive and productive knowledge begs the question as to whether productive knowledge from the Web *VocabProfile* includes all the knowledge which the learner would need for the *X-Lex* Swansea Levels Test. The following section will argue that productive knowledge is qualitatively different from receptive knowledge.

If production of lexis requires more knowledge than receptive knowledge, then a productive test can probe the learners' lexical knowledge on a deeper level. Productive knowledge demands that the learners recall the item(s) rather than simply recognise them. However, in a productive test such as a picture description it is possible that learners can recall some lexical items without the assimilation of all the knowledge structures. For instance, some lexical items may be formulaic in that they are learnt as "holistically learnt strings" (Wray, 2002, p.200) in which morphological details are unanalysed. On the surface, formulaic strings can give the impression of complexity but if the learner cannot use them creatively i.e. assemble them in a rule-governed manner then the use of such strings may be compromised in that they could be overused in inappropriate contexts.

The relationship between receptive and productive vocabulary knowledge has been argued not to be binary but to be degrees of knowledge which could be qualitatively separate. The integration of knowledge seems to be pushed forward by restructuring which relies on depth of processing. However, productive knowledge may be hidden or may give the appearance that it has been internalised but is in the first stages of acquisition. The next section examines a study on receptive and productive knowledge in order to understand the relationship between them. The study by Laufer (1998) was chosen because it uses a vocabulary test (The Lexical Frequency Profile, Laufer and Nation, 1995) from which the *Web VocabProfile* was derived and which will be used in my own empirical work.

2.5.3 The relationship between receptive and productive knowledge

Receptive and productive vocabulary knowledge are often put on a continuum which may in fact be an oversimplification. This leads us into looking at different types of lexical knowledge because different tests produce diverse results. One issue which emerges from my research methodology is productive versus receptive knowledge and so Laufer's (1998) study, which is critically reviewed, examines this issue. Research by Laufer (1998) looked at the relationship between receptive (passive) vocabulary and productive (active) vocabulary knowledge. Interestingly, this research also looked at an intermediate stage of vocabulary learning which they called "controlled active". The aim of the research was to examine the development of the three types of vocabulary knowledge over one year of school instruction, and to examine the relationship between the three types of vocabulary knowledge.

The test instruments for the three dimensions of vocabulary development were as follows. The Vocabulary Levels Test (Nation 1983, 1990), which requires learners to match groups of three words out of six with their corresponding paraphrases, was used for the receptive vocabulary. The productive version of the levels test (Laufer and Nation, 1999) was used for the controlled active vocabulary and is similar to the levels test except that the vocabulary items are not provided but elicited in short sentences with the first few letters of the target item provided to avoid non-target items. Both tests include samples from the 2k, 3k, 5k and the University Word List (Xue and Nation, 1984). The Lexical Frequency Profile (Laufer and Nation 1995) was used for lexical richness in free written expression. Recall that this instrument uses a computer program to show the relative proportion of words from the 1k, 2k, UWL and the not-in-any-list.

Two groups of learners were tested. The first group consisted of twenty-six 16 year olds (10^{th} graders); group two consisted of twenty-two 17 year olds (11^{th} graders). Both groups were learners of English who were Hebrew native speakers who had had six and seven years of English language instruction respectively in a typical comprehensive school in Israel.

Results showed that when 10^{th} graders' passive vocabulary was compared with that of 11^{th} graders, there was a difference of 84 percent (i.e. an increase of 1,600 word families), controlled active showed a 50 percent difference (i.e. an increase of 850 word families), but that there was no significant progress in the free active vocabulary of the learners. Spearman's correlations showed a close relationship ($r = 0.67$) between passive and controlled active in individual test scores but no significant correlation when these types of vocabulary knowledge were compared to the free active test scores.

Laufer explains that these results indicate that as learners develop, the gap between passive and active vocabulary size also increases, but also that "the free active vocabulary reached a plateau beyond which it did not progress...[t]he learners seem to have "fossilized" their free vocabulary at an average of 7 percent beyond 2000 words per composition and do not progress even when their passive and controlled active vocabularies improve" (pp.266-7).

In this study there is an underlying expectation that free-active (productive) vocabulary should develop in parallel with the passive (receptive) and controlled active gains. Laufer explains why free active vocabulary may not progress e.g. the plateau effect. This progression is expressed in terms of rarer lexis. Lexical frequency may not be the only factor which makes some lexis more difficult to use automatically than others. Laufer (1990) highlighted intrinsic word difficulties which indicate that not all words have the same level of ease or difficulty in acquisition. These intrinsic word difficulties may not be directly related to word frequency.

2.5.4 *Intrinsic word knowledge*

It would be an oversimplification to treat all words as equal. There are many intrinsic characteristics of a word which will make it easy or difficult for the L2 learner. Laufer (1990) explains why some words are easier to learn than others. The research she cites refers to L1 studies as well as L2. I will simply summarise the characteristics which are relevant to my research aims.

The grammatical characteristics of the word.

Part of speech: nouns are easier to learn than verbs or adjectives but the effect dies out as the learner's proficiency increases.

Inflectional complexity: features such as irregularity of the plural and gender can make an item more difficult than one with regular features.

Derivational complexity: regular morphology can ease the burden of learning whilst a lack of regularity with morphemes that can or cannot be combined can cause extra difficulty.

The semantic features of the word.

Abstractness: Concreteness in itself cannot assure ease in learning. Concrete words may contain other factors of difficulty, either intra- or inter-lexical. Moreover, an abstract word may represent a familiar concept whilst a concrete word may not. The semantic similarity of words influences the over or under use of semantically similar words (Ijaz, 1986).

Specificity: Learners generally will opt for words which are superordinates (general terms) rather than co-hyponyms (more specific terms) since there is less chance of making errors, see Foster (2009a, p.103).

Idiomaticity: The lack of transparency in meaning of idioms even when the individual words are known make them more difficult to learn and understand. Semantic opaqueness of lexis will be discussed again in Chapter 9 in light of the empirical work.

Register restrictions: Words which are restricted to one register are argued to be more problematic than words which are used in all registers and are thus neutral.

Multiple meaning: A form which is represented to have several meanings is either: a polyseme, a lexical item with several meanings related to each other (e.g. foot), or a hyponym, separate lexical items with distinct meanings that are unrelated to each other (tear).

So far we have mainly concentrated on tests which measure lexical frequency. The next section looks at how we can measure lexical richness by using intrinsic measures. Rather than relying on external frequency lists which are usually from native-speaker corpora, intrinsic measures use the learner's own production and use mathematical calculations based on, amongst other criteria, the ratio between types and tokens.

2.5.5 Intrinsic measures of lexical richness

Another way of measuring lexical richness, rather than measuring the text against frequency data, is to measure the text using type token ratio (TTR). Meara and Bell (2001, pp.6-7) coin the terms "extrinsic measures" of lexical richness versus "intrinsic measures" of lexical variety respectively to highlight the difference between external based criteria based on frequency lists and internal criteria based on the text itself. The Lexical Frequency Profile falls into the category of lexical sophistication because it measures the learner's production of rare and frequent words – rarer words are an indication of sophistication. The problem is where to draw the line between frequent words and rare words. A word may be rare in terms of frequency counts but may have a considerable distribution (i.e. range) in a particular text. Another way of measuring lexical richness is lexical variability.

One of the most common measures of lexical variability (or diversity) is traditionally conceptualised as the number of different words (word types) used in a text or transcript, or in terms of the relationship between the number of types and text length. This has been calculated by type-token ratio (TTR) i.e. the number of word types divided by the number of word tokens. This measure of lexical richness has been widely criticised (e.g. Laufer and Nation, 1995) because TTR is text length dependent, therefore the longer a text, the smaller the chance that new or different types will be introduced, automatically resulting in a lower TTR for longer texts (Van Gijsel *et al.*, 2005).

Tweedie and Baayen (1998) conducted a useful study in which various measures of lexical richness were analysed by using texts by different authors. They looked at measures based on simple transformations of vocabulary size and text length e.g. Guiraud (1954). Secondly, measures of elements of the frequency spectrum e.g. Honoré's (1979) measure which assumes the ratio of *hapax legomenta*[5], to the vocabulary size, i.e. growth rate, is constant with respect to the logarithm of the text size. Thirdly, parameters of probabilistic models e.g. Orlov's (1983) generalised Zipf model in

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[5] The number of types occurring once.

which vocabulary size is a function of one free parameter, Z. This parameter specifies the text length at which Zipf's law[6] holds. An increase in Z leads to an increase in vocabulary size. The authors conclude that measures of lexical richness are not independent, or roughly independent, of text length (p350). That is, almost all measures vary substantially in systematic ways with text length. They found that it was necessary to correct for text length or to consider the developmental profiles of the full text. More recently, the problem of falling type-token ratio has been addressed by Malvern *et al.*'s (2004) parameter *D* which measures lexical diversity. A version of this research tool will be used in my later empirical work.

2.6 Conclusions and direction of the empirical research

Lexical knowledge is a multi-faceted phenomenon. This chapter has shown that the research tool used for eliciting this lexical knowledge has a profound effect on the profiles obtained because no one method can capture all of the lexical knowledge learners may possess. Whilst this may sound pessimistic, lexical frequency profiling can tell us the proportion of words a learner knows or can use at different frequency bands, for example, *X-Lex* and *VocabProfile,* both of which are based on extrinsic measures of

[6] Zipf law connects the frequency of occurrence of words in a language with the rank of the word. (Kosmidis *et al,* 2006).

word frequency. Recall that the lexical profiles in Milton's study drew upon word recognition i.e. whether a learner understands the word presented in isolation. This has implications on how we can obtain profiles of learners' L2 lexis.

The chapter looked at what the differences between receptive and productive vocabulary knowledge could be. Productive knowledge may be different from receptive. Laufer's (1998) study highlighted the "plateau" effect in which learners' productive use may remain static unless they are "pushed" to use rarer lexis. Learners' demonstration of lexical knowledge will clearly differ depending on whether the test instrument draws on receptive or productive knowledge. Laufer's study shows that if a learner is required to produce lexis then receptive knowledge may not be sufficient for production; as such, a receptive profile will differ from a productive one. Laufer's analysis of intrinsic word difficulties highlighted that it may be an oversimplification to treat all words simply in terms of frequency.

Two different types of vocabulary tests, *X-Lex* the Swansea Levels Test (Meara and Milton, 2003a) and the *Web Vocabprofile* (Cobb, 2002), give different vocabulary profiles because they measure receptive knowledge and productive knowledge respectively. It appears that there is no ideal method of obtaining lexical profiles from learners and this has been apparent in the studies which have been reviewed in this chapter. The study by Milton (2007) motivated my pilot study because it explicitly looks at the relationship between lexical profiles and learning style. Therefore, it is for that reason *X-Lex* will be used in my first study which shares some similarities to Milton's study. However, as we shall see, the *X-Lex* is an imperfect instrument when it comes to examining differences in lexical profiles. Therefore, productive measures will be used in later studies, both frequency and diversity measures. Before the empirical work, the next chapter examines the notion of learning style which is a central variable in the research questions.

3 Intrinsic learner differences: learning styles.

"A theory of second language learning that does not provide a central place for individual differences among learners *cannot* be considered acceptable."

(Selinker 1972, p.213, fn. 8)

It is a truism to say that learners differ in their approach to learning a second language. The problem for researchers is to understand in what ways learners differ. More specifically to the central aim is to investigate whether or not different learning or cognitive styles are associated with the lexical knowledge of L2 learners. Das (1988) defines cognitive style as: "...an individual characteristic and consistent approach to organising and processing information". However, there is a further distinction to be made between learning style and cognitive style. Riding (1991) differentiates the two by claiming that cognitive style is bipolar in that it is characterised by two extremes, whereas learning style is composed of many elements and is not dichotomous. I will use the term "learning style" in my own empirical work because, according to Riding, this term has become more widespread since the 1970s. In the literature, researchers use the two terms interchangeably, so in discussing a particular author I will use the term that author uses to describe their work.

Because of the plethora of learning/cognitive style frameworks and the overlaps in learning style dimensions, the only style frameworks which will be discussed are those which have been empirically researched since their initial development in relation to second language learning, so this chapter will firstly focus briefly on two cognitive style frameworks which are: Riding's (1991) Wholistic-Analytic style dimension and Ehrman and Leaver's (2003) Synopsis-Ectasis construct. The first two frameworks are language learning independent, i.e. they could be applied to any learning context e.g. understanding of a text in L1. The third, Skehan's memory-analysis framework, will be reviewed in more depth because it is the framework which is used throughout the empirical chapters. Before Skehan's memory-analysis framework is discussed, Carroll's work on language aptitude is reviewed because two aptitude tests are used to measure memory and analysis in my empirical work. Learner types, memory-orientated and analysis-orientated, emerged from studies by Wesche (1981) and Skehan (1986), both of whom used aptitude as a way of classifying learners. These two studies will be discussed in the second part of the chapter. The final part the chapter then proposes how the Memory-Analysis framework can be tested.

3.1 Language independent cognitive/learning style frameworks

3.1.1 Wholist-Analytic

A style dimension that does not rely on the learner's language level is Riding's (1991) Wholist-Analytic style dimension. Riding (2001) defines Wholists as those who perceive a situation as a whole, and are able to have an overall perspective and to appreciate its total context. Analytics will perceive a situation as individual elements and will often focus on the parts which will exclude the whole. Intermediates will be able to have a view between the extremes which should allow some of the advantages of both.

In order to measure these two dimensions, Riding (2001) describes a computer-based test that presents items containing pairs of complex geometrical figures so that the testee must decide whether the figures are the same or different.

Riding's (2001) Wholist-Analytic tests rely on latency of response to determine the learner's preferences. However, this test is not without its drawbacks. There is very little research which supports this as a valid style construct in the context of language learning. Another drawback is the format of the test relies on latency of response, which means that a participant who performs well on the two tests and a participant who performs poorly are both classified as neutral (Littlemore, 2001, p.247). This contrasts with the battery of language aptitude tests by Meara *et al* (2001), which gives percentage scores for both analytic and memory ability and so differentiates learners who are flexible in their learning (i.e. proficient in both analysis and memory) and learners who are poor in their learning.

There has been some research though into language learning and Riding's style construct. Littlemore (2001) looked into cognitive style (holistic-analytic) and communication strategy preferences. In a study of 82 Belgian university students, Littlemore found that holistic participants used a higher proportion of holistic conceptual strategies than the analytic participants. Conversely, analytic students were found to use higher proportions of analytic conceptual strategies than their holistic counterparts. The next section reviews an umbrella framework of cognitive style which encompasses a wide range of constructs and which relies on self-report data rather than computer based-tests.

3.1.2 Synopsis-ectasis

Ehrman and Leaver (2003) introduce the merits of a cognitive style construct which the authors claim help to provide a new understanding and better diagnosis for advising language learners. The questionnaire administered is the Ehrman and Leaver (E&L) model of a superordinate cognitive styles construct called *synopsis-ectasis*. Synopsis refers to how learners either group or treat information all at once, whilst ectasis means to stretch out information. Within this framework are ten sub-scales of cognitive styles. The superordinate construct originated from the authors' dissatisfaction with a "global-analytic" umbrella term which they claimed had led to misdiagnoses and confusion, but it is not stated why or how.

The authors claim that the superordinate construct, synopsis-ectasis, provides a conceptual link to the ten sub-scales in the questionnaire. "Synopsis relies on unconscious or preconscious and thus may result in perception of phenomena as wholes. Ectasis …seeks conscious control of processing and thus may result in perception of phenomena as composites" (Ehrman and Leaver, 2003, p.404). Put more simply, "synoptics trust their guts and ectenics tend not to" (*ibid*, p.395).

A questionnaire based on the above cognitive style constructs was used to draw up learners' style profiles. Self-reported behaviour forms the basis of the raw data. It is not known how data was elicited for cognitive style constructs which are based on visual perception e.g. field independent – field dependent and which were drawn from self-reported data. The results from this questionnaire were used with two learners to highlight how this instrument can be used as a diagnostic tool to determine cognitive style.

The Ehrman and Leaver construct is useful insofar as it attempts to provide an overall framework for disparate cognitive style dimensions. The main benefit appears to be a tool to obtain rich data on cognitive style dimensions that can be used to help individuals understand their own style preferences and how they can adapt their approach to become more effective language learners, both during their intensive courses and once they are in their overseas post. The tone of the article, however, is one of promotion for the synopsis-ectasis model rather than one of critical assessment. In promoting their instrument, Ehrman and Leaver tend to gloss over the fact that the reliability and validity of the cognitive style sub-scales on which their instrument is based are lacking in the research literature.

Hence, we need to look to another area of individual differences in second language learning which has proved to be more fruitful in understanding how learners approach the task of vocabulary learning. One area which has managed to achieve a good level of success in predicting L2 success is language aptitude. More recently, research has shown that aptitude does affect learning of easy and hard rules of sentences under different learning conditions (see Robinson, 1997). So this next section will briefly trace the roots of what is currently known about second/foreign language aptitude and will then focus on two studies which suggest that learners' approach to second language learning may well be underpinned by their strengths and weaknesses in language aptitude.

3.2 Foreign language aptitude

Carroll's (1981) essay highlights how his battery of aptitude tests have been winnowed from factor analyses which have been used to predict foreign language learning performance in a formal foreign language learning environment. It is interesting that the article is written without reference to language learning in a natural environment or even communicative language classrooms which were starting to become more popular. It gives the impression that language aptitude measures are only relevant in controlled learning conditions e.g. explicit conditions. As later research has shown (see Robinson, 1997) language aptitude interacts with implicit and explicit learning processes. Carroll is also careful to point out that foreign language aptitude is distinct from native language verbal ability and that verbal intelligence plays a minor role in foreign language learning.

Carroll's definition of aptitude is "...in approaching a particular learning task or program, the individual may be thought of possessing some current state of capacity of learning that task – if the individual is motivated, and has the opportunity of doing so" (Carroll, 1981, p.84). Carroll explains that the capacity is a combination of elements and that they have to be enduring. In contrast, achievement for Carroll is the outcome of a learning task/program for which aptitude may have been assessed because it drives, so to speak, the achievement. Correlation is argued not to be a good measure to determine whether two things are the same or not. Aptitude, it is argued, should not correlate with any learning achievement task before the learning program takes place but should do so afterwards. Carroll examines four components of foreign language aptitude in relation to various language aptitude batteries. The following three aptitude constructs will be described because they relate to my own empirical work.

Grammatical sensitivity: MLAT-4 sub-test which tests words in sentences (the awareness of syntactical patterning of sentences in a language and of the grammatical functions of individual elements in a sentence) represents this ability. Interestingly, Carroll cites another study by Politzer and Weiss (1969) which aimed to improve aptitude through training in grammar. There were slight gains in the *words in sentences* test; however, these gains were from the untrained control group which received no training. Carroll concludes that grammatical sensitivity is a basic aptitude component little influenced by forced training. A similar test to this one will be used in my empirical work to determine analysis.

Rote-learning ability: This ability is represented by MLAT-5 sub-test of paired associates and also possibly MLAT-1 which relies to some extent the ability to memorise names of numbers in a pseudo language. Carroll makes only tentative conclusions from previous research studies into rote-learning ability. For example, low aptitude students are more affected by within-list similarities than high aptitude students, and that factors such as meaningfulness, concreteness, similarity, etc. had few, if any, effects on individual differences. Carroll suggests that rote-learning ability resists influences by training although concedes that mnemonic devices can help individuals overcome some difficulties with rote-learning in foreign languages. A similar test to this one will be used in my empirical work to test memory.

Inductive language learning ability: Carroll states that this ability is only weakly represented in MLAT sub-test 1 which tests number learning. Previously, Carroll with Sapon had produced other types of tests of this ability but these tests proved to be too long and difficult to administer for them to be practical.

From an initial concept of aptitude which stemmed from ability and achievement in the native language of the learner to how the construct was developed in response to more effectively selecting army personnel for language training, Carroll's test battery has been empirically tested for predictive validity in formal language learning environments. Nearly thirty years on from when Carroll wrote this article, a better understanding of SLA in an information-processing framework has let us see how language aptitude is still relevant today in second language learning research.

How aptitude combinations relate to language learning success has been researched by Wesche (1981) and Skehan (1986), so it is these two studies which are reviewed next because they have important implications for my empirical work, both researchers having put forward similar aptitude profiles based on their empirical findings. The implications from these papers are then discussed in light of a dual path to language learning.

3.3 Identification of learner type to teaching approach (Wesche, 1981)

The focus of the study by Wesche (1981) was to verify whether Analytical students matched with the appropriate teaching methodology achieve higher language test scores than Analytical students mismatched with an Audio-Visual methodology.

Aptitude profiles of the students were drawn up using the two types of aptitude tests which are used to stream students for ability (A, B, C, D) and preferred method of learning. Table 3.1 below summarises information on the sub-tests of Modern Language Aptitude Test (MLAT) and Pimsleur Language Aptitude Battery (LAB).

Table 3.1: Aptitude tests Carroll (1981, pp105-109)

Aptitude factors	MLAT measure	PLAB measure
Phonetic coding ability: "an ability to identify distinct sounds, to form associations between those sounds and symbols representing them, and to retain these associations" (p.105)	MLAT-2 Phonetic Script MLAT-3 Spelling Clues	PLAB-5 Sound Discrimination; PLAB 6 Sound Symbol Association
Grammatical sensitivity: "the ability to recognize the grammatical functions of words (or other linguistic entities) in sentence structure" (p.105)	MLAT-4 Words in Sentences	PLAB-4 Linguistic Analysis
Rote learning ability: "the ability to learn associations between sounds and meanings rapidly and efficiently, and to retain these associations" (p.105)	MLAT-5 Paired Associates and MLAT-1 Number learning	
Inductive language learning ability: "the ability to infer or deduce the rules governing a set of linguistic materials, given samples of language materials that permit such inferences" (p.105)	MLAT-1 Number learning	PLAB-4 Linguistic Analysis

Learners were placed in one of the three teaching methodologies/approaches that best suited their learning profile. 1. The Audio-Visual Method was the main method of the training program that presents new material orally along with illustrative slides that help to contextualise the recordings. 2. The Analytical Approach provided a conceptual framework in which new language is presented. 3. The Functional Approach relied on the context of the situation to present new material. As part of an effort to validate the diagnostic uses of the aptitude tests, matched pairs of students, all of whom had aptitude profiles appropriate for the Analytical Approach, were placed either in the Audio-Visual Method (i.e. mis-matched), or in the Analytical Approach (i.e. appropriately matched). In order to ensure comparability, each pair were matched on MLAT 3, 4 and total scores.

Listening comprehension and oral expression tests as well as attitudinal measures were administered to the students of both groups (mis-matched and appropriately matched).

Listening comprehension and oral expression tests were administered in two parts. Scoring for both oral tests was based on accuracy and quality of expression. Mean scores for the appropriately matched students were higher (10-12%) on three out of the four achievement tests. The only test in which mis-matched students scored higher was the 730 oral expression, but this was not statistically significant. The appropriately matched students reported a greater interest in foreign languages, more initiative to continue learning French outside the classroom, a more positive attitude towards the method used, and less anxiety in class.

Wesche interprets these findings as suggesting that in a relatively controlled learning environment (i.e. the PSC context), using aptitude tests to provide basic criteria for matching highly analytical students with appropriate language teaching methodology encourages positive attitudes and superior achievement. Moreover, she goes on to state that the factors which aptitude tests measure, along with other types of data, could improve the effectiveness of similar language training programmes where students are streamed for ability so that potential problems in respect of instruction approaches can be addressed.

What may be an influential factor in Wesche's study is the way new language is introduced to the learner. Research by Robinson (1995) cited by Skehan (1998) supports the notion that it is the learners' aptitude profiles which interact with the presentation of the language. This research suggests that aptitude correlates more strongly with test scores when the focus of instruction is directed towards meaning rather than form. It is the language analytic aspects (i.e. MLAT *words in sentences*) ability which correlates most strongly with test performance. What seemed to be happening was that learning through structured input tended to cancel out the effects of aptitude, whereas when the learners were faced with providing their own structure on the input then the effects of aptitude were more marked.

This has implications for Weshe's findings. It would suggest that rather than a particular approach favouring particular aptitude profiles, some approaches (where the focus is on meaning rather than form) may allow learners to use their own abilities to notice and restructure the target language for themselves. Other approaches (where the focus is on form and sequence) may help learners who are not particularly strong in analytical abilities to notice and restructure. In Chapter 9, the pedagogical consequences of learning style will be discussed in relation to helping learners notice and restructure their L2.

In Wesche's study, only the "Analytical" students were mis-matched. What would have made the results more robust would have been for the Audio-Visual group of students to be mis-matched with the Analytical Approach. Then, an analysis of variance (ANOVA) could have been conducted to test the variability between groups or within groups of both sets of learners. Better still would have been for the learners with profiles matched with the Functional Approach to be mis-matched in the Analytical Approach. If these learners had been mis-matched in the Analytical classes then the findings might have highlighted whether a compensatory teaching approach that helps them to notice and restructure has a derogatory influence on their performance or not.

In Wesche's study there appeared to be two paths to language success. One path could be through linguistic intelligence, i.e. an ability to analyse and restructure; the other through memory and language use. Moreover, Wesche's findings are encouraging because they mirror to some extent the next paper which I have chosen to deal with, Skehan's (1986) cluster analysis findings in learner types. They both highlight similar paths to second language development. This is key to the empirical research in the following chapters which uses aptitude preferences as a learning style framework in relation to vocabulary knowledge.

3.4 Cluster analysis in the identification of learner types (Skehan, 1986)

This paper follows on from Skehan's PhD thesis (Skehan, 1982) which looked into the inter-relationships of a number of tests to predict language learning success. The research used tests which focused on recall and recognition, as well as other sub-tests drawn from existing language aptitude batteries. Skehan also describes some of the previous research into aptitude as well as his own work which relies on multivariate techniques to condense data which may sacrifice the underlying complexities of language aptitude at the expense of actual language learners. Three factors are mentioned which Skehan uses to suggest that aptitude and L2 development may not be a linear relationship: 1. second language achievement may depend on a variety of aptitudinal/cognitive abilities; 2. patterns of abilities may be important for L2 success; 3. threshold levels may be ignored e.g. higher levels of phonemic discrimination ability may not contribute to better language development, whilst below a certain level may be insufficient to discriminate between words which is necessary in language learning.

This context provides the motivation for Skehan's study which focused on the usefulness of cluster analysis in the identification of learner types. The aim of Skehan's study is to explore an alternative means of statistical analysis in order to uncover the individuality of the language learner in relation to second language attainment. Skehan opted for cluster analysis, which reduces the number of observations or cases (i.e. people rather than variables) by grouping them into a smaller set of clusters. The scores from the various sub-tests of language aptitude were used to identify various language learner types. The participants used in the study were two adult groups of learners enrolled on a ten-week intensive course of L2 Arabic at the Army School of Languages. They were divided into two groups because a modified set of aptitude tests were administered to the second group.

The data were analysed using a clustering method of analysing the data. Cluster analysis is essentially about discovering groups in data (see Everitt *et al.,* 2001). The method of clustering in this study was based on mode analysis (Everitt, 1980) which "searches for natural sub-groupings in the data...the search is made by considering a sphere of some radius... surrounding each point and counting the number of points falling within the sphere. Individuals are counted as dense or non-dense depending on whether their spheres contain more or fewer points than the value of the *linkage* parameter... which is preset at a value dependent on the number of individuals in the data set" (Everitt *et al.,* 2001, p. 142).

When the second set of data were analysed the results were a little more promising. There were two overall patterns. The first was a general profile with no sharp highs or lows in their profile scores. These learners tended to score below or just about average in their attainment test scores. Then, there was a second group which had more apparent saw-tooth profiles and so tended to have strengths and weaknesses in their aptitude scores. These learners tend to achieve higher scores on the end of course test. Skehan focused on the more dramatic clusters which tended to be higher achievers. His analysis revealed two cluster groups which were described as:

Cluster 1: "...a younger, intelligent student who is able to use a good memory to assimilate a lot of material. Success is possible despite language ability which is not good" (Skehan, 1986, p.91).

Cluster 3: "The older students do not have such effective memory abilities but seem able to compensate for this by a combination of intelligence and language ability (*ibid*, p.91)".

Skehan finds that in his study three important clusters of learners are those who achieve language success through: intelligence, memory and an even pattern of abilities.

Skehan's paper is an exploration of a different type of statistical analysis, i.e. cluster analysis, in order to uncover the complex relationship between language aptitude and the individuality of language learners. Skehan linked these patterns of abilities to the typologies described by Wesche, which were arrived at through the streaming of students for one of three different language teaching methodologies.

The study is useful insofar as the identification of learner types was made after the language aptitude tests were done. There was no *a priori* identification of learner types as in other studies (c/f Erhman and Leaver, 2003). This is important because many of the learning style constructs, for example, field independence and field dependence, lack empirical research to support their validity and have only a tenuous link to second language learning (Dörnyei and Skehan, 2003). Skehan identifies cluster groups based on a balance between a reasonably low error sum of squares and a manageable number of groups. However, it would be helpful for instance to know more about the cluster groups which Skehan identifies, so, for example, in the first data set he chooses eight groups but no mention is given to the number of learners in each group.

The decision, as Skehan admits, on the number of groups to include in the analysis was rather subjective. It was based on the size of an error sum of squares criterion (Ward 1963). Wards's (1963) agglomerative clustering method tends to find same size, spherical clusters but finds that this method is sensitive to outliers (Everitt *et al.,* 2001, p.62). However, Skehan makes no mention of whether there were any outliers or not or whether the groups were of similar size or not. All that is given is an error sum of squares (3.13) for the eight cluster groups in the first dataset and the error sum of squares (3.09) for the seven in the second dataset. It would be useful, for example, to have a breakdown of the numbers in each group to appreciate which cluster groups capture which proportion of learners.

The Ward density method of clustering used in this study may be more useful than regression analysis to uncover the possibility that there could be threshold levels involved in language learning. As Skehan mentions, higher levels in I.Q. and Words in

Sentences tests may not be enough to overcome poor memory skills (Skehan, 1986, p.92). This is where the division between learning style and language aptitude/ability becomes apparent. This study looked at the capacities in aptitude constructs which Skehan argues enables a pre-disposition to process information in one way or another i.e. memory or analytic (Skehan, 1998). Style constructs generally consist of tests which focus on how the learner approaches the learning task i.e. the preferred channel of perception, which is why they have come in for such heavy criticism recently (Coffield *et al.*). One of the main criticisms is that learners are being labeled according to their preferred channel of perception i.e. auditory rather than visual. However, as Coffield *et al* (p.13) argue, we do not learn through our channel of perception but at a deeper level through interpreting to give meaning. One of the strengths of Skehan's study is that most of the tests correspond to second language acquisition stages e.g. the Romanian – English test (auditory paired associates), the Digit Span test (short term memory) and the Finnish (visual paired associates) test correspond to noticing and pattern identification; whilst the Words in Sentences test (grammatical sensitivity) corresponds to pattern restructuring and manipulation (Dörnyei and Skehan, 2003, p.597). This correspondence gives the tests a degree of validity which most of the style constructs seem to lack. However, it could also be argued that for some of the tests, e.g. the I.Q. test, learners can improve their scores simply by practising the type of test questions (James *et al.,* 1984). Therefore, it is conceivable that learners who are accustomed to these types of psychometric tests score more favourably on them than other learners for whom they are completely new, thus giving a false impression of the learner profile.

The groups were comprised of participants attending the Army School of Languages. Presumably, this group consisted of mainly male participants. It would have been helpful if Skehan had given information on the gender of the participants to confirm whether the group was predominately male or female. Interestingly, a study by El Euch (1997) which also used the MLAT sub-tests to verify the types of learners by using cluster analysis also broadly supported the conclusions of Skehan (1986) and Wesche (1981).

It would be helpful to know the type of instruction in this intensive training programme, but presumably there is a heavy processing load placed on individuals which may favour a more holistic, memory-orientated type of learning. Smith and Kemler Nelson (1989, p.132) argue that relative to analytic processing, holistic processing may constitute a less resource-intensive, fallback mode of cognition that is especially associated with the lack of a deliberate, strategic approach. In an intensive training programme there may be a focus towards a more holistic, memory-orientated processing which could favour younger learners. In a less intensive training programme a more analytic type of processing may be encouraged, i.e. "a controlled, effortful, rule-seeking (hypothesis-testing) mode of cognition" (*ibid*, p.132), which could favour older learners.

We can see that in Skehan's data set two, high achievement is associated with good memory and is clustered with young participants (although we do not know the age difference between the "young" participants and the "older" ones). Interestingly, the older participants are clustered with worse memories, so while intuitively it seems correct that good memory is associated with language achievement, good memory in Skehan's study is also associated with youth. In fact, Harley and Hart (1997) have shown that the predictive qualities of various aptitude components change with age, although research has moved on since the memory tests in Skehan's study were used, and so associative or rote memory is now part of a more complex understanding of memory. For instance, Finkle (2007, p.58) describes how our declarative memory[7] is very susceptible to age whilst our procedural memory[8] is less so.

In conclusion, Skehan's identification of learner types is interesting because the sub-tests which the types are based on are grounded in an information-processing account of second language acquisition. Other style constructs lack a clear unequivocal relationship to second language acquisition and so this may explain why they lack any high correlations to second language development. The next section looks at how Skehan developed his theory on learning style to put forward a framework: memory-analysis which has been informed by his own research, Wesche (1981) and psycholinguistic research into dual-modes of syntax representation and processing.

[7] Declarative memory stores all the information we have consciously learnt: facts and figures, names, important events and so on.

[8] Procedural memory is highly durable which applies to learnt routines like playing tennis or riding a bike.

3.5 Skehan's model of learning style: Memory and Analysis

Skehan's model of learning style is informed by his own work with learners clustered by aptitude type (Skehan 1986) and psycholinguistic research into dual-modes of processing. Psycholinguistic research into how language is represented in the mind and how it is processed works with language-like material e.g. artificial languages or letter strings. Performance is tested on grammaticality judgments which can reflect performance simply based on memory or an awareness of the underlying structure of the material. It is the representation between exemplar-based system and generative rule-based system which is at the centre of Skehan's model of learning style.

Carr and Curran (1994, p.210) discuss the issue of how language is represented in the mind. Central to the issue is whether language is represented as instance memories which are formed as chunks of language, or is language represented as abstract rules? The former, Carr and Curran explain, deals in specific exemplars that have been studied which typically represent the surface features of the material. The latter is more abstract and concerned more with the underlying patterns which correlate with the grammar. This concept of a dual coding of language maps onto Skehan's learning style framework of memory and analysis.

Skehan's theory is that learners may have strengths and weaknesses in exemplar-based and rule-based representation and processing. In terms of foreign language learning, Skehan (1998, pp.88 - 89) describes a rule-based based system as "...parsimoniously or elegantly organised, with rules compactly structured" which draw upon well-organised lexical elements. A generative system is creative in application and so precise in the meanings the rules can express. Skehan describes rules (which are presumably hypotheses about the language) as "...likely to be restructurable" and thus able to subsume or replace old rules. Skehan argues that this would make feedback more salient to the learner as there is precision and system in language representation. However, the cost in Skehan's view is a high processing burden during real time language use as rules rather than exemplars tend to be processing heavy. Development of a rule-based system could be more concerned with the growth and complexity of the underlying system involved.

An exemplar-based system is complementary to a rule-based system. In this type of system "there are multiple representations of the same lexical items, because in each case the element functions as part of a unit longer than a word" (*ibid*, p.89). What Skehan appears to be saying is that lexical items are chunked together and so the system lacks generative potential. Because of the potential for relatively fixed units there is a limited potential for new and precise meanings. A drawback for this system is that it is likely to be "context bound since such wholes cannot be adapted easily for the expression of more complex meanings" (Skehan, 1989, p.89). Moreover, feedback is likely to be less effective because "...there is not the same connection with a rule which can produce general change" (*ibid*, p.89). An advantage is that such a system is less processing heavy and so more cognitive resources can be devoted to the formulation of the message and conceptual content. Development of an exemplar-based system is interpreted as more concerned with the accumulation of wholes and their utility in performance.

This rather abstract representation of language and central processing has parallels with Skehan's own work on identifying learner types by cluster analysis

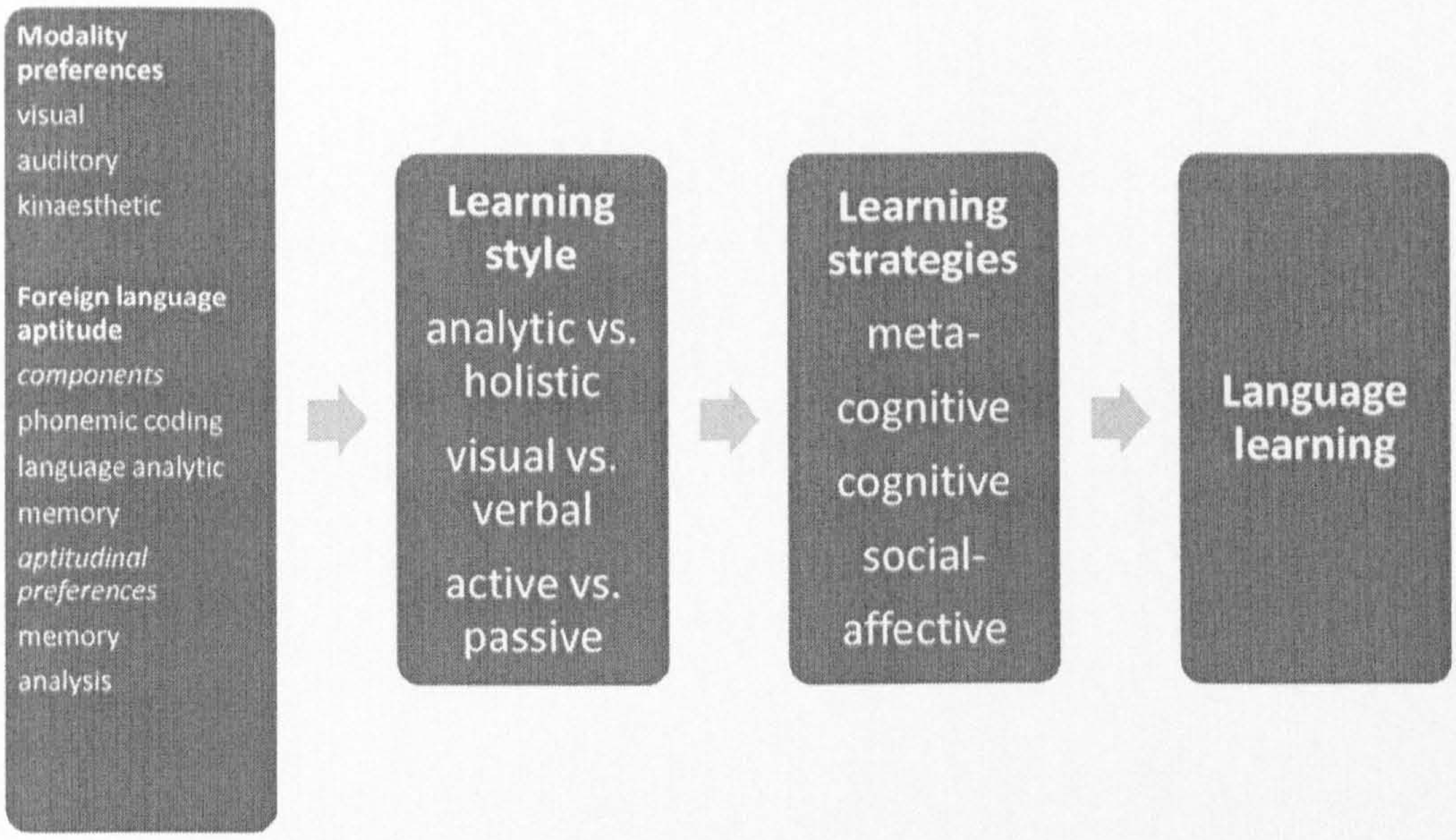
(Skehan, 1986). Basically, one type of learner had a flat profile, at different levels, but with no obvious strengths and weaknesses relative to their performance on the criterion test scores. Another cluster consisted of relatively young learners who had good memory ability, only slightly above average grammatical sensitivity. Another cluster group was older and only had average memory ability, but who had higher grammatical sensitivity which might compensate for poorer memory ability. A study by Hatch (1974) also identified "rule-formers" and "data-gatherers".

From his work with language aptitude and learner types, Skehan (1998, p.250) develops his model of learning style. Skehan's argument is that there is research (Wesche, 1981; Skehan, 1986) which identifies memory-orientated and analysis-orientated learners. Analysis-orientated learners would favour rule-based representation and processing, whereas memory-orientated learners would favour exemplar-based representation and processing. Skehan's argument is that learners can be high or low in either or both dimensions. In terms of lexis, high analysis foreign language learners would only need a "single representation lexical system...[l]ow analysis learners, in contrast, would have smaller and less differentiated systems" (Skehan, 1998, p.250). High memory learners would have a "wide range of lexicalized exemplars, considerable redundancy in their memory systems, and multiple representations of lexical elements... [which] could be highly accessible, and could be mobilized for communication in real time" (*ibid*, p.250). However, low memory learners "would not have such a repertoire of lexical elements, and might not have the multiple representations characteristic of high memory learners" (*ibid*, p.250).

The question Skehan raises is how these dimensions are accounted for. One possibility is that learners are "hard wired" for their orientation towards language learning because of their underlying strengths and weaknesses in aptitude. Another possibility is that the task demands influence different representations and processing. For example, real-time communication will call upon fluency and so memory and access will be prioritised. A style interpretation represents a predisposition given one's ability and circumstances to approach the learning task with a preference for memory or analysis. Skehan's argument is that some learners are drawn towards a focus on form and the systematicity of the language. Others are more concerned with communication and the availability of language units in getting their message across. Skehan also argues that learners may also prioritise complexity and restructuring in the longer term but when engaged in interaction will favour a memory-based performance.

In order to situate learner differences in the language learning process, Skehan offers the following diagram. The point Skehan makes is that the left to right movement gets progressively more malleable for the learner; as such, whilst modality preferences and foreign language aptitude remain relatively fixed, learning strategies are more open to change and influence. What the model lacks, however, is an indication of how the different components interact with each other. For example, how would aptitudinal preferences influence strategy choice and use? The research in this thesis is designed to explore one of those gaps: how memory and analysis relate to lexical production in a second language.

Figure 3.1: Learner differences and language learning



Source: Skehan (1998, p.268)

The question that arises is how these two constructs, exemplar-based i.e. memory-orientated or rule-based i.e. analysis-orientated, are related to learners' lexical development. Previously the two types of knowledge have mainly been discussed in relation to learners' performance in grammaticality judgment tests (e.g. Robinson, 1997). What is lacking is how these two approaches to language learning relate to vocabulary development. Vocabulary and grammar are inextricably intertwined because, as Bogaards (1996, p.373) argues, "every lexical unit calls up its own grammar" because the meanings of words call up their own argument structure and the theta-roles. Hence, lexis, as Ellis (2001, p.54) argues, "...is at the very centre of syntax...syntax acquisition reduces to vocabulary acquisition – the analysis of the sequence in which words work in chunks". It seems that grammaticisation is a process in which individual words lie at the very centre.

3.6 Testing: memory and analysis[9]

It was suggested that learners may be predisposed to a memory- or analysis-orientated approach to language learning. Recall that Skehan (1986) identified two types of learners. One group achieved language learning success through good memory ability but grammatical sensitivity only just above average, the other group average in memory but much higher in grammatical sensitivity. Skehan's theory distinguishes between these two types of learner: a memory-orientated learner who is predisposed to an exemplar-based system of language representation and processing, and an analysis-oriented learner who is predisposed to a rule-based system of representation and processing. In order to test this theory of learning style, we need to test learners on these style dimensions. The two tests which are presented are LAT B a test of visual memory for paired associates for the Memory dimension and LAT C a test of grammatical sensitivity for the Analysis dimension. These two tests are part of the language aptitude tests by Meara *et al* (2001).

The tests themselves cannot be seen as "pure" tests of memory or analysis because the tests themselves are interdependent. For example, grammatical sensitivity

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[9] *Glossary*

"Memory" will refer to the LAT B, whereas "memory" will refer to memory in general unless otherwise specified. "Analysis" will refer to the LAT C, whereas "analysis" will refer to its denotative meaning.

will rely to some extent on memory to store and retrieve patterns already learnt. However, the tests have been chosen because they come from a heritage of language aptitude testing which has been shown to be a good predictor of language learning success (See Carroll, 1981). Secondly, these tests which are used to measure the style dimensions are firmly based in the context of second language learning. Many learning style theories and tests have only tenuous links with second language learning.

I have chosen to use the computer-based tests by Meara *et al.* (2001) because of the advantages over the paper and pencil MLAT tests (Carroll and Sapon, 2002). The advantages of a computer-based test are: scores can be saved securely on a database; it eliminates human error in the scoring; it ensures the tests are administered identically; it gives immediate feedback to test takers on their performance.

3.6.1 Memory

LAT B is a timed test in which 10 words in a fictional language plus their English translations appear across the computer screen; for example, *duduk = to drink* will move across the screen. When all 10 words have disappeared the learners are then tested. An English translation appears on the screen and the learners have to choose its counterpart from a choice of the 10 fictional words. The words and the tests will repeat 5 times. Afterwards, the software calculates an accumulated percentage from the 5 attempts. The test book explains that people who do well on this test have good visual memory but may not be so strong in other areas of language learning.

The test of paired associates for visual memory was chosen over aural memory because visual memory is used in conjunction with lexical recognition and production in writing. This test of memory is also sometimes referred to as rote memory. This theory of memory was predominant at the time of a behaviourist theory of learning i.e. that learning is the association of two stimuli or a stimulus and response. Although the theory of memory has moved on since that time, this type of test has been fully developed for its predictive power (see Carroll, 1981).

3.6.2 Analysis

In order to test for Analysis, LAT C was used because it measures the ability to infer grammatical rules. The test is similar to LAT B in the sense that learners are presented with a language they are unfamiliar with. Unlike the MLAT Part 4, it does not test recognition, analogy, and understanding of sentences in English. Instead, LAT C tests the ability to recognise the grammar in a new language. The participants used in my research are at various levels of proficiency and so it is important that the language which is presented is at the same level of difficulty for all participants i.e. a fictional language which nobody has been given the chance to study before.

In this test a series of sentences in a new language and their English translation are presented to the test taker. For example:

the dog is watching the goats	vidon canat tavat mo
the wolf is hunting the goat	helon lobat tavat mo
the goat is afraid of the wolf	temon tavat lobat mo

these goats are fat tavat palam

The learners have to infer the grammatical patterns from these examples and there are practice questions to help them do this. Then, there is a test where the participant has to decide on the correct construction of the sentences in the new language from a choice of two options. For example:

the grey wolf is watching the goats

vidon lobat luam tavat mo vidon luam lobat tavat mo

A dictionary is provided at the bottom of the screen so that the student does not have to rely on memory for the lexical items. The test booklet explains that people who do well on this test are very analytical and people who do badly are likely to have problems with accuracy and correctness.

3.6.3 The administering of the tests

In all cases the participants were informed of the aims of the research; that their scores would be looked at to understand their approach to vocabulary learning, and were reassured that their scores would not be used in relation to their academic studies. A background questionnaire was also administered before the tests were conducted. The LAT B test was administered before the LAT C test. In all cases the tests were demonstrated to the learners via a projection screen. The learners also had copies of written instructions to refer to if necessary. The tests were held in various computer labs throughout Kingston University and the participants were seated as far as possible from each other to avoid communication.

3.7 Conclusions and research framework

One of the most striking things about cognitive style frameworks is that they usually rely on two dimensions. Clearly, language learning is a complex process and a two dimensional framework is a simplification. However, it appears that even when there are multiple constructs researchers have tried to subsume them under a superordinate framework in order to put forward a workable model. This chapter has examined a variety of style constructs but there is a paucity of empirical research which ties them to language learning. In order to address this problem the work on language aptitude has proved to be very useful because of its success in predicting language learning outcomes.

In studies of learners' preferred teaching methods and learners' strengths and weaknesses in language aptitude, the memory-analysis construct emerges from second language learning. Moreover, it also bears a resemblance to a model of a dual-mode of learning of artificial grammars. This construct seems to be the most valid learning style in the context of second language acquisition. This model of learning style will be used in this thesis to examine whether or not it relates to second language vocabulary profiles.

The central aim of this thesis is to examine the interplay between L2 lexical profiles and learning style. Vocabulary is examined first via Meara and Milton's *X-Lex* Yes/No test of receptive knowledge and then is examined via productive tests of lexical rarity and diversity. Skehan's learning style framework, memory-analysis, measured by LAT B and LAT C respectively, is used throughout all the studies. Synchronic studies will highlight patterns obtained from groups, contrasted with diachronic studies over time with groups and then individuals. Quantitative measures are complemented with qualitative judgments of learners' lexical production to obtain richer results. Finally, the use of words in context is analysed in relation to not only lexical frequency but also the learners' L1 and task preparation.

4 Lexical profiles and learning style: a pilot study

"At the earliest stages of learning some learners appear to produce very low scores on the functional and structural vocabulary ... but perform rather better on the lexical vocabulary in the other bands...We suspect this may be due to the testee's learning strategy; a memory-based approach rather than an analytical approach" (Meara and Milton, 2003b, p.9).

It is generally assumed that learners acquire the most frequent words first and, as learning progresses, acquire less frequent words later on. However, as research into vocabulary acquisition moves forward, researchers are starting to understand that other factors such as individual differences play a part that can alter the rate and type of words learnt. The starting point for my pilot study, therefore, is the relationship between lexical profiles and learning style. Recall that Milton's (2007) study investigated the lexical profiles of learners in Greece. Milton explored the relationship between these lexical profiles and learning styles i.e. Memory and Analysis. The second part of Milton's study provides the incentive for my pilot study that seeks to confirm the hypotheses made by Milton.

In Milton's study, learners were tested using two sub-tests from a set of language aptitude tests (Meara, Milton and Lorenzo-Dus 2001) for their strengths and weaknesses in their approaches to language learning. Memory was tested by LAT B visual memory for paired pairs of words. Analysis was tested by LAT C inductive and analytic skills.

Vocabulary knowledge was tested using *X-Lex* (Meara and Milton, 2003a), a Yes/No vocabulary test which presents learners with a sample of words from one to five thousand frequency bands. Learners indicate whether they know the word or not. To eliminate guesswork, words which look like English words, but are in fact false words, are also presented. Learners who indicate they know these words are penalised with a lower score.

My study sets out to explore further the notion by Meara and Milton (2003b), broadly supported by Milton (2007), that learning style may influence the lexical profiles of learners. Milton found that learners with strengths and weaknesses in Memory and Analysis i.e. memory-orientated and analysis-orientated learners may display different profiles. A hypothesis put forward by Milton is that structural words, which appear in level one (1k) and two (2k) frequency bands, may be more difficult for memory-orientated learners. However, less frequent words may be more concrete and therefore more learnable for these learners. Analysis-orientated learners may display normal profiles because they apply a rule-based system for language learning which would allow them to acquire structural vocabulary more readily. Milton then analysed the normal profilers' LAT B and C scores and compared them with the aptitude scores from the irregular profilers.

Mean scores from the aptitude tests showed that normal profilers tended to score higher on the analytic test (LAT C) than the memory task (LAT B). These learners were classified as analytic-orientated. Learners with a level two deficit tended to score higher on the memory task than the normal profilers. These were classified as memory-orientated. The results are summarised in the table 4.1 below.

Table 4.1: Lexical profiles and learning styles

LEXICAL PROFILE	LEARNING STYLE	
normal	high analysis	low memory
level 2 (2k) deficit	low analysis	high memory

However, Milton's work showed that learners with an L2 deficit averaged out with only a marginally higher LAT B score than those classified as analytical. Moreover, the difference between the mean score for the Analysis test from the normal profilers and the level two deficit profilers was very narrow.

4.1 Study 1

My new study aims to test whether normal profilers are stronger in Analysis than level two deficit profilers and whether level two deficit profilers are stronger in memory than normal profilers. This chapter reports a study the aim of which is to examine the relationship between the words second language learners acquire and the manner in which they acquire them. This study sets out specifically with the same research questions as Milton:

1. What is the incidence in variability of lexical profiles of learners and in what proportions do they occur?
2. Are there any relationships between particular types of lexical frequency profiles and learners' respective performances on the Memory and Analysis tests?
3. Is there is a relationship between Memory and a deficit of function words, and Analysis and normal profiles?

The first question deals with the variability which is inherent in researching lexical profiles. The overall pattern should be that learners will know more words in the high frequency bands and that at each successively rarer frequency level learners will show progressively less knowledge. The second deals with the relationship between types of profiles and learning style. Based on Milton's findings, we would expect that learners who score higher on the LAT C (Analysis) test to display normal profiles, whereas learners who score higher on the LAT B (Memory) test to display irregular profiles. The third and final question examines the relationship between function or grammar words which appear in the 1k and 2k frequency bands and whether a comparatively low score in these bands are indicative of a memory-orientated approach to learning.

The learners in my study are less homogenous in terms of proficiency level and L1 background than in Milton's study and these two combined factors have implications for the results obtained.

4.2 Method

4.2.1 Participants

The participants for my study were taken from two different institutions. The first group of learners consisted of 13 English language learners from Kingston College in south west London who followed a weekly English language course. Six were assessed by their teachers as pre-intermediate level and the others as intermediate. The second group of learners consisted of 28 learners from West Thames College, also in south west

London, who also followed a weekly English language course. These learners were classified by a computer-based level test as 20 at elementary level, 7 at intermediate, and 1 at upper-intermediate.

These two groups of learners differ from the participants in Milton's study. Firstly, the nationalities and first language of the learners in this study are mixed. Secondly, in these groups the minimum age is 18, whereas in Milton's study the learners would have been under 18 years old. Thirdly, and perhaps more importantly, the low English proficiency level of some of these learners had some consequences as regards to one of the learning style tests. Whilst these differences affect the basis for comparison to some extent, this new cohort of participants offers a more diverse range of second language learners. For example, these mature students come from a greater range of educational backgrounds.

4.2.2 The tests

All 41 learners were tested on their vocabulary knowledge using the *X-Lex* (v2.00) Swansea Vocabulary Levels Test (Meara and Milton, 2003a) to determine their lexical profiles. The *X-Lex* (v.2.00) uses a set of basic English files based on the work by Meara and Milton. After learners completed this test they were then tested on their learning style (Meara *et al.*, 2001): Memory (visual memory of paired associates) and Analysis (ability to infer grammatical rules). At West Thames College extra help was available from an assistant because some of the learners were at an elementary level of English and needed help understanding how to complete the data sheet.

4.2.3 Error scores

Out of the 41 learners who took the vocabulary test, there were 11 learners who scored over 5% on the error dimension. These learners (approximately 27%) were discounted from the study because, as Meara and Milton (2003b) claim, their profile scores should not be taken at face value because they might not be a reliable representation of the learners' vocabulary knowledge. These learners who over-estimate their vocabulary knowledge are mostly at elementary level so they could be particularly uncertain of their vocabulary knowledge and are more prone to take wild guesses than higher proficiency level students.

Table 4.2 summarises the first language backgrounds of the remaining learners from both groups.

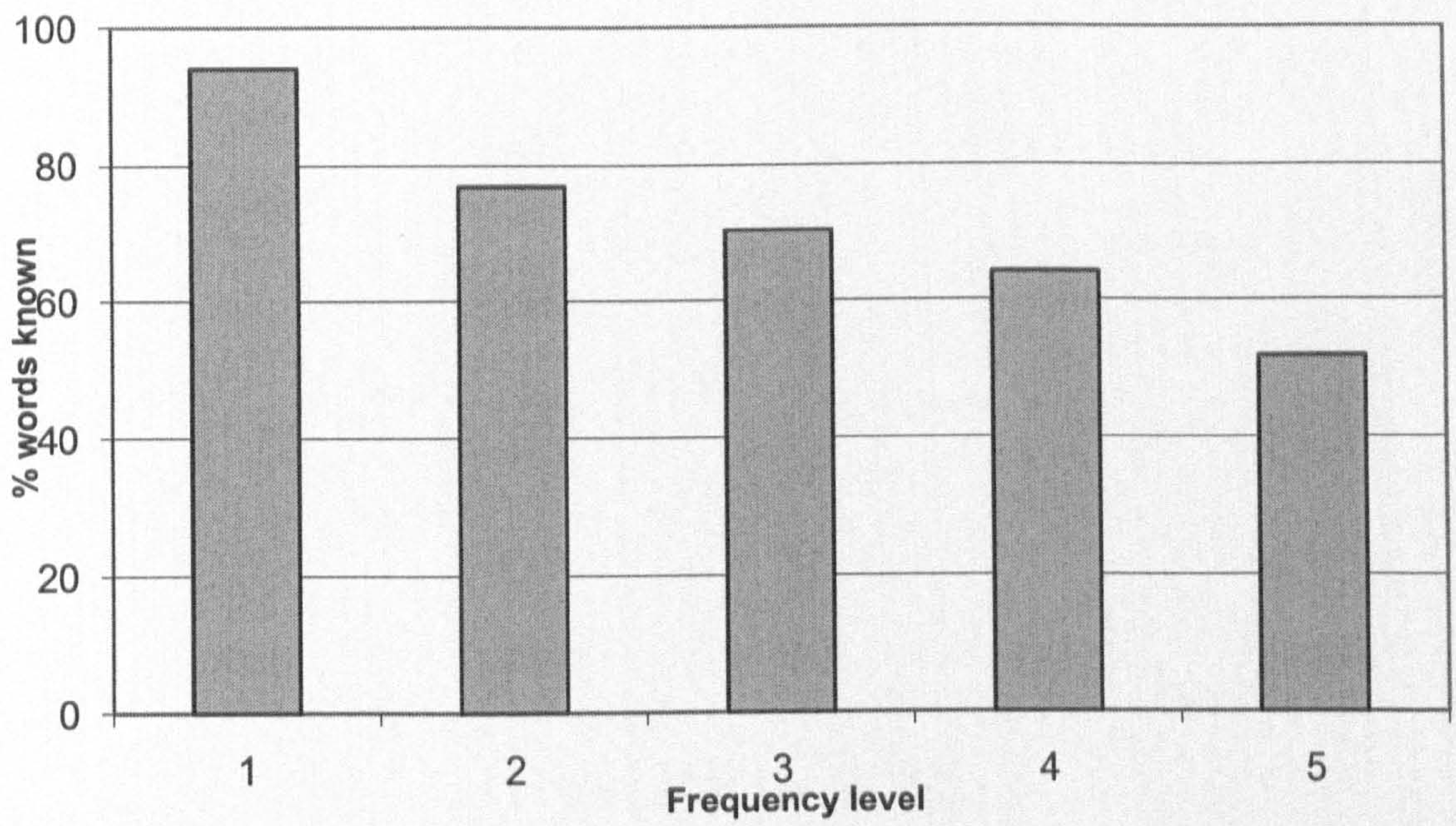
Table 4.2: First language backgrounds of participants

L1	N
Somali	6
Farsi/Pashto	4
Hungarian	3
Punjabi	3
Czech	2
French	2
Slovak	2
Turkish	2
German	1
Lithuanian	1
Urdu	1
Polish	1
Romanian	1
Spanish	1
Total	30

4.3 Results

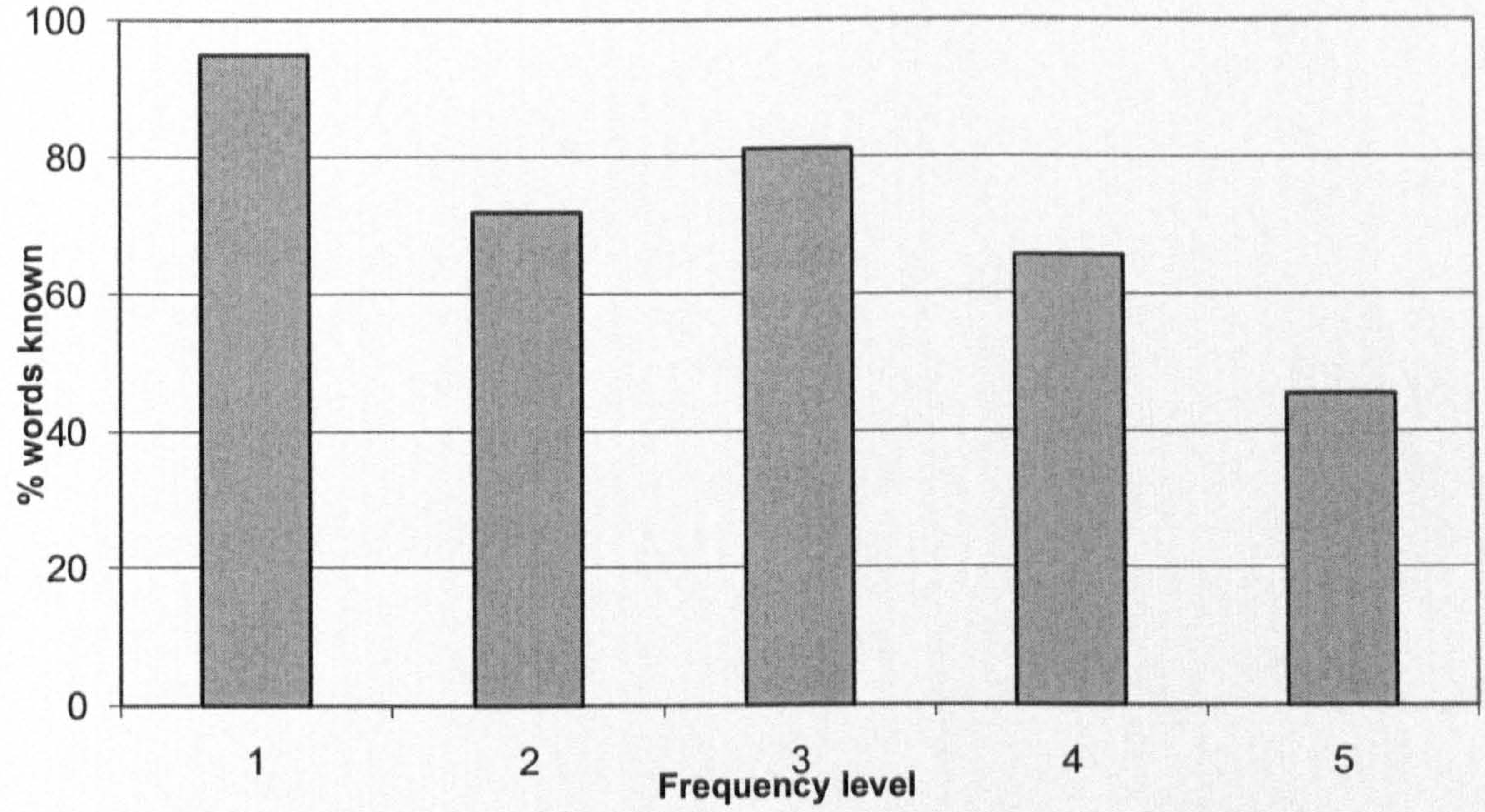
4.3.1 Distribution of profiles

Figure 4.1: Whole group mean scores for frequency bands



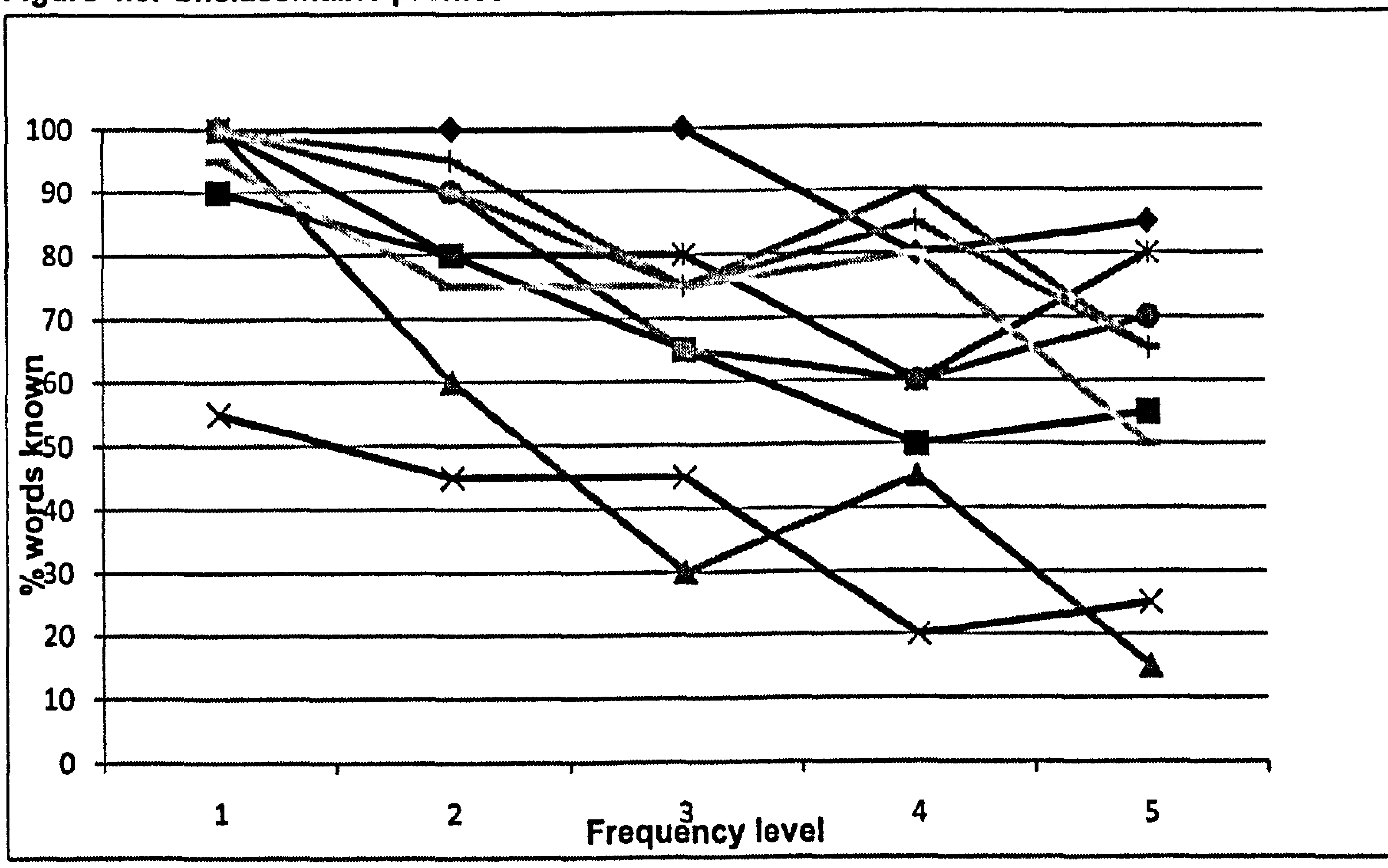
The mean profile scores for the group mirrored Milton's findings insofar as overall the learners displayed a greater knowledge of the more frequent words and less knowledge of the less frequent words, as can be seen in Figure 4.1. In fact, 13 students, or approximately 43% of learners, had normal profiles. Recall that in Milton's second study, approximately 60% of learners displayed normal profiles.

Figure 4.2: Mean score for level 2 (2k) deficit profile



Within the group though there were other profiles which did not fall into the normal profile. Eight learners (approx. 26%) displayed a level 2 (2k) deficit profile (see Figure 4.2) which was broadly similar to Milton's finding of 25% with a level 2 deficit. However, none of the learners in this study displayed a level 1 (1k) deficit (i.e. the type of learners who have lower scores at level 1 than at level 2), whilst in Milton's second study 10% of learners fell into a level 1 deficit category.

Figure 4.3: Unclassifiable profiles



The remaining learners 9 (approx. 30%) displayed profiles that had erratic dips at various frequency bands (see Figure 4.3). In Milton's first study, approximately 22% also displayed profiles that could not be classified. Although the general trend from left to right is downward, the greatest variability in profiles is at the lowest frequency band. In this study, learners with unclassifiable profiles have been in the UK approximately the same amount of time (on average around 3 years) as the rest of the cohort which suggests that time spent in the country where the L2 is spoken does not appear to make profiles more normal. These results are also reflected by Milton (2007), who observes that individuals are highly varied not only in their profiles but also in their mean vocabulary scores.

4.3.2 *Profiles and learning style: normal and level 2 deficit*

If these results are to mirror Milton's (2007) then we would expect learners with normal profiles to score higher on the Analysis dimension than learners with a level 2 deficit (2k) , and, conversely, to score less well on the Memory dimension than the level 2 deficit profilers. The scores in Table 4.3, however, do not support Milton's findings. On the Memory dimension, the learners with normal profiles tend to score higher than the level 2 deficit profilers. Whilst on the Analysis dimension, the normal profilers score marginally less than the level 2 deficit profilers. This is the opposite of what happened in Milton's study.

Table 4.3: Lexical profile and mean aptitude test scores

	Memory		Analysis	
LEXICAL PROFILE	Mean	Std. Deviation	Mean	Std. Deviation
Normal N = 13	45.23	30.26	48.85	9.60
Level 2 (2k) deficit N = 8	37.25	25.94	53.13	9.23

The Memory and Analysis scores have not been included for those with unclassifiable profiles because 4 out of the 9 learners did not report their Memory and/or Analysis scores. This may have been due to their abandoning of the tests because they found them too difficult. It is interesting to note that the SD for the Memory scores is high. There were some very high Memory scores (e.g. 86%) and some very low scores (e.g. 0%), whilst the Analysis test did not produce such a wide variability.

T-tests were carried out to determine whether the differences in Memory and Analysis scores for normal and level 2 deficit profilers were statistically significant. Because of the small sample size and the possibility of outliers, it was decided that a non-parametric test should be used, so the Mann-Whitney U test for two independent samples was selected.

Table 4.4: The sums of ranks for the normal and K2 deficit profilers

	Profile	N	Mean Rank	Sum of Ranks
Memory	Normal	13	11.54	150.00
	2k deficit	8	10.13	81.00
	Total	21		
Analysis	Normal	13	10.19	132.50
	2k deficit	8	12.31	98.50
	Total	21		

Table 4.5: Mann-Whitney U test differences in Analysis and Memory scores (grouping variable: profile)

	Memory	Analysis
Mann-Whitney U	45.00	41.50
Exact Sig. (2-tailed)	.632	.457

Although the mean Memory score for the normal profilers (45.23%, SD = 30.26) was higher than the mean Memory score for the level 2 (2k) deficit profilers ((37.25, SD = 25.94), a Mann-Whitney U test failed to show significance: U = 45.0; exact p = .632 (2 - tailed). The mean Analysis score for the normal profilers (M = 48.85%, SD = 9.60) was less than the mean Analysis score for the level 2 deficit profilers (M = 53.13%, SD = 9.23), the difference was not significant: U = 41.50; exact p = .457 (2-tailed).

From these results we can say that those with normal profiles are fairly equally balanced in memory-orientated and analysis-orientated learning. Those with a level 2 deficit or other irregular dips in their profiles appear to be less strong in memory-based learning, therefore these findings do not support Milton's notion that learners with normal profiles are predisposed to an analytical learning style and learners with a level 2 deficit profiles are inclined to a memory-based learning style.

If we look at Milton's study (2007), it was suggested that normal profilers may be better language learners because of their ability to compensate for lexical shortcomings, although it was not demonstrated how. If we look at the Table 4.6 below, it is the irregular profilers (level 2 deficit and unclassifiable) whose mean vocabulary score is in fact higher than those with normal profiles. All three language levels (elementary, pre-intermediate, and intermediate) are included in both normal and irregular profiles.

Table 4.6: Profiles and mean vocabulary score

	***X-LEX* ADJUSTED SCORE**	
	Normal profile	**Irregular profile (2k deficit & unclassifiable)**
Mean	3119.23	3214.71
SD	640.16	740.52

However, the results from a Mann-Whitney U test failed to show significance: $U = 97.50$; exact $p = .599$ (two-tailed). It is concluded that the vocabulary test scores obtained from normal profilers do not differ from those obtained by irregular profilers.

Table 4.7: The sums of ranks for the *X-Lex* scores from normal and irregular (K2 deficit & unclassifiable) profiles

***X-LEX* SCORES**	**N**	**Mean Rank**	**Sum of Ranks**
Normal profilers	13	14.50	188.50
2k deficit and irregular profilers	17	16.26	276.50

Table 4.8: Mann-Whitney U test differences in *X-Lex* scores (grouping variable: normal and irregular profiles)

	***X-Lex* (adjusted) score**
Mann-Whitney U	97.50
Exact Sig. (2-tailed)	.599

4.3.3 L3 and learning style

Table 4.9: Elementary learners with and without a third language and mean scores on aptitude test

	ELEMENTARY WITH L3		ELEMENTARY WITHOUT L3	
LAT	**Memory**	**Analysis**	**Memory**	**Analysis**
Mean	22.50	48.33	16.70	48.90
SD	12.37	2.89	12.84	10.54
N	4	3	9	9

Some of the participants in my study had a third language which could have been an advantageous for them in relation to LAT C (Analysis) because this test rewards an understanding of language rules. I decided therefore to determine whether learning a third language gives the learner an advantage in Memory or Analysis scores. So a questionnaire was used to elicit whether or not the participants have a third or even a fourth language and the manner in which they learnt it, either formally or informally. It was decided that learners with an elementary level of English would be used because this was the largest level group. Moreover, learners of higher language levels may have an advantage over the elementary group for the Analysis test (see *4.4.2 Methodological issues: Testing for learning style*). Only the learners from the second institution were used to ensure continuity in the classification of their language level. The data was analysed in relation to learners with or without a third language and their Memory and

Analysis scores. However, in Table 4.11 a Mann-Whitney U test failed to show significance between learners with or without a third language and their Memory scores: U = 13; exact p = .480 (two-tailed). Likewise, in Table 4.12 a Mann-Whitney U test also failed to show significance in Analysis scores: U = 12; exact p = .891 (two-tailed). It is concluded that the Memory and Analysis test scores obtained from participants with an L3 do not differ from those with only an L2.

Table 4.10: The sums of ranks for the Memory scores from learners with and without a third language

	L3	N	Mean Rank	Sum of Ranks
Memory	L3	4	8.25	33.00
	No L3	9	6.44	58.00

Table 4.11: Mann-Whitney U test differences in Memory scores

	Memory
Mann-Whitney U	13.00
Exact Sig. (2-tailed)	.480

Table 4.12: The sums of ranks for the Analysis scores from learners with and without a third language

	L3	N	Mean Rank	Sum of Ranks
Analysis	L3	3	7.00	21.00
	No L3	9	6.33	57.00

Table 4.13: Mann-Whitney U test differences in Analysis scores

	Analysis
Mann-Whitney U	12.00
Exact Sig. (2-tailed)	.891

4.4 Discussion

4.4.1 A comparison of the results: Lexical profiles

The findings from these results are unexpected in the light of Milton's (2007) work. In Milton's study learners with normal profiles scored just under 50% on the Analysis dimension, whilst their score for Memory was around 25%. There was clearly a difference between the two scores. In my study, however, learners with normal profiles are not predisposed to score higher on the Analysis test than the Memory; on the contrary, they generally score higher on the Memory dimension.

Learners with level 2 deficit profiles are not more inclined to score higher on Memory; in fact, level 2 deficit profilers generally score higher on the Analysis test. However, the difference is non-significant in this study; as such, the hypothesis that normal profilers may have an analytical learning style and that level 2 deficit profilers may have a memory-orientated style has not been supported.

In Milton's study, the difference between Memory and Analysis scores for level 2 deficit profilers was small; Memory was only slightly higher, so there could have been some over interpretation by Milton. In my study, though, level 2 deficit profilers gained a higher mean score on the Analysis dimension than the Memory, so the trend seems to be going the other way although the difference is not significant.

What does this tell us? Firstly, we have to reconsider the hypothesis by Milton (2007, p.52) that learners with an analytical approach may more easily acquire function words, and that learners with a memory-based approach may acquire more readily less frequent lexical vocabulary because it tends to be more concrete and easily visualised.

This notion may still be valid, but the tests used in this study might not be sensitive enough to pick up this relationship between lexis and style with this group of learners. Recall that in Morris and Cobb's (2004, p.83) results it was the percentage of function words below 50% that was related to academic success. However, this needs to be disentangled from language proficiency. Indeed, in Chapter 5, I take up again the discussion on function words and how they relate to language proficiency. In Chapter 9, I discuss how it is not the raw percentage of function words per se, but a greater repertoire of low semantic function words used in writing which is argued to be related to an analytic learning style. In my initial study, though, the issues surrounding function words remain unresolved.

4.4.2 Methodological issues: Testing for learning style

Informal interviews with a sub-sample of students revealed that they found the vocabulary profile test user-friendly and enjoyable to do. However, the test for learning style (i.e. LAT C) proved to be more problematical for some of the students insofar as they found the test to infer grammatical rules more taxing, especially the elementary learners who struggled with understanding the various grammatical constructions in English. From the qualitative feedback on the test provided by informants, many expressed the opinion that the Analysis (LAT C) test was harder than the Memory (LAT B) test. Four of the Analysis test scores are missing, which could indicate that the test was too hard for these learners to complete. What is more, these aptitude tests are all in English (apart from the pseudo language which the tests are based on). Learners need a good level of English in order to complete them. The Memory test simply presents new pseudo words for the learners to remember, whereas the Analysis test presents sentence structures in both of the languages for learners to infer grammatical patterns which could be overtaxing for the learners. Testing learners' analytical style via LAT C depends on a certain amount of proficiency in English grammar in order to infer the grammatical rules in the new language. However, I will leave the discussion of this issue until the next chapter where I compare proficiency level and LAT B and C test scores.

The results showed that there was a much higher standard deviation for the Memory test than the Analysis. This may have had something to do with the scoring systems for both tests. With the Memory test it is possible to get every word wrong. This may explain why there was a higher SD for the Memory test than the Analysis test. The Analysis test, however, comprises of simply a choice of two answers: one is right, the other is wrong. Consequently, a learner could score 50% simply by guessing the answer. Meara *et al.*'s (2001) normative data for this test puts a score of 0-49 into the bottom 10% of all scores for this test. This calls into question Milton's interpretation of his results; for example, the mean score for learners with normal profiles (i.e. those who do well on tests of analytic ability) is under 50%. The mean score is in the bottom 10% and suggests that, taken as a group, do not score particularly well.

In my study, normal profilers' (1k>2k>3k) mean *X-Lex* score was lower than that of irregular profilers (1k>2k<3k) and unclassifiable profilers so the results here do not support Milton's conclusion that normal profilers may be more efficient language learners; the argument being that all other things being equal, a higher vocabulary score is indicative of greater language proficiency (see Meara and Buxton, 1987). Normal profilers in this study also displayed the highest Memory score of the three groups and so memory (rather than analysis) may account for the relatively higher vocabulary score.

4.4.3 Methodological issues: X-Lex

The vocabulary test also needs to be examined as to whether there is a sufficient proportion of functional words in the one and two thousand frequency bands for the learners to be tested on. A quick calculation from the list of English words used in the test shows that there are 18 function words[10] out of 100 lexical words in the 1k frequency band and one function word in the 2k frequency band. Because the test randomises the words used, it is possible that the learners are not tested on any function words. On average, though, learners would be tested on about four function words each time they took the test, so from the distribution of function words in the test, a learner whose profile displays a level two deficit is probably not indicative of a deficiency in functional vocabulary.

In this study learners were classified with a level 2 deficit even if there was only one word deficit between 2k frequency and the 3k frequency. Learners are tested on 20 words for each frequency band and so knowing only a single word more in the 3k band than the 2k band would be enough to tip the balance. Milton (2007) also recognised the problem with the test insofar as a single shift in the mark can change the profile. Milton

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[10] Based on Nation's list (2001, pp.430-431).

tried to eradicate this problem by testing the learners' vocabulary knowledge twice so as to obtain stable profile scores. The majority of learners, 21 out of 29, retained stable profiles in his study. With my cohort of learners there was insufficient time to test learners twice so learners were eliminated with error scores over 5% because Milton's study highlighted that learners with unstable profiles tended to have higher error scores than those with stable profiles.

In my study some of the learners were at upper intermediate level and so had a good knowledge of lexis from the higher frequency bands. This meant that they knew all of the words in some of the frequency bands which resulted in a ceiling effect. Therefore, the test would not be sensitive enough to any subtle differences in their profiles.

Another measure of learners' functional vocabulary knowledge is through the *Web VocabProfile* (Cobb, 2002) which analyses learners' productive vocabulary in the one thousand and two thousand frequency bands, the Academic Word List (Coxhead, 2000), and off-list words (words which are not found on the other lists). In the one thousand frequency band the computer software gives a percentage breakdown of function and content words. Accordingly, it could be a more precise indicator of functional vocabulary knowledge - albeit productive rather than receptive knowledge (see Chapter 2 for a discussion of this issue).

4.5 Conclusions

This study used the same methodology as Milton's (2007) investigation which sought to establish a relationship between learners' lexical profiles and learning styles.

My study focused on whether normal profilers (i.e. learners whose scores in the first thousand frequency band are greater than their scores in the second thousand and so on) were predisposed to an analytical learning style because of their ability to acquire structural/functional vocabulary which is found in the first and second thousand frequency levels. The study also sought to establish whether irregular profilers (i.e. learners with a level one or two deficit) were predisposed to a memory (i.e. acquire language holistically) style of learning because of lexical dips in their profiles where structural/functional vocabulary tends to occur.

Although Milton's (2007) study broadly supported a positive relationship between normal profiles and Analysis, and irregular profiles and Memory scores, my study did not. Instead, my study found that the normal or irregular profilers did not differ significantly in mean Memory or Analysis scores. In fact, the normal profilers actually scored lower on the Analysis test than the irregular profilers. Moreover, the normal profilers scored higher on the Memory test than the irregular profilers. The mean total vocabulary scores from the Swansea Vocabulary Levels Test (*X-Lex* v2.00, Meara and Milton, 2003a) did not highlight any significant differences in the vocabulary knowledge from the normal and irregular profilers.

The learners in this study were different to Milton's cohort. The learners in this study were older and many had a third language and so could be more experienced language learners, e.g. they may use more mnemonic devices in memorising vocabulary. This may explain why both normal and irregular profilers did not score significantly differently on the memory or analysis dimension. The learners in Milton's cohort may have simply had less experience learning a second language.

The results suggest that any future work needs to use a finer grained instrument. In the next chapter the *Web VocabProfile* (Cobb 2002) is used to measure learners' lexical profiles. The change would mean a shift in the method of testing lexical knowledge, from a broadly receptive approach to productive so as to overcome any ceiling effect problems. It would also be an opportunity to retest the notion of whether a memory- or analysis-based approach favours vocabulary knowledge at the higher frequency bands. Any future studies may give us further insights into the complex relationship between lexical knowledge and the way learners systematically approach language learning.

5 Lexical frequency profiles and their relationship to learning style

This chapter will firstly briefly reiterate the implications of moving from receptive to productive knowledge (see also section 2.7.1). Then a second study examines whether productive lexis categorised according to different frequency bands correlates to Memory and Analysis test scores. This study makes an important move from receptive knowledge, as tested by *X-Lex*, to productive knowledge. The move is instigated because *X-Lex* did not discriminate higher level learners' (e.g. upper intermediate) lexical profiles sufficiently well. Therefore, a different vocabulary test is used which is not prone to ceiling effects as exhibited by the *X-Lex*. It is important to use an instrument which is fine grained enough to measure any subtle differences in lexical knowledge so that these differences can be correlated to learners' strengths and weaknesses in learning style.

5.1 Lexical knowledge and test difficulty

Several issues have emerged which suggest that the vocabulary test (*X-Lex*) might not be a suitable instrument to determine learners' lexical profiles. One of the reasons for this shift is because of the ceiling effects of the *X-Lex* test. More proficient learners seem to already have a core receptive knowledge of most of the lexis from the first three frequency bands (1k – 3k) and so it is problematical to tease out whether there is a relationship between a memory- or analysis-based learning style and words learners actually acquire.

Another reason why the vocabulary test might have been unsuitable is that it did not highlight what type of words learners did or did not recognise. Although the *X-Lex* calculates the percentage of words learners recognise at level one (1,000 word frequency band), it does not highlight which of those items are content words and which are function words. So any predisposition a learner may have for content over function words or vice versa is not highlighted by the test. This distinction is important because the previous study showed that none of the learners displayed a level one deficit which would suggest that there were no learners who lacked knowledge of function words. The lexical profiles are simply displayed as percentages of words known at each thousand frequency level and not which proportion of content and function words are known. After careful examination of the words used in the one thousand frequency band, I argued that the learners may not have been tested on a sufficient quantity to determine whether or not they had a predisposition to acquire content words more easily than function words.

5.1.1 Lexical knowledge and test type

A vocabulary test that uses a written sample from high level learners avoids the flattening out of the profiles and so may be more effective at discriminating higher level learners. A test which analyses learners' written production of lexis into various frequency bands is the *Web VocabProfile*. This type of test is more demanding because the learner has to produce the lexis rather than indicate whether he/she understands the lexis. The same learners cannot obtain flat profiles from the *Web VocabProfile* because the lexis is not presented to the learner, rather, the lexis is produced by the learner and is categorised into various frequency bands.

In Chapter 2, I discussed how receptive knowledge is different from productive knowledge and so are the tests measuring different aspects of lexical knowledge. An interesting finding by Mondria and Wiersma (2004) was that the effect of the type of test is greater than the correspondence between the type of learning and type of test; therefore, learners tested using a productive approach will score lower than those tested using a receptive approach. Recall also that research from Laufer (1998) indicated that as learners' lexis develops, the gap between receptive and productive knowledge increases. This may be due to several factors, one of which may be that the learners fossilise or plateau at a certain level i.e. they may reach a certain point in their learning in which they can "get by" for most of their needs (Laufer, 1991). Learners may also find certain words intrinsically more difficult than others (Laufer, 1990) and so avoid lexis which presents problems for them. Alternatively, learners may avoid using certain lexis because of the context constraints of the situation (Teichroew, 1982, p.17).

5.1.2 Proficiency level and test difficulty

Another issue from the previous study was that the test of analytic and inductive language learning skill, LAT C, (Meara *et al.,* 2001) might have been too difficult for some of the lower level learners. The test can be very taxing for some of the learners because they had to notice certain grammatical features of a completely new language. The grammatical features are not made explicit and the participants only had translations in English of the nouns and adjectives in the new language. Therefore, to ensure that learners do not simply guess the answers, learners whose English is at intermediate level or above need to be recruited.

5.2 Study 2

There was a relatively small number of participants (N=30) in the previous study so the significance calculations may not have been sensitive enough to detect subtle differences in the population. Therefore, this new study aims to use a greater number of participants to obtain more meaningful statistics. The language proficiency of the learners will also affect their vocabulary profiles. Furthermore, background information on the learners' language level will be obtained.

In light of the issues outlined above and perusing the main aims of this thesis, the following research questions are asked:

Do productive lexical frequency profile scores correlate with Memory?

Do productive lexical frequency profiles scores correlate with Analysis?

The previous study did not show any significant relationships between lexical profiles and learning style. The aim therefore is to determine any patterns between productive lexical profiles and learning style. Because of the greater number, it became apparent that the data needed to be examined in relation to low and high language proficiency levels. The different proficiency levels had different relationships with the LAT B (Memory) and C (Analysis) tests. The results also suggested that lexical development is an important factor.

5.3 Method

5.3.1 Participants

The 60 participants in this study were from the pre-sessional English Language Course at Kingston University. The participants were not a random sample of second language learners but they were representative of the international students who study at the university. The students in this sample were mostly of Asian origin and the predominant nationalities were Thai, Korean, Chinese and Japanese. Table 5.1 below highlights the first language backgrounds. The mean age of the participants was 24.1 years old (the spread of ages were 18-37) and females outnumbered the males by nearly 2 to 1 (39 females and 21 males).

Table 5.1: Participants profiles L1

First language	N	%
Thai	12	20.0%
Korean	11	18.3%
Chinese (Mandarin)	9	15.0%
Japanese	8	13.3%
Greek	3	5.0%
Portuguese	3	5.0%
Russian	2	3.3%
Spanish	2	3.3%
Swedish	2	3.3%
Chinese (Cantonese)	1	1.7%
Catalan	1	1.7%
Chinese (other)	1	1.7%
Farsi	1	1.7%
French	1	1.7%
Gujarati	1	1.7%
Polish	1	1.7%
Urdu	1	1.7%

5.3.2 Participant profiles: faculty and status

The students were all enrolled on graduate and postgraduate degree courses at Kingston University and were mostly destined for courses in the Faculty of Business and Law and the Faculty of Art, Design and Architecture. Postgraduate students outnumbered undergraduates by nearly two to one.

Table 5.2: Participant faculty

Faculty	**N**	**%**
Art and Design and Architecture	25	42.4%
Business and Law	21	35.6%
Arts and Social Sciences	8	13.6%
Computing, Information Systems & Mathematics	2	3.4%
Engineering	2	3.4%
Science	1	1.7%

Table 5.3: Participant status

Status	**N**	**%**
undergraduate	22	36.7%
postgraduate	38	63.3%

5.3.3 English language proficiency

Two broadly based proficiency groupings were determined on the basis of *X-Lex* scores which were substantiated by scores from standardised tests (IELTS, TEOFL, CB TOEFL). The Swansea Vocabulary Levels Test *X-Lex* (v 2.00) scores were available for all of the participants. Table 5.4 below shows how the *X-Lex* scores relate to the standardised tests.

Table 5.4: Equivalences in performance on English language tests

	Test score				
IELTS	7	6.5	6.0	5.5	5.0
TOEFL	600	570	540	520	500
CBTOEFL	250	230	207	190	173
X-LEX	4250-4490		3750-4240		3250-3740

Source: Meara and Milton (2003b, p.8)

Performance from IELTS and TOEFL tests has been subjected to some research, whilst the CBTOEFL scores are based on exam board recommendations (The BALEAP Guidelines on English Language Proficiency Levels for International Applicants to UK Universities, 1999, 2003). The equivalent *X-Lex* scores were determined by using Meara's guide on how to interpret the *X-Lex* scores (Meara and Milton, 2003b).

Although one internationally recognised standardised test for all participants would have been ideal, the reality was that the learners were available for testing only within a short timeframe and not all participants had taken the same type of proficiency test. Because of the mixed nature of level tests, the students were simply divided into low and high proficiency levels. Low proficiency were IELTS scores of 5.5 and below; TOEFL scores of 520 and below, CBTOEFL scores of 190 and below, and *X-Lex* scores of 3745 and below. All scores above were classified as high proficiency.

Table 5.5: Frequency of low and high proficiency levels

Proficiency	N	%
Low	26	43.3%
High	34	56.7%

5.3.4 Data collection

The *Web VocabProfile* (v 2.7) (Cobb, 2002) was used to obtain and measure learners' vocabulary profiles. The *Web VocabProfile* is a computer program that performs a lexical text analysis to measure the proportions of low and high frequency word types from learners' written text. For a more detailed description of this research tool see section: *2.3 Lexical profiles: an indication of academic performance.*

A picture story (see Appendix 2d) used to elicit learners' productive vocabulary was initially piloted with three students whose first language was not English. They were asked to describe the story. All three, with varying levels of proficiency, articulated the main ideas illustrated in the sequence.

The participants in this study were given the cartoon picture story. They were instructed to look at the pictures to understand what happened in the story before they started to write. A time limit of 40 minutes was given to write a story based on the pictures. The students wrote a minimum of 300 words directly on the PCs in Word format. No dictionaries were allowed but they did have access to Word *Tools* i.e. *Spelling* and *Grammar* check which some learners did use. The participants were seated sufficiently apart so that they could not copy from each other. When there were more than ten participants two computer technicians were available to help with any technical problems e.g. logging on and saving documents. I had also previously demonstrated all the tests used in this study to the technicians so that they could help any participants who had trouble with understanding the test instructions. Before writing, the learners were told that there were no "wrong" or "right" ways to write the story but that it was their vocabulary which would be analysed. The stories were then inputted into the *VocabProfile*. All spelling mistakes were corrected; proper nouns and misused words were deleted.

5.3.5 Memory and Analysis

The language aptitude tests by Meara *et al.* (2001) were used to determine the learning style of the participants: Memory LAT B (visual memory for paired associates) and Analysis LAT C (ability to infer grammatical rules). Learners carried out the Memory and Analysis tests at their own pace. They recorded their scores onto their background data sheet, which I then checked to ensure there were no errors in reporting the results.

5.4 Results

5.4.1 Vocabulary profiles

The texts that the learners wrote were analysed using the *Web VocabProfile.* There were a total of 71 texts; however, 11 texts were discarded because they fell more than 10% below the minimum of 300 words and so were not used in this study. Laufer and Nation (1995, p.314) found that profiles under 200 words were not stable.

Table 5.6: Mean percentages and standard deviations of word families at different frequency levels

Proficiency		K1 Words %	K2 Words %	Academic Words %	Off-List Words %
low N = 26	Mean	89.29	5.36	2.10	3.26
	Std. Deviation	3.67	2.02	1.27	1.82
high N = 34	Mean	89.45	4.57	2.43	3.55
	Std. Deviation	2.41	1.55	1.32	1.75

Table 5.6 presents the mean percentages of words at different frequency levels which were used by the two proficiency groups of learners. The high proficiency group tended to use marginally more academic words (AWL) and off-list (O/L) words than the low proficiency group, which could reflect a greater sophistication in their vocabulary use. The low proficiency group used a greater percentage of words in the two thousand frequency band whilst for the one thousand frequency band the mean percentages are very similar.

These results show that the less proficient students make marginally less use of the academic and off-list words but a slightly greater use of words in the second thousand frequency level. Both groups tended to use a similar percentage of words in the first thousand level. At each frequency level t-tests were conducted on the differences in mean scores between the two proficiency groups. None of the differences achieved statistical significance.

The next step was to measure the correlations between the various frequency ranges of the vocabulary profiles and the results from the Memory and Analysis test scores. Correlations were calculated using Pearson *r*. T-tests were used to compare mean Analysis scores and proficiency, and mean lexical profile scores and proficiency.

When both proficiency groups are put together (see table 5.7), the overall tendency is clear. There is a negative correlation between Memory and high frequency lexis, but a positive correlation between Memory and the AWL and Off-List words. There is no discernable relationship, however, between Memory and the two thousand frequency band.

Table 5.7: Correlations between Memory and vocabulary profiles both proficiency groups

		K1 Words	K2 Words	Academic Words	Off-List Words
Memory	Pearson Correlation	-.378(**)	.146	.319(*)	.258(*)
N = 60	Sig. (2-tailed)	.003	.265	.013	.047

*Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed).

5.4.2 *Memory and vocabulary profiles*

Tables 5.8 and 5.9 below show the Pearson correlations between the Memory scores and vocabulary profiles of both low and high proficiency groups.

Table 5.8: Correlations between Memory and vocabulary profiles at low proficiency

		K1 Words	K2 Words	Academic Words	Off-List Words
Memory	Pearson Correlation	-.586(**)	.208	.540(**)	.576(**)
N = 26	Sig. (2-tailed)	.002	.308	.004	.002

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

Table 5.9: Correlations between Memory and vocabulary profiles at high proficiency

		K1 Words	K2 Words	Academic Words	Off-List Words
Memory	Pearson Correlation	-.136	.093	.152	-.010
N = 34	Sig. (2-tailed)	.444	.602	.392	.957

The highest correlation, r = -0.586, is the relationship between words in the one thousand frequency band and Memory scores in the low proficiency group. This relationship is mirrored in the high proficiency group but the correlation is weaker, r = -0.136. These results would suggest that particularly with low proficiency students, those with low Memory test scores tend to rely more on using words from the one thousand frequency level than students with higher Memory test scores. However, this relationship is less clear from the sample of the high proficiency students. Overall, Memory scores (associative memory) negatively correlate with the use of high frequency lexis, particularly with low proficiency learners, whilst for higher proficiency learners the relationship is less straightforward.

The lower frequency words positively correlated with Memory. For the low proficiency group, use of academic words (AWL) and off-list words (O/L) is positively related to Memory scores, r = 0.540 and 0.576 respectively. Whilst for the high proficiency group there was little if any relationship between the AWL and O/L words and Memory.

There were no significant correlations between Memory and the two thousand frequency band. It seems that for both groups of learners there is only a very weak relationship between middle level vocabulary and Memory. More sophisticated vocabulary i.e. lexis in the two thousand frequency band is a characteristic of greater proficiency although there was only a weak relationship with Memory in this study.

5.4.3 Analysis and vocabulary profiles

Overall, there is no discernable relationship between Analysis and vocabulary profiles when both proficiency levels are analysed together or separated.

Table 5.10: Correlations between Analysis and vocabulary profiles for both proficiency groups

		K1 Words	K2 Words	Academic Words	Off-List Words
Analysis	Pearson Correlation	.075	-.170	-.021	.061
N = 60	Sig. (2-tailed)	.568	.194	.873	.644

Tables 5.11 and 5.12 show the relationship between Analysis and lexical profiles of the separated proficiency groups is less clear.

Table 5.11: Correlations between Analysis and vocabulary profiles at low proficiency

		K1 Words	K2 Words	Academic Words	Off-List Words
Analysis	Pearson Correlation	.132	-.052	-.032	-.185
N = 26	Sig. (2-tailed)	.521	.800	.877	.365

Table 5.12: Correlations between Analysis and vocabulary profiles at high proficiency

		K1 Words	K2 Words	Academic Words	Off-List Words
Analysis	Pearson Correlation	-.008	-.174	-.092	.234
N = 34	Sig. (2-tailed)	.964	.325	.604	.182

None of the correlations achieved statistical significance. The highest correlation, r = 0.234, is between Analysis and O/L words at the high proficiency level. At the low proficiency level, on the other hand, this correlation is negative: r = -0.185. The results are not particularly surprising given that the Analysis test requires learners to infer grammatical patterns rather than retain words for a short period of time. As a result, the relationship between lexical use and Analysis may not be so straightforward. Because the Analysis test requires learners to infer grammatical patterns, this test may be more closely related to restructuring i.e. the qualitative changes that take place in learners' second language at certain stages of development. Analysis and restructuring will be discussed later in the section entitled *Learner type and proficiency*.

What the correlations do not show is that the low proficiency group tended to score low on Analysis and high on the percentage of K1 words. The high proficiency group tended to score the opposite i.e. higher on Analysis and a lower percentage of the K1 words (see figures 5.1 and 5.2 below).

Figure 5.1: K1 words and Analysis at low proficiency

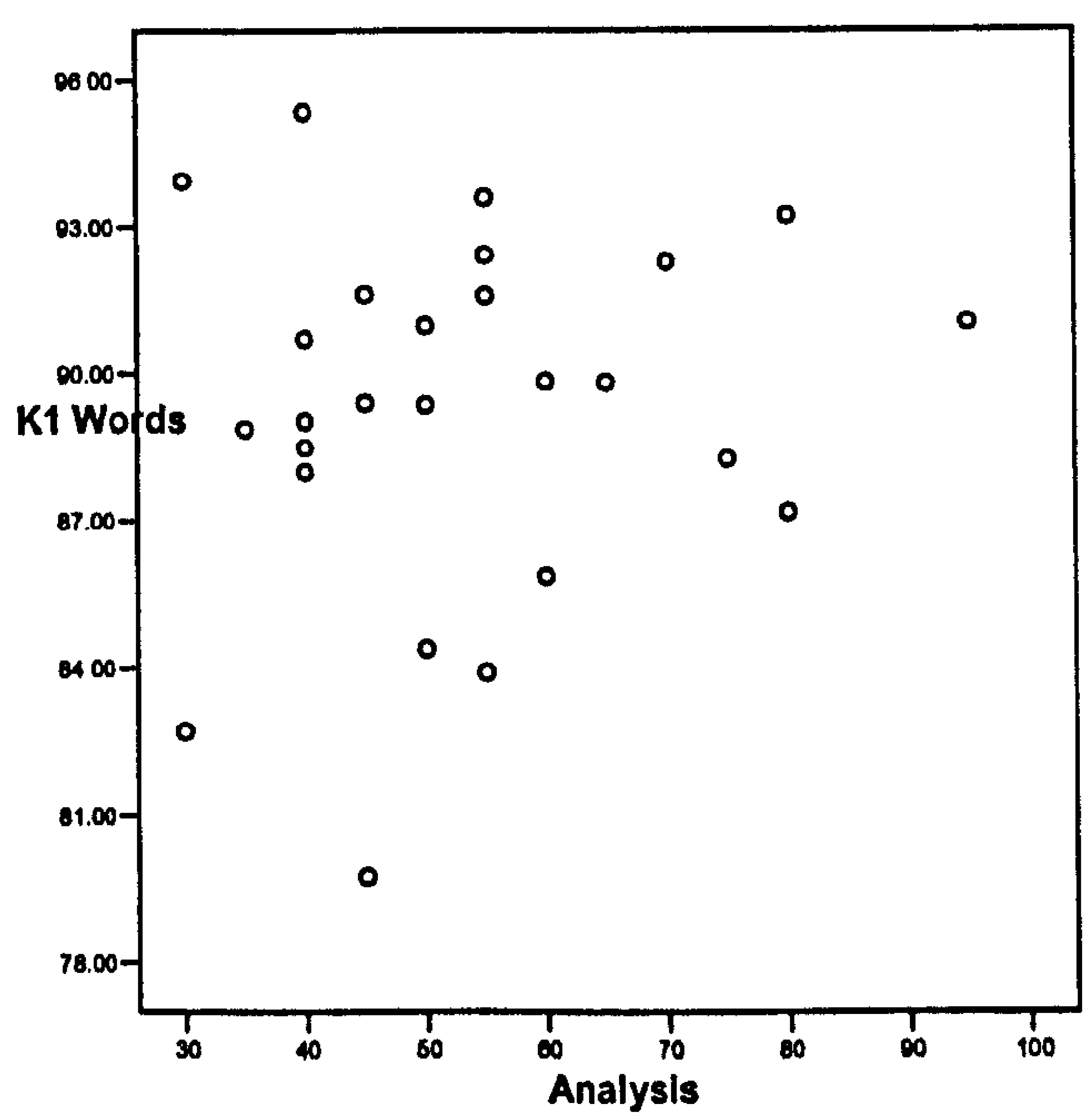
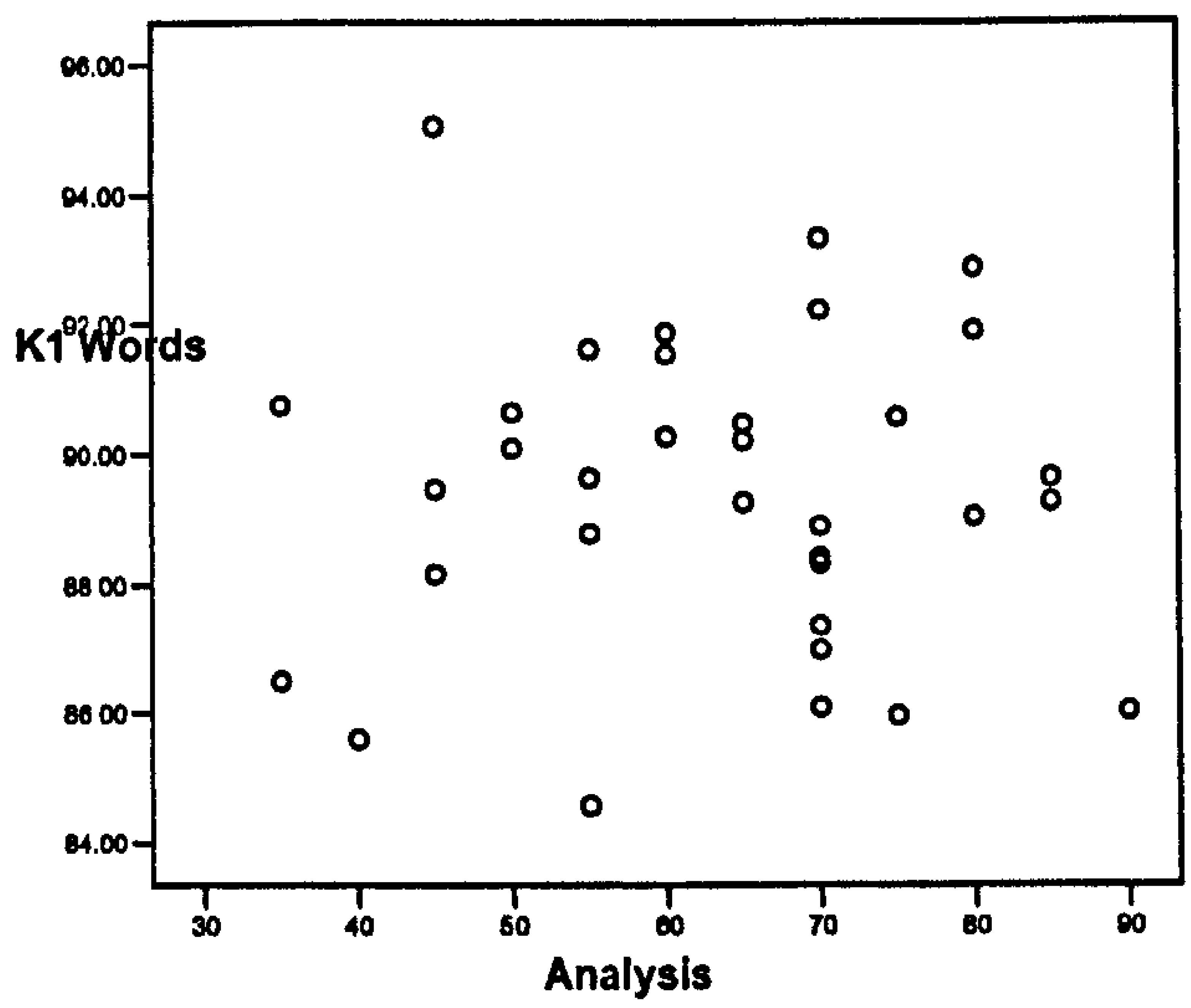


Figure 5.2: K1 words and Analysis at high proficiency



In Figures 5.3 and 5.4 below, the O/L words for the low proficiency group tended to cluster around low Analysis and low O/L percentages. The high proficiency group had a comparatively wide range, almost zero to nearly 8%, of O/L scores and a wide range, around 35% to 90% of Analysis scores.

Figure 5.3: Off-List words and Analysis at low proficiency

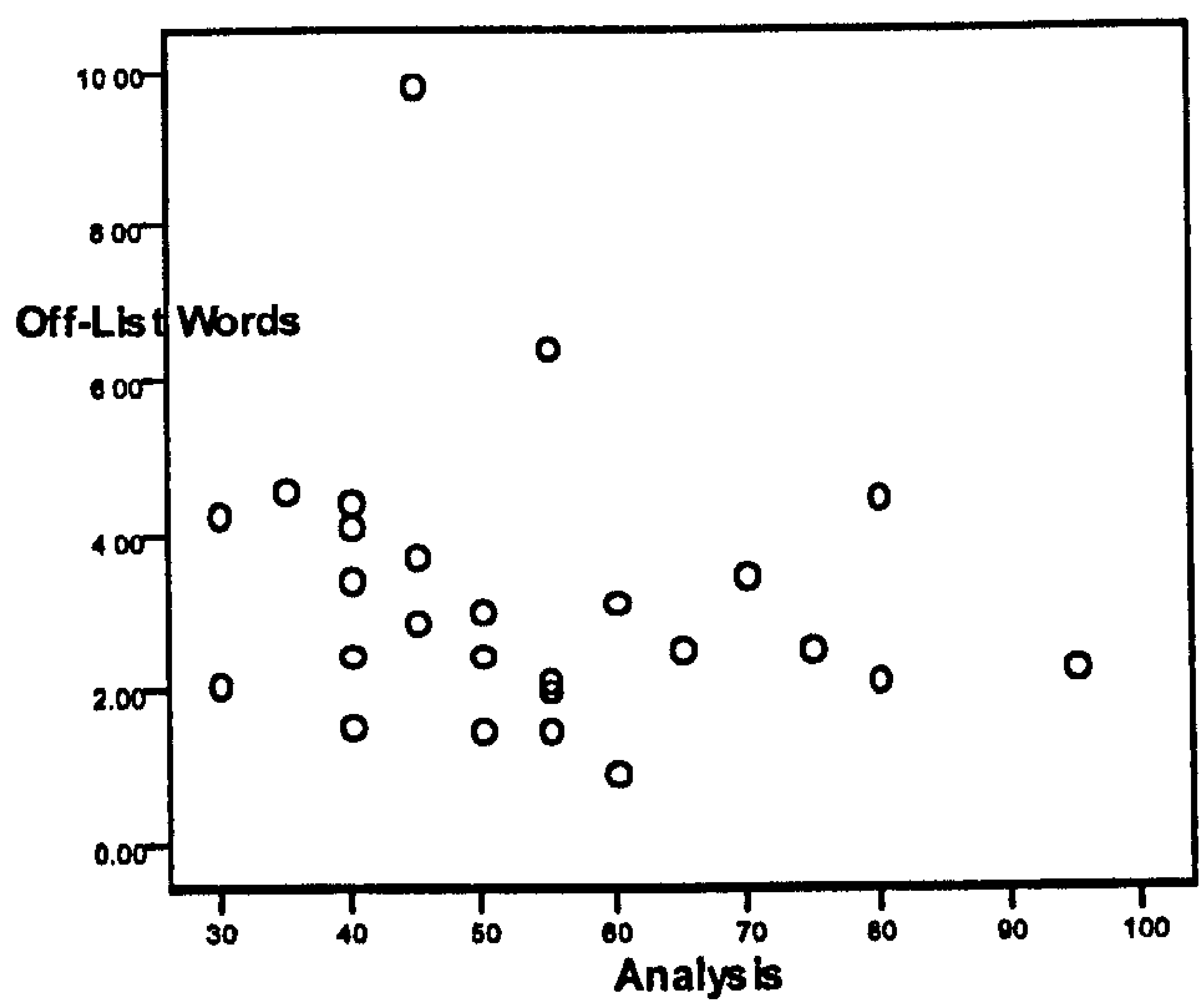
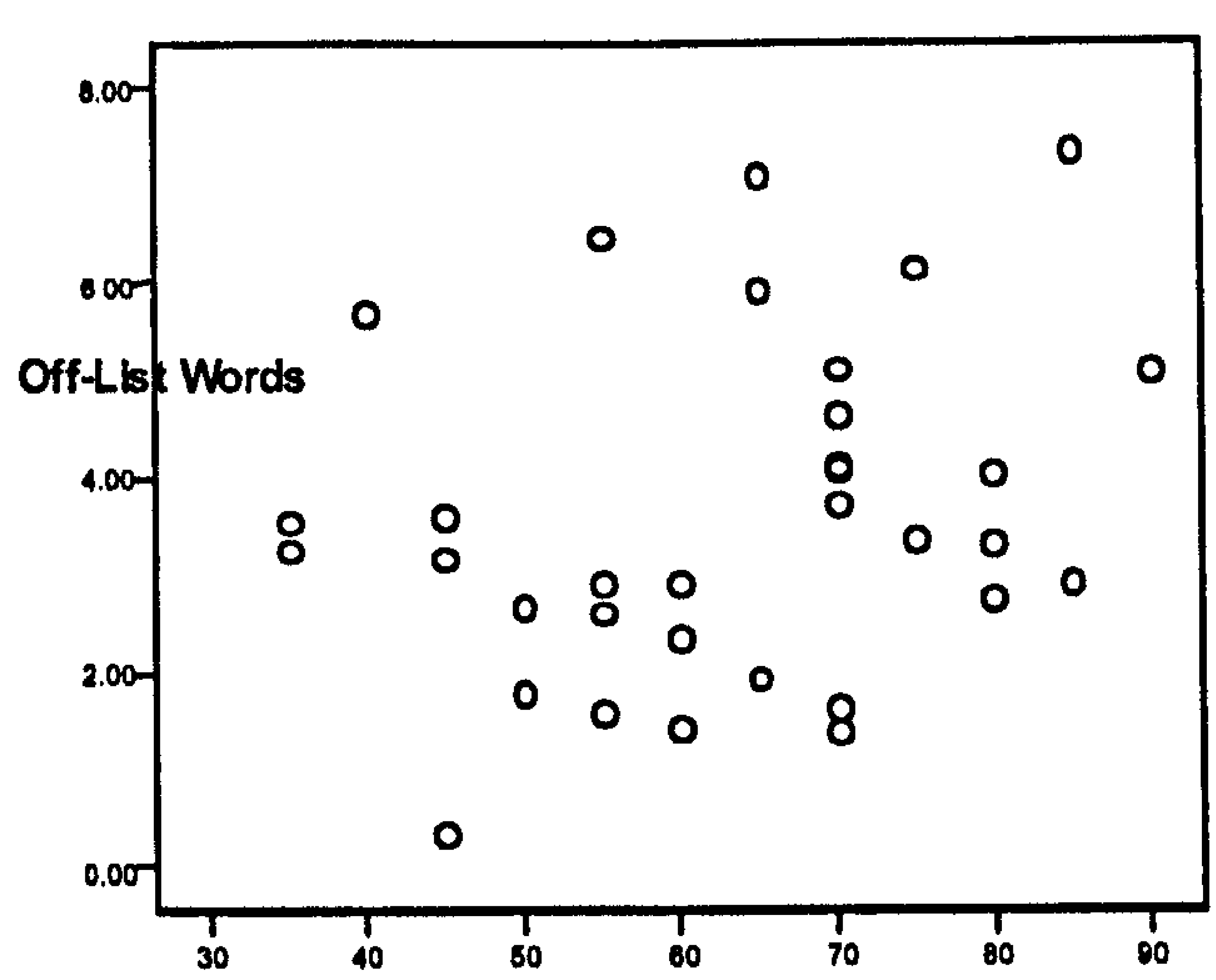


Figure 5.4: Off-List words and Analysis at high proficiency



What the results seem to show is that for those students at the low proficiency level, Memory ability has a clear relationship with the type of words these learners used in their written texts. Those low proficiency learners with high Memory scores rely less on the first thousand frequency words than those with low Memory scores. High Memory ability also has a positive relationship with the use of lexis at the lower frequency levels: the AWL and O/L words. There does not seem to be a clear relationship between the two thousand frequency band profiles and high or low Memory. For the higher proficiency group, however, Memory no longer displays such a strong relationship with the lexical profiles.

The Analysis scores did not show any significant correlations with the lexical profiles. However, there were some interesting patterns of behaviour which were not picked up by the correlational analysis. Although there is no strong relationship between Analysis and K1 words, the high proficiency group tends to rely less on these words and score higher on Analysis. They also tend to use more O/L words and achieve a wider range of Analysis scores.

The results have been highlighted for the main frequency bands in relation to Memory and Analysis; the next section highlights the results for first 500 words, content words and function words which occur in the first thousand frequency band.

5.4.4 Memory and sub-set of K1 words (first 500, content and function)

Table 5.13: Correlations between Memory and the sub set of K1 words (first 500, content and function) at low proficiency

		First 500 Words	Content Words	Function Words
Memory	Pearson Correlation	-.496(**)	-.476(*)	-.026
N = 26	Sig. (2-tailed)	.010	.014	.898

**Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).

At low proficiency level, Memory negatively correlates with the first 500 words and content words, r = -0.496 and –0.476 respectively. This correlation is not surprising given that there was also a negative correlation between K1 words and Memory from the previous set of statistics. Memory also has only a weak negative correlation, r = -.026, with function words, but this relationship is not statistically significant. Recall that Milton (2007) suggested that learners with irregular lexical profiles, i.e. lexical dips in their profiles at K1 and K2, at which level function words occur, may be attributable to a learning style that favoured Memory over Analysis. In other words, Memory scores should correlate negatively with function words. However, in this study this does not appear to have happened.

Table 5.14: Correlations between Memory and the sub set of K1 words (first 500, content and function) at high proficiency

		First 500 Words	Content Words	Function Words
Memory	Pearson Correlation	-.081	-.001	-.103
N = 34	Sig. (2-tailed)	.649	.994	.562

At high proficiency level there is no statistically significant correlation between Memory and the sub-set of K1 words. This lack of correlation between Memory and the sub-set of K1 words mirrors what happens with Memory scores and lexical profiles in the K2, AWL and O/L frequency bands with high proficiency learners. It seems that for the low proficiency group, higher Memory scores are related to less use of the first 500 and content words, but at the high proficiency level this relationship is less strong.

5.4.5 Analysis and sub-set of K1 words (first 500, content and function)

Table 5.15: Correlations between Analysis and the sub set of K1 words (first 500, content and function) at low proficiency

		First 500 Words	Content Words	Function Words
Analysis	Pearson Correlation	.310	-.058	.174
N = 26	Sig. (2-tailed)	.123	.779	.395

Table 5.16: Correlations between Analysis and the sub set of K1 words (first 500, content and function) at high proficiency

		First 500 Words	Content Words	Function Words
Analysis	Pearson Correlation	-.105	.099	-.106
N = 34	Sig. (2-tailed)	.553	.576	.550

At both proficiency levels there are no statistically significant correlations between Analysis and the sub-set of the first thousand frequency words. Recall that Milton's study suggested that "analysers" may be predisposed to acquire structural (function) words to compensate for any dips in their lexical profiles at the 1K and 2K frequency levels. In my study and the previous pilot study, however, the data suggests that Analysis is not quantitatively related to function words. Recall that in the pilot study, level 2 deficit learners (who were thought to have a deficit of function words) had higher, but not statistically significant, mean Analysis scores than those with regular profiles. What these two studies show is that gains in Analysis scores do not correlate with use of function word tokens. However, the previous study used a receptive approach to vocabulary testing (*X-Lex*), whereas this study used a productive approach (*Web*

VocabProfile). The recognition and use of function words place very different demands on the learner.

Table 5.17: Correlations between Memory and Analysis and the sub-set of K1 words at both proficiency levels.

		First 500 Words	Content Words	Function Words
Memory	Pearson Correlation	-.255(*)	-.247	-.064
N = 60	Sig. (2-tailed)	.049	.057	.630
Analysis	Pearson Correlation	-.001	.033	.028
N = 60	Sig. (2-tailed)	.997	.803	.832

*Correlation is significant at the 0.05 level (2-tailed).

When both proficiency groups are put together, we can see that there is only a statistically significant relationship between Memory and the sub-set of K1 words and this is to be found at the first 500 word frequency group. The relationship between Memory and Content words only just fails to achieve significance.

5.4.6 Function words: usage at low and high proficiency

Although the lexical profiles do not measure language accuracy, the use of function (F) words could be related to grammaticisation[11] of the interlanguage. Figures 5.5 and 5.6 show that the use of function words is more erratic for the low proficiency

[11] "With interlanguage [L2] it is the language form that is 'regenerated'...and it is the language function that remains fairly constant" (Rutherford, 1987, pp.40-41).

group than it is for the high proficiency group. Although the means are similar i.e. 51.52% and 51.25% for the low and high proficiency groups respectively, the high proficiency group is much more homogenous insofar as a higher number of learners score around 50%.

Figure 5.5: Percentage of function words at low proficiency

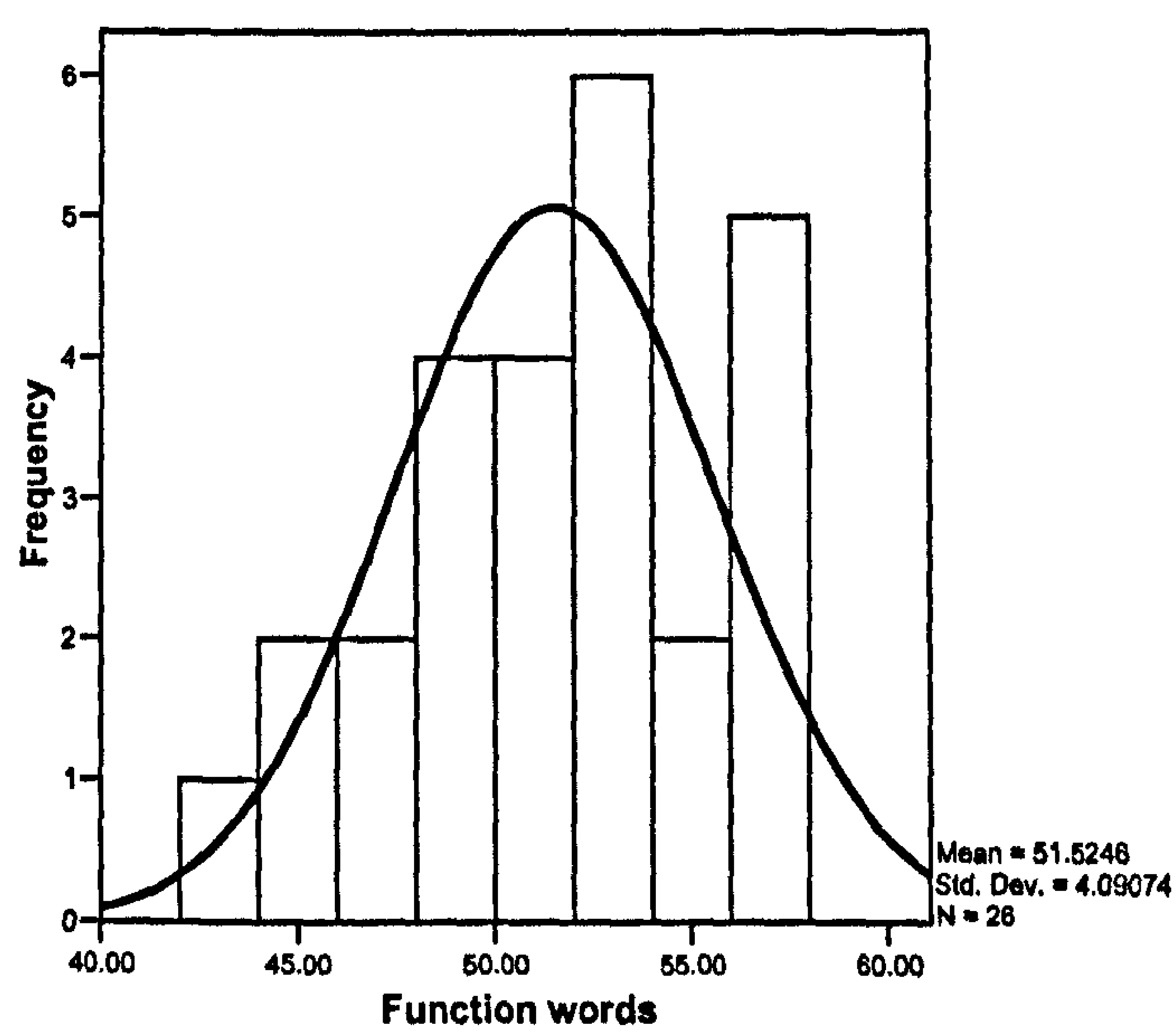
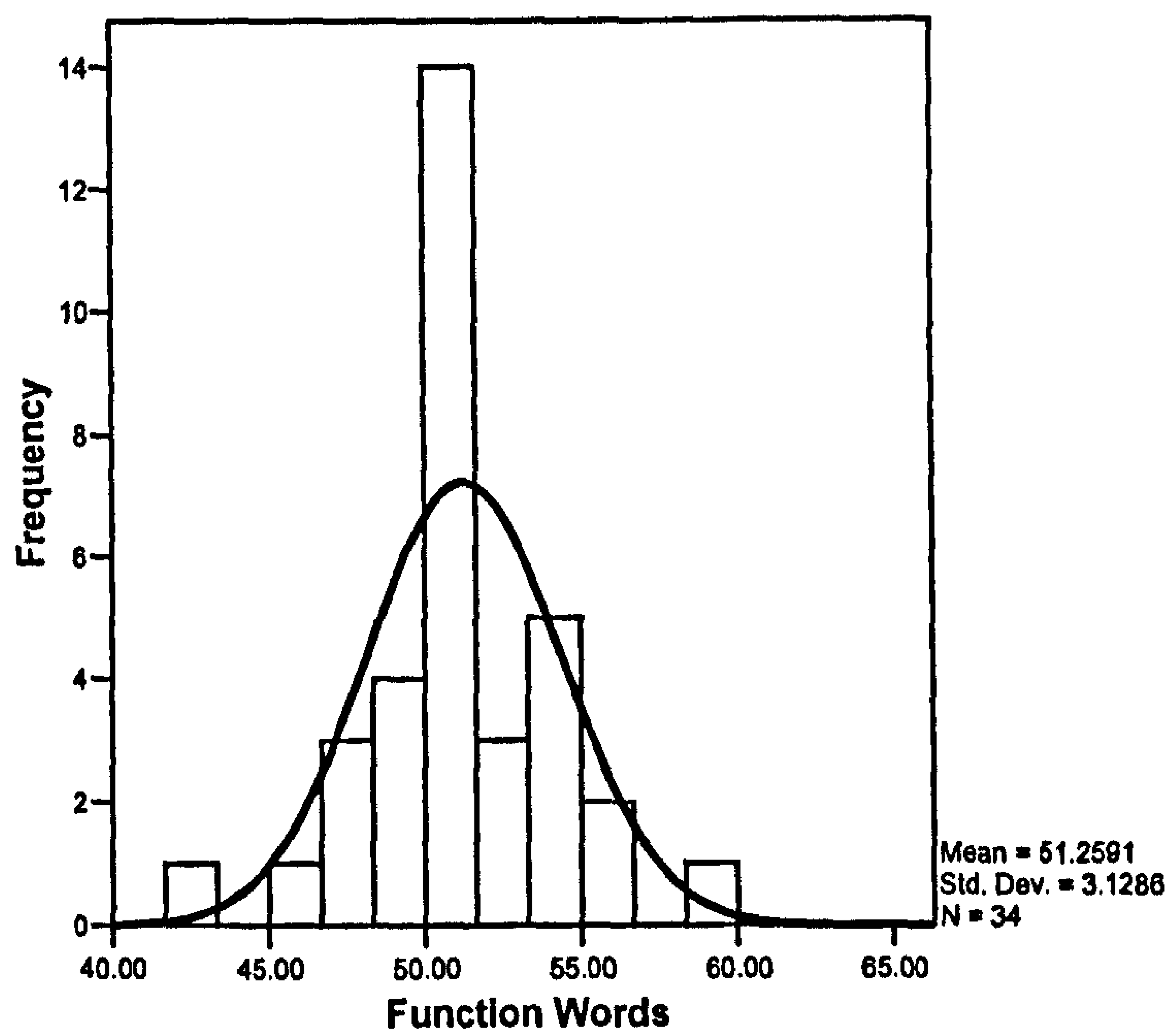


Figure 5.6: Percentage of function words at high proficiency

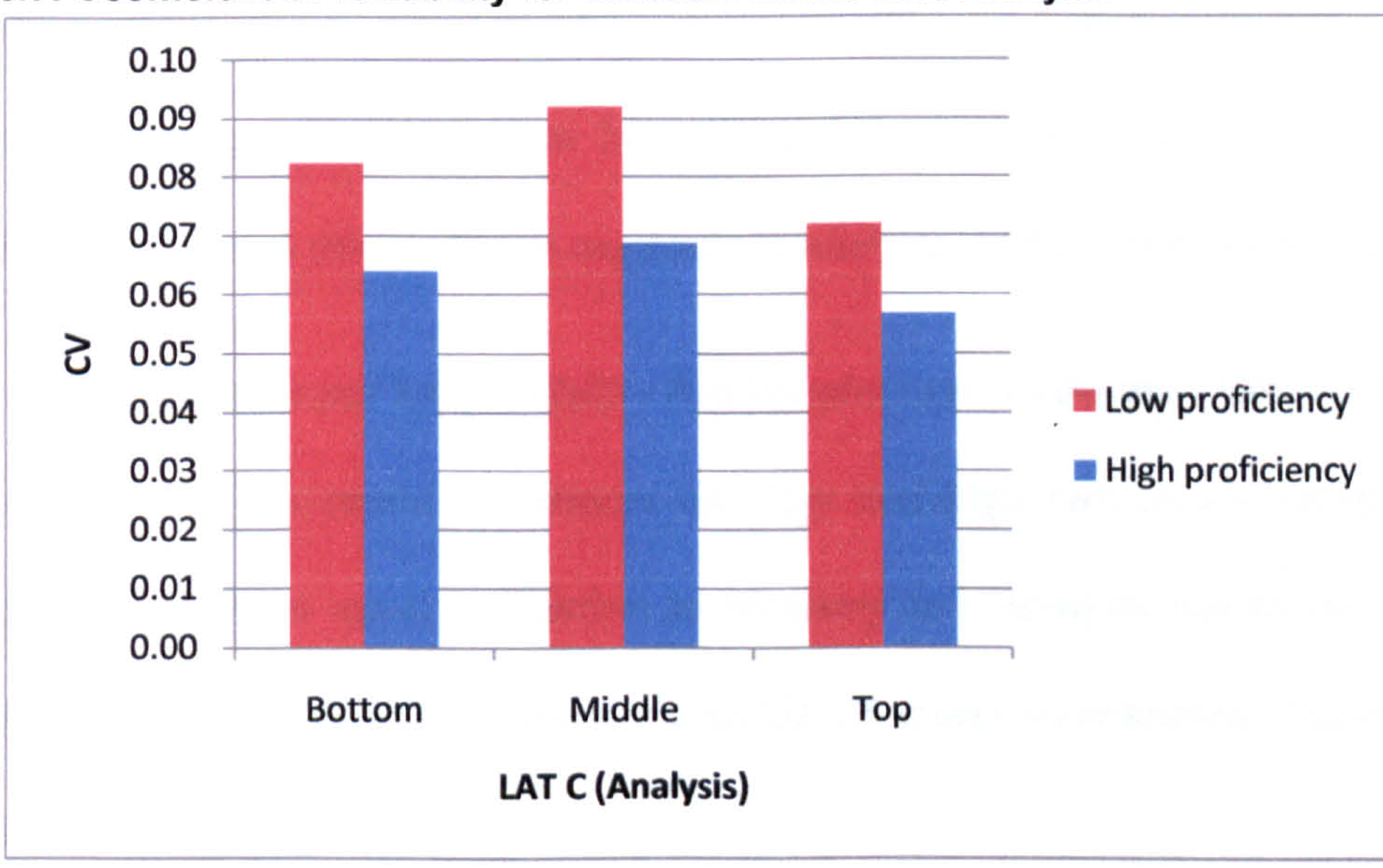


The above figures seem to suggest that the greater the proficiency, the more stable the use of function words. The charts also seem to suggest that although Analysis and function words are not linearly related there may be a non-linear relationship in respect of function words and LAT C (Analysis). Therefore, I reanalysed the data again but this time for variability.

5.4.7 Function words: variability and stability

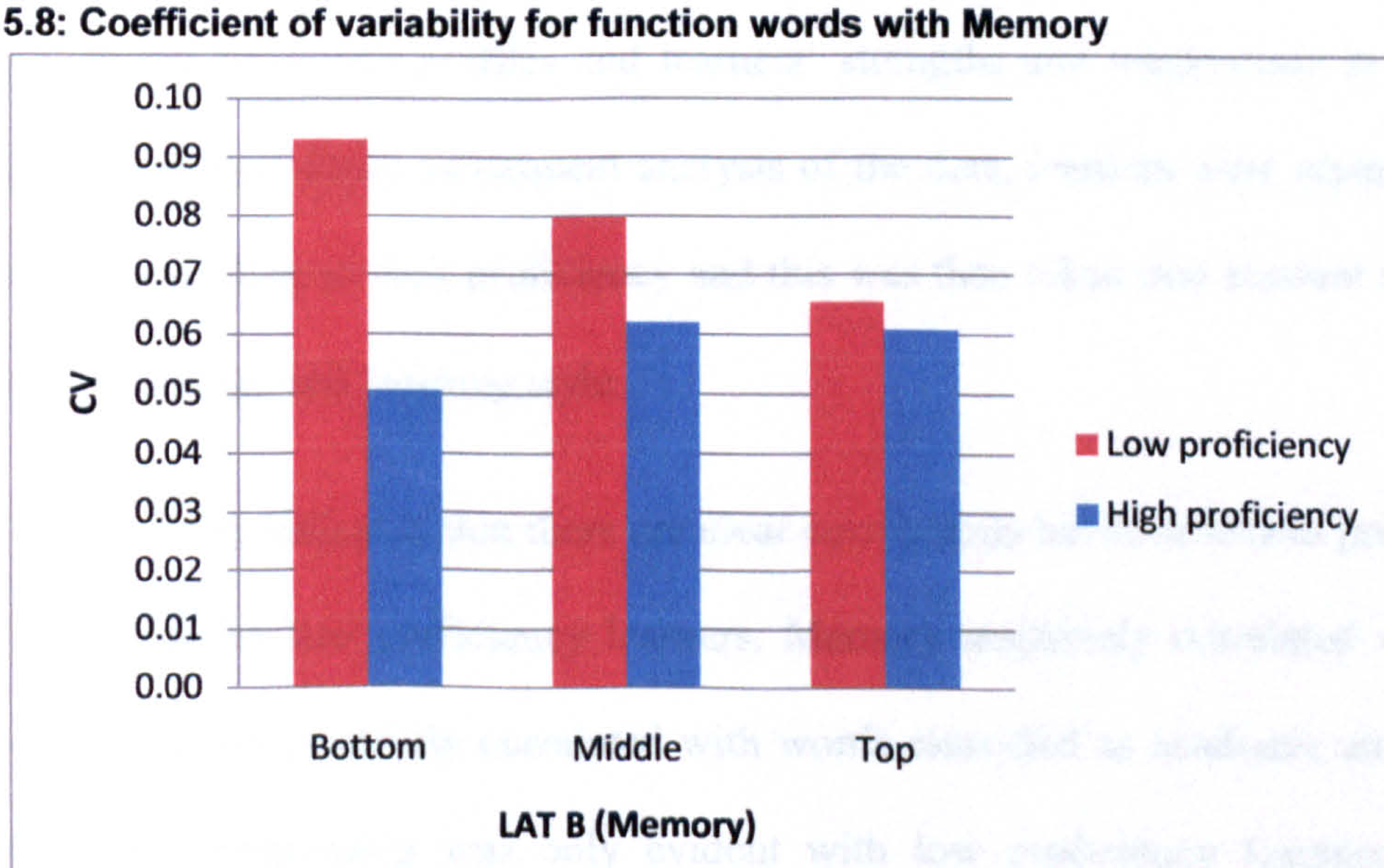
In order to get any insight into this, I decided to compare the LAT scores with the variability of function words. The LAT scores were categorised as Bottom, Middle and Top according to Meara *et al.*'s (2001) normative data on these tests. Variability was defined as the coefficient of variability (CV) which is calculated by dividing the standard deviation by its mean.

Figure 5.7: Coefficient of variability for function words with Analysis



In Figure 5.7 we can see that greater language Analysis tends to result in less variability in the use of function words. The next set of data shows the variability of function words in relation to Memory.

Figure 5.8: Coefficient of variability for function words with Memory



In Figure 5.8 it is the low proficiency learners with the lowest Memory scores who show the greatest variability and as Memory scores increase so the variability decreases. The high proficiency learners tend to be relatively low and stable in relation to variability of function words and Memory scores. The next study will follow up this issue of variability and explore how Memory and Analysis are related to variability in lexical profiles, but in this study the emphasis is solely in relation to function words.

Finally, to rule out the possibility that the previous results may have been skewed by the inaccurate placement of learners into low and high proficiency groups, lexical profiles are examined again in relation to Memory and Analysis scores but this time taken only from the sub-set of learners whose IELTS scores were known. The results can be seen in Appendix 2e.

5.5 Discussion

The main aim of this study was to establish whether there was any relationship between lexical frequency profiles and learners' strengths and weaknesses in Memory and Analysis scores. From subsequent analysis of the data, learners were separated into two groups according to their proficiency and this was then taken into account regarding their lexical profiles and learning style.

The results indicated that there are clear correlations between lexical profiles and Memory scores for low proficiency learners. Memory negatively correlated with high frequency lexis but positively correlated with words classified as academic and off-list. However, this relationship was only evident with low proficiency learners. Lexical profiles from high proficiency learners did not display any statistical significant correlations with Memory or Analysis.

Several important points have emerged from the data. One of them is those learners who tended to score highly on the Analysis test also tended to be classified as high proficiency. This then warrants further discussion of whether Analysis is simply a test of language proficiency i.e. does an ability to infer grammatical patterns operate separately from language proficiency? We also saw that learners categorised as top, middle and bottom in their Analysis scores use a similar percentage of function words, but the variability between these sub-groups revealed non-linear patterns which I will discuss later.

This study also used a methodology of obtaining lexical profiles which differed from Milton's original work. Learners were asked to produce lexis rather than indicate whether they understood words. The results also showed that the relationship between Memory and lexis is fairly clear at the high frequency levels but less so at the low frequency levels. The relationship between the production of lexis at decreasing levels of frequencies and scores on the Memory test are not particularly linear, so these points which have emerged from the findings will be the basis of the discussion in the next section.

5.5.1 *Learner type, proficiency and function words*

The scatter charts (Figures 5.3 & 5.4) above suggested that there might be a relationship between Analysis and Off-List words. The greater use of Off-List words by some learners could indicate that these learners are using a greater range of rarer lexis because their productive use of vocabulary is categorised, to some extent, beyond the two thousand frequency band. Learners who tended to use rarer lexis tended to also have higher Analysis scores, that is to say, they scored higher in inferring grammatical patterns. Both of these factors point towards language proficiency in terms of vocabulary range and grammatical sensitivity. Therefore, there could be a relationship between Analysis and proficiency. To test this notion, both the means of Analysis and Memory scores were analysed in relation to language proficiency.

Figure 5.9: Memory and proficiency

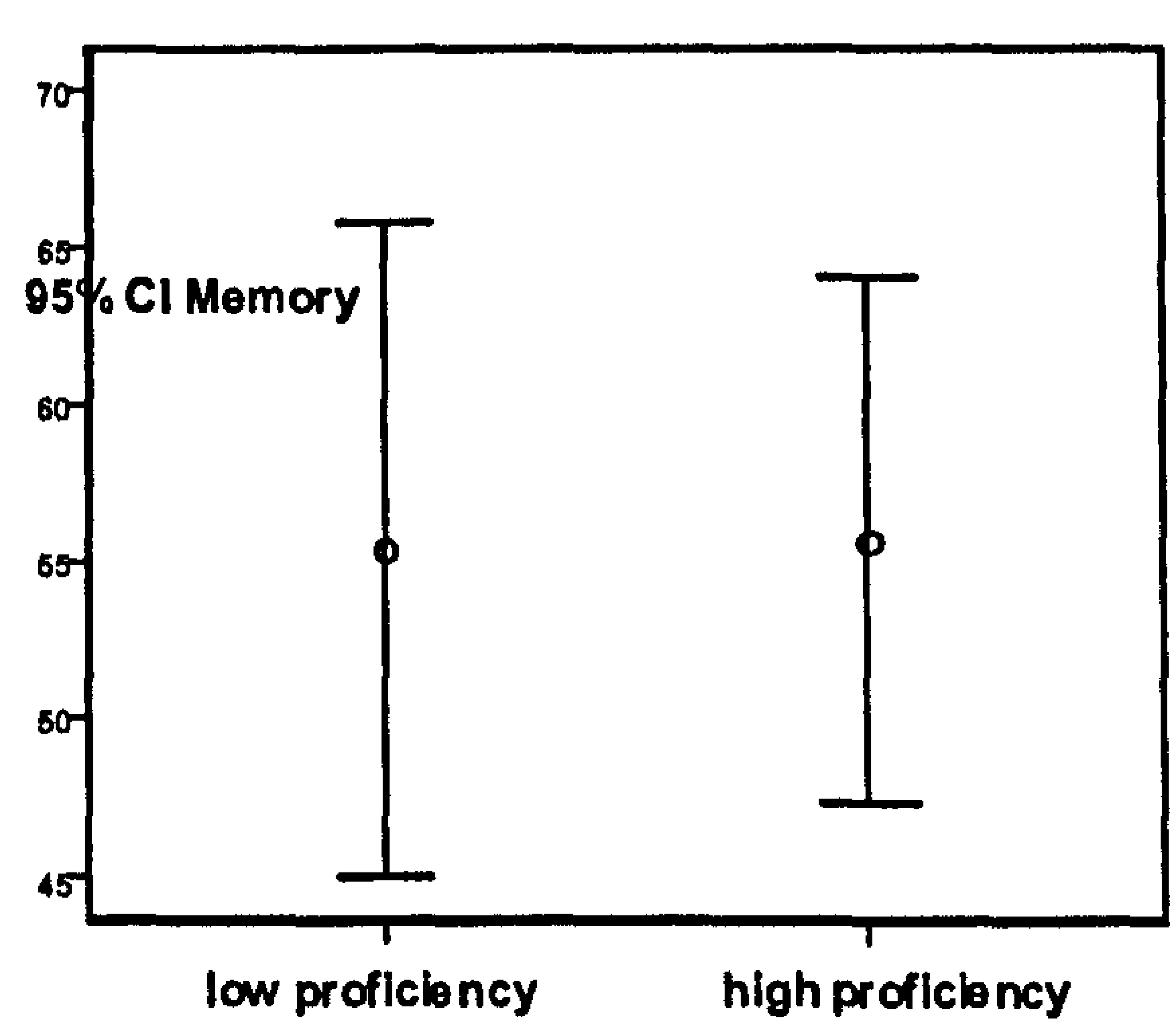


Table 5.18: Mean Memory scores and proficiency

	Proficiency	N	Mean	Std. Deviation	Std. Error Mean
Memory	low	25	54.88	25.99	5.20
	high	34	55.71	23.97	4.11

Figure 5.10: Analysis and proficiency

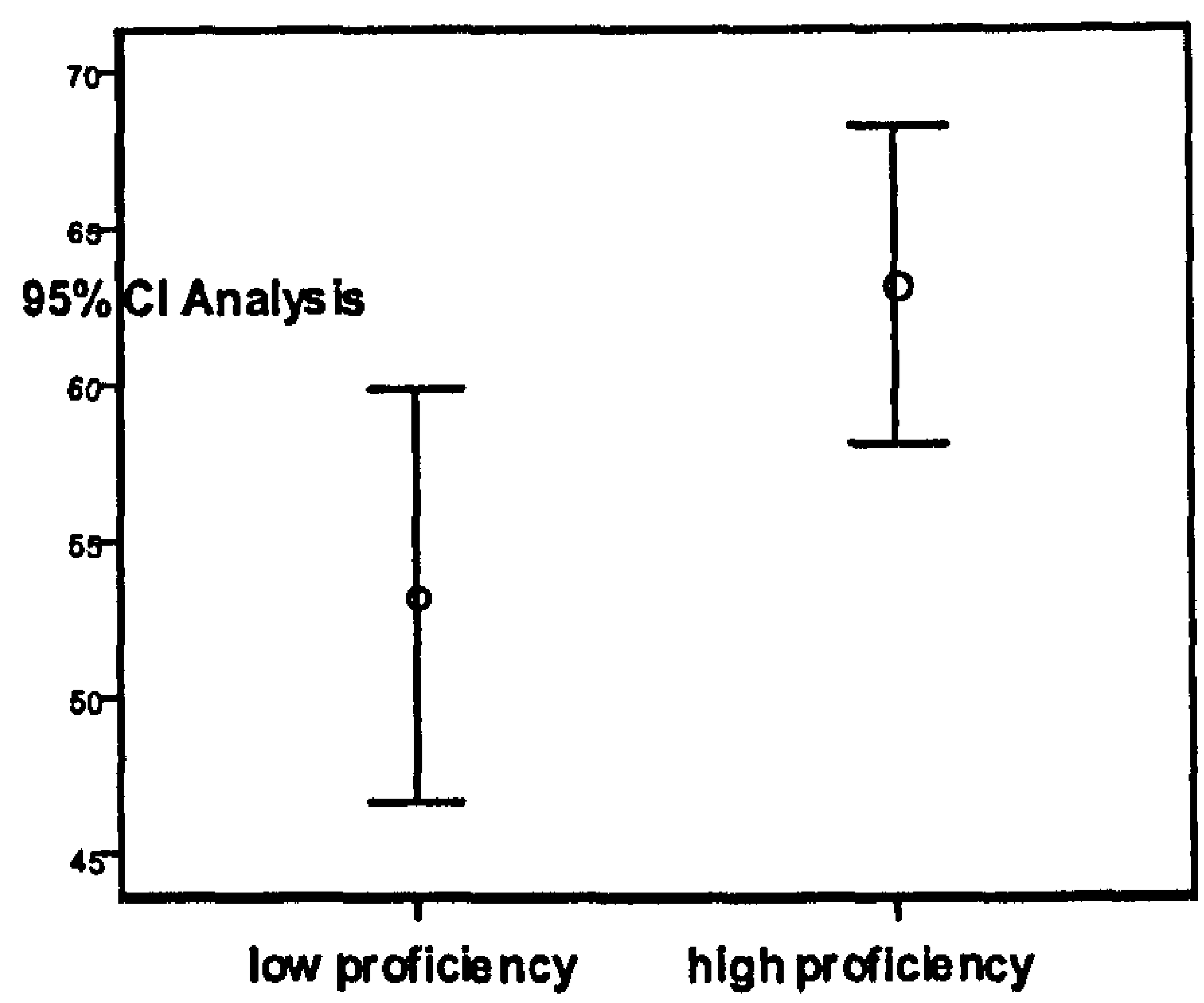


Table 5.19: Mean Analysis scores and proficiency

	Proficiency	N	Mean	Std. Deviation	Std. Error Mean
Analysis	low	25	51.60	14.26	2.85
	high	34	63.24	14.50	2.48

The error bar charts above (Figures 5.9 and 5.10) highlight the differences in mean scores and the spread of confidence intervals for the means at the two proficiency levels. The 95% confidence interval of difference is considerably wider for the Memory scores at each level than the upper and lower Analysis scores. What this shows is that the multiples of the standard deviation for the Memory scores are spread more widely for each proficiency level than the multiples of the standard deviation for the Analysis scores. Furthermore, the mean Memory scores at low and high proficiency are virtually identical, whereas the mean Analysis scores at each proficiency level are different.

An independent samples t-test was carried out to confirm whether the differences in the mean Analysis scores at low and high proficiency level were statistically significant. Those students who were classified as low proficiency[12] (M = 51.60; SD = 14.26) scored lower on the Analysis test than those students classified as high proficiency (M = 63.24; SD = 14.50). The difference is significant beyond the .05 level: t (df 57) = 3.06; p = 0.003. The 95% confidence interval on the difference between means is (19.23, 4.03), which excludes zero. Cohen's d = 0.80, which is a "medium" effect in his classification of effect size (Cohen, 1988). This suggests that Memory is not related to language proficiency but that Analysis might be related.

The mean Memory and Analysis scores in relation to proficiency have important implications as to whether we can separate style from ability. Recall that in the strict sense of the word learning "style" is not attributable to any talent or skill, rather, it is how a learner normally approaches a learning task. Learning (or in this context language learning) ability or aptitude is assumed to be an underlying endowment which is relatively stable (Politzer and Weiss, 1969 cited in Skehan, 1998, p.188). Research from Skehan (1986) and Wesche (1981) has shown that language learning aptitude not only influences how learners approach language learning but also their achievement. Skehan

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[12] A boxplot revealed that case seven was an extreme case i.e. a very high Analysis score (95%) but was classified at low proficiency and so was removed from the t-test. Although the IELTS score (5.5) categorised this learner as low proficiency, the *X-Lex* score (3800) categorised the learner as high proficiency.

and Wesche have highlighted that language memory ability and analytic ability both play an important role. Their studies show that there is a relationship between language achievement and the aptitude test performances. The discussion in this section will highlight how Memory and Analysis scores relate to learners' productive vocabulary in the form of their lexical profiles. Memory in this study is simply associative memory and does not concern itself with access or retrieval. Analysis refers to a skill in understanding grammatical patterns.

One possible explanation why proficiency and Analysis seem to be related might conceivably be that the proficiency tests and the Analysis test are measuring the same thing and so are simply different forms of the same test. In fact this seems unlikely because most of the proficiency scores were taken from the IELTS exam which is a composite score of the four language skills (reading, writing, listening and speaking). The Analysis score measures the learner's ability to find or infer language rules from examples of an unknown language. Whereas the IELTS exam is an overall indication of language proficiency, the Analysis test is an indication of the learner's ability to analyse language. Moreover learners who have strong analytical skills may be more comfortable with written tasks and grammar exercises rather than real time communication (see Wesche 1981).

Research by Robinson (1997) suggests that Analysis i.e. grammatical sensitivity is related to language form. In Robinson's study, aptitude MLAT (sub-tests part 4: *words in sentences* and part 5: *paired associates*) correlated the least in test performance where the focus was on incidental learning and towards processing meaning. However, when the focus was switched to implicit learning (i.e. a memory task) and rule search and instructed learning then aptitude, and especially part 4 (analytic aptitude), correlated the highest with language test results. These findings are interesting insofar as when the focus is on form then analytic aptitude of language learning (i.e. grammatical sensitivity) takes effect. When the focus is purely on meaning then the correlation to aptitude is less clear.

My own view is that the LAT C, grammatical sensitivity, favours higher proficiency learners because although the test is of pseudo language, the corresponding translations are in English. Therefore, learners need a relatively high level of English to compare the pseudo language with English in order to infer grammatical patterns in the new language. Although it is not a direct test of their level of English, it does test their English indirectly. At the time of writing, this test is not commercially available in any other languages apart from English.

The pattern in my study could indicate that the ability to infer grammatical rules (i.e. Analysis) is an underlying aptitude which relates to language proficiency but is not a proficiency test per se. Learners' ability to form associative bonds in memory between L1 and L2 vocabulary items (i.e. Memory) does not appear to be related to proficiency in my study. The mean Memory scores for low and high proficiency were similar.

A possible explanation is that it may take a longer time for second language learners to achieve proficiency beyond an intermediate level if they do not have reasonable ability for grammatical sensitivity. Memory in my study only appears to be related to rarer lexis in the earlier stages of language development. It seems to suggest that associative memory is more marked in the earlier stages with the production of lexis which may or may not be analysed. It is possible that lexis "bootstraps" grammatical competence in that a learner needs a large store of lexis for achievement in syntax and morphology (Ellis 2001, p.47). My study suggests that with low proficiency learners although there is a relationship between associative memory scores and rarer lexis use, there is not a linear relationship between rarer lexis and grammatical sensitivity. Grammatical sensitivity (Analysis) may not be directly associated with rarer lexis but rather deeper knowledge of lexis which the *VocabProfile* and *X-Lex* cannot detect.

On closer inspection, the Analysis test seems to be an indication of restructuring, i.e. what McLaughlin (1990, p.117) describes as the qualitative changes that take place in the learners' L2 at certain stages of development. This is a process in which language knowledge becomes more structured in that there is a move from "exemplar-based representations to more rule-based representations" (p.118). To take McLaughlin's (1990, p.118) example, learners may start from representing the past tense forms as separate items and then move to representing them as a general rule for past tense. From a lexical perspective, Ijaz (1986, p.405) describes acquisition which "involves the mapping of two lexical and conceptual systems onto each other". Restructuring can be seen as a process in which the L2 becomes reorganised into more efficient, new units. The ability to analyse grammatical patterns may be a prerequisite for the process of restructuring to happen. Analytic learners may also use function words in a qualitatively different manner to learners who are not predisposed to analyse language.

We saw in Figure 5.7 how the variability of function words tended to decrease in relation to higher LAT C Analysis. In this context it could be described as interlanguage which is more stable in terms of the frequency of a range of function words. The Bottom and Middle groups could have a less developed ability to analyse and so their use of function words might be in more of a developmental stage in which there is greater variability in the dispersion of function words in their interlanguage (especially with the low proficiency learners). For example, some of the central meaning features of function words could be overused whilst the non-central meaning features are underused (Ijaz, 1986, pp.440-1), thus encouraging learners to display greater variability in the frequency percentage of function words.

In Figure 5.8, the variability of function words across the different Memory scores was also non-linear. Recall that at low proficiency, as Memory scores rose then variability decreased; however, this trend did not exist at the higher proficiency level. It is possible that low proficiency learners with weak memories are more prone to over or under use function words. Possibly, they too over-use the semantically transparent meanings of function words but underuse the semantically opaque meanings of grammar words because semantically transparent meanings may be more memorable. However, as these learners attain greater proficiency then the variable use of function words fades and a more stable pattern of function words emerges. In the following study this theme of variability and stability is taken up again but in relation to lexical diversity. Chapter 9 will also discuss semantically transparent and opaque vocabulary.

5.5.2 Proficiency, vocabulary size and learning style

From the previous set of results we have seen that LAT B (Memory) correlates with frequent lexis (negatively) and rare lexis (positively) with learners classified as low proficiency. However, this relationship was weak when high proficiency lexical profiles were analysed. It is possible that there was only a weak relationship with high proficiency learners because they do not necessarily produce profiles that reflect the wide range of productive lexis available to them. In other words, high proficiency learners may choose not to use rarer lexis, whereas lower proficiency learners, by definition, have no choice but to use high frequency lexis. With this in mind I decided to use the *X-Lex* data from this study to examine vocabulary size and learning style. Table 5.20 below highlights the correlations between *X-Lex* and LAT B and LAT C.

Table 5.20: *X-Lex* and LAT B (Memory) and LAT C (Analysis)

High proficiency (IELTS 6.0 or above)		**Memory**	**Analysis**
X-Lex (adjusted)	Pearson Correlation	.433*	.309
	Sig. (2-tailed)	.011	.075
	N	34	34
Low proficiency (IELTS 5.5 or below)		**Memory**	**Analysis**
X-Lex (adjusted)	Pearson Correlation	.196	.018
	Sig. (2-tailed)	.338	.929
	N	26	26

*Correlation is significant at the 0.05 level (2-tailed).

Vocabulary size and Memory are only significantly correlated at high proficiency. At lower proficiency, there is no significant correlation between *X-Lex* and Memory. Recall that correlation between productive lexis and Memory were only found with low proficiency learners. When learners are required to produce lexis it will inevitably come from a smaller pool of lexis than the words which learners can recognise and so could give a more extreme relationship between lexical frequency and Memory at low proficiency. At higher proficiency learners do not necessarily have to draw upon high frequency lexis so much but they may do so in written production, which may weaken the correlation between Memory and frequency. When we turn to a measure of vocabulary size, higher proficiency learners are able to draw upon rarer lexis as well as frequent lexis. They will normally have a greater pool of lexis and so may produce more extreme *X-Lex* scores which, when associated with Memory, could be why there is a stronger correlation. In short, high proficiency learners' lexical production may not elicit such extreme scores, whereas lexical recognition may and this may affect correlations with Memory.

What this tells us is that when learners are at a higher proficiency then vocabulary <u>size</u> and Memory strengths appear to be associated. At lower proficiency, frequent lexis negatively correlates to Memory because these learners do not have the scope of a wide range of vocabulary to draw upon. This suggests that at low proficiency the strong negative correlation between LAT B and K1 lexis and positive correlations with AWL and Off-List may partly be an artefact of the test. High proficiency, high Memory learners tend to produce more random productive profiles, which could explain their ability to remember rare words but not necessarily use the more frequent function words.

5.5.3 Lexical development and learning style

Memory clearly correlates with the lexical profiles of low proficiency learners. Although the results are a "snapshot" of the learners at a particular stage of their development, as the Memory scores increase the use of high frequency words decreases. So why is the relationship not so clear at the higher proficiency level?

Schmitt and Meara (1997, p.25) found that as the learners' language develops then learners "do not know all (or even most) of the words at the basic higher frequency levels before they begin learning rarer words at lower frequency levels". That is to say, learners do not progress smoothly from high frequency words to low frequency words. In Chapter 4 there was a sizeable proportion of learners that displayed irregular profiles.

Moreover, the present study has also shown that neither Memory nor Analysis scores show a strong relationship with function words. Therefore, the pattern appears to be that as the learner's lexis develops then the relationship with Memory and word frequency becomes more complex and non-linear. This is hardly surprising given the range of factors that are involved in acquiring and using a word (see section *2.5.4 Intrinsic word knowledge*). These will all impact on the rate and order of acquisition. Moreover, in the present study only the skill of associative memory has been examined in relation to lexis use. Other types of memory skills may affect learners' lexical profiles.

The relationship between Memory and lexis is not linear or accumulative at higher proficiency levels possibly because of the phenomenon of restructuring. Certain lexical items may have become routinised (i.e. automatic) without being analysed. As mastery develops then these items become more analysed and so form the basis of a rule-based system rather than a more holistic or memory-based system (see Lightbown, 1985 and McLaughlin, 1990). If the language remains formulaic, the learner may be able to recall and productively use a certain number of lexical items in formulaic expressions but they may not be sufficiently analysed to be used in more creative language. As such, the correlation between Memory and K1 words in this study may show that for low proficiency learners some of the items that they have acquired in the K1 band may be more closely linked to their associative memory because the learners might not have analysed them sufficiently in order to use them across a wide range of contexts.

Henriksen (1999, p.308) calls this the "process of discovering links between words...fitting the words together in semantic networks".

The higher proficiency group may not exhibit a clear relationship between their productive lexical profiles and Memory because they may be using certain lexis in a qualitatively different manner. Their depth of knowledge of the lexis (Wesche and Paribakht, 1996) may be greater and so their productive use of lexis may be analysed more and more accurately and therefore not be so closely associated to a more holistic, memory-orientated use. In my study it is difficult to know precisely how accurately the learners used the lexis. The *Web VocabProfile* is a quantitative measure of learners' vocabulary and only measures what percentage of words is produced at each frequency level. It does not give any indication of how well particular words are known so the *Web VocabProfile* is largely independent of syntax and text cohesiveness. Nevertheless, the frequency graphs for function words show that high proficiency learners tend to use the grammar words in a more consistent manner than low proficiency learners. In Chapter 8 texts will be evaluated in a qualitative manner to get a fuller understanding of lexical quality.

We have also seen that high proficiency learners tend to have higher Analysis scores, and that these scores tend to be clustered closer together than the Memory scores. This suggests that although Memory scores can be fairly varied at higher proficiency levels, Analysis scores are less varied and more tightly clustered, so there may be a relationship between lexical development and an analysis-orientated approach. However, it is difficult to speculate whether analysis drives lexical development forward or not because, in my study, more advanced language learners do not necessarily produce noticeably rarer lexis than less advanced learners.

It is possible that less variability of function words is related to a more systematic use of lexis. We have seen that a stable use of function words tends to be related to the high proficiency learners and that a wider spread of scores tends to be related to lower level learners. Moreover, those high proficiency learners tend to score better on the Analysis dimension of learning style. From the above discussion, the focus of the research needs to change in order to understand how a restructuring process relates to lexical profiles, in particular, how learners with a memory-based approach differ from learners with an analysis-based approach to vocabulary learning.

5.6 Conclusions

This study sought to investigate whether there was a relationship between analytically-orientated learners and memory-orientated learners and their lexical profiles. In particular, how Memory and Analysis, as measured by LAT B and C respectively, are associated with the productive lexis in learners' written texts. Additionally, it was important to understand the degree to which L2 proficiency interacts with learning style and lexical profiles. The results produced some intriguing patterns which go some way towards answering the questions posed in this study. This study has empirically shown that there are correlations between learners' Memory score and lexical profile. It has shown that learners categorised as low proficiency tend to use fewer basic high frequency words as their Memory scores increase. This shift is reflected in their use of low frequency words which tend to increase as their Memory scores increase. When the focus is on learners classified as high proficiency this trend is less coherent. Part of this relationship may be due to the effect of low proficiency learners using more of their lexical resources whilst higher proficiency learners were using less and so the association with Memory becomes weaker at higher proficiency levels.

However, there is a relationship between Analysis and language proficiency. Learners who were classified as high proficiency tended to have higher mean Analysis scores than learners who were classified as low proficiency. This pattern was not replicated when Memory and proficiency were compared. I argued that the LAT C is not a test of proficiency but, rather, is a test of grammar in a fictional language which some learners may find difficult because of their approach to language learning. Some learners may focus more on the meaning and use than the analysis of language itself.

The results from this study point to the complex relationship between productive vocabulary knowledge and learners' strengths and weaknesses in Memory and Analysis. At lower levels, associative memory skills are clearly related to the production of rarer lexis whilst at higher levels the picture is less clear. Learners who have achieved high proficiency levels in their L2 can, generally, infer grammatical patterns more effectively than low level learners. The pattern which seems to be emerging is that at the lower language levels Memory is related to a quantitatively greater use of lower frequency lexis, whilst Analysis may be related to a qualitative process of restructuring which would explain why the scores are related to greater language proficiency.

Complicating the issue is how proficiency interacts with the function word profiles. It seems that as proficiency increases then the use of function words becomes more stable. When we examine this phenomenon in relation to learning style, then we see that increasingly greater Analysis and Memory scores lead to greater stability of function words, particularly at low proficiency.

This "snapshot" of learners sheds some light on the process of restructuring at various levels of proficiency. Firstly, it appears that at higher proficiency levels their productive vocabulary profiles are not linearly related to memory (as measured by LAT B) insofar as they steadily move from high to low frequency lexis. This implies that as the learners restructure their language then the relationship with memory becomes less clear. Nonetheless, what becomes more apparent is that at higher proficiency levels learners display a relatively high degree of analysis ability (as measured by LAT C) which may be related to restructuring. The above discussion points towards the need to explore further the relationship between lexical variability and learning style. Lexical diversity rather than frequency will be measured because lexical diversity is strongly affected by how learners structure and complexify their language.

6 The variability of lexical diversity profiles and its relationship to learning style

6.1 Study 3

The work reported in this chapter is concerned with variability in learners' lexical production across different data sets. The work follows on from the previous chapter in that it is concerned with variability of the mean rather than the mean value itself. Variability in learners' lexical profiles is an important source of information to not only understand development, but also the processes which drive it forward. Van Geert and van Dijk (2002, p.341) argue that "[v]ariability is viewed as a potential driving force of development and a potential indicator of ongoing processes". There is also a shift in the way lexical richness is measured. Instead of lexical frequency, lexical diversity will be measured. Lexical diversity measures the extent to which learners avoid repetition of the same words and so is used in this study because it is possible that diversity is connected to the complexification of learner texts. I intend to explore the question of whether variability in lexical profiles can be associated with learning style.

6.1.1 Variability

To measure variability standard deviation (SD) is probably the best-known measure (square root of the variance, which is in turn the average of the squared deviations from the mean). However, a problem arises if we want to compare SDs of different datasets (van Geert and van Dijk, 2002, p.361). The SD is sensitive to the mean and so a higher mean is usually associated with a higher SD. Therefore, straightforward comparisons of the SD are not possible without taking into account the mean. An alternative measure is the coefficient of variability (CV), which is the standard deviation of a sample divided by its mean. This unit specifies the amount of SD in a standard unit of the mean which can be used when comparing different data sets. In this study the coefficient of variability will be used to describe the data. In order to test for differences in variability, Levene's test is used to determine whether differences in variability are in fact statistically significant or not.

6.1.2 Lexical diversity

Meara and Miralpeix (2007b) explain that the repetition of function words and sentence structure are related, so rather than measuring the text against frequency data, in my study it is measured by using type token ratio (TTR). Meara and Bell (2001, pp.6-7) coin the terms "extrinsic measures" of lexical richness versus "intrinsic measures" of lexical variety respectively to highlight the difference between external criteria based on frequency lists and internal criteria based on the text itself. Problems with TTR have been well documented (e.g. Jarvis, 2002). One of the fundamental problems with this measurement, and other functions of TTR for that matter, is that the TTR falls as the number of words increases. A person theoretically only has a finite amount of words at their disposal and so as the text increases in tokens then likelihood of repetition of tokens of the same type increases. This is why TTR is high to begin with when there is less repetition but then gradually decreases over a larger sample of words.

Malvern and Richards tackle this phenomenon by producing a method of measuring lexical diversity that is a measurement made over a series of points in order to establish the pattern of fall of the curve rather than any particular value on it (Malvern *et al.,* 2004 p.59). Parameter D[13] (for diversity) calculates a mean segmental TTR for a random selection of words from the text. Skehan (2009, p.108) describes the D value as "an index of the extent to which the speaker [or writer] avoids the recycling of the same set of words." The statistic which is calculated is not any particular point on the curve but it is the pattern of fall of the curve which is calculated. The parameter is a mathematical ideal curve which is the closest fitting curve to the actual TTR curve from real language. The program (*vocd*) "...can read a transcript of the language sample, then plot the TTR verses tokens curve between N = 35 and N = 50, deriving each point from an average of 100 trials on sub-samples of words of the token size for that point" (Malvern *et al.,* 2004, p.55).

This measure of lexical diversity has been used in a cross-sectional study (Malvern *et al.,* 2004, pp.153-176) of nearly one thousand narrative compositions written by English school children of the ages 7, 11, and 14 years. One of the aims was to look at the relationship between lexical diversity and the quality of writing as assessed in accordance with the National Curriculum guidelines. Lexical diversity, as measured by D, was sensitive to writing quality and showed continuous development across levels in writing as defined under the National Curriculum.

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[13] $TTR = D/N * [(1 + 2 * N/D)^{\frac{1}{2}} - 1]$ N= the number of word tokens.

A more recent study by Daller and Xue (2007) has shown that Malvern and Richards' measure *D* discriminates between two different groups of learners: Chinese learners of English who had spent a year in the UK and another group of similar learners who had not. Transcriptions of oral data were analysed using Malvern and Richards' measure *D*, *P-Lex* (see Study 5 Chapter 8), Advanced Guiraud[14], LFP/Beyond 2000 and Guiraud[15]. A one-way ANOVA for the measures showed that the p-values and the Eta^2 indicated that Guiraud and *D* were the most appropriate measures.

6.1.3 Research question

In light of the above, the research question of this study is concerned with Memory and Analysis and the relationship with the variability of learners' diversity profiles: How are LAT B (Memory) and LAT C (Analysis) related to the variability in productive lexical diversity?

I would expect to find lower CVs in lexical diversity for learners who score high on LAT C (Analysis) because Analysis has been associated with stability in function words from my previous empirical work. I would also expect to find higher CVs

[14] This is calculated by dividing the advanced types by the square root of tokens in a text.

[15] This is calculated by dividing the types by the square root of the tokens.

especially from low proficiency learners who score low on the LAT B (Memory) because low Memory scores have been associated with high variability in function words.

6.2 Method

6.2.1 Participants

The learners of English comprised of undergraduate and postgraduate students from a pre-sessional English course at Kingston University. The mean age of the learners was 26 years (oldest 41, youngest 19). The learners were categorised into two proficiency groups to understand how variability interacts not only with learning style but also with proficiency. Low proficiency was categorised as learners who score IELTS 5.5 or below and high was proficiency IELTS 6.0 or above. Table 6.1 below shows the number of the participants in each group as categorised by their IELTS score.

Table 6.1 Frequency of low and high proficiency levels

Proficiency	N	Percent
Low	25	40.3
High	37	59.7
Total	62	100.0

It is worth noting that the overall IELTS scores were taken. Some learners who were classified as low proficiency actually had IELTS scores over 5.5 in their writing, and some learners classified as high proficiency had writing scores below 6.0. Table 6.2 below shows the mean IELTS writing score from both proficiency groups. Five learners were excluded from this table because no information was available on their IELTS writing score.

Table 6.2: Mean IELTS writing score

Proficiency	Mean	N	Std. Deviation
Low proficiency	5.458	24	.3269
High proficiency	5.773	33	.4163

As shown in Table 6.3, they were mostly postgraduate students. Half of the participants were male.

Table 6.3: Status

Status	N	Percent
Undergraduate	19	30.6
Postgraduate	43	69.4
Total	62	100.0

The participants had a wide variety of first language backgrounds. Table 6.4 below highlights that most were Asians whose first language background was not cognate with English.

Table 6.4: Participant L1s

L1	N	Percent
Korean	16	25.8
Mandarin	11	17.7
Thai	9	14.5
Arabic	7	11.3
Farsi	3	4.8
Gujarati	3	4.8
Cantonese	2	3.2
Japanese	2	3.2
Bulgarian	1	1.6
Greek	1	1.6
Italian	1	1.6
Lithuanian	1	1.6
Polish	1	1.6
Spanish	1	1.6
Taiwanese	1	1.6
Telugu	1	1.6
Turkish	1	1.6
Total	62	100.0

6.2.2 Learning style groups

All participants were tested for Memory (LAT B) and Analysis (LAT C). Each proficiency group was then sub-divided into the high and low Memory-Analysis matrix. The participants were grouped into high and low Memory and Analysis dimensions based on Meara *et al.*'s (2001) findings of bottom, middle and top. LAT B scores 43%-73% are classified as the middle (with a score of 58% as the median). Therefore, <58% were classified as low, 59% > as high. Middle LAT C scores in Meara *et al.* are 60%-69% so < 64% were classified as low, 65% > as high.

In order to obtain productive lexis, the learners wrote a single text which was elicited via a discursive type question under timed conditions with no dictionaries or electronic translators. In this study, the participants write discursive essays. This might have the effect of producing more varied profiles as learners are encouraged to express their ideas rather than describe a series of cartoons. The essay question elicited a situation-problem-solution-evaluation text on the topic of globalisation. All students had a choice of two questions[16] related to this topic of which they were given texts to read

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[16] 1) The process of globalisation has given rise to a number of cross-cultural problems. Identify one of those problems, explain the situation which gives rise to the problems and offer some solutions. You should also evaluate your solutions.

2) There are a number of problems associated with the rise of English as a world language. Outline some of these problems, explain how they arose, offer some solutions and evaluate your proposed solutions.

beforehand. The question on cross-cultural communication was twice as popular as the question on English as a world language. All participants were allowed to bring to the writing session one sheet of hand written notes (i.e. not copied out chunks of text) and only three quotations. In section *8.6.2 Qualitative analysis of texts* learners' notes are compared to a qualitative analysis of their written texts and their first language backgrounds. The hand-written essays were then transcribed so that they could be inputted for lexical diversity. All quotations were discarded but paraphrasing was included. Phrasal verbs and hyphenated words were counted as one word, and minor spelling mistakes but not grammar mistakes were corrected. The mean number of tokens for low proficiency learners was 358 (SD 88.23) and high was 404 (SD 102.44).

6.2.3 D-Tools

Meara and Miralpeix's *D-Tools* (2007a) is used which is based on Malvern and Richard's *vocd* program but is more user-friendly in that texts can be transcribed on Microsoft Notepad instead of the rather more complex CHILDES system (MacWinney, 2000). *D-Tools* has been used by Read (2005) to analyse 88 transcriptions of IELTS speaking tests. The mean values for *D* decreased as the IELTS band scores scale decreased. At the high band levels (i.e. bands seven and eight) the standard deviations showed large dispersions. Read suggests more proficient candidates use a wider range of vocabulary than less proficient ones but that *D* by itself cannot distinguish between the bands. Lexical production in my study was given a value of a parameter *D* (for diversity).

The results from the diversity scores were analysed for variability (CV) in each learning style sub-group. The differences in CV highlighted the variability within each learning style sub-group. Levene's test was used because it is an inferential statistic which assesses the equality of variances (the sum of squared deviations from the mean divided by the sample size) and allows us to know whether learning style group variances in lexical profiles are in fact statistically different.

6.3 Results

6.3.1 Lexical diversity and learning style

In Table 6.5, the high proficiency mean scores for diversity (*D*) are fairly consistent across the learning style groups, except the low scoring Memory and Analysis learners who have a particularly high mean lexical diversity.

Table 6.5: Measures of variability (CV) in lexical diversity (D) in relation to learning style of high proficiency learners

D	Learning Style			
	Low Memory – low Analysis	High Memory - low Analysis	Low Memory - high Analysis	High Memory - high Analysis
N	13	7	11	6
Std. Deviation	19.33	18.88	13.86	14.01
Mean	83.42	74.72	77.17	74.45
CV	.23	.25	.18	.19

Table 6.5 also shows the SDs and CVs are greater with learners who score low on the LAT C (Analysis) sub-groups but the SDs and CVs are relatively smaller at the high scoring Analysis-Memory sub-groups. Learners who score highly on the LAT C

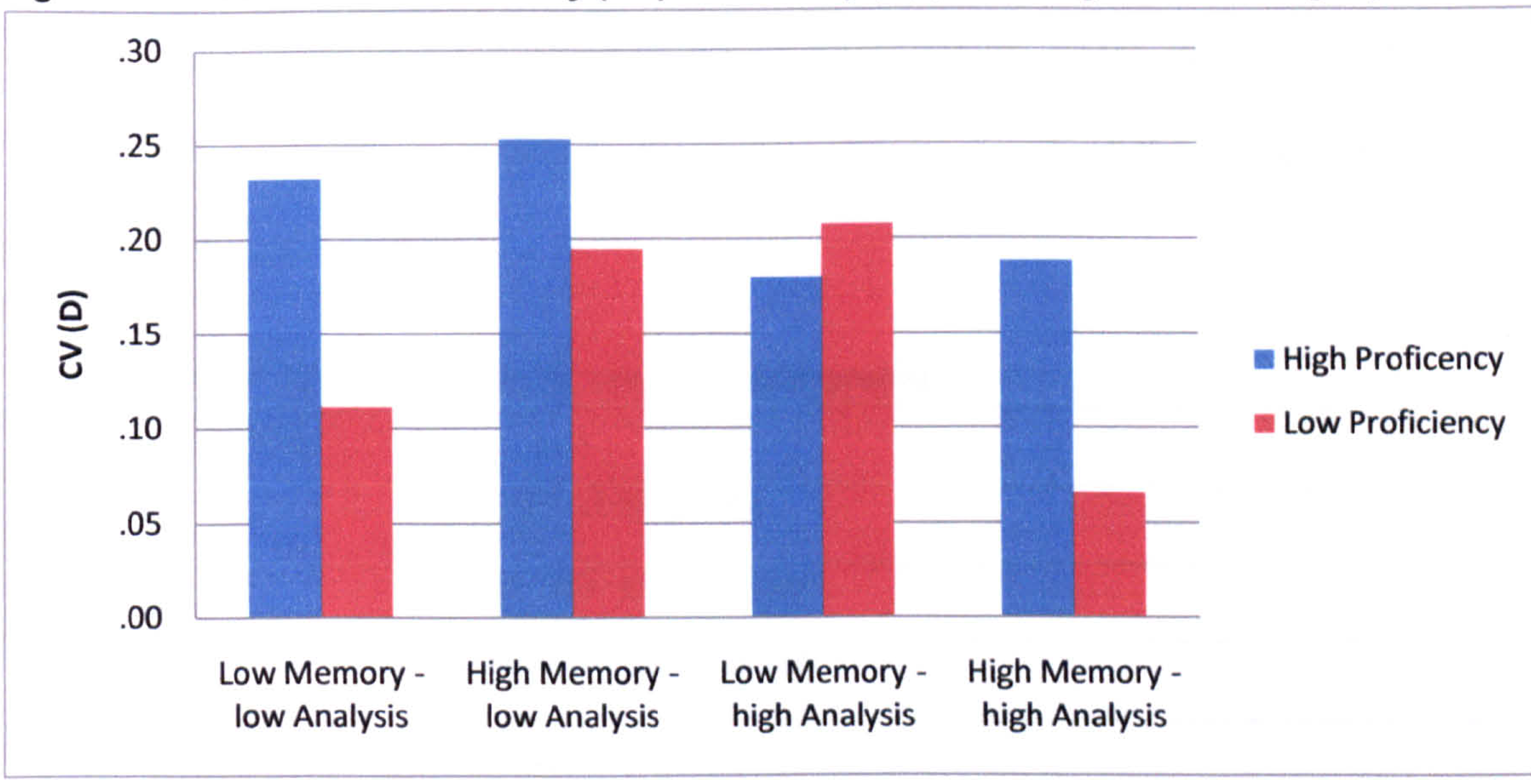
(Analysis) tend to show less variability in their *D* scores than learners who score low on LAT C.

Table 6.6: Measures of variability (CV) in lexical diversity (D) in relation to learning style of low proficiency learners

D	Learning Style			
	Low Memory - low Analysis	High Memory - low Analysis	Low Memory - high Analysis	High Memory - high Analysis
N	9	7	5	4
Std. Deviation	9.34	14.52	15.67	5.56
Mean	84.20	74.61	75.36	84.49
CV	.11	.19	.21	.07

When we switch our attention to low proficiency learners in Table 6.6, we find that greater mean diversity (*D*) scores are found with learners who either score low on both the LAT B and C or high on these tests. The smallest CV value is from learners who score high on both LAT B and C. With low proficiency learners, variability tends to be higher when learners have either a Memory or Analysis learning style strength. Figure 6.1 below contrasts the two proficiency groups.

Figure 6.1: Coefficient of variability (CV) in diversity (D) plotted against learning style



We can see that patterns of variability at high proficiency do not necessarily mirror those at low proficiency. For high proficiency learners, a convergence of *D* scores is associated with high Analysis. For low proficiency learners, no coherent pattern emerges. Both high and low Memory and Analysis scores are associated with relatively little variability. Overall, high proficiency and high Analysis go hand in hand with minimal variability. These results suggest that high proficiency learners who are particularly analytical typically produce texts which are relatively stable in lexical diversity.

6.3.2 Variance in lexical diversity

I decided to pool the data from the high proficiency (above IELTS 5.5) learners from Study 2 and the high proficiency learners from current study to test whether an analytic approach is related to low variability in lexical diversity. The full texts from Study 2 were edited according to the same procedures used in the current study and were then inputted into the software (*D-Tools*) for diversity. The learners were then grouped bottom, middle and top according to their LAT C scores, which is based on Meara *et al.'s* (2001) normative data for the percentage of learners who fall into the bottom 30%, middle 40%, and top 30%.

Table 6.7: LAT C Analysis scores and their interpretation

LAT C (Analysis)	
70-100	Top 30% of all scores
60-69	Middle 40% of all scores
0-59	Bottom 30% of all scores

The number of participants, mean, and standard deviation in each LAT C sub-group is shown below.

Table 6.8: Lexical diversity (D) for Top, Middle and Bottom LAT C sub-groups

	LAT C (Analysis)		
Lexical Diversity (*D*)	Bottom	Middle	Top
N	25	19	27
Mean	74.99	70.66	68.78
Std. Deviation	20.25	15.94	13.73

The mean *D* values decrease with increasing LAT C scores. In addition, the standard deviation also mirrors this same pattern: the higher the diversity the lower the SD. This suggests that lower variability is associated with higher LAT C. The means were then calculated for differences between the sub-groups by using Levene's test for equality of variances. A one-way between groups analysis of variance was made to examine the relationship between lexical diversity (*D*) and Analysis (LAT C). Levene's test is used to test the null hypothesis that the variances in lexical diversity are equal. If the test is not significant then we can assume that the variances are homogenous; however, if the test is significant then we can assume that there is a difference between the variances.

Table 6.9: Levene's Test for Equality of Variances [a] (high proficiency)

Dependent variable: *D*			
F	df1	df2	Sig.
4.804	2	68	.011
a. Design: Intercept + LAT C groups			

In Table 6.9 above, Levene's test for homogeneity of variances was significant $F = 4.804$ ($p < 0.05$) which indicates that there is a difference between the variances in the sample for high proficiency. When the low proficiency learners were grouped according to Top, Middle and Bottom LAT C sub-groups Levene's test was not significant $F = 1.317$ ($p = 0.277$) which indicates there is no difference between the variances.

6.4 Discussion

This study has examined the variability of lexical diversity patterns in relation to learning style groups in order to consolidate the evidence so far. Recall that the research question was whether variability of diversity was related to the learning style framework (memory and analysis).

6.4.1 Variability in lexical diversity and the relationship to learning style

When we look at lexical diversity from high proficiency learners, there are differences in variability patterns between learners grouped according to their grammatical sensitivity. Learners who score highly on LAT C are learners who could be described as grammatically sensitive. They are arguably more likely to notice the semantically opaque function words which give texts their precision and complexity. The evidence presented in my empirical work shows that high proficiency and grammatically sensitive learners' lexical performance converges i.e. shows less variability. It is possible that they prize complexity and systematically strive for it through the regular use of function words and repetition of words for coherence. This may help to explain why their texts show relatively low variability. A learning style which relies heavily on memory as categorised by high LAT B but low LAT C seems to encourage variability in lexical diversity.

One possible reason is that lexical diversity could have closer association with grammar and syntax than lexical rarity. As function words are the most common form of repetition (Meara and Miralpeix, 2007b), so *D* is heavily influenced by sentence structure. Lexical frequency, however, seems to be independent of syntax. In other words, highly rare words do not necessarily reflect language complexity. One feature of complex language is the repetition of function words and prepositional phrases. Lexical diversity is sensitive to the repetition of words and so more sensitive to the repetition necessary to code complexity. Texts which contain lexis of this nature would not be overly repetitive or overly "telegraphic" (i.e. a lack of function words). Paired associate learning, on the other hand, would make semantically opaque lexis difficult to acquire in part because of the lack of L1 to L2 mapping. The most common first language backgrounds in this study were of languages non-cognate with English. Learners with this type of L1 background may only have vague semantic knowledge of opaque lexis and so use semantically opaque lexis erratically which could in turn make the diversity scores more unstable and so prone to greater variability than learners who have a more precise conceptual understanding of semantically opaque lexis. This theme will be discussed further in Chapter 9. Unlike the more linear relationship between lexical rarity and lexical sophistication, a higher *D* statistic does not indicate more sophisticated language. The upshot of complexity in texts is a convergence in *D* scores from various learners who are more grammatically sensitive but a divergence in *D* scores from learners who are less grammatically sensitive.

6.4.2 Lexical diversity and the relationship to learning style

The main finding is that lexical diversity is associated with the learning style characteristic of analysis, as measured by grammatical sensitivity. The association could be made because of the relatively strong relationship between lexical diversity and sentence structure. The repetition of grammar and content words is necessary for sentence structure and coherence, which has a convergence effect on the lexical diversity measure. In other words, those who structure their language are hypothesised to have more homogeneous lexical diversity, whereas those who do not are hypothesised to have heterogeneous diversity scores. Learners who are grammatically sensitive are hypothesised as those who structure their L2 to a greater extent which in turn affects lexical diversity. Moreover, lexical diversity seems to be more independent of the discourse domain (c/f rarity) which would make it less susceptible to topic specific language.

6.4.3 Variability and the relationship to proficiency

Different patterns of variability (CV) are shown when learners are separated by proficiency. High language proficiency and language analysis encourage stability in lexical diversity profiles. At low proficiency there are confusing patterns which are difficult to interpret. Although there was a strict criterion for deciding proficiency level, the difference between the levels was not that great i.e. 0.5 IELTS. In some cases, learners who were classified as low proficiency actually had a higher IELTS writing score than some learners classified as high. Therefore, there is some overlap between the groups as far as writing is concerned so the interpretation of the data needs to be cautious.

In this study, learners who were classified as low proficiency (IELTS of 5.5 and below) tended to be more erratic in lexical diversity. That is to say, the patterns found at high proficiency in relation to CVs and learning style were not necessarily there at low proficiency. High variability has been associated with low proficiency learners' use of function words in Study 2 (Chapter 5). In that chapter although high and low proficiency learners used approximately 50% of function words in their texts, the standard deviation from the mean was greater at low proficiency.

Memory, i.e. associative memory, seems to be related to the production of words from learners who were IELTS 5.5 or below. Recall that in Study 2 (Chapter 5), Memory negatively correlated with high frequency lexis and positively correlated with low frequency lexis. This trend was more marked at low proficiency than high. The obvious answer to why this may be so is that the LAT B (Memory) is simply easier for these learners than the LAT C (Analysis). Forging an association between two words is less cognitively demanding than the restructuring involved in "the mapping of two lexical and conceptual systems onto each other" (Ijaz, 1986, p.405). The Memory test (LAT B) as well as the Analysis test (LAT C) will both be re-evaluated in Chapter 9. All other things being equal, LAT B may have a more direct relationship with the size of their vocabulary as measured by frequency than LAT C. The cost, though, for learners who are weak in Analysis and who are more predisposed to a memory-based approach to vocabulary processing may be that those learners are less likely to restructure and most likely to fossilise in L2. However, more research needs to be done in this area.

6.5 Conclusions

From the empirical work done we can see how learners who are grammatically sensitive recycle words in a more systematic manner than those who are not particularly grammatically aware. Grammatically sensitive learners are more likely to complexify their L2 because they are by definition able to perceive the patterns in language. The ability to recognise grammatical patterns could dispose learners to use lexis in a more systematic manner in terms of function and semantically opaque words. Texts which have extremely low or high diversity typically have either excessive repetition or limited use of semantically transparent words which are needed to give a text precision. I have argued that from a vocabulary perspective, the use of semantically transparent function words and word phrases help to give a text its precision and complexity.

Instead of taking a one-off approach to examine learners' lexical profiles, the next stage of research needs to follow the lexical development of learners over time to understand better how learners' strengths and weaknesses in Memory and Analysis are related to how L2 lexis develops. In other words, in what ways does the relationship between learning style and lexical profiles change over time? The lexical development path would necessitate taking two samples of learners' texts, one at the beginning and one at the end of an academic semester. Although there have been previous longitudinal studies which have investigated lexical profiles of second language writing (e.g. Laufer, 1994) none, to my knowledge, have investigated how learners' strengths and weaknesses in Memory and Analysis help to shape their lexical development profiles.

7 Macrodevelopment paths of lexical profiles in relation to learning style.

7.1 Study 4

Whilst learning style may remain relatively static, second language lexis does not. A static "snapshot" of learners' lexical profiles does not give an indication of how L2 lexis develops over time. More importantly, it does not give an indication how the learning style construct, memory-analysis, may be related to any development in lexical profiles over time. Although there have been previous studies into L2 lexical development (e.g. Schmitt, 1998, and Laufer, 1994, 1995), the research seems to be sparse and learning style has not previously been considered in the developmental process.

Learners in the early stages of lexical development may have only a very limited amount of lexis to use productively. When learners become more proficient then they have a larger store of lexical items to use productively but they may not necessarily do so when lexis is elicited from a written text. In fact, Laufer and Nation (1995, p.317) suggest that at the 1,000 word frequency level and the University Word List (Xue and Nation, 1984) "the LFP is stable except for the advanced learners whose vocabulary apparently becomes too varied to remain stable across different samples of writing". Therefore, understanding any relationship between learning style and productive lexis can be problematic. Nevertheless, learning style may be a way of understanding how lexis changes over time.

Learners who are predisposed to analyse language may use lexis in a qualitatively different manner. Recall that Skehan (1998, p.88-9) put forward the notion that an analytic processing mode represents a rule-based system that is probably efficiently organised and is more likely to be sensitive to restructuring. In contrast an exemplar based system is more likely to be composed of multiple representations of the same lexical elements but which is less generative. What this might mean in terms of productive lexis is that memory-orientated learners may be less systematic in their use of lexis. There may be more variability in their lexis because of a greater emphasis on exemplar-based language. Analysis-orientated learners may be more systematic in their use of lexis i.e. rely less on exemplars and more on the underlying rules of language. Therefore, the aim of this next study is to explore whether in fact learners' L2 lexis develops over one semester. A secondary aim is to examine learners' strengths and weaknesses in memory and analysis in relation to lexical development. A profile score of lexis beyond the 2000 measure was adopted because more advanced lexis is thought to occur at this level and because a single score is more amenable to statistical analysis (Laufer, 1995).

7.1.1 Research questions

In the light of the previous section, the research questions are as follows:

1. Is there any lexical development beyond 2000 over the period of one semester?
2. Is any lexical development related to strengths and weaknesses in Memory and Analysis?

I would expect most learners to develop beyond the 2000 frequency level or, at the very least, to remain relatively static. It is difficult to predict which type of learner (memory- or analysis-orientated) would be more consistent in their development. Learners with good memories are more likely to accumulate lexis, whereas learners with good analysis are more likely to restructure their language which might not show so much quantitative gain but are likely to be more consistent from Time 1 to Time 2. Learners who score poorly in Memory and Analysis are most likely to remain static in terms of lexical development.

7.2 Method

7.2.1 Participants

The participants were comprised of students from different academic backgrounds (see table 7.2) whose writing was sampled at two different times (Time 1 and Time 2) with a gap of one semester between the two different times. Originally 55 students took part in the first test session but only 33 in the second. Table 6.1 below highlights the number and first language of those who participated in both testing sessions (T1 and T2). There were 23 males and 10 females.

Table 7.1: First language backgrounds

First language	N	Percent
Korean	4	13
Arabic	3	9
Polish	2	6
Portuguese	2	6
Cantonese	2	6
Turkish	2	6
Spanish	1	3
French/Creole	1	3
German	1	3
Pashto	1	3
Vietnamese	1	3
Ghanaian	1	3
Somali	1	3
Thai	1	3
Unknown	1	3
Mandarin	1	3
Bengali	1	3
Malay	1	3
Italian	1	3
Croatian	1	3
Urdu	1	3
Sinhala	1	3
Danish	1	3
Gujarati	1	3
Total	33	100

As can be seen from Table 7.1, there is a wide variety of first language backgrounds. Most of the language learners have a first language which is not cognate with English. The participants were mainly first year Engineering students. Year one students were contacted because they tend to be less jaded by university questionnaires and so are more likely to give up their time for research projects than students in the more advanced stages of their studies.

Table 7.2: Faculties and proficiency

	Proficiency	
	low	high
Computing, Information Systems, and Mathematics	0	4
Engineering	1	15
Science		1
Art, Design, and Architecture	3	1
Arts and Social Sciences	2	1
Business and Law	2	3

The criteria used in the previous study to categorise the learners in terms of L2 English proficiency were also used in this study. High proficiency learners were classified as those with IELTS scores above 5.5, TOEFL scores of above 520, CBTOEFL scores above 190, Cambridge Advanced English, A-Level English, and GCSE English grade D and above. Where no data was available on their English language backgrounds (3 participants), learners with *X-Lex* scores of above 3745 were classified as high proficiency.

The essay questions were customised to suit the academic experience of the informants. The questions were designed to encourage the students to write as freely as possible by using their background knowledge. Time 1 and Time 2 questions were as follows:

Engineering and Computing

How has science and technology changed life since you were a child?

How important is science and technology to the modern world?

Art, Design, and Architecture and Arts and Social Sciences[17]:

What is the relationship between culture and community?

What is the relationship between culture and communication?

Business and Law:

Is a good manager born and not made?

Which qualities would you expect a good manager to have?

7.2.2 Data processing

All participants were tested for their receptive vocabulary knowledge using Meara and Milton's (2003a) The Swansea Vocabulary Levels Test *X-Lex* (v 2.00) to determine proficiency levels if no background data were available. All students were tested for their learning style by using Meara *et al.'s* (2001) Memory LAT B (visual memory for paired associates) and Analysis LAT C (grammatical sensitivity). As in previous studies, all students were shown how to use these tests through a demonstration of each test projected onto a large screen. Written instructions were also provided.

[17] The essay questions for the students from the university were based on topics which these students had read and written about during their pre-sessional English course.

After the computer tests, the learners were asked to write a discursive essay of 250 words on the relevant Time 1 question outlined in the previous section. Although a time limit of 40 minutes was given for the writing section, I allowed the slower writers more time in order to reach a word count of 250 tokens. Exactly the same procedure for the productive free writing was carried out at Time 2. The texts were then inputted into Cobb's *Web VocabProfile/BNC-20* (v3.0), which calculates word frequency by using the British National Corpus. This version of the *VocabProfile* calculates the percentage of coverage of families, types and tokens at the various frequency levels, from the one thousand level (1k) to the twenty thousand level (20k) as well as Off-List. In practice, hardly any of the learners' texts contained any tokens beyond 10k. A full description of the software is given in Chapter 5.

All spelling errors were corrected unless they were deviant to the point that the word was unrecognisable. The following sample of a participant's text contains spelling errors which make the intended words, 'well' (?) 'willing' (?), difficult to deduce:

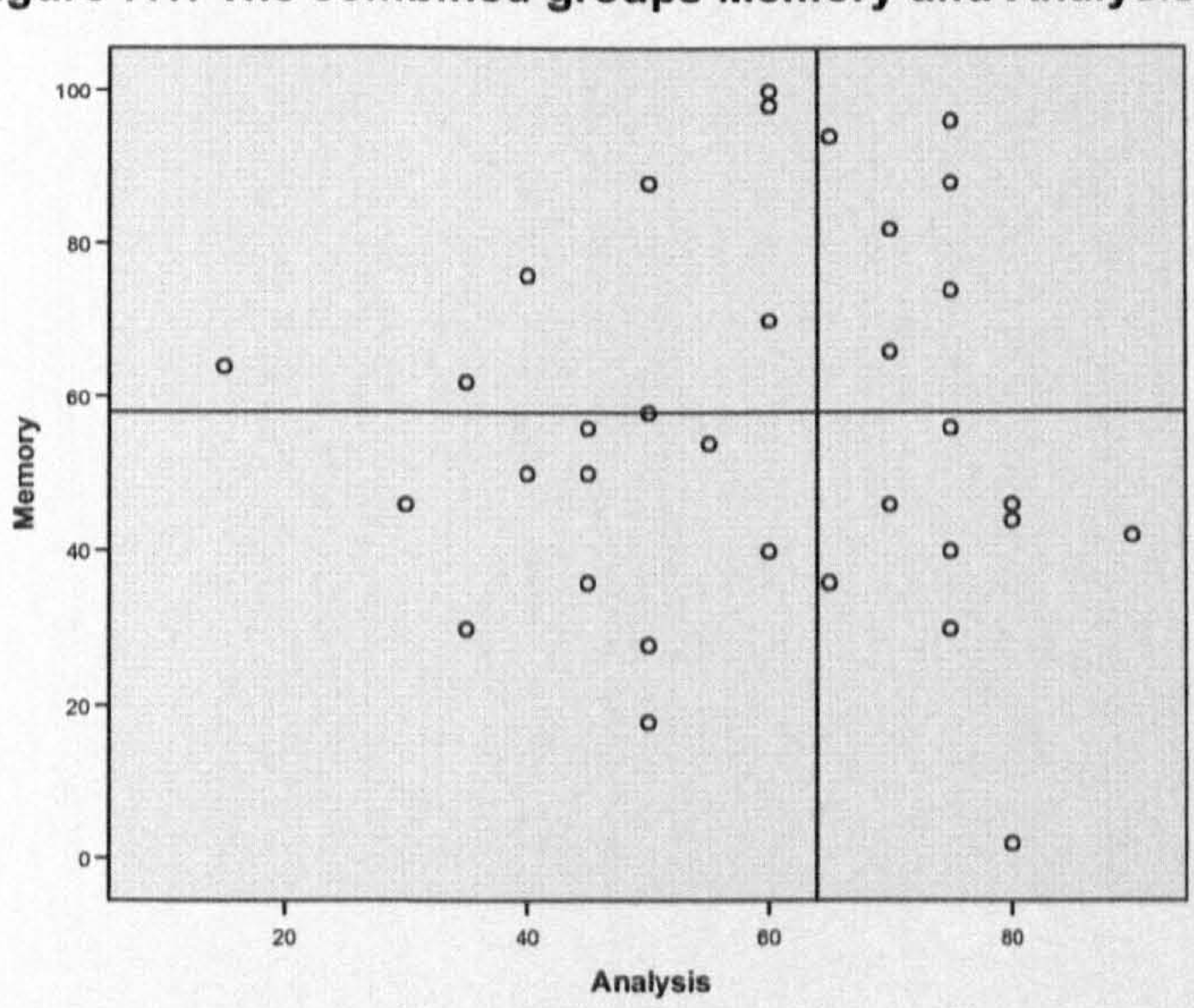
> When I was a boy we had no computers in school and even the government had few of them, our teachers and as ware* so waling* to learn computer if we could get one, but we never had a chance.
>
> * word discarded

Errors in the wrong derivative form were ignored because the software for the *VocabProfile* counts all the derivatives (i.e. the word family) at the same frequency level. Semantic lexical errors were few and far between. The criterion for a semantic error was if a word made no communicative sense. However, no errors fell into this category. Only 250 tokens were analysed from each participant from each session. In the case of longer texts, only the first 250 tokens were used for computer analysis because the effects of different text lengths have not been fully investigated.

7.3 Results

The participants were grouped into high and low Memory and Analysis dimensions based on Meara *et al.*'s (2001) findings of bottom, middle and top. LAT B scores 43%-73% are classified as the middle (with a score of 58% as the median). Therefore, <58% were classified as low, 59% > as high. Middle LAT C scores in Meara *et al.* are 60%-69% so < 64% were classified as low, 65% > as high.

Figure 7.1: The combined groups Memory and Analysis scores



The scatterplot chart above illustrates the spread of percentage scores for Memory and Analysis from both sets of data. As can be seen, there is no relationship between a learner's Memory and Analysis score. So a learner high in Memory could be weak or strong in Analysis.

Table 7.3: Mean Memory and Analysis scores

Memory	Mean	58.75
	Std. Deviation	22.275
Analysis	Mean	58.94
	Std. Deviation	17.534

The mean score for Memory in this study (Table 7.3) seems to be in line with Meara *et al.*'s data for this test. The mean score for Analysis, on the other hand, is just below the middle band. Interestingly, the standard deviation for Memory indicates a greater spread of scores. This may have been due to the test format which will be discussed later.

7.3.1 Lexical development beyond 2000 over the period of one semester

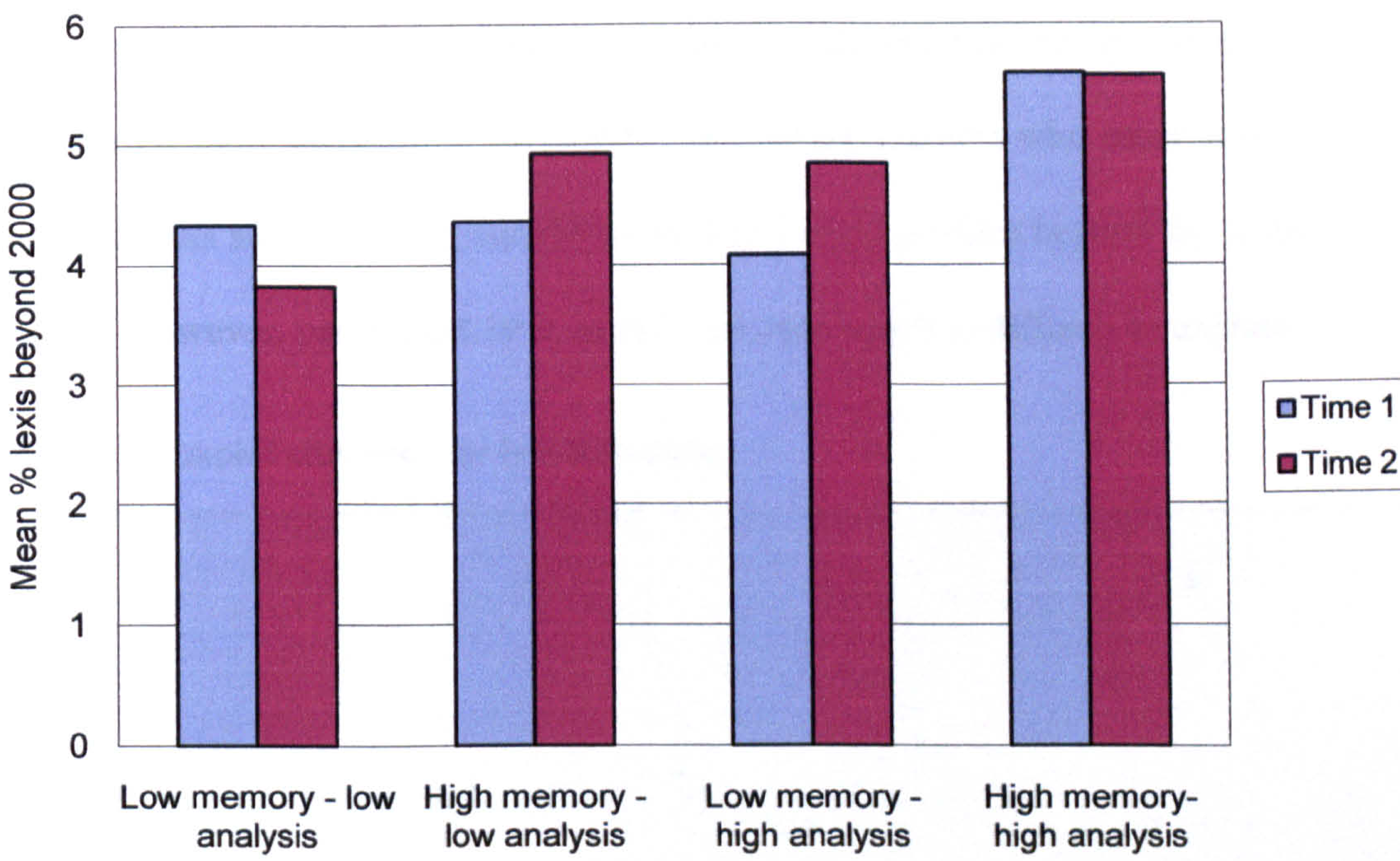
Table 6.4: Lexical development Time 1 and Time 2

	Mean	N	Std. Deviation
Beyond 2k t1	4.50	33.00	2.00
Beyond 2k t2	4.65	33.00	2.25

Overall, there is only minimal development in lexical profiles beyond the two thousand frequency level.

7.3.2 Lexical development in relation to strengths and weaknesses in Memory and Analysis

Figure 7.2: Lexical development over one semester



With regard to whether lexical development beyond the 2,000 frequency is related to strengths and weaknesses in Memory and Analysis, the mean scores in Figure 7.2 above show that learners who are strong in one of the dimensions but weak in the other tend to develop over the period of one semester. In contrast, learners with low Memory and Analysis scores show a decrease in lexis beyond the 2,000 frequency level over one semester. High Memory and Analysis learners show practically no development although they do display higher mean beyond 2000 profiles scores at Time 1 and 2 than the other sub-groups. The mean scores, however, do not show the wide variability between the individuals in each group. Therefore, the next set of data highlights this variability.

The box-and-whisker plots in Figures 7.3 and 7.4 below show that there are differences between these groups for T1 and T2. The bar in the box shows the median, the top of the box shows the 75th percentile and the bottom the 25th percentile. In terms of lexical rarity beyond the 2,000 frequency level, at T1 learners low on the Memory-Analysis dimension show the greatest variability. In contrast, learners who score high in Memory and Analysis show the least variability in their lexical profiles beyond the 2,000 frequency level. However, participant 19 is an extreme case which is difficult to explain.

Figure 7.3: Time 1 boxplot clustered for learning style

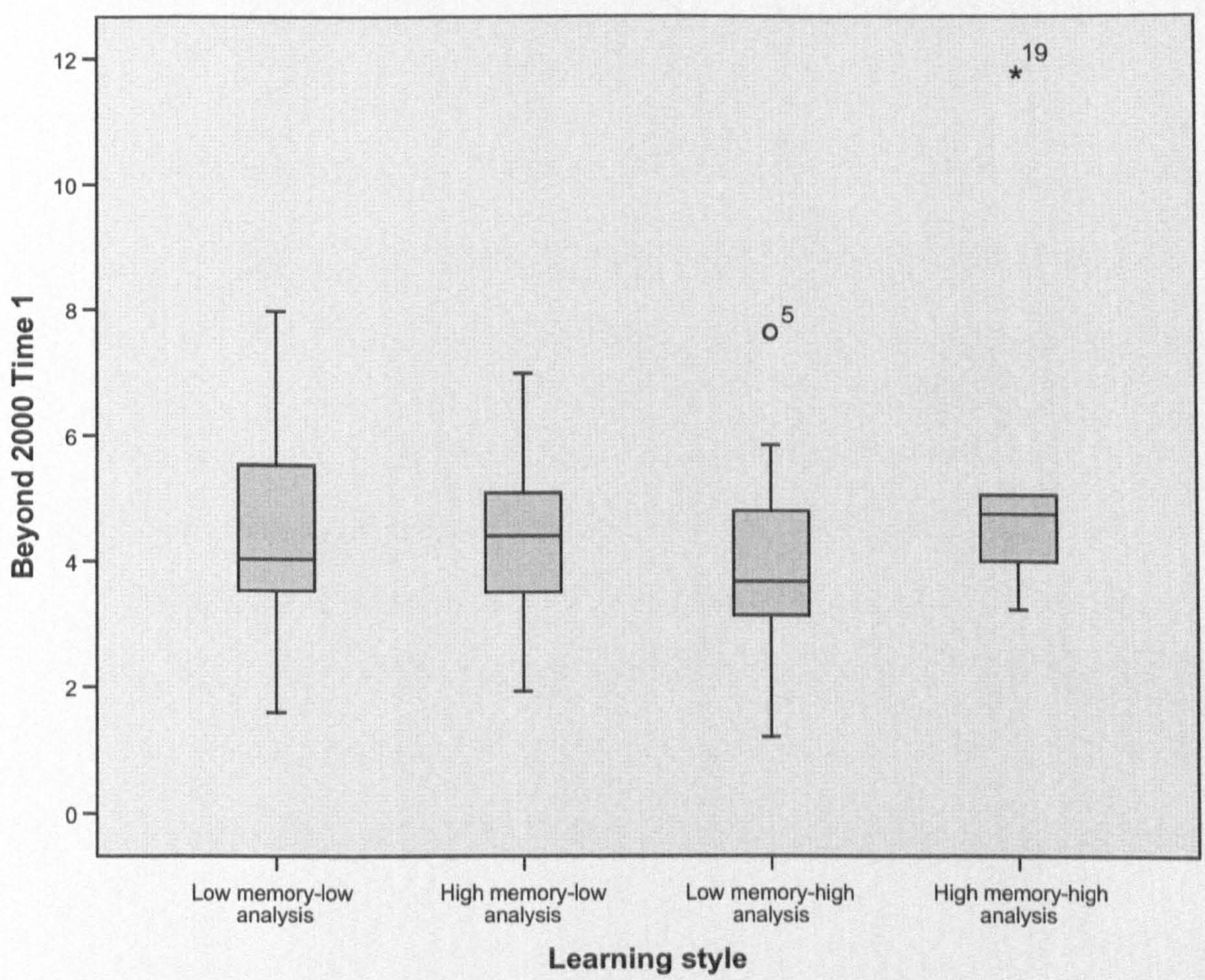
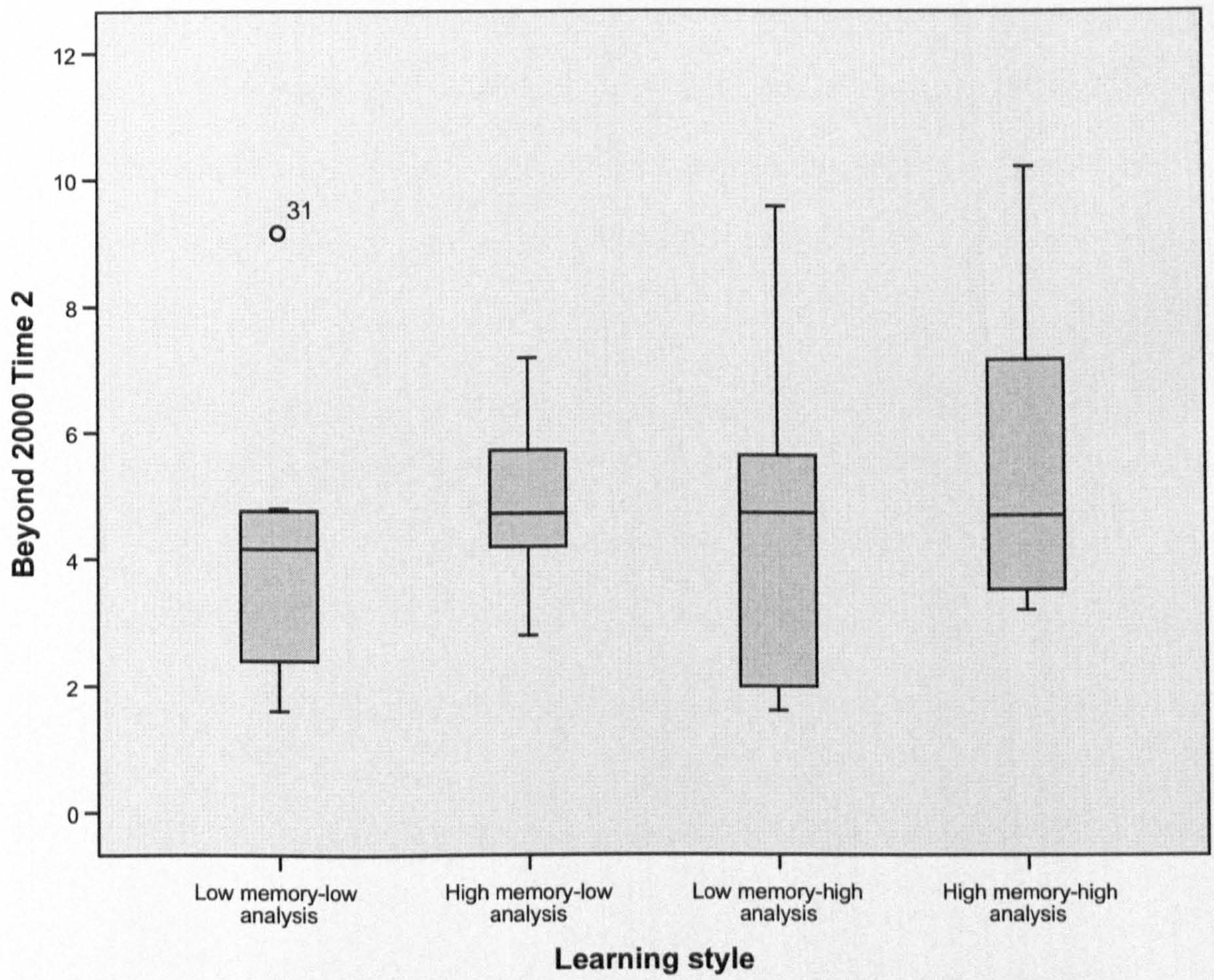


Figure 7.4: Time 2 boxplot clustered for learning style



These charts show variability across the different sub-groups of learners. The boxplots clustered for T2 in Figure 7.4 above show little relation to T1. There is greater variability in the T2 scores, and the greatest variability is from the low Memory-high Analysis sub-group and a similar but less extreme pattern for the high Memory-high Analysis group.

There is actually no reason why the beyond 2000 scores should be homogenous. Learners grouped according to LAT scores should show variability in their lexical profiles if learning style or aptitude is not related to proficiency in a particular language.

What learning style is hoped to shed light upon is the pattern of development for learners with different learning profiles. It is the relationship between the lexical profile scores which is likely to be more informative because it will show the trajectory of development. Therefore, the next set of results are set out to examine whether there is a correlation in profile scores taken at Time 1 and 2 in relation to Memory and Analysis strengths and weaknesses. The correlations are first represented graphically in the scatterplots and then numerically in the tables.

Figure 7.5: Low Memory – low Analysis beyond 2000 lexis T1 and T2

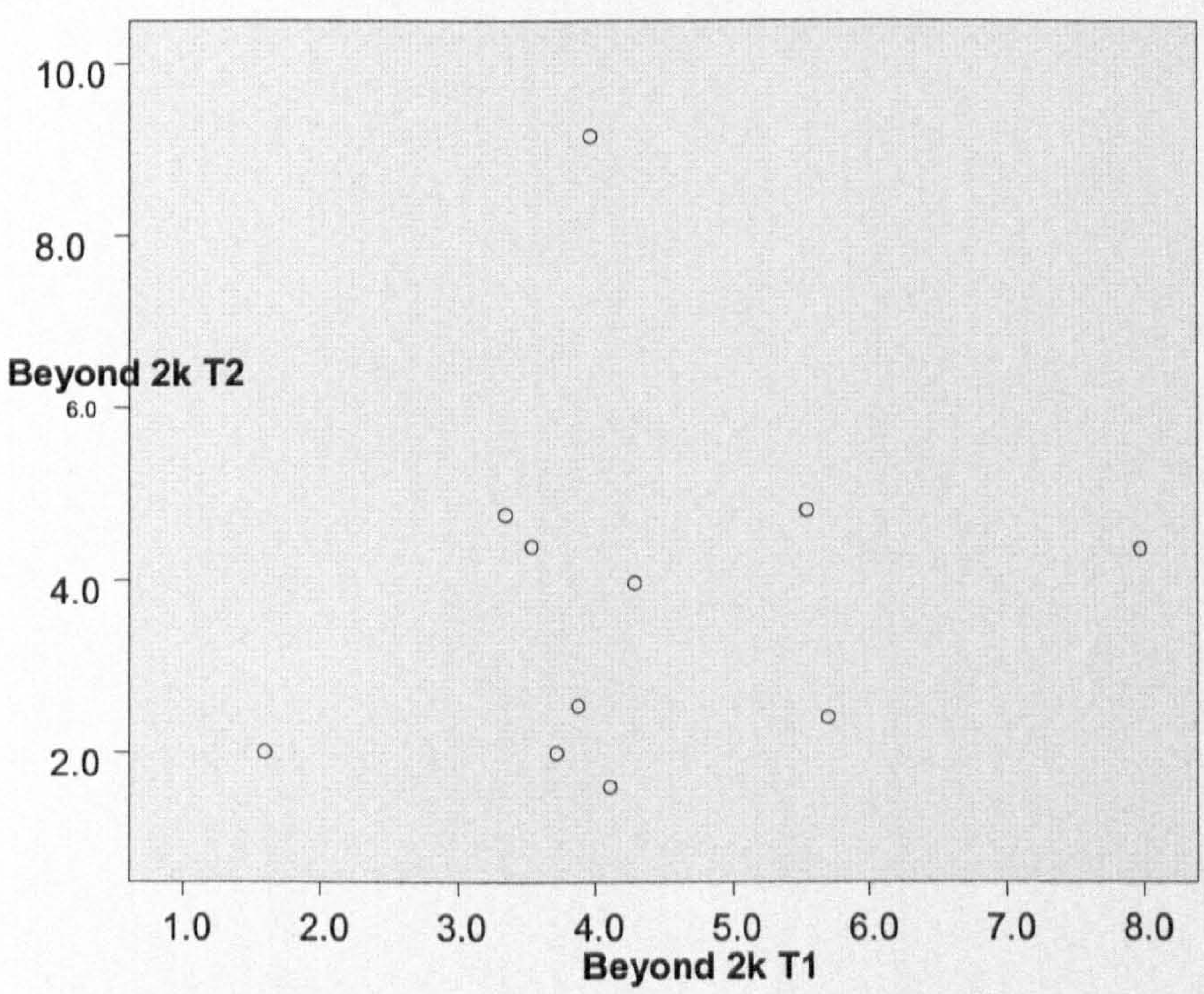


Table 7.5: Low Memory – low Analysis beyond 2000 lexis T1 and T2

		Beyond 2k t2
Beyond 2k t1	Pearson Correlation	.144
	Sig. (2-tailed)	.672
	N	11

Figure 7.6: High Memory – low Analysis beyond 2000 lexis T1 and T2

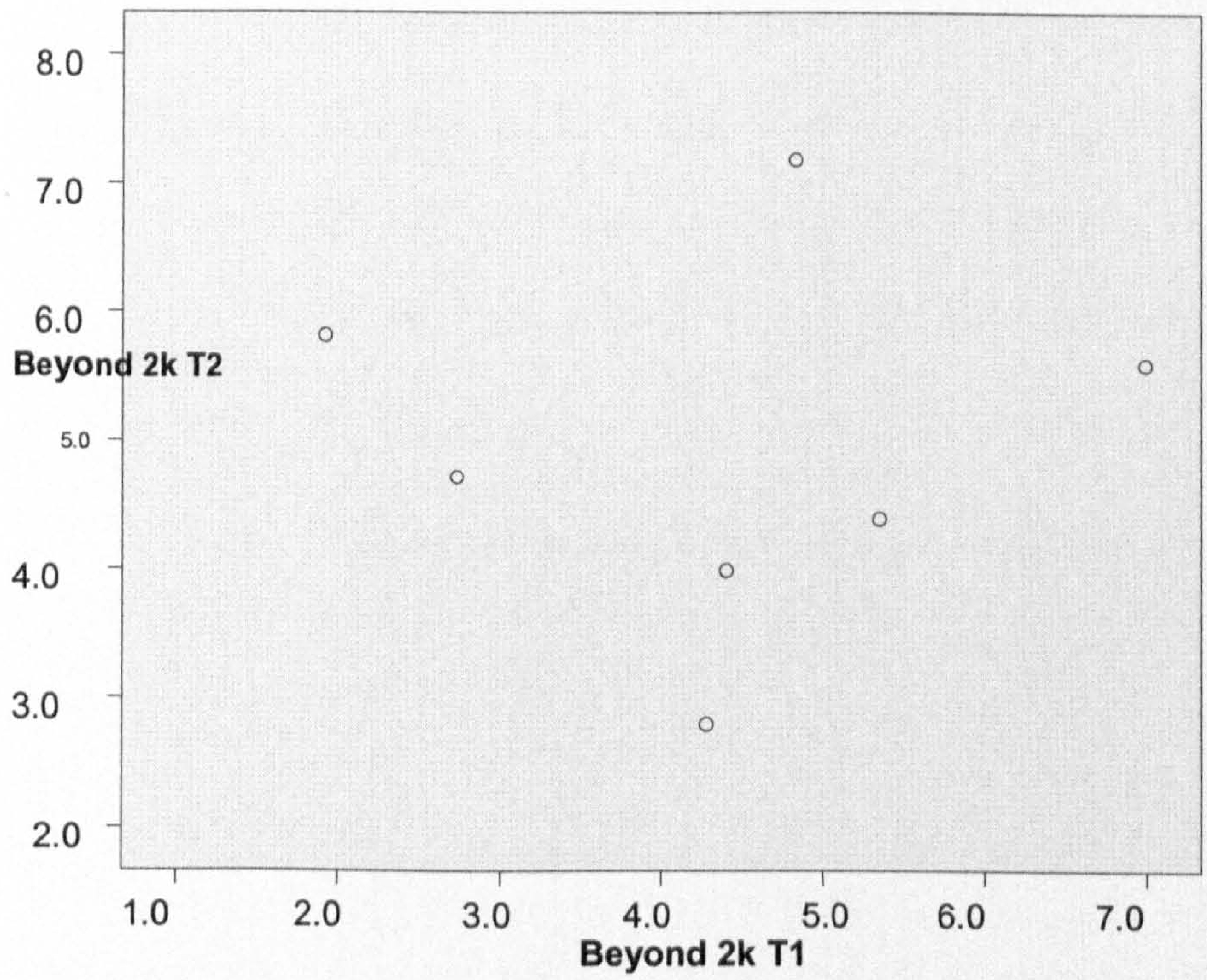


Table 7.6: High Memory – low Analysis beyond 2000 lexis T1 and T2

		Beyond 2k t2
Beyond 2k t1	Pearson Correlation	.041
	Sig. (2-tailed)	.930
	N	7

Figure 7.7: Low Memory – high Analysis beyond 2000 lexis T1 and T2

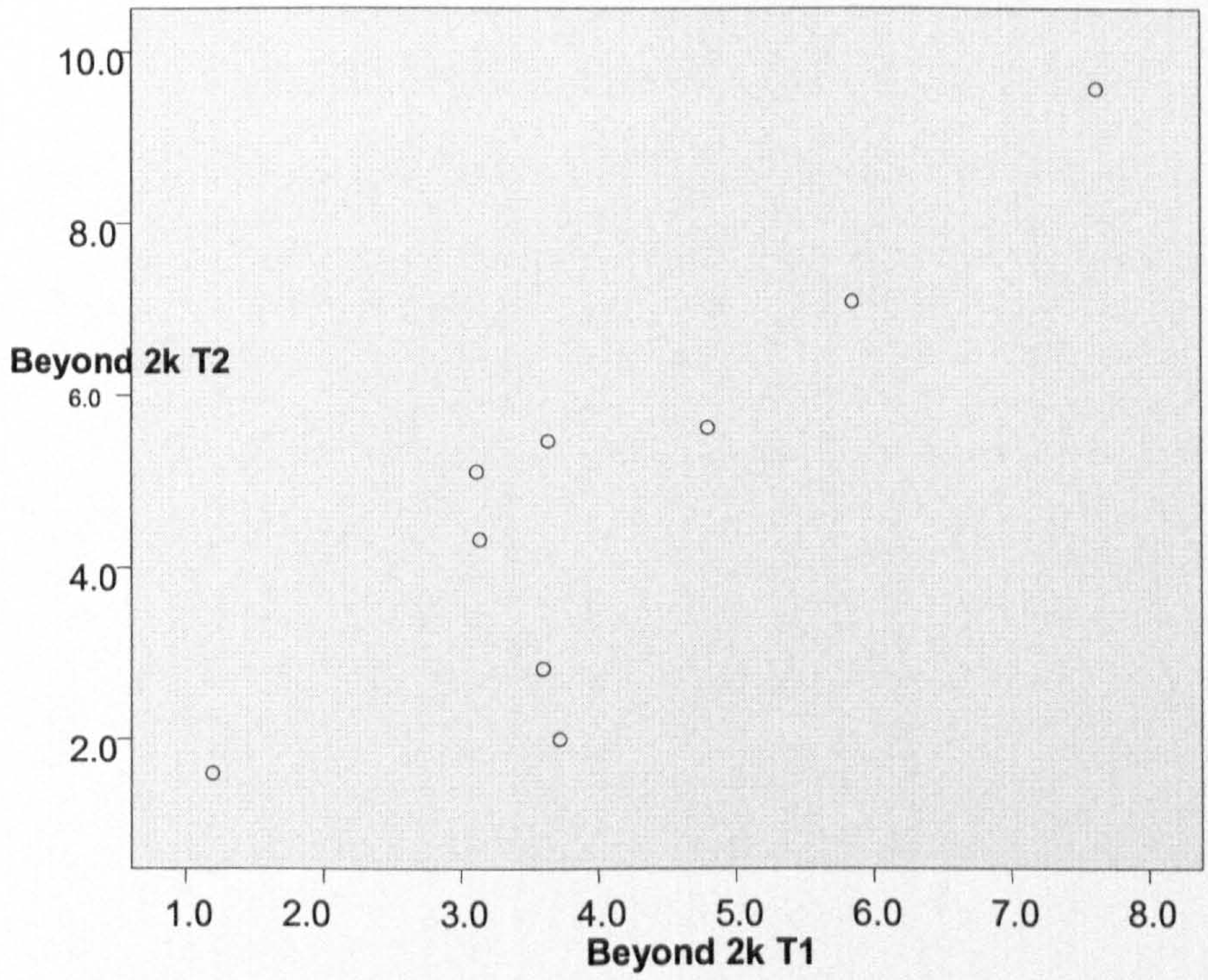


Table 7.7: Low Memory – high Analysis beyond 2000 lexis T1 and T2

		Beyond 2k t2
Beyond 2k t1	Pearson Correlation	.876(**)
	Sig. (2-tailed)	.002
	N	9

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

Figure 7.8: High Memory- high Analysis beyond 2000 lexis T1 and T2

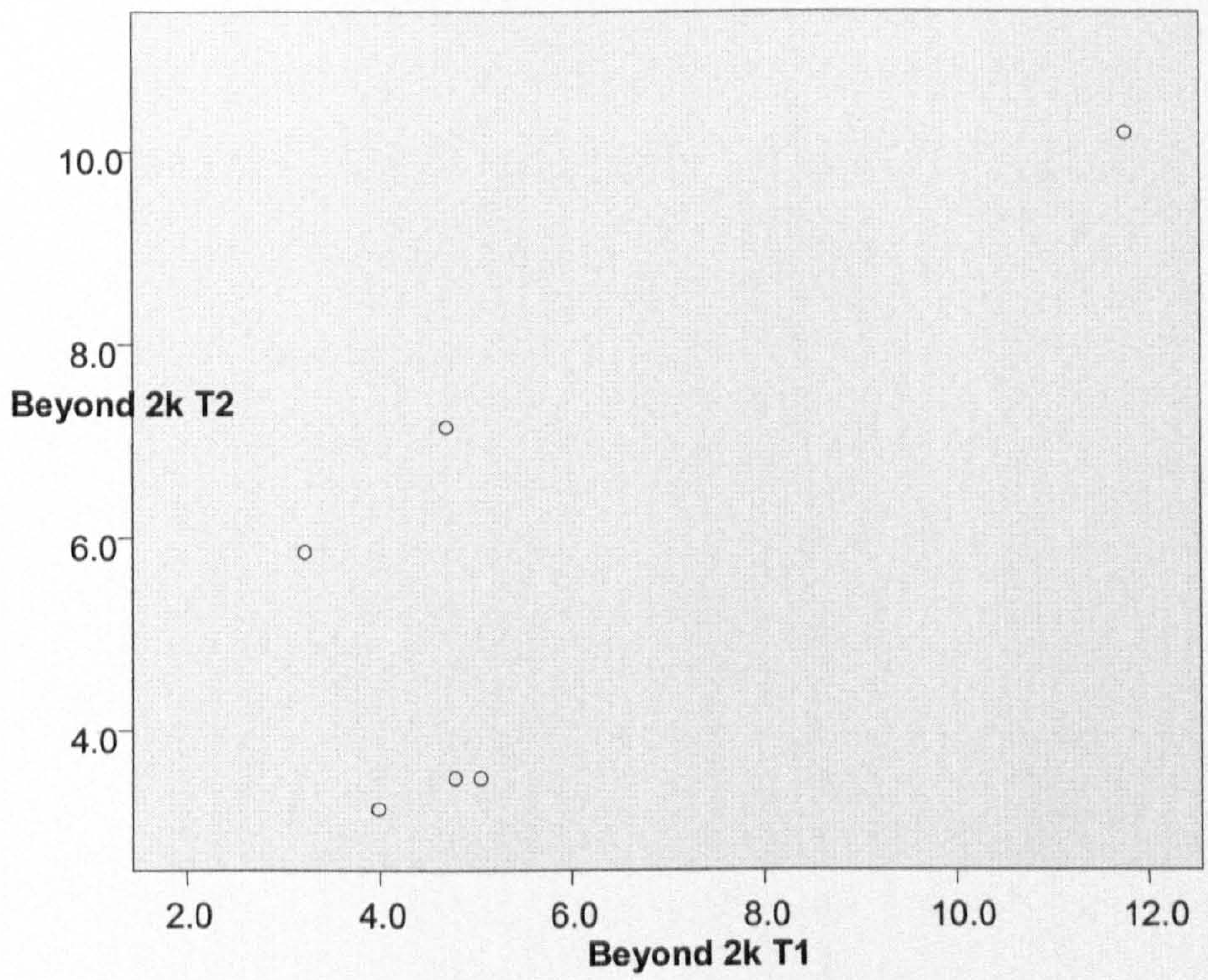


Table 7.8: High Memory- high Analysis beyond 2000 lexis T1 and T2

		Beyond 2k t2
Beyond 2k t1	Pearson Correlation	.773
	Sig. (2-tailed)	.071
	N	6

The data suggest that when LAT B and C scores are low then there is little or no correlation from Time 1 to Time 2. When Memory is high then profile scores of lexis are highly variable over the same time period. The data shows that when Analysis is high, then profile scores of lexis beyond 2000 are stable across two sets of writing taken over the period of one semester. High Memory and Analysis learners show a weaker correlation beyond 2000 and this is non-significant. Interestingly, when the data are displayed in the scatter charts and we can see the individual learner profiles from T1 to

T2 then it is the learners who score high in Analysis but low in Memory who show the strongest correlation in lexis beyond 2000 over time. Recall that when the beyond 2000 scores are analysed by mean gains from T1 to T2, the mean scores for the sub-groups mask this relationship and we simply see the sub-group gains in lexical development but not the stability of the high Analysis group and the variability of the high Memory group.

The low Memory high Analysis sub-group looked the most promising to measure development in lexis beyond the 2k level. Because of the small sample size, a non-parametric t-test was carried out to determine the differences in mean scores at Time 1 and Time 2.

Table 7.9: Ranks

		N	Mean Rank	Sum of Ranks
Beyond 2k T2 – beyond 2k T1	Negative Ranks	2(a)	4.00	8.00
	Positive Ranks	7(b)	5.29	37.00
	Ties	0(c)		
	Total	9		

a Beyond 2k T2 < beyond 2k T1

b Beyond 2k T2 > beyond 2k T1

c Beyond 2k T2 = beyond 2k T1

Table 7.10: Wilcoxon signed ranks test

	Beyond 2k T2 – Beyond 2k T1
Z	-1.718(a)
Asymp. Sig. (2-tailed)	.086
Exact Sig. (2-tailed)	.098
Exact Sig. (1-tailed)	.049
Point Probability	.012

a Based on negative ranks

A Wilcoxon matched-pairs, signed ranks test showed that the difference between the median beyond 2000 lexis from Time 1 and Time 2 (mean = 4.08% SD = 1.83 Time 1 and mean = 4.84% SD = 2.54 Time 2) was significant beyond the .05 level: exact p = .049 (one-tailed). The sums of ranks were 8 and 37 for the negative and positive ranks respectively, therefore W = 8. Interestingly, the group which showed the greatest lexical development also had the highest mean Analysis score, see Table 7.11 below.

Table 7.11: Mean Analysis score and group

	Analysis (LAT C)		
	Mean	N	Std. Deviation
low Memory-low Analysis	45.91	11	8.61
high Memory-low Analysis	45.71	7	16.94
low Memory-high Analysis	76.67	9	7.07
high Memory-high Analysis	71.67	6	4.08

7.4 Discussion

This discussion will firstly consider to what extent the research questions can be answered. After that I will consider methodological and theoretical issues that arose during the experiments.

7.4.1 Lexical development patterns T1 and T2 means

The first question asked whether there was any lexical development beyond the 2000 measure over the period of one semester. The group mean showed an increase; however, the gain was relatively small. The second research question asked whether any lexical development over a one semester period is related to strengths and weaknesses in Memory and Analysis. The lexical profile scores beyond 2000 showed that lexical development is possibly related to strengths and weaknesses in Memory and Analysis. Learners who have a predisposition towards Memory or Analysis show the greatest gains in lexical development beyond 2000. In other words, learners who have strengths and weaknesses in Memory and Analysis tend to show development. Learners low in these dimensions, as one would expect, tend to show little, if any, development. Strangely, high Memory and Analysis learners do not change very much over time. However, Laufer (1998) found that free productive lexical development beyond 2000 over time tends to remain static.

One question which arises from the data is whether the LAT B and LAT C are linked to language proficiency as seen by a greater proportion of rarer lexis?

Table 7.12: Aptitude group and proficiency

	Proficiency	
	low	high
Low memory - low analysis	3	8
High memory - low analysis	0	7
Low memory - high analysis	3	6
High memory - high analysis	2	4

Table 7.12 shows the number of high and low proficiency learners in each sub-group. Recall that proficiency was determined by external examinations of English unless none were taken, in which case proficiency was determined by *X-Lex* scores. For three of the groups there is roughly double the number of high to low proficiency learners. The exception is the high Memory – low Analysis group which contains all high proficiency learners. Learners who are high on both dimensions tend to be high level

learners; but low proficiency level learners are not necessarily low in LAT B and C scores. In my study, lexical development seems to be more related to LAT C scores than L2 proficiency.

7.4.2 Lexical development patterns T1 and T2 correlations

The next set of data looked at whether there is a correlation in profile scores taken at Time 1 and Time 2 and whether any correlations are related to Memory and Analysis. High Analysis and low Memory (and to a lesser extent high Analysis and Memory) are related to a stable use of rarer lexis over Times 1 and 2. The strong correlation between T1 and T2 could indicate the strength of an "attractor state" (de Bot *et al.*, 2007, p. 8) i.e. coalesce to form a specific state (see section 9.5.1 Dynamic Systems) which is encouraged by analysis of language. In other words, analysis of language appears to encourage a kind of equilibrium in which the production of lexis is not erratic in terms of lexical frequency, but tends to steadily increase. The low Memory high Analysis group was further analysed for lexical development and a non-parametric t-test showed that their scores did show development. This is an interesting finding albeit with very small numbers in the sub-groups. It tends to also suggest that analysis of language, rather than associative memory, is linked to development of lexis beyond the 2k band. Recall also from Study 2 (Chapter 5) that high proficiency learners tended to achieve higher Analysis scores. That is, learners who are adept at analysing language use this knowledge to help acquire new lexis. Analysis and lexical development will be discussed further in the next section. Although there is not a linear relationship between rarer lexis and Analysis, it appears that with high Analysis scores there is stability in beyond 2000 lexis and that learners who achieve high scores tend to be more consistent in their lexical development beyond 2000.

It appears that learners with good memories (i.e. associative) can and do also make gains in lexical rarity beyond 2000 but they can also just as easily show a decrease in lexical rarity which is masked when the scores are simply analysed by grouping together the mean for Time 1 and 2 and comparing the differences. This has important implications for how the data are analysed. Although group means may show quantitative developmental gains in lexical frequency beyond 2000, individual profiles may not correspond to the group pattern. Both high Memory and high Analysis sub-groups showed mean lexical gains, but it is only when the data are broken down across time, i.e. correlations between Time 1 and 2, can we see the differences between the two groups.

Learners who are low in Memory and Analysis show erratic scores over the period of one semester. In fact, with the low scoring learners, there appears to be little or no relationship between the two scores. When lexical profiles beyond the 2000 measure are erratic i.e. no relationship between T1 and T2 there is little, if any, in rare words.

An interim conclusion is that memory-orientated learners tend to show uneven gains whereas analysis-orientated learners show more consistent gains. When we simply look at the net gains we miss important developmental patterns. In fact most learners will make net gains but learners appear to take different paths of development. What seems to be more interesting is the variability in trajectory of lexical development rather than the product of development.

Lexical variability was also examined in a study by Bell (2002) in which written texts were collected from a single subject over 18 months. They were subsequently analysed using *P-Lex* (Meara, 2001). This is a similar measure of lexical richness in that both the *Web VocabProfile* and *P-Lex* make central use of frequency lists. The main difference with *P-Lex* is that it is based on the observation that certain words occur more rarely than others and that this differential distribution is best described by a Poisson curve, and reports this curve by means of a lambda value (Bell, 2002, pp.79-80). *P-Lex* will be discussed further in section 8.2.2 (Chapter 8). The results of Bell's experiment suggested that "students with low levels of lexical proficiency are more likely to produce consistent scores from one piece of writing to another, and that this effect fades as proficiency rises" (p.164). However, Bell's results should be read with caution as his hypothesis is based on a single subject study. The implication from my research is that variability in lexical richness (i.e. use of rare words) may be related to the memory-analysis learning style construct. Learners who obtain high Analysis but low Memory tend to show a consistency in their free production of lexis beyond 2000 over the period of one semester. In fact, learners who are high on the Analysis dimension but low on the Memory dimension showed significant lexical development. The other sub-group scores failed to show statistical significance in lexical development. Learners who are low in both dimensions show erratic lexical profile scores beyond the 2000 measure.

Recall also that in Study 2 (Chapter 5) learners who were classified as low proficiency displayed a greater variability in their percentage of function words than learners who were classified as high proficiency. High proficiency learners' texts at the one thousand frequency level comprised of approximately 50% function words, whereas low proficiency learners, although they had a similar percentage of function words, had a greater variability of percentages. This result may indicate the effects of grammaticisation which could lead to greater stability in the percentage of function words at around 50% in the one thousand frequency band. More developed lexical systems may in fact show greater signs of stability in respect of function words. What this also suggests is that it is not the mean percentage which is more revealing regarding low and high proficiency learners, but the standard deviations of the mean scores. Low proficiency and low Analysis seem to suggest greater variability in terms of function words and lexical profiles. Development i.e. quantitative gains in rarer lexis may take two paths: either a memory-based approach which is more erratic and more likely to fluctuate or an analysis-based approach which is more consistent and less likely to fluctuate. The next section explores how depth of processing may be related to the process of lexical development.

7.4.3 Depth of processing and lexical development

In this study, learners who show signs of lexical development and are consistent in their use of rare words over one semester are those who show, on average, greater grammatical sensitivity (Analysis). What I think Analysis means in the context of this learning style test is the ability to process language to understand the grammatical patterns. The key word here is "process", which in Craik and Lockhart's terms is depth of processing. Although information may be held in what they call primary memory, such information is lost at a rate which depends essentially on the level of analysis (Craik and Lockhart, 1972, p.677). Consequently, deeper analysis leads to a more persistent memory trace. Kandel's work has also shed light on how we shift from short-term memory to long. "For a memory to persist, the incoming information must be thoroughly and deeply processed. This is accomplished by attending to the information and associating it meaningfully and systematically with knowledge already well established in memory" (Kandel, 2006, p.210). Although grammatical sensitivity is seen as a separate ability from memory, it is the ability to recognise grammatical patterns and so process language on a deeper level which seems to be a prerequisite for the storage of information in long-term memory. In other words, lexis which is analysed in terms of its grammar, for example, may have a better chance of storage in long-term memory because it may be more systematically established in terms of how it is used with other lexis.

Learners who are oriented towards Memory (i.e. associative), but not Analysis show less consistency in their production of rare lexis over a period of several weeks, although in my study the number in this group was particularly small compared to the others. It may be that associative memory, in this study, is related to short term or explicit memory[18] but not long term memory. For these learners then, their store of rare

[18] "Explicit (or declarative) memory... is the conscious recall of people, places, objects, facts, and events" (Kandel p.132).

words may not be so permanently available in the long term memory as those learners who are more able to process lexis more deeply. Learners with above average Analysis scores may be better able to commit rare lexis to long term memory. Future research, beyond the scope of this thesis, could test for a correlation between the Analysis scores and a long term memory test of lexis.

The results in this study suggest that learners who analyse and so process language on a deeper level are those who consistently produce lexis beyond the 2000 measure. Because rarer lexis, on the whole, has a lower surrender value[19], it may require deeper analysis in order for it to grade into long term memory. Learners who do not process language so deeply may be able to produce rare lexis which has occurred fairly frequently in their input. Therefore, rare lexis may be in long term memory not through conscious processing, but through frequency in the input. This may explain why their profile scores are more erratic because they do not systematically analyse words.

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[19] "In teaching terms, this is the overall utility (value) of the English taught at the end of a specific course; the higher the surrender value the greater the utility (usefulness) of the English taught." Boston (n.d. fn 3).

7.4.4 Standard deviations and means

The results showed that the standard deviation from the mean for the Memory scores was greater than for the Analysis (i.e. SD 22.27 and 17.53 respectively). This may have been due to the format of the tests. When the learners take the LAT B for associative memory there is a greater possibility of achieving a wide variety in the scores because they have a choice of 10 answers. To compensate for the wide range of possible answers they are tested 5 times and the computer program calculates their accumulative score. When they take LAT C for grammatical sensitivity there is a 50/50 chance of scoring the correct answer on any given question. The greater restriction in choice of answer of the LAT C test may explain the smaller standard deviation. In practice, though, the learners were grouped above and below the median score from the published statistics (Meara *et al.,* 2001) so this should not have impacted on the categorisation of the learners.

7.4.5 Lexical development

Overall, the difference between the percentages of beyond 2000 words at Time 1 and Time 2 is minimal for the learners in this study. This result may have been compounded by the way the software analyses learners' texts. The *VocabProfile* software does not distinguish between different word types at each frequency level or whether a word is repeated or not. This means a learner who repeatedly uses the same word (e.g. "technology") is not differentiated from one who uses different word types or families at this frequency level (beyond 2k). The lexical frequency profile is a calculation of the percentage of word coverage at each frequency level. Therefore, lexical development may be attributed to learners who simply repeat words as well as to learners who show a wide use of different words beyond the 2000 measure. The following texts from this study illustrate the point.

> Science and technology is changing day by day. Every week there is a new product launch in the market. During my childhood days I used to take walkman [deleted] when I am travelling. It was just not the walkman [deleted] and earphone, but with that I had to take extra batteries and several cassettes. Now we have MP3 [deleted] player which can store 1000 songs and can play music for 8 hours on a single battery.
>
> I also remember when mobile phones were introduced they were so huge and weighed heavy as a big rock. It was impossible to keep it in pocket. But, today's mobile phone's weighs around 150 gms [recategorised] and half the size than the mobile introduced in early days. It is also packed with some other latest innovative technology.
>
> When I was child, I used to wait for hours in queue to pay the bills. Using internet it takes me only minutes to pay it and I don't need to worry about penalty for late payments if, I am on a holiday. I just need to have access to internet and I can pay my bills from anywhere in the world.
>
> Finding a good deal used to be painful as you search many shops and took more time. Now, I just go to a website [deleted] and can get the results in few minutes. Not only that I can also get reviews from the customer's and delivered to my doors. Engineers are always looking to bring new and improved a product's to make our life easier. After a

Text 1 (participant 16)

Table 7.13: Lexical profile (participant 16)

Freq. Level	Families	Types	Tokens	Coverage%	Cum%
K1 Words :	102	121	229	90.16	90.16%
K2 Words :	13	14	15	5.91	96.07%
K3 Words :	**4**	**4**	**6**	**2.36**	**98.43%**
K4 Words :	2	2	2	0.79	99.22%
K5 Words :	1	1	1	0.39	99.61%
K6 Words :				0.00	99.61%
K7 Words :	1	1	1	0.39	100.00%
Off-List:	?	0	0	0.00	100.00%
Total	123+?	143	254	100%	100%

We can see that in Text 1 the coverage of 3000 frequency words is 2.36% and there are 4 different word types and word families but 6 tokens. So there is repetition of certain words at the 3k level.

> Science and technology are both areas where development over the past twenty years has made significant improvements and has had great impacts on the lives of humans in general. Science and technology are changing and improve so rapidly, that new products are developed on a day to day basis. Computers and robots are taking over more and more jobs that were actually done by "us" humans in the past with a great input of effort. Numerous people are loosing [spelling corrected] there jobs, due to the rapid development of science and technology. People say that if the development continues to move forward at this rate, at some point the majority of the employees will be machines.
>
> If I think back to when I was small, I can for example remember the day when my father bought his first cell phone. It was one of the first ones available on the market. Nowadays cell phones are one of the most important inventions to our society. Even some children from the ages of 6 years upwards already have their own phone. Another day I can think back to is when we got our first PC [recategorised] at home. It had an processor with 200 MGH [recategorised] , which was one of the fastest processors at that time. Nowadays the fastest processors vary between 3000-4000 MGH [recategorised].
>
> Everything nowadays is computer based. You see computers everywhere in our day to day lives. If one of these computers brakes [wrong spelling corrected] down in a firm, it will cause a major crisis since everything is based on them.

Text 2 (participant 18)

Table 7.14: Lexical profile (participant 18)

Freq. Level	Families	Types	Tokens	Coverage%	Cum%
K1 Words :	104	125	236	92.19	92.19%
K2 Words :	9	9	13	5.08	97.27%
K3 Words :	**3**	**3**	**3**	**1.17**	**98.44%**
K4 Words :	2	3	3	1.17	99.61%
K5 Words :				0.00	99.61%
K6 Words :	1	1	1	0.39	100.00%
Off-List:	?	0	0	0.00	100.00%
Total	119+?	141	256	100%	100%

In Text 2 the coverage is smaller at 1.17%, but that each token is from a different word family. In other words, the writer of text two has produced three tokens, each from a different word family. At the same time though, the writer has a lower coverage at 3k than the writer of Text 1 who has repeated words at this frequency level and who, consequently, has a higher coverage. This is the problem when the software categorises words according to its frequency level, but does not recognise the fact that some words may be repeated. Learner profiles that show a greater variety (i.e. contain a greater number of word families) are not differentiated from profiles that show repetition (i.e. a lower number of word families but the same number of tokens).

Another possibility of why there is so little development is that the learners have reached a level of proficiency which is adequate for their studies. There may not be the motivation to increase their knowledge of rarer lexis and so they may have reached a plateau in their use of rarer lexis. Learners who are accepted on year one undergraduate Engineering or Computing Information Systems and Mathematics (CISM) courses only need an IELTS level of 6.0 which is equivalent to an upper intermediate range. For other students in this study, for example, L2 English students for Business and Law normally need IELTS 6.5 whilst for undergraduate Art and Design the IELTS score can be lower e.g. 5.5. What is more, the IELTS score is an aggregation of scores for different language skills (speaking, listening, reading and writing) and so their writing score could actually be lower. In practice, though, the CISM and Engineering students did not have IELTS scores and so we must examine other factors. The writing demands placed on them in their first year of study may not require them to use a large percentage of lexis which is consistently beyond the 2000 measure. Students from The Faculty of Arts and Social Sciences and the Faculty of Business and Law do have assignments to write, however. Moreover, the writing topics used in this study could be answered with high frequency lexis. No specialist vocabulary was needed; however background knowledge of the topic was required.

7.5 Conclusions

The learners in this study showed modest gains in lexical development over one semester. Those with higher Analysis scores tended to progress i.e. produce lexis beyond the 2000 frequency level more than learners with higher Memory scores. Although learners with high Memory scores progressed, only the analysis-orientated learners' development was significant in a one-tailed t-test i.e. they knew significantly more words after one semester. Analysis-orientated learners also displayed a strong correlation between their beyond 2000 profile taken at the start and end of a semester. Memory-orientated learners did not show a correlation between Time 1 and Time 2. The net gains are less revealing about lexical development than the relationship between the two points in time. Correlational analysis highlighted the consistency that the analysis-orientated learners displayed. Language analysis may help learners to establish stronger memory traces which could lead to greater retention of lexis. Some memory-orientated learners also showed mean gains while others did not, highlighting the inconsistencies in their profile scores. A lack of language analysis could be the reason why.

Closer inspection of the data revealed that some learners repeated rare tokens and so inflated their beyond 2000 percentage of words in comparison to those learners who produced rare tokens of different word families beyond 2000. As such, a measure of lexical richness which makes the distinction between word families and word tokens is needed in order to tackle this problem.

Synchronic studies may miss important development processes in terms of gains in lexical rarity. With this type of research design, analytic learners can show high levels of variability in lexical rarity. However, when learners are tracked over time, analytic learners tend to develop beyond the 2k frequency band. Memory-orientated learners are also associated with variable lexical frequency profiles but they do not seem to develop in a consistent, stable manner. Several data collection points are needed to tease out how lexical rarity develops over time. The relationship between learning and lexis is time-dependent and so longitudinal as well as one-off studies need to be made to explore this relationship.

By solely analysing the start and end point, we may miss important developmental patterns in the trajectory of lexical development. Most L2 learners tend to develop in terms of lexical rarity, but some learners may take different developmental paths so a study which focuses on the microdevelopment of individual learners could give us an important window on how learners develop. The next chapter is designed to investigate not just the start and end point, but also the trajectory of development so as to capture important developmental differences.

8 Microdevelopment paths of lexical profiles in relation to learning style.

"Groups do not change; individuals do." (Thelen and Smith, 1994, p.99)

8.1 Study 5

This chapter, to use Thelen and Smith's analogy (1994, p.xvi), turns up the magnification on learners' lexical production over time. The emphasis here is on individual learners categorised by learning style rather than sub-groups. We saw in the previous study that group means can miss important developmental characteristics. Two groups of learners can appear to be similar in terms of bars on a graph, but once we look across the data points at individual lexical development profiles there are individual differences in development and so it would be sensible to track the trajectories of individual learners at more than two points in time to explore individual variability. Supporting this line of enquiry is research by Larsen-Freeman (2006) who looked at, amongst other elements in L2 development, the average growth in vocabulary complexity (type-token ratio i.e. word types per square root of two times the words). Although problems with type-token ration have been well documented, she found that "[w]hereas group averages can be represented as more or less as a smoothly ascending curve, some individual performances regress and progress and others remain unchanged over time" (Larsen-Freeman, 2006, p.599).

This study then will track the learners' development over five points in time by using timed essays. Of particular interest are the development profiles of learners with obvious learning style preferences and how these preferences may shape lexical development. So the aim of this chapter is to examine the trajectory profiles of learners who have strengths and weaknesses in Memory and Analysis to build upon the notion from the previous study that those learners who are analysis-orientated may be more consistent in the lexical profiles, whereas those learners who are memory-orientated tend to be less systematic.

Whilst quantitative measures of lexical richness can provide insights into lexical performance, subsequent analysis of the data uses qualitative, holistic quality ratings of texts to inform us on how lexis is used. In brief, a qualitative focus is intended to inform a quantitative focus and vice versa. The next section reintroduces a tool to investigate lexical diversity and a new tool to investigate lexical rarity.

8.2 Measures of lexical richness

8.2.1 Intrinsic measures: Parameter D

The previous study highlighted the problem of learners repeating rare tokens which could have inflated their beyond 2000 frequency profile score. In this study lexical diversity is measured as well. Recall that *D-Tools* (Meara and Miralpeix, 2007a) uses computer software that gives a single value of a parameter (*D*) which is a best fit between ideal curves and those derived from real transcripts over a range of points of the falling type-token ratio (see Chapter 6). It is possible that lexical diversity captures only one dimension of lexical sophistication so lexical rarity is used as well.

8.2.2 Extrinsic measures: P-Lex

In order to measure lexical rarity, Meara's *P-Lex* will be used (Meara, 2007a). Although this software shares some similarities with *Web Vocabprofile* in that they both use frequency lists to determine the rarity of a word, the similarity ends there. *P-Lex* is not text length dependent and so this is why *P-Lex* rather than *Web Vocabprofile* will be used in conjunction with *D-Tools*. Meara (2007b, pp.1-2) explains how *P-Lex* works. The software calculates lexical richness by analysing 10 word segments of a text and then counts the number of "difficult" words in the text. It then calculates the number of blocks containing difficult words and the probability of this happening. The "difficult" words are those which are not found in the list of high frequency words which are listed in the *P-Lex* Manual. The statistic which *P-Lex* uses is the Poisson distribution which is calculated from the formula below[20]. The Poisson distribution describes the likelihood of rare events occurring. In this context, though, the key factor is not the likelihood of rare events happening over time, but of the distribution of certain i.e. "difficult" words

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[20] $P_N = (\lambda^N * e^{-\lambda})/N!$ (Meara 2007b, p.1)

occurring in a length of text. The program calculates the closest fitting Poisson curve and reports this curve by means of a central parameter, (λ) lambda. The output profile displays the proportion of 10-word segments which contain 0 difficult words, 1 difficult word, 2 difficult words, and so on. Putting aside the differences in mathematical calculations of lexical richness of the *VocabProfile* and *P-Lex*, the *P-Lex* is less "wasteful" of learners' texts. Moreover, by using *P-Lex* and *D-Tools*, the learners' texts can be used in their entirety without having to edit the texts so that they are of the same token length.

8.2.3 Measures of rarity versus diversity.

There have been some issues with the measurement of diversity as opposed to rarity. Meara and Bell (2001, p.6) have pointed out that diversity, in this case *D*, does not take into account the difficulty of the words. In the example they give, the following sentences would record the same Type-Token ratio:

The man saw the woman.

The bishop observed the actress.

The magistrate sentences the burglar.

Their argument is that diversity measures do not take into consideration the rarity of the word. So, for example, all of the above sentences would achieve the same TTR when clearly they differ in terms of lexical sophistication. Malvern *et al.* (2004, p.124) defend their measure of lexical diversity by saying that "...it would be a mistake to take

Meara and Bell's sample sentences as evidence that diversity and rarity are entirely independent factors". They argue that "...the two [diversity and rarity] are bound to be interrelated because, over a longer stretch of language, diversity can only increase by the inclusion of additional different words, and the more they increase, the more any additional word types will tend to be rare" (*ibid*, p.124). In other words, the proportion of words that are rare is a function of the number of different words, which is in turn a function of the number of tokens.

In fact, external measures of lexical richness using frequency data (e.g. *P-Lex* and *Web Vocabprofile*) and internal measures (e.g. Parameter *D*) have their advantages and disadvantages. Both the *P-Lex* and *Web Vocabprofile* measures do not take into account repetition of word tokens and so do not discriminate between learners who repeat rare tokens of the same type and those who use rare tokens of different types. Thus, it would be possible to inflate the lambda score or lexical profile of rare words simply by repeating a small number of rare words. In the case of lexical diversity the same learners would achieve a low score.

The distortion which comes from frequent use of rare words is particularly acute when the sample population uses technical vocabulary. What is rare in one environment may not be in another. Measures based on frequency counts from large corpora do not take into account the frequency of words in any particular environment. Student engineers, for example, may be exposed to technical jargon which, for them, is highly frequent and may not be perceived as difficult. However, this type of low frequency lexis may have a limited range and so probably would be considered as rare (i.e. beyond the 2000 frequency level) because technical words tend not appear outside of a certain environment. Consequently, a written sample of L2 English from students studying engineering may include a disproportionate amount of rare lexis which could give a false impression of the lexical sophistication of the student. Other less rare words may be more of a problem because these students might not have been exposed to them and so may not be a part of their productive lexicon. Biber (1988) makes the distinction between genres in which there is a high degree of dissociation between rarity and diversity. For example, "non-technical informational discourse has a markedly higher lexical variety than abstract technical discourse" (Biber, 1988, p.112).

Although the *D* parameter does discriminate in this respect, it does not recognise the difference between rare and frequent words so it is possible that high diversity scores can be achieved by using a diverse range of high frequency words (Biber, 1988 cited by Malvern *et al.,* 2004, p.160). Taken to extremes though, lexical diversity beyond a certain point may preclude repetition which is necessary for text coherence (see Jarvis, 2002, p.82). A high diversity score can be achieved through, for example, lists which tend to destroy the coherence of a text. The position as it stands at the time of writing is that no single measure of lexical richness can encompass all of the dimensions which make a text rich in terms of vocabulary. What you gain in one aspect by using one measure you lose in another.

To recap, in this new study there is a shift in focus from a macro to a micro level. Different learner orientations towards Memory and Analysis have shown some broad patterns in relation to lexical development but these tend to hide the "waxing and waning" (see Larsen-Freeman, 2006, p.596) in SLA language patterns. Therefore, individual learners, rather than groups, are analysed in this study.

8.2.4 Research questions

In light of the above discussion, I set out to answer the following research questions.

1. Are any patterns in lexical diversity (parameter *D*) trajectories related to strengths and weaknesses in Memory and Analysis?
2. Are any patterns in lexical rarity (*P-Lex*) trajectories related to strengths and weaknesses in Memory and Analysis?
3. Is productive lexical development as measured by lexical diversity and lexical rarity a linear or nonlinear trajectory over time?

The first two research questions are intended to shed light upon the interplay between learners' lexical trajectories classified by their learning style. From Study 3 (Chapter 6), variability would be expected from memory-orientated learners, whilst stability is expected from analysis-orientated. In addition, the questions also seek to find out what type of trajectory is expected from individual learners who tend to be weak in both dimensions. Their lexical trajectories are not expected to fall but are expected to be highly erratic.

In the subsequent examination of the learners' texts, I asked several judges to holistically rate the quality of the texts in order to understand how lexis is actually used in texts, taking into account the accuracy of the lexis and overall coherence. It is worth investigating individuals if we are to gain any insights into the complex process of lexical development. This study firstly attempts to track lexical profiles against a backdrop of learning style; and secondly, get behind the statistics to look at learners' lexis in relation to the overall quality of their texts to see if this might be related to their strengths in language learning.

8.3 Method

8.3.1 Participants

The participants were 12 second language learners of English who were enrolled in a private language school in London. All learners were post Cambridge First Certificate level grade C or above (i.e. post upper-intermediate) and were enrolled on an intensive language course designed to help them pass the Cambridge Advanced Exam. They all worked for the same bank in Switzerland which had sponsored them for this exam course in English over a period of 12 weeks. Therefore, there was extrinsic motivation for them to do well on this course. Among the 12 learners, eight of the learners' L1 was German or Swiss-German, two were French, one was bilingual in Bengali and German, and one was bilingual in Croatian and German. The mean age for this group was 22 years (oldest 31, youngest 19) and there were five males and seven females. At the time of testing they had all lived in the UK for three months.

8.3.2 Data processing

The research tool, parameter *D*, was used to calculate an index of lexical diversity. A version of this measure which is called *D-Tools* v2.0 (Meara and Miralpeix, 2007a) was downloaded from the University of Swansea website. This version is similar to the original index of lexical diversity proposed by McKee, Malvern and Richards (2000); however, the version on the website does not allow you to set switches which determine how the raw data will be processed e.g. *go, goes, going* will be treated as different types. In my study this was not a problem as there was no preconceived perspective on what to count as a different word type.

Because lexical diversity is one aspect of lexical richness, *P-Lex* was also used to measure lexical rarity to give a more complete picture of lexical richness. This software was used rather than the *Web VocabProfile* because *P-Lex* (like *D-Tools*) uses all of the text to calculate its statistic (lambda).

The raw data which the *D-Tools* and *P-Lex* software used were participants' texts written at five different points in time with two weeks between each point. In order to ensure validity, the texts were written under exam conditions so no dictionaries were allowed and the learners had one hour to write each text. The learners had no advanced warning of the writing tasks but were familiar with the genre of the writing they were expected to produce:

Text 1: A character reference for a job

Text 2: A report (fund raising for a charity organisation)

Text 3: A report (profit investment)

Text 4: A letter recommending changes for a friendship club

Text 5: A complaint letter to the editor

When learner texts were inputted, grammar errors were not corrected, wrong words were deleted, superficial spelling mistakes were corrected but words that were unclear because of spelling errors were deleted. Hyphenated words and phrasal verbs were treated as one word and contractions were treated as two. Numbers were included either as written words or as numerals. Meara *et al.'s* (2001) Language Aptitude Tests (LAT) B Memory and C Analysis were completed by the participants towards the end of their language course.

8.4 Results

The learners were categorised according to their Memory and Analysis scores (see Tables 8.1 and 8.2). Meara *et al.'s* (2001) categorisation of scores was used to put similar scoring individuals together (see Figure 8.1).

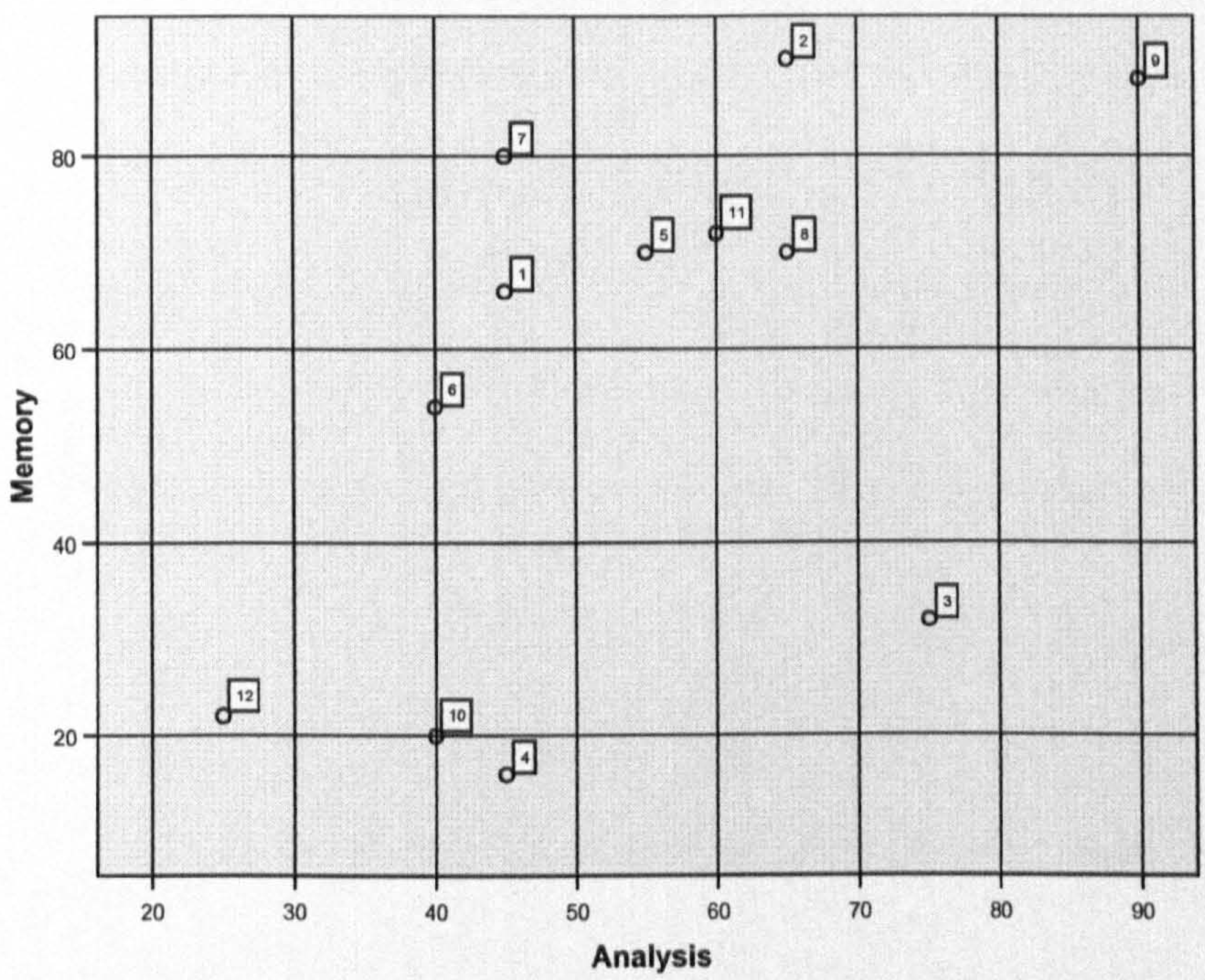
Table 8.1: LAT B Memory scores and their interpretation

84-100	top 10% of all scores
74-83	next 20% of all scores
43-73	middle 40% of all scores
34-42	next 20% of all scores
0-33	bottom 10% of all scores

Table 8.2: LAT C Analysis scores and their interpretation

90-100	top 10% of all scores
70-89	next 20% of all scores
60-69	middle 40% of all scores
50-59	next 20% of all scores
0-49	bottom 10% of all scores

Figure 8.1: Memory and Analysis scores



The trajectories of learners with extreme Memory and Analysis scores will be presented to ascertain whether there are any similarities or differences between these learners. The trajectories from participants whose Memory and Analysis scores fall into the middle bands are not presented because the effect of learning style on lexical profiles may not be so strong. Therefore, I will only present learners with extreme scores (i.e. bottom and top 30%) in Memory and/or Analysis to examine their individual lexical trajectories.

The groupings were as follows:

Table 8.3: Group 1: bottom 10% Memory and Analysis.

Participant	Memory	Analysis
4	16	45
10	20	40
12	22	25

Table 8.4: Group 2: top 30% Memory.

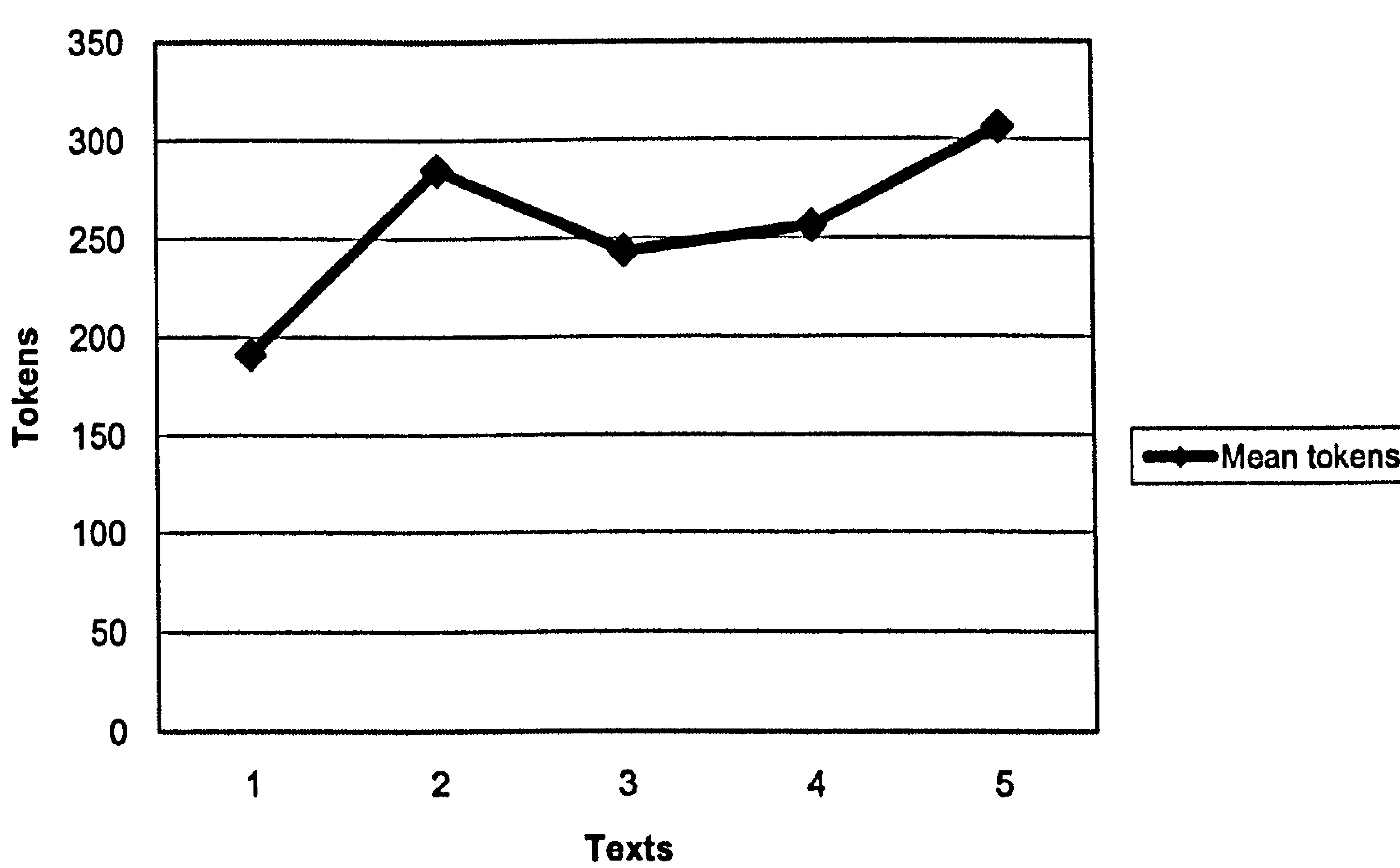
Participant	Memory	Analysis
2	90	65
7	80	45

Table 8.5: Group 3: top 30% Analysis

Participant	Memory	Analysis
3	32	75
9	88	90

The top Analysis group includes a participant who also has a high Memory score because there was only one participant with a high Analysis but low Memory score. The next section looks at the number of tokens produced by all the participants over five data collection points.

Figure 8.2: Mean number of tokens (whole group)



The number of words which all the participants wrote during their timed essays increased. Correlations were made between the *D* statistic and number of words. There was no relationship between the number of words and the *D* statistic. This is encouraging because the texts were not standardised for word count.

Table 8.6: Mean number of words

	N	Minimum	Maximum	Mean	Std. Deviation
text 1	11	151.00	242.00	191.18	31.54
text 2	11	213.00	350.00	286.91	34.82
text 3	10	168.00	292.00	243.60	39.42
text 4	12	189.00	314.00	256.33	34.83
text 5	10	242.00	355.00	306.60	37.12

The next section looks at the mean lexical diversity for the whole group.

8.4.1 Lexical diversity

Figure 8.3: Mean lexical diversity (parameter D whole group)

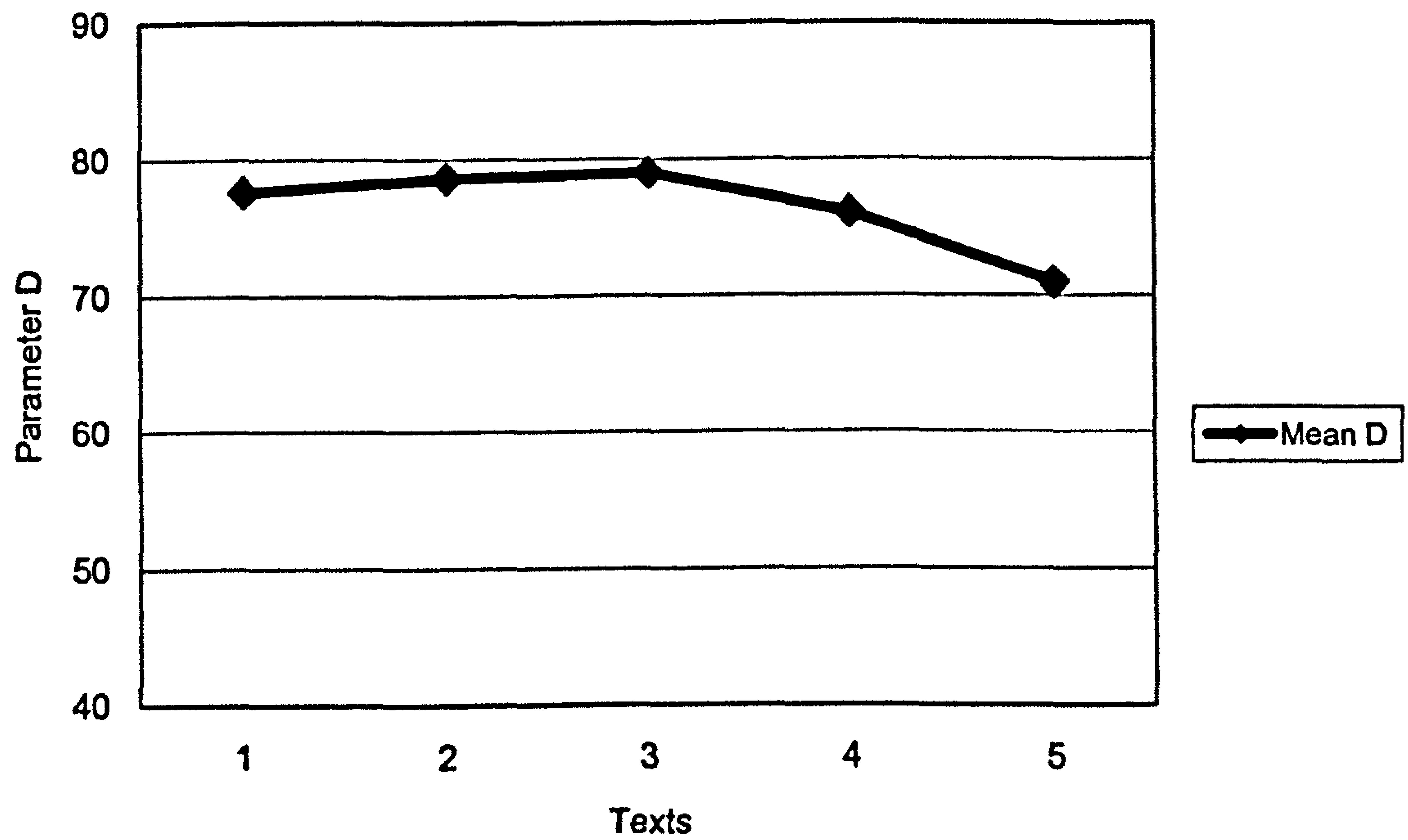


Table 8.7: Mean lexical diversity (*D*)

	Text 1	Text 2	Text 3	Text 4	Text 5
N	11	11	10	12	10
Mean	77.59	78.58	78.98	76.08	70.97
Std. Deviation	9.66	13.07	13.87	15.16	8.48
Minimum	65.21	64.33	60.68	56.74	59.63
Maximum	93.39	100.6	101.42	113.13	84.51

The whole group mean for lexical diversity shows a slight increase and then a steady decline in the last half of the 12 week intensive course. This graph highlights that lexical diversity does not suddenly increase during the initial few days but, as a group mean, remains relatively stable and then declines. There may be various reasons for this trajectory which will be discussed later. Interestingly, the steady decline falls further than the starting point at the beginning of the course.

To determine whether the differences in diversity scores between the different points in time were significant or not, a non-parametric one-factor within subjects ANOVA was carried out. A non-parametric measure was used because of the small number of participants. Not unsurprisingly, the differences between the texts at different points in time were not significant.

Table 8.8: Friedman ANOVA lexical diversity

N	6
Chi-Square	6.93
df	4.00
Asymp. Sig.	0.14
Exact Sig.	0.14
Point Probability	0.01

Ranks	Mean Rank
D text 1 character reference	2.83
D text 2 report (charity)	3.33
D text 3 report (investment)	2.83
D text 4 letter (friendship club)	4.17
D text 5 letter (complaint)	1.83

The next section shows the individual lexical diversity trajectories in relation to top and bottom scores in Memory and Analysis. Whereas the mean diversity trajectory is smooth, some individual trajectories show greater variability and others remain relatively smooth. Below we can see individual lexical diversity profiles from learners with low Memory and Analysis scores are plotted over five texts.

Figure 8.4: Lexical diversity (D) plotted against texts at bottom Memory and Analysis level

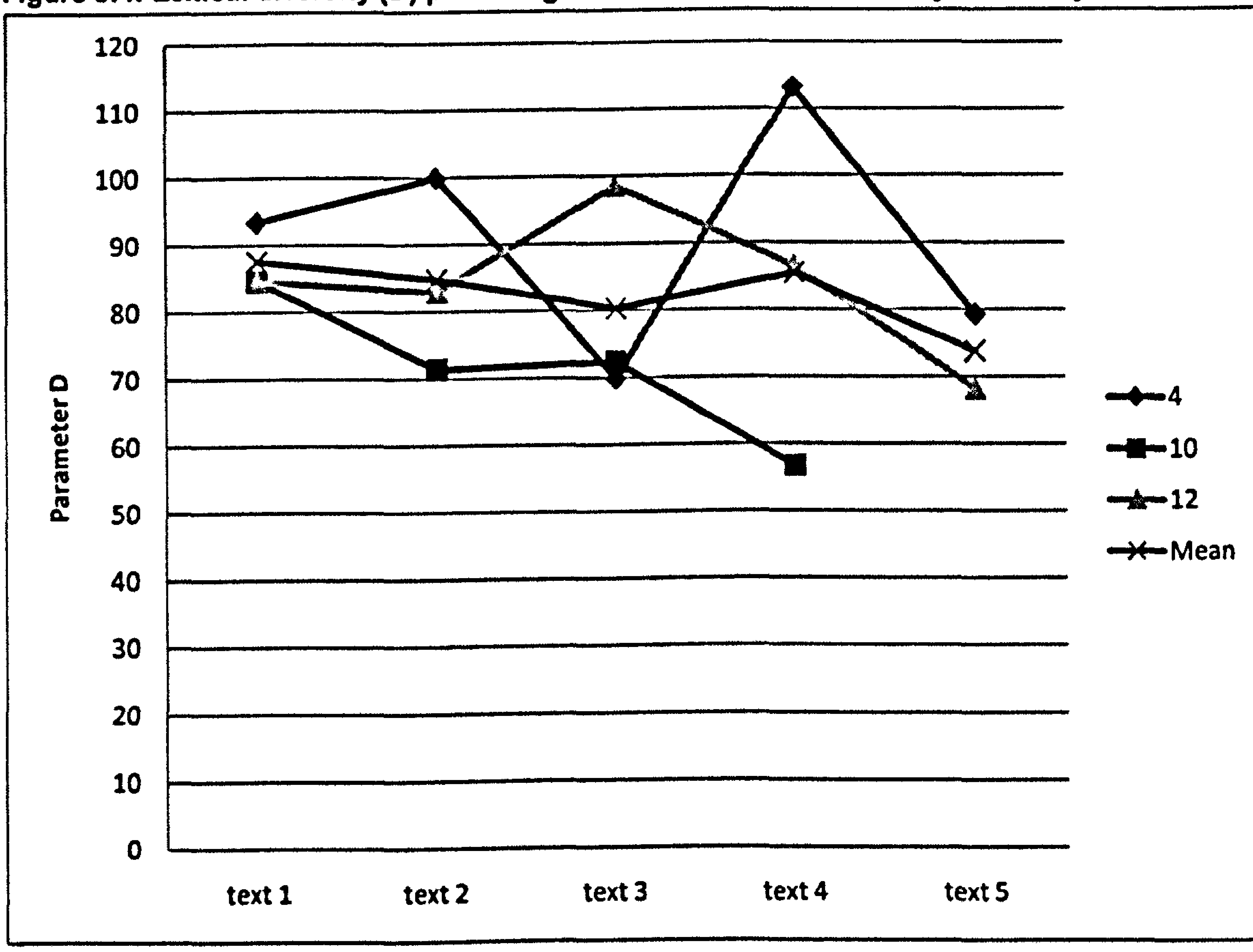


Table 8.9: D scores

Participant	Text 1	Text 2	Text 3	Text 4	Text 5
4	93.39	99.92	69.86	113.13	79.32
10	84.61	71.42	72.37	56.74	*
12	84.56	82.93	98.60	86.47	68.21

We can see that these three learners who have low LAT B and C scores did not progress in terms of mean lexical diversity as the course wore on. There are peaks and troughs, however, which is what you would expect, considering all of the variables in writing texts over a short intensive course. Participant 4 has a particularly dramatic saw-tooth profile and the *D* statistic reflects this fluctuation in diversity. The score for text four is the highest diversity score of any of the other participants. However, the overall lack of development, i.e. all of the participants ended with a lower *D* statistic than when they started, mirrors my previous study in which learners also low in Memory and Analysis displayed little or no lexical development.

Figure 8.5: Lexical diversity plotted against texts at top Memory level

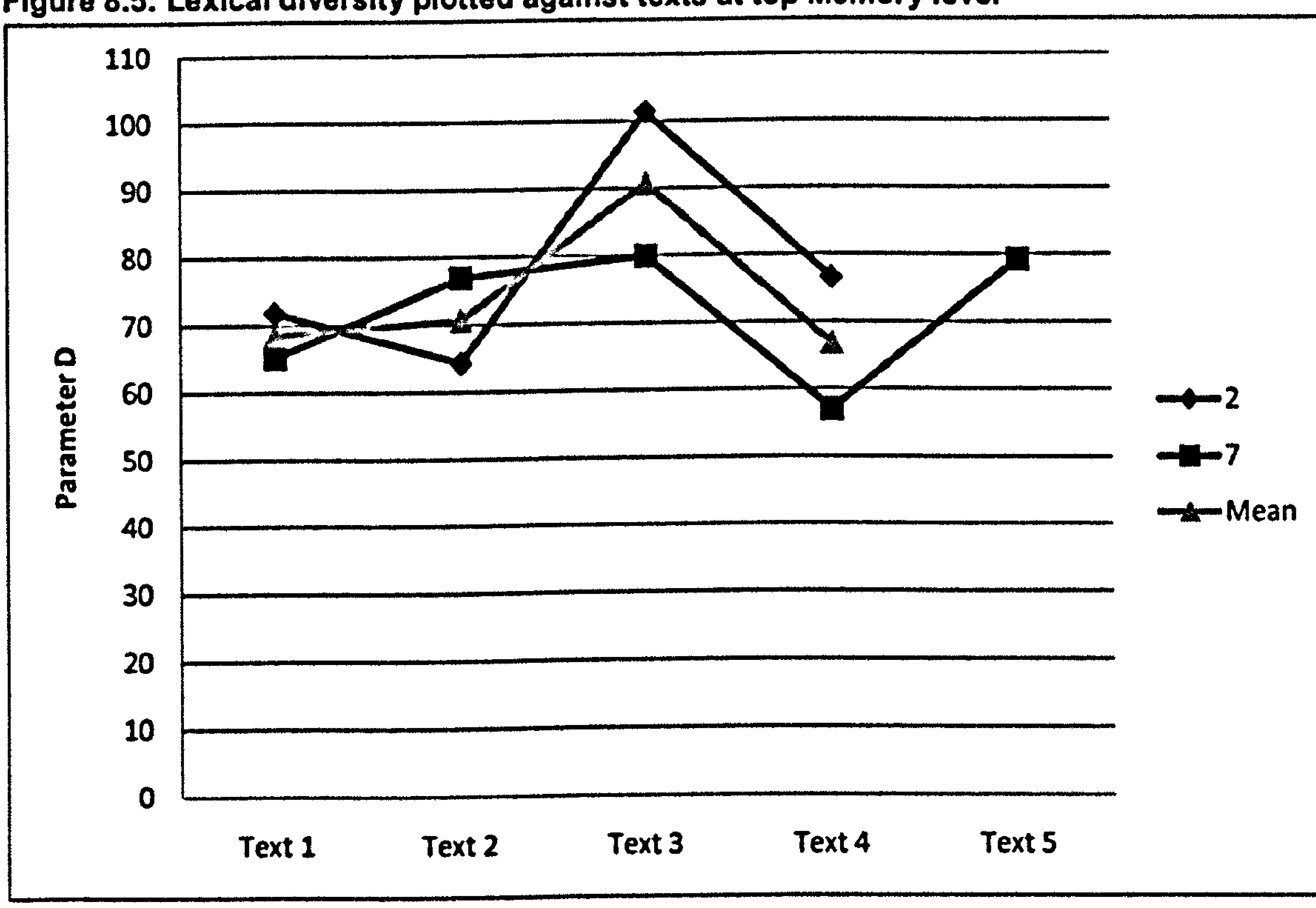


Table 8.10: D scores

Participant	Text 1	Text 2	Text 3	Text 4	Text 5
2	71.88	64.33	101.42	76.62	*
7	65.21	76.95	79.33	57.06	79.29

These two trajectories from the top Memory group in Figure 8.5 show a wide range of diversity scores, especially participant 2 who scored the highest on the Memory dimension out of the entire cohort. These two trajectories fluctuate over five data collection points, as can be seen from the mean trajectory.

Figure 8.6: Lexical diversity plotted against texts at high Analysis level

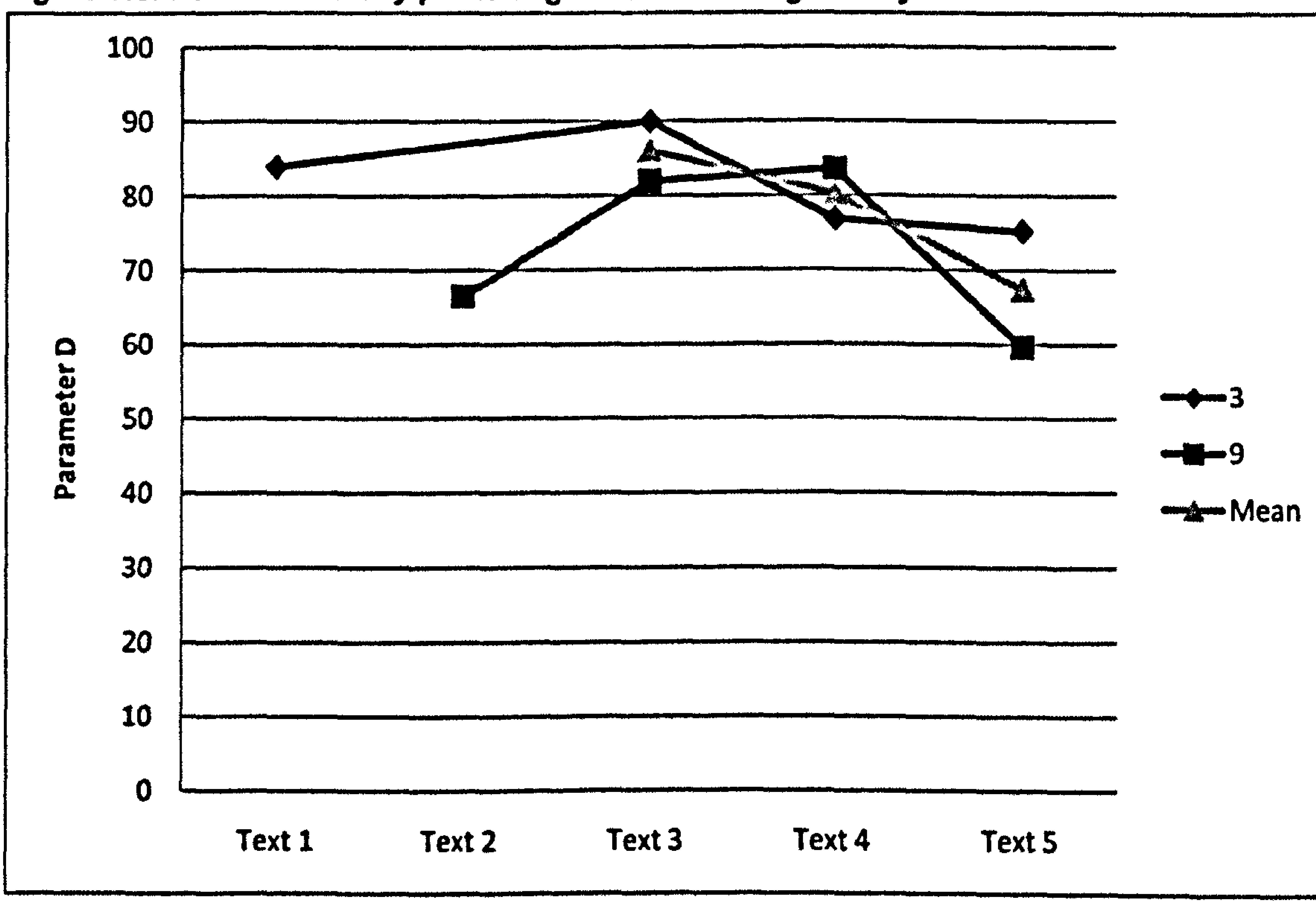


Table 8.11: D scores

Participant	Text 1	Text 2	Text 3	Text 4	Text 5
3	83.89	*	90.00	76.91	75.29
9	*	66.48	81.98	83.60	59.63

These two trajectories from the top Analysis group tend to cluster fairly close together as can be seen from the distance from the mean trajectory. They appear more consistent in relation to the other groupings. Although they both fall towards the end of the course, they do not display the wide swings in diversity as some of the other trajectories. In fact, Participant 3 with above middle Analysis but bottom Memory scores, remained fairly consistent in terms of diversity.

In order to examine lexical rarity, the next set of data is the lambda statistic from the *P-Lex* software. Firstly, the mean group statistic will be given and then the data will be analysed using a one-way ANOVA to determine whether there are any differences between the values taken at different points in time. Then, individual word rarity trajectories using the same participants who scored high or low on the Memory and Analysis dimensions will be analysed.

8.4.2 Word rarity

The *P-Lex* software was used to determine word rarity and the statistic given is the lambda values. This mean whole group trajectory differs from diversity in that there is a discernable peak in lexical rarity for text 3. Although the mean diversity was at its peak at this point as well, the trajectory was much smoother. The start and finish points highlight an improvement in terms of rarity at the end of the course whilst there was no improvement for diversity.

Figure 8.7: Mean word rarity (whole group)

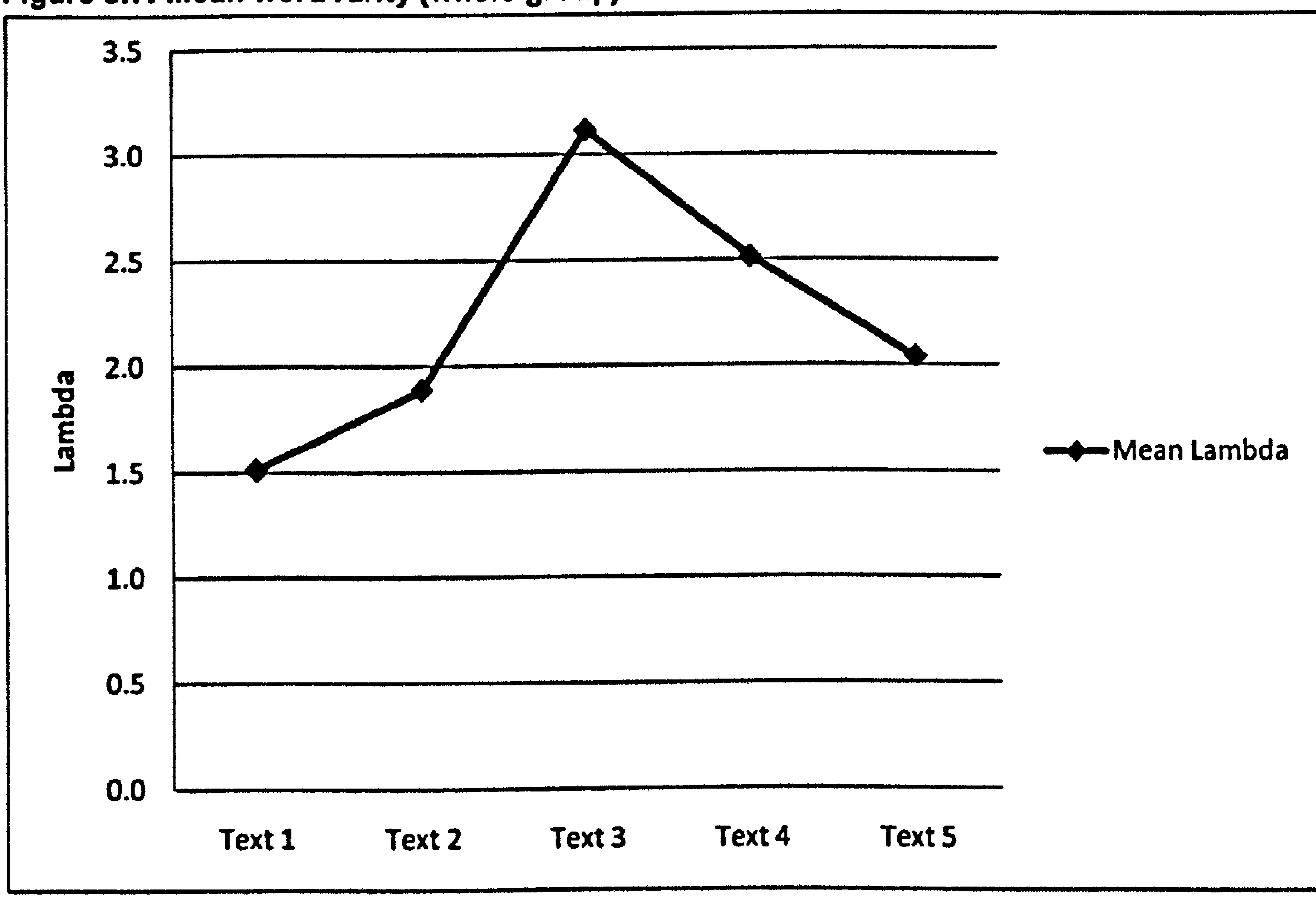


Table 8.12: Mean word rarity

	Text 1	Text 2	Text 3	Text 4	Text 5
N	11	11	10	12	10
Mean	1.51	1.89	3.12	2.51	2.04
Std. Deviation	0.26	0.32	0.52	0.24	0.31
Minimum	1.13	1.37	2.06	2.16	1.49
Maximum	2.11	2.34	4.04	2.95	2.57

In order to determine whether the differences were significant or not across the different texts, a Friedman one-way ANOVA test was conducted.

Table 8.13: Friedman ANOVA word rarity

N	6
Chi-Square	19.529
df	4.000
Asymp. Sig.	0.001
Exact Sig.	0.000
Point Probability	0.000

Ranks	Mean Rank
Lambda text1	1.42
Lambda text2	2.17
Lambda text3	5.00
Lambda text4	3.83
Lambda text5	2.58

This test shows that the rankings for the texts differ significantly across the texts: X^2 (6) = 19.53; $p < 0.01$. The next section examines the word rarity plotted against Memory and Analysis scores using the same groups as before.

Figure 8.8: Word rarity plotted against texts at bottom Memory and Analysis level

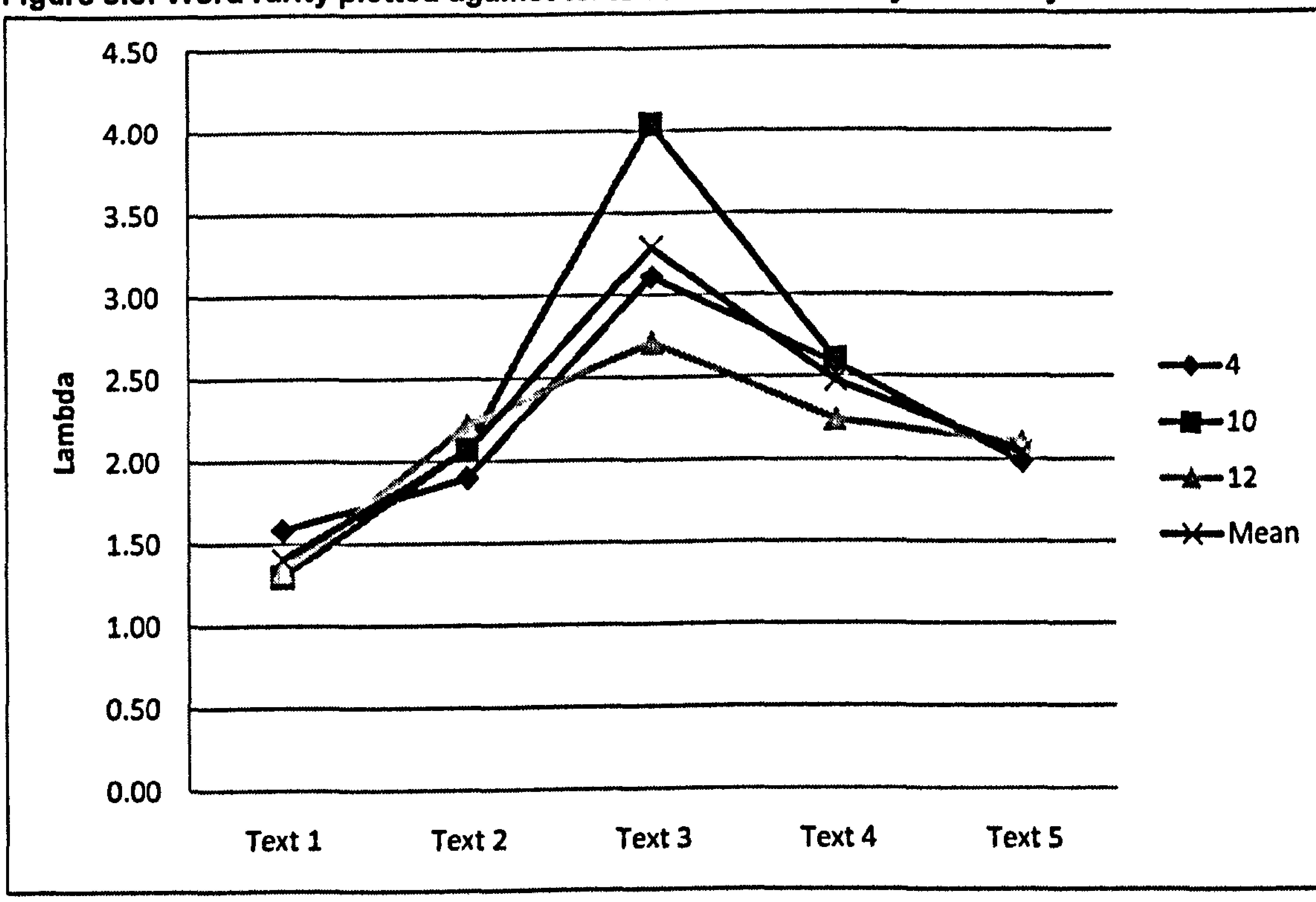


Table 8.14: Word rarity scores

Participant	Text 1	Text 2	Text 3	Text 4	Text 5
4	1.58	1.9	3.11	2.58	1.99
10	1.3	2.08	4.04	2.61	*
12	1.33	2.22	2.71	2.24	2.1

Whereas the diversity trajectories for bottom Memory and Analysis participants fell over five pieces of writing, the rarity scores (lambda) rose and then fell which follows the pattern from the whole group average. The trajectory from participant 10 is particularly high for text 3. Recall that in the previous section, this participant's diversity trajectory fell rather steeply.

Figure 8.9: Word rarity plotted against texts at top Memory level

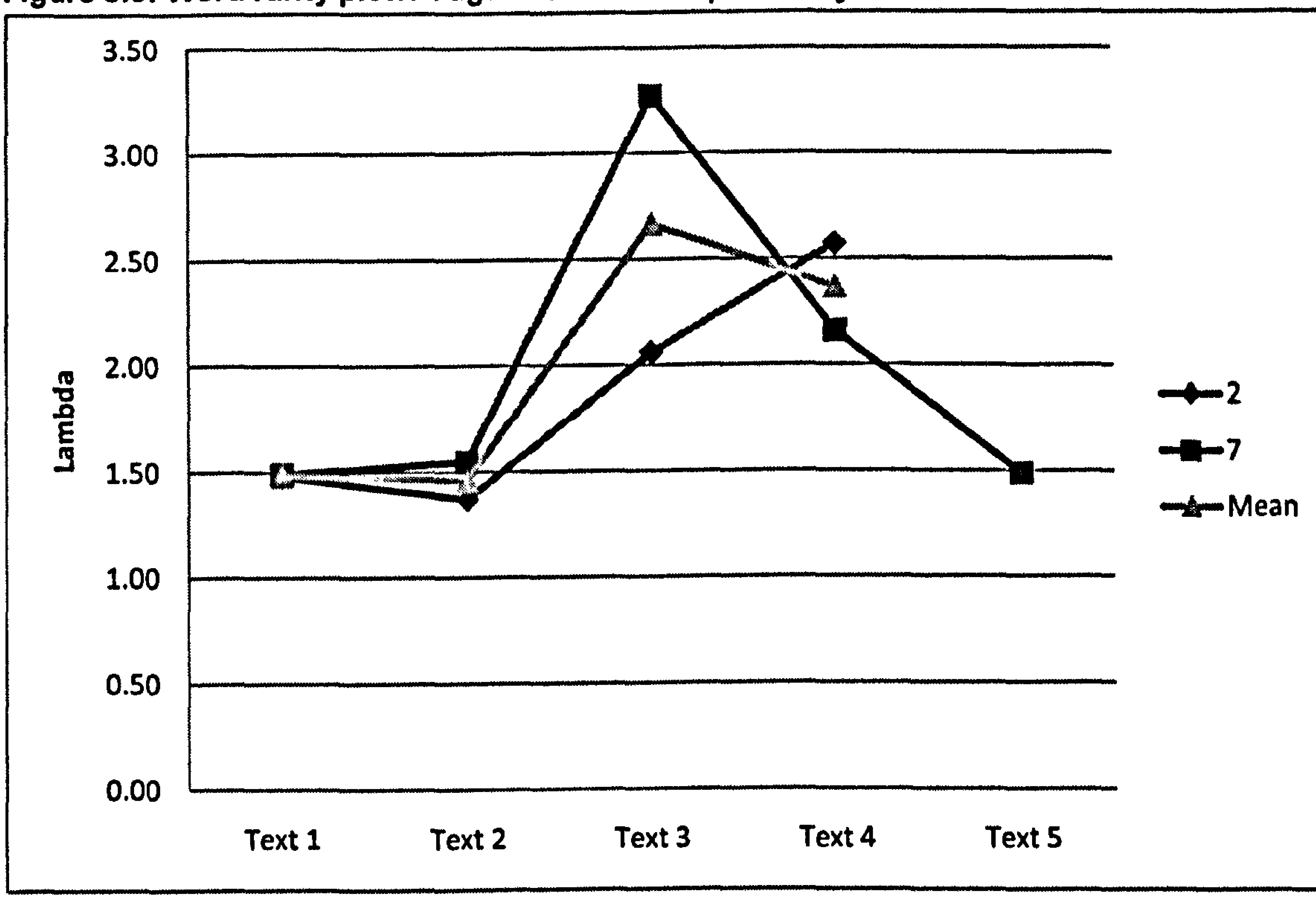


Table 8.15: Word rarity scores

Participant	Text 1	Text 2	Text 3	Text 4	Text 5
2	1.48	1.37	2.06	2.57	*
7	1.49	1.55	3.27	2.16	1.49

Although both participants in the top Memory group start off with practically identical scores, they both rise and fall without any apparent relationship between them. No coherent pattern emerges between high Memory learners and their word rarity trajectories.

Figure 8.10: Word rarity plotted against texts at top Analysis level

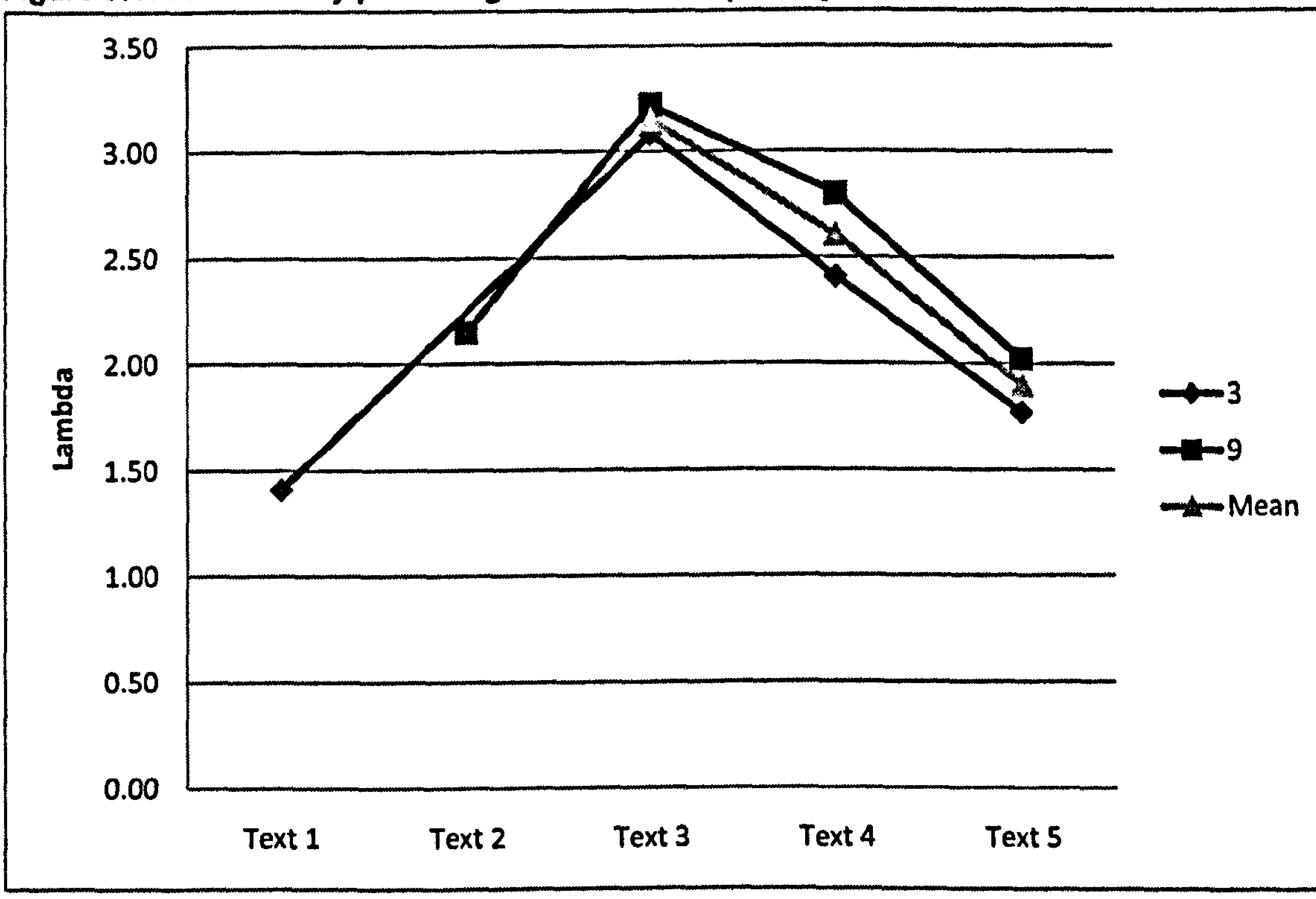


Table 8.16: Word rarity scores

Participant	Text 1	Text 2	Text 3	Text 4	Text 5
3	1.41	*	3.08	2.41	1.77
9	*	2.15	3.22	2.8	2.02

The two participants who scored high on the Analysis dimension rise and fall in tandem. As with their lexical diversity scores, the lambda scores tend not to fluctuate as much as the scores from learners who are in the top Memory but low Analysis range.

Recall that the first research question asked whether there is a relationship between the lexical diversity (*D*) scores and learners' strengths and weaknesses in Memory and Analysis. The *D* trajectories tended to fluctuate more with learners who achieved low Memory and Analysis and those with high Memory only. Smoother, less dramatic trajectories were found with the two learners who were high on the Analysis dimension.

In answer to the second question, the lambda scores (*P-Lex*) from the low in both Memory and Analysis sub-group showed that their lexical rarity rose and then fell. Interestingly, a similar pattern emerged from the learners both high in Analysis. The high Memory learners did not show much relationship between their trajectories. Although they both started off from similar points, they tended to diverge over the period of the course.

In answer to the third question which asked whether productive lexical development is linear or not, we can firmly say that lexical development is not linear. Both diversity and rarity tends to rise and fall as learners produce texts over a period of twelve weeks. The diversity trajectories have shown that, in this study, over this period of time, learners' texts do not necessarily become more diverse in terms of vocabulary; in fact, the trajectory of the mean parameter *D* scores rose and then fell, so rather than a steady increase in diversity, there was instead a slight increase followed by a steady decline. The word rarity trajectories have shown that learners can increase their production of rare words but the increase can just as easily fall with the next piece of writing. This, to some extent, can be expected given all the factors involved in lexical production.

8.5 Discussion

8.5.1 Diversity, rarity and learning style

The focus of this study is the idiosyncratic nature of individual lexical profiles which fluctuate over time. Although there were exceptions, individuals with low Memory and Analysis scores tended not to gain in lexical diversity over the 12 weeks, which is what could be expected. In the previous study, learners who scored low on the Memory and Analysis tests did not progress in lexical rarity over the period of one semester. In this current study, learners with high Analysis scores, however, tend to show relatively smooth, less fluctuation in their diversity trajectories than learners with only high Memory scores. This also chimes with my previous study which looked at lexical rarity; analytic-orientated learners tended to be more stable in their lexical frequency profiles from Time 1 to Time 2 than memory-orientated learners.

The two learners with high Analysis scores also had very similar lexical rarity profiles, whilst high Memory learners' trajectories did not show a coherent relationship. Regularity rather than irregularity in lexical knowledge can be associated with learners who are oriented towards analysis. In a study of receptive vocabulary knowledge, Milton (2007) found that learners with normal profiles (i.e. greater knowledge of each succeeding band of greater frequency) score higher on the LAT C test (Analysis) than learners with a level two deficit (i.e. a dip in the knowledge of the second thousand frequency band). Therefore, whilst individual learners fluctuate in terms of lexical diversity and rarity over five pieces of writing, regularity and stability tend to go hand in hand with high Analysis scores but not high Memory scores.

In this current study, when the trajectories of learners low on the Memory and Analysis dimensions were compared we see that overall, during this period of time, they decline in diversity but gain in rarity, particularly participant 10. It appears that in terms of lexical production, development in lexical diversity is more static than word rarity. The relationship between word diversity and rarity seems to be a complex one. It is possible that lexical rarity is more susceptible to task topic than diversity in that a highly specialised topic would encourage more specialised, rarer lexis but not necessarily greater diversity. For example, a car manual would conceivably have highly rare lexis but also repetition of important lexis. This will be discussed further in the next section.

It is also possible that the use or non-use of rare words will cause the lambda statistic to fluctuate whilst the complexity of the language will remain relatively unchanged. Jarvis (2002, p.78) notes that "excessively high levels of lexical diversity preclude the amount of repetition which is necessary... to maintain discourse coherence". If the learner complexifies sentence structure then a certain amount of repetition (e.g. function words and discourse markers) may be necessary, which will depress the *D* statistic. Therefore, there is not a linear relationship between the *D* statistic and quality of a text. An extremely high diversity statistic would render a text "telegraphic", whereas an extremely low *D* score would render a text repetitive. Skehan's notion that analysis-orientated learners engage in regular restructuring and complexification (Skehan, 1998, p.250) is borne out to some extent by some of my results in that they are the ones whose diversity trajectories are likely to be more stable and less likely to fluctuate. However, memory-orientated learners are difficult to pin down in that data from their lexical trajectories in terms of rarity and diversity do not show much consistency with each other. They are the learners most likely to display fluctuations in their lexical trajectories. Associative memory may encourage a more holistic type of learning which could favour lexical chunks and repetition rather than rule-based language which is needed for complexification and precision. The combined effects of high Memory and low Analysis may account for the more erratic diversity and rarity lexical trajectories. It is clear, though, that no single statistic can represent all of the qualities of a text in terms of lexical production.

8.5.2 Lexical development and the influence of task type

The third research question set out to ask whether lexical development is a linear or non-linear process. The evidence from my study suggests that it is certainly not a linear process either in diversity or rarity. Learners' diversity scores rose and fell over the different points in time. Recall also that a very high *D* score may mean that a text lacks coherence because a certain amount of repetition is necessary for text unity. One of the factors which may have influenced the scores could be the amount of repetition in any particular piece of writing. We need to look at a learner whose texts we would expect to remain stable or even increase in diversity but in fact fell.

Participant 9 has exceptionally high Memory and Analysis scores. This learner showed a steady progression but then an unexpected decline in the last text. His text 5 shows why this may be the case. There is a lot of repetition of certain words; for example, the word "article" is repeated eight times in this short text (see table 8.17).

Table 8.17: Text 5 Participant 9

Rank	Freq	Coverage		Word
		individual	cumulative	
1.	35	10.23%	10.23%	THE
2.	16	4.68%	14.91%	I
3.	12	3.51%	18.42%	TO
4.	11	3.22%	21.64%	YOU
5.	9	2.63%	24.27%	OF
6.	8	2.34%	26.61%	A
7.	8	2.34%	28.95%	AND
8.	8	2.34%	31.29%	ARTICLE
9.	7	2.05%	33.34%	HAVE
10.	7	2.05%	35.39%	IN

This may be the result of the exam writing tasks which tended to be very specific in what they require the learners to write about. This particular task required learners to complain about an article published about a school and so encouraged learners to refer to the article on many occasions, thus causing repetition of certain words.

At the beginning of the course the whole group's production of tokens was quite low, reflecting perhaps a lack of sub-topics in each text. A reduced word count means that the *D-Tools* software has less lexical information to base its *D* statistic on. Although the *D* parameter mitigates against type token ratio (TTR) being a function of text length by using a curve-fitting procedure based on random samples of the text, it does mean that texts with a low token count may give a less accurate idea of a learner's lexical production than a larger text.

Subsequently, the word count rose which might indicate more sub-topics within the text and so greater diversity (Chotloss, 1944 cited by Malven *et al.*, 2004). Then, at the end of the course although learners were more fluent, they perhaps were more focused on the task (see *Teacher influence* next section), thus causing the *D* statistic to fall. Looking again at the standard deviations for the group as a whole, we can see that the initial *D* scores are close together and it is only after the first piece of writing that the trajectories become more diverse and then become closer together at the end of the language course.

Although the trajectories are not particularly smooth, intuitively one would expect more of an overall increase as the course progressed. At best, most learners seem to end up at a lexical diversity score roughly the same as where they started from; at worst, some learners' scores declined. The lexical rarity trajectories showed an increase then a fall. There may be many reasons for this. It would be wrong to expect that there is a direct relationship between teaching and learning. Learners may not progress for some very obvious reasons e.g. tiredness or boredom with the course; sometimes there is no obvious reason at all e.g. development is not immediate but delayed.

One reason for the peak in lexical rarity could have been due to the task topic. Recall that these learners came from a banking background and that the subject of text 3 was an investment report. This task topic would call upon lexis connected with investment which these learners would have been exposed to in the course of their work or training. It is possible that certain low frequency lexis of this topic is similar in both German and English. For example, participant 9 used the following cognates in the investment report: principal – *prinzipiell*, modern – *modern*, productivity – *Produktivität*, motivated – *motivieren*, information – *Information*, communicate – *kommunizieren*. However, the other learners did not use as many cognates for this task. The other topics the learners had to write about, for example, a personal reference, may not have been so familiar to the writers in terms of topic.

8.5.3 Teacher influence

In fact, the teacher may have also had an indirect effect on the learners. An informal interview revealed that he did in fact encourage learners to focus on exactly what the task required them to do and not to include superfluous information. This might have had the effect of reducing the number of sub-topics within each text and also of increasing the amount of repetition of certain key words. However, a skilled writer would possibly use synonyms to reduce the monotonous effect of repeating the same words. Another teacher influence was the emphasis he gave to discourage the students from translating their thoughts from German into English. Instead, they were encouraged to think and work directly in English.

Simply telling students to work in English throws up two questions. Firstly, is it effective for students to think in L2 for writing tasks? Secondly, is this actually possible most of the time? The intuitive answer to the second question would be that thinking in L2 can be helpful but not always possible. The wider question is why tell students to do this in the first place? Learners use whatever strategies they can to communicate in L2 and the use of L1 cognates is one of them. In fact, participant 9 used German-English cognates to good effect; moreover, the use of cognates may encourage learners to make educated guesses when their L2 lexical knowledge is insufficient. It is interesting to note that this teacher did not speak a second language and so may not appreciate the strategies which learners use to cope with the extra processing demands placed upon them in a formal L2 writing context.

8.5.4 Affective factors

One learner (participant 12) was noted as being particularly uncomfortable with writing under exam conditions and usually became flustered when told she was coming to the end of the time allowed. Interestingly, this learner also scored the lowest on the two LAT tests B and C. This is unusual because this learner also reported that, apart from German, she has French and Czech as other languages, so although she scores very low on the LAT B and C tests, she is an experienced language learner who has reached a high level of proficiency in English. Meara *et al.* (2001) explain that when interpreting the LAT B scores, learners with high anxiety levels do not perform as well on the LAT B test. One reason could be that the pairs of words travel across the computer screen at a fixed speed which the test taker has no control over.

8.5.5 A comparison of exam scores with Memory and Analysis scores

Towards the end of the English course these participants received a mock CAE exam in which they were tested on reading, writing, English in use, listening and speaking. Overall, participants 1 and 4 scored the highest (71%). They were also below the median in both Memory and Analysis. The two participants who scored the lowest overall were participants 2 and 12. Participant 2 had an exceptional Memory score (90%), whilst participant 12 had the lowest LAT B and C scores.

Table 8.22: Mock results

	Reading /40	Writing /40	Eng. in use /40	Listening /40	Speaking /40	Total %	Grade[21]	Memory	Analysis
1	34	22	26	28	33	71	C/B	66	45
2	30	20	21	25	32	64	D	90	65
3	24	27	21	28	32	66	C	32	75
4	33	23	26	28	33	71	C/B	16	45
5	33	22	27	33	33	74	B	70	55
6	22	24	23	20	32	61	C	54	40
7	27	28	26	31	27	69	C	80	45
8	27	25	25	28	32	68	C	70	65
9	30	23	18	35	28	67	C	88	90
10	24	23	21	29	35	65	C	20	40
11	25	25	23	29	28	65	C	72	60
12	23	22	23	29	27	61	E	22	25

When the test scores are picked apart for writing, participants 3 (top Analysis) and 7 (top Memory) score highly (27 and 28 out of 40). Participants 1, 2, 5 and 12 score low (20 -22 out of 40) for writing, none of whom score high on Analysis, but participant 2 scored well on Memory. In the actual CAE exam, overall, all participants passed at C level except participants 12 (E grade) and 2 (D grade). From this study it seems that very low Memory and Analysis scores might be able to predict failure (participant 12) but that a high Memory score may not predict success (participant 2).

[21] 24-27/40 = C (pass)   28-31/40 = B   32+/40 = A

The next section reports on qualitative ratings in order to get a different perspective on participants' L2 production.

8.6 Qualitative analysis of texts

8.6.1 Qualitative analysis of texts (cognate L1)

In order to determine qualitative differences between the texts three native speaker judges who are qualified in teaching English as a second language were asked to give a single holistic quality rating to the texts from the participants of the various sub-groups. The quality rating was based upon the Cambridge CAE general impression mark scheme (Cambridge Advanced Exam Teaching Resource, 2008). This mark scheme was chosen because it includes the criteria for this exam class and the criteria have been fully piloted. The score is from 0 to 5 which is a general impression of the text. The criteria include: accuracy of language, range of vocabulary, structure of text, cohesion, and register. Handwritten texts from the learners were typed so that the judges would not be influenced by handwriting style.

Tables 8.18: bottom Memory and Analysis

Text 1 character reference				
Participant	J A	J B	J C	mean
4	4	3	5	4
10	3	3	3	3
12	3	2	3	2.7

Text 2 fundraising				
Participant	JA	JB	JC	mean
4	3	4	5	4.0
10	3	4	3	3.3
12	3	3	2	2.7

Text 3 investment				
Participant	JA	JB	JC	mean
4	4	4	4	4.0
10	3	4	3	3.3
12	2	3	3	2.7

Text 4 letter				
Participant	JA	JB	JC	mean
4	3	3	3	3.0
10	2	4	5	3.7
12	3	4	4	3.7

Text 5 school				
Participant	JA	JB	JC	mean
4	3	5	5	4.3
10				
12	3	3	4	3.3

With bottom Memory and Analysis participants we can see that participant 4 tends to score well compared to the other two. Participant 12 consistently scores less than the other two in the group. This is not surprising considering that this student scored the lowest on the LAT (Memory and Analysis) and also claimed that the time limit was not sufficient. The judges' scores for participant 10 show a wide variability (2-5) for the letter text (Text 4). Overall, though, participant 4 is judged the best out of this particular sub-group. This student also has the highest Analysis score in this group (45%)

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Tables 8.19: Top Memory

Text 1 character reference				
Participant	JA	JB	JC	mean
2	0	1	2	1
7	3	4	4	3.7

Text 2 fundraising				
Participant	JA	JB	JC	mean
2	2	2	3	2.3
7	4	4	4	4.0

Text 3 investment				
Participant	JA	JB	JC	mean
2	2	4	4	3.3
7	4	4	5	4.3

Text 4 letter				
Participant	JA	JB	JC	mean
2	2	3	3	2.7
7	3	4	4	3.7

Text 5 school				
Participant	JA	JB	JC	mean
2				
7	3	3	3	3.0

Participant 2 from the top Memory group tends to be erratic in the quality of the work. This is also reflected in the lexical diversity and to a lesser extent in the word rarity trajectory of this learner. The reason why the first text was judged so low is because this student misread the task question and produced a text which was not relevant.

Interestingly, this sub-group does not tend to be judged any higher than participants 4 and 10 from the low Memory and Analysis group.

Tables 8.20: Top Analysis

Text 1 character reference				
Participant	JA	JB	JC	mean
3	4	4	5	4.3
9				

Text 2 fundraising				
Participant	JA	JB	JC	mean
3				
9	4	4	4	4.0

Text 3 investment				
Participant	JA	JB	JC	mean
3	3	5	5	4.3
9	3	4	5	4.0

Text 4 letter				
Participant	JA	JB	JC	mean
3	4	4	5	4.3
9	2	4	5	3.7

Text 5 school				
Participant	JA	JB	JC	mean
3	4	4	5	4.3
9	4	4	4	4.0

All the judges consistently scored the top Analysis learner 3 or above for the texts he wrote. Participant 3, who is top in Analysis but not Memory, also scored relatively

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well. Over five different pieces of writing, the judges tended to rate the texts from the two analysis-orientated learners' texts higher than the other two sub-groups.

If we are to draw any conclusions about the holistic ratings of the texts it is vital to know how reliable the raters are. I have used Cronbach's alpha as a measure of rater reliability. Table 8.21 shows that the Cronbach's alpha is generally acceptable for the texts, except text 4.

Table 8.21: The reliability of the raters

Text type	Cronbach's alpha
1 Character reference	.926
2 Report (fund raising for a charity)	.785
3 Report (profit investment)	.719
4 Letter recommending changes for a club	.573
5 Complaint letter	.727

These holistic score ratings by the judges suggest that a higher *D* statistic is not associated with a higher quality rating. In fact, a very high *D* statistic is likely to make the judges' scores low. Likewise, a very low *D* value is not necessarily rated low. This is corroborated by Jarvis (2002, p.78) who found that *D* scores of above 43 correlated negatively with holistic ratings. What my study of holistic ratings and learning style seems to suggest is that learners with high Analysis scores tend to achieve higher holistic ratings although the number of participants is not large enough for any statistical confirmation.

Most of these learners' L1 (German) was cognate with English which could give an advantage in lexical production when compared with learners whose L1 is not cognate. This motivated a subsequent analysis of texts in which the participants' L1 backgrounds comprised of a mix of cognate and non-cognate languages with English.

8.6.2 Qualitative analysis of texts (non- cognate L1)

To examine the written texts in a holistic, qualitative manner the texts produced by learners in a study reported earlier (Chapter 5) were printed out and given to two raters who are both experienced and qualified teachers of English to L2 university students. The raters then graded the essays based on the IELTS writing criteria. These criteria were used instead of Cambridge CAE because of the lower overall proficiency of the group from Study 3. The quality rating band descriptors (IELTS org. n.d.) emphasise only writing quality and not any technical referencing skills. The criteria include: task response, coherence and cohesion, lexical resource and grammatical range and accuracy from which the essays were rated 1-10. In order to assess inter-rater reliability, Spearman's rho correlation was then carried out on the two raters' scores for each essay. A non-parametric statistic was used because the values were based on a rating scale rather than ratio values. Table 8.22 below shows the correlation between the two raters.

Table 8.22: Correlation between Rater 1 and 2

			Rater 2
Spearman's rho	Rater 1	Correlation Coefficient	.391**
		Sig. (2-tailed)	.002
		N	61

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

The correlation is moderate and it shows an inter-rater reliability of $r = .391$ ($p<.01$). The scores from each rater were then averaged to give a single mean quality rating to each text.

Table 8.23 below shows a sample of learners who were all of the same overall IELTS level of 6.0 (no data was available for participant 8). From the data we can see that lower rated texts, i.e. below 5, tend to be associated with learners whose L1 is not cognate with English (participants 34, 48, 49). In contrast, higher rated texts, i.e. 6.5 and above, seem to be associated with learners whose L1 or L3 is cognate (participants 47, 8, 9). From this sub-set of data it would appear that a cognate first or third language background is advantageous in the writing quality of L2 texts. Interestingly, lower rated texts were not only associated with a non-cognate L1, but with the quality of their notes.

Table 8.23: Quality rating of texts and L1 and L3 background

Participant	Quality Rating	L1	L3
34	4	Bulgarian	
48	4.5	Thai	
49	4.5	Gujarati	
47	7	Greek	
8	6.5	Turkish	German
9	7.5	Italian	Spanish & Portuguese
13	6	Mandarin	Taiwanese & Japanese
15	6	Japanese	
37	6	Korean	Japanese
42	6	Korean	

The writers who produced these texts were allowed to bring notes to the writing session. The notes themselves are quite revealing in how these learners prepare for a timed writing exercise. All of the participants had relevant reading for the topic of globalisation but did not know in advance the discursive type question. All they knew was that the questions would require them to write a situation, problem, solution, evaluation, structured essay. One thing which stood out was the quality of notes (see Appendix 5c: *Learner notes* for full page examples). Students could only use one page but it was the content which was revealing. Some students clearly used the notes to record vocabulary. Some learners who seemed to prepare more thoroughly for the writing test, as seen from their notes, tended to achieve better ratings. Better preparation seemed to be particularly beneficial to learners whose L1 was not cognate with English (participants 13, 15, 37 and 42).

Participant 13

From shaking hands to eye contact, even color can be an issue.

herefore | ex: India → purple means virginity, white means used for death shrouds.

n | (3) Richard Cook → one of the biggest growth = cultural training in email.

onclusion | more companies → virtual terms based in different countries

thus | Richard Cook → necessity of netiquette

e.g. The US : too direct

hence | The Japanese : underling key sentences

The UK: sending reminders

(4) A Clear message: if in doubt, resort to stereotype

describe/state/define/argue/dispute/conceded/investigate/estimate/believe/recognise/predict/analyse/compare/comment/conclude/criticise/demonstrate/discuss/illustrate/indicate/note/observe/point out/report/show/suggest

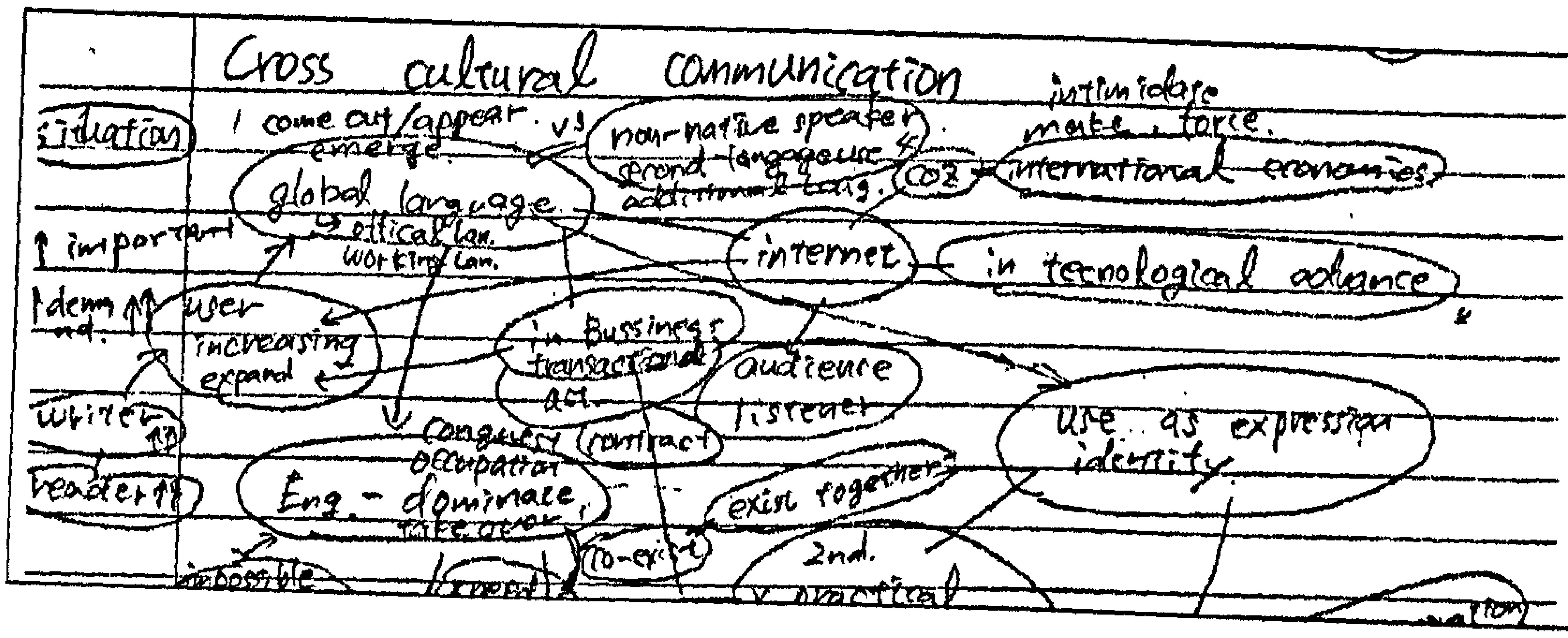
△ The academic programme ouilt up 5 learning circles — 1. international business and communication; 2 sustainable development; 3. global cultures; 4. social change; 5. art and cultures.

△ The unique selling point → the Scholar Ship = experience of living in a transnational community.

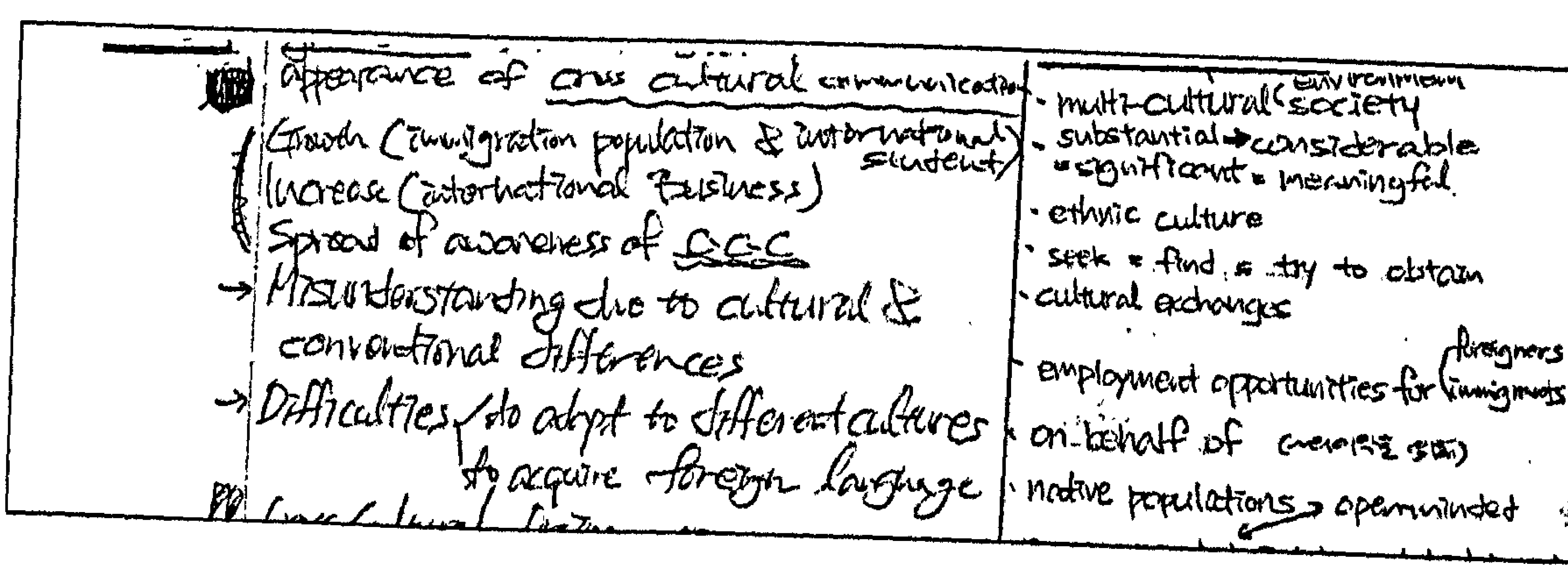
△ Business schools → Aware that students are increasing attracted to courses given them international experience e.g. Short secondments to partner universities, compus abuard.

△ Manchester Metropolitan, business school → biggest and most diverse in UK

Participant 15



Participant 37



Participant 42

* John Crace. "Crossing cultures". Guardian, (2003) http ______ (Accessed on —)

speaking same language + saying same thing.

company : cultural consultant potential minefields staff

eg) nuance. colour (national flag)

HSBC bank : direct expression "Give ... money"

Mark McCrum

* "Mind your non-language" : Guardian, (2002) _____ ( )

non-verbal communication = important language.

cultural DNA eg). Jumping line ← UK - immoral / Italy, Arab, China - OK

accepting incomprehensible → cultural open-mindedness

✓ globalisation → homogenising behaviour (the youth)

[illegible] % communication

[illegible] % body language & expression

describes / states / defines / argues / disputed

conceded / investigated / evaluated / [illegible]

believes / recognised / predicted

analysed / compares / comments / concludes

discusses / illustrates / points out / reports / shows

eg) Japan - business card

· similarly / equally / likewise / in the same way

· also / in addition / besides / as well as / not only but

· furthermore / moreover / indeed / what is more

· however / on the other hand / despite

For learners whose L1 was not cognate with English and whose text quality was low (participants 48 and 49), their notes tended to be less detailed and more list-like.

Participant 48

① language

English as situation | a global language ↙ advantage ↖ disadvantage — scient

problem | 1. benefit → English as mother tongue

2. native speaker lazy to learn language

3. lost of minority language

4. equality

5. logistic cost

solution | 1. early education in language learning

2. using artificial language (⑤)

3. change mind set of native speaker

⑦ culture (cross culture in business)

Situation business world → create some problem

problem lack of communication

1. misunderstanding

3. business style, idea → have their own

Solution 1. high cultural consultant → ~~make team~~

2. training about business culture

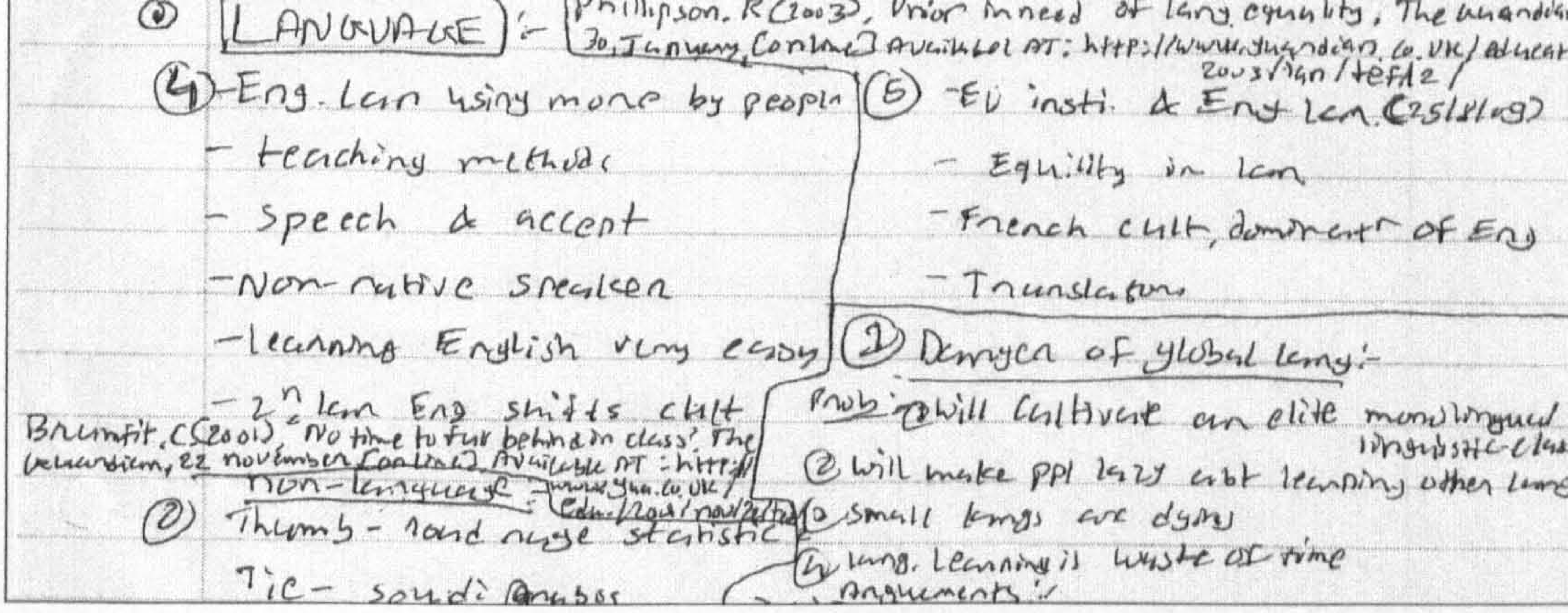
3. e-mailer culture avoid misunderstanding

4. website → show the culture

5. respect individual measure

⑥ Since English language ~~[illegible]~~ | ~~has~~ boomed in 1970 & 1980s

Participant 49



1 LANGUAGE :- Phillipson. R (2003), 'Union in need of lang. equality', The Guardian, 30, January, [Online] Available AT: https://www.guardian.co.uk/education/2003/jan/tefl2/

4 -Eng. Lan using more by people

- teaching methods
- Speech & accent
- Non-native speaker
- learning English very easy
- 2^n lan Eng shifts cult

Brumfit, C (2001), 'No time to fall behind in class', The Guardian, 22 November [Online] Available AT: http://www.gua.co.uk/Education/2001/nov/22/tefl

non-language :

2 Thumb - hand nose statistic

Tic - saudi Arabs

5 -EU insti. & Eng lan. (25/8/09)

- Equality in lan
- French cult, dominant of Eng
- Translation

1 Danger of global lang:-

Prob: 1 will cultivate an elite monolingual linguistic class

2 will make ppl lazy abt learning other lang

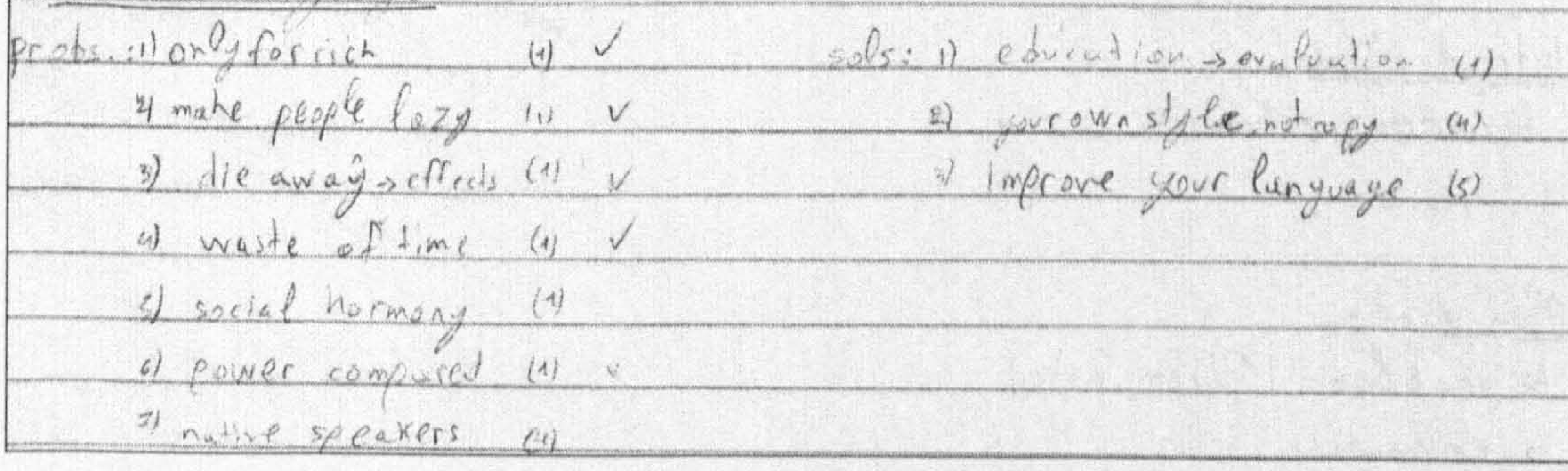
3 small langs are dying

4 lang. Learning is waste of time

Arguments :-

However, for learners whose L1 was cognate with English (participants 47 and 9) there seemed to be no apparent relationship between the quality of their notes and their written texts.

Participant 47



Global language

probs: 1) only for rich (1) ✓

2) make people lazy (1) ✓

3) die away → effects (1) ✓

4) waste of time (1) ✓

5) social harmony (1)

6) power composed (1) ✓

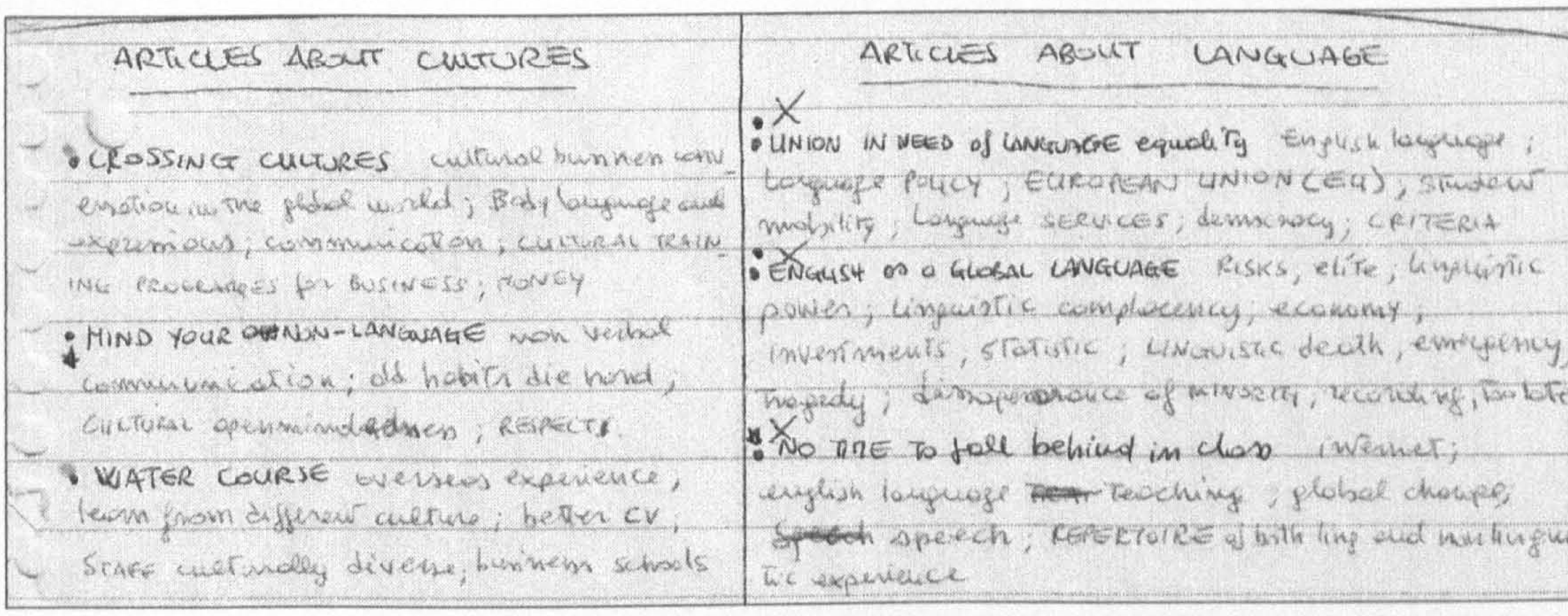
7) native speakers (1)

sols: 1) education → evaluation (1)

2) your own style not copy (4)

3) improve your language (5)

Participant 9



ARTICLES ABOUT CULTURES	ARTICLES ABOUT LANGUAGE
• CROSSING CULTURES cultural bunnen conv emotion in the global world; Body language and expressions; communication; CULTURAL TRAINING PROGRAMMES for BUSINESS; MONEY	• UNION IN NEED of LANGUAGE equality English language; language POLICY; EUROPEAN UNION (EU); student mobility; Language SERVICES; democracy; CRITERIA
• MIND YOUR NON-LANGUAGE non verbal communication; old habits die hard; CULTURAL openmindedness; RESPECTS.	• ENGLISH as a GLOBAL LANGUAGE RISKS, elite; linguistic power; linguistic complacency; economy; investments, STATISTIC; LINGUISTIC death, emergency; tragedy; ~~disappearance~~ of MINORITY, recording, too late
• WATER COURSE overseas experience, learn from different culture; better CV; STAFF culturally diverse, business schools	• NO TIME TO fall behind in class internet; english language ~~[illegible]~~ teaching; global change; ~~speech~~ speech; REPERTOIRE of both ling and multilinguistic experience

In short, it seems that having a cognate L1 helps in the quality of L2 lexical production; however, learners can make up, to some extent, for a non-cognate L1 to L2 when they prepare well for the writing task.

8.6 Conclusions

This study examined learners' lexical development over time in relation to a memory-analysis learning style framework. Lexical development was measured in terms of diversity and rarity so as to capture both aspects of lexical richness. Whilst the trajectories show fluctuations in terms of diversity and rarity, the memory-analysis framework can help us to understand which learners are likely to display trajectories which are relatively more stable i.e. less likely to fluctuate than others. Analysis-orientated learners are more likely to show similar patterns of trajectories than memory-orientated learners. Learners who are memory-orientated tended to show greater variability in their trajectory pattern. However, the trajectories were not linear. The learners do not display profiles that progressively gain in diversity or rarity. The trajectories tended to rise and fall, which suggests that learners' output is relatively unstable and that a single sample of their productive vocabulary may not be typical. Although the parameter *D* and lambda statistic from the software is sensitive to variability in learner output, impressionistic, holistic ratings of the writing quality tended to score analysis-orientated learners higher than those bottom on the memory-analysis dimensions.

The qualitative ratings also revealed that a cognate L1 to English may in fact be beneficial. Learners who do not have a cognate L1 have a greater learning task and may need to work harder in order to achieve comparable quality in their use of lexis. It was suggested that meticulous preparation can help learners go some way towards reaching higher quality in their use of lexis and ultimately their writing.

We have also seen how task topic has an influence on lexical rarity rather than diversity. As a group, the learners peaked in lexical rarity for a particular writing topic, whereas the group diversity score remained relatively unchanged. This implies that lexical rarity is more sensitive to task topic than diversity. A specialised writing topic may encourage learners to call upon specialised lexis which could inflate their lexical rarity score. Lexical diversity seems to be immune to differences in writing topic. One reason could be that it relies on an intrinsic measure of lexis which is influenced by sentence structure and coherence rather than extrinsic frequency criteria which is independent of syntax.

The implication from this study is that learners orientated towards grammatical sensitivity (Analysis) are more likely to be predictable in their lexical output. This type of learner is more likely to produce a stable profile over different times. This is not to say that this type of learner will always develop in terms of lexical diversity or rarity, but sensitivity to grammatical patterns may be related to a more systematic use of vocabulary i.e. one that does not show dramatic fluctuations in diversity or rarity. On the other hand, memory-orientated learners tend to fluctuate more in terms of lexical diversity and rarity. It could indicate that these learners are more likely to use words recently encountered but that usage will be temporary. Another possibility is that memory-based approach to learning may encourage a strategy which focuses on the core meaning of lexis rather than to analyse for the peripheral meanings. The next chapter will bring together the unfolding nature of my research studies, pick up core themes outlined in the literature review in light of my empirical findings, and discuss theoretical and methodological issues which arose during the studies.

9 Discussion: inferences, conclusions, limitations and further research

9.1 The evolution of the research studies

The studies in this thesis have moved from a simple concentration on the means in lexical frequency to studies in which variability, time, diversity as well as lexical quality, were included into the design. Simply concentrating on the means ignored the important developmental features which are inextricably linked to L2 lexis. Consequently, the variability found in individual, longitudinal trajectory patterns eventually became the focus. Measurement of lexical frequency was coupled with lexical diversity which both provided quantitative measures of lexical richness. However, quantitative measures did not take into account how learners actually use words in context and so holistic quality ratings added a qualitative dimension.

Several interesting and important issues came out of the five studies in this thesis. L2 lexis is highly variable which implied the need to focus on the dynamic nature of lexical production. Patterns in variability and stability were examined as learners were tracked across different points in time. One of the possible reasons why L2 lexis should be so variable in nature is that high frequency lexis can have semantically opaque non-core meanings which learners may find difficult to acquire. The discussion explores this issue in relation to memory and analysis and how this can map onto lexical processing.

The findings are also discussed in the light of Dynamic Systems Theory (de Bot *et al.,* 2007). In particular it has helped us to appreciate how lexis is assembled under task conditions which interact with individual learning strengths. In light of this theory, I will revisit the longitudinal studies I have conducted and connect the findings to this theory. One of the important issues raised in relation to this theory is the notion of complexity and how learners achieve this in their written texts. The chapter will consider what drives complexity and how it cannot always be measured quantitatively.

The emphasis of the chapter shifts to an evaluation of the learning style test instruments and reappraises the relationship L2 lexis has with the two learning style dimensions. The pedagogical consequences of learning style are discussed to relate some of the work conducted to a classroom context. The last two sections discuss limitations of the studies and future work which could be done to extend the work carried out in this thesis.

9.2 Stability and variability of lexical profiles and the relationship with learning style

Lexical profiles are dynamic in the sense that they change from one point in time to another. Although single profiles can give us some idea of lexical production, it is frozen in time and does not capture the dynamic aspect of lexical production. Longitudinal studies are also needed to understand the dynamics of change. Despite learner differences in lexical knowledge, each context will make salient different lexis so that no two pieces of writing from the same learner will be identical in terms of lexical diversity or frequency. It is here that we find the fundamental challenge of measuring productive vocabulary via written texts from learners. There will inevitably be variability in the vocabulary production.

My empirical work highlights the phenomenon that group patterns do not accurately reflect individual patterns. When we put the spotlight on individual profiles, we see that lexical profiles appear almost chaotic in the sense that no two pieces of writing from the same learner will produce exactly the same numerical value in terms of rarity or diversity, see Study 5 (Chapter 8). We tend to see linear development patterns when individuals are grouped together; however, when the focus is on individuals then development appears messy and idiosyncratic. When we actually focus on the variability itself and examine intrinsic learner differences, then we can see patterns and make inferences from the inevitable variability in L2 lexical production. As lexical resources can be seen as a system and the individual lexical items are assembled in response to a task, then this process becomes dynamic and thus time becomes intrinsic in this process. Differences in grammatical sensitivity (Analysis) and visual memory for paired associates (Memory) seem to have a subtle relationship with the assembly of lexis. However, these effects tend to be cancelled out if the focus is only on group means. For example, Laufer and Nation's (1995) study assumed that the only differences between learners' lexical production of two texts were attributable to their proficiency level in English and not idiosyncratic differences shaped by any number of factors including context, previous learning and learning style. Top-down and bottom-up approaches of looking at the data have shown that individual change is not the same as group change, but that one can inform the other.

The interplay between stability and variability in lexical profiles has confirmed the work by Milton (2007). The test of memory, LAT B, could give us a good indication of an individual's ability to memorise words but not an indication of whether an individual actually understands the semantic relationships between words. Recall that Milton (2007) used the *X-Lex* vocabulary test and found that learners with level two deficit profiles scored better on LAT B than those with normal profiles. Milton's suggestion is that "different learning strengths and styles really can influence foreign language lexis that learners acquire in class" (p.56). In light of the empirical work done in the previous chapters, a reasonable explanation could be that memory, in this case associative memory, is associated with vocabulary size (Study 2, Chapter 5). However, it does not give us an indication of whether a learner actually has a good grasp of the grammatical or semantic relationships between words. A learner with a good associative memory may have a fairly large vocabulary but whether a learner is able to use lexis accurately and precisely is unknown. Good associative memory could explain why learners can develop vocabulary knowledge but not whether they know how to use words accurately or appropriately. This may explain why high Memory learners can have a deficit in their lexical profiles; they may simply be able to acquire rare lexis more easily which could tip the balance in favour of a higher 3k band than a 2k band when tested by *X-Lex*. In fact, in Milton's (2007) study 25% of the learners tested had a level 2 deficit. Milton's explanation was because they lacked function words; however, it is more likely that they may just have more random profiles regardless of their ability to learn function words. This could explain why high Memory learners in my previous studies have tended to have less stable profiles. The next section takes this further and looks at how memory and analysis impacts upon lexical processing.

9.3 Lexical processing

It is possible that early stages of L2 development are characterised by language which is exemplar-based, i.e. the accumulation of chunks. Because of the unfamiliarity of the L2 in the early stages, the learner may not have the cognitive resources available to generate language which is rule-governed. A cost of relying too heavily on a memory-based system, Skehan (1998, p.53) argues is that it is "more concerned with the accumulation of exemplars and their utility in performance" than with the "growth and complexity of the underlying system involved" as in a rule-based system. It is possible that some learners have no choice but to rely heavily on a memory-based system while for others building up a store of words is slow. We have seen from my previous empirical work that learners vary markedly in their LAT B and C scores. To express complex and precise meaning through lexis and grammar requires not only motivation but also analysis of language to learn new ways of expressing concepts in a more target-like manner. Ellis (1996, p.115) argues that grammatical knowledge develops from a large repertoire of exemplar sequences. Therefore, some learners' inability to analyse a large stock of learned exemplar sequences could inhibit their knowledge of grammar. Moreover, learners with poor memory and analysis may have only a vague notion that their L2 is non-target like and the finer points of L2 lexis and grammar may not be salient to them.

However, in aptitude research, rote learning, i.e. a memory-based approach as measured by visual memory for paired associates, has never been a very strong factor in the aptitude construct. Sasaki (1996, p.91) found that in her correlational model of different second language proficiency test scores and their relationships with a general cognitive ability that was assumed to influence foreign language aptitude, among the aptitude variables Language Analysis measured the construct best, whereas Paired Associate Memory measured the construct the worst. There is something of a puzzle here. Early L2 memorisation of pre-fabricated chunks would appear to be a worthwhile strategy to accumulate enough language to communicate fluently. However, it does not appear to be enough to ensure L2 development in which the learner can express complex meaning. Chipere (2009, p.182) makes the following observation of lexical knowledge of children's first language. "...children differ in their knowledge and application of derivational rules, with some children treating words as unitary wholes that simply have to be memorized while others treat them as morphological complexes that are built up via computation. One would expect children who treat words as unitary wholes to experience slower vocabulary growth than those who can derive new words through computation". It appears that memorisation is a useful strategy but that it has severe limitations if it is the only strategy. It would be reasonable to assume that memorisation of lexis can give superficial understanding but that grammatical sensitivity is needed to develop L1 language and L2 lexis in particular.

This would be a reasonable assumption to make if learners used memorisation in the earlier stages of L2 development and then were able to somehow analyse the language in the latter stages. This seems to be a rather simplistic account of what learners do. In the empirical work presented we have seen that low and high proficiency learners have been tested on the LAT B for paired associates. If the above were true we would expect to find that low proficiency learners would score higher on the LAT B than high proficiency learners, as it would be a preferred style of learning. This has not been the case. Whether learners are low or high proficiency, the mean LAT B test scores are not significantly different between the two groups. Learners may not analyse L2 lexis simply because they do not have the learning strengths to do so and this could well be a factor why learners with similar L2 backgrounds seem to develop at different rates.

Wray (2002, p.200) points to perhaps why L2 learners do not simply rely on memory for prefabricated chunks, or in her terms, "holistically learnt strings". "Holistically learnt strings are, by definition, subject to loss of detail, because they rely on the memory of the visual and/or phonological shape of the entire unit. Unless they continue to be encountered, and are regularly used, the memory of them will fade, and, because they were not analyzed, there will be no way to reconstruct any details that have become difficult to recall". It would seem that analysis is a necessary factor in retaining the details of prefabricated chunks but that some learners are able to do this more than others. In Study 2 (Chapter 5), scores on the language analysis test were significantly higher for the high proficiency group. Therefore, it would suggest that language analysis as measured by LAT C is associated more strongly with language proficiency than LAT B for memory. Analysis could be a prerequisite for development.

9.4 Semantically transparent and opaque lexis

Key to the development of lexis is the ability to develop semantic and grammatical associations between words. We have seen that in study 2 high proficiency was related to higher scores on the LAT C than those of learners classified as low proficiency so grammatical sensitivity and language proficiency seem to go hand in hand. It suggests that in order to develop proficiency, a pre-requisite is to develop the semantic knowledge of words. However, Ijaz (1986, p.405) found that lexis which is semantically opaque may then be avoided or overused because semantic distinctions in one language may not exist in another. Ijaz argues that L1 concepts may need to be restructured to L2 concepts and new definitions of semantic boundaries need to be established. Moreover, lexis which is semantically opaque may not even be noticed until very late in the learning process which could affect syntactical development in relation to function words for sentence structure. Chipere (2009, p. 181) makes the point that "differences in lexical knowledge should lead logically to differences in syntactic ability, given that considerable grammatical information is attached to individual lexical items". The outcome could be that semantic opaqueness of lexis may inhibit the development of syntactical and grammatical knowledge.

Recall that Sjöholm (1998) looked at the opaqueness of phrasal verbs in an empirical study in which Finns and Swedes were tested on their avoidance or acceptance of opaque English phrasal verbs. Since phrasal verbs are rare or coded differently in Finnish, whereas in Swedish phrasal verbs exist, one would expect avoidance from the Finns but not the Swedes. The results showed that this was indeed the case but that this was only true at the early stages of language learning. Higher level Finns were much more likely to accept opaque phrasal verbs than lower level Finns.

The implication is that more advanced language learners may in fact be more willing to accept and therefore use opaque lexis. More opaque lexis, such as phrasal verbs, is more complex for learners but not necessarily more rare. For example, *make up*, *make off with*, *make out* are all comprised of high frequency words but are uncommon in

L2 texts. The upshot of this is that lower variability of analysis-orientated learners may indicate that these learners are using more the frequent lexis such as phrasal verbs and function words which are not rare per se but can be semantically opaque and are necessary for learners to complexify their language. Rarer lexis can be used in place of phrasal verbs and learners do not necessarily need to use phrasal verbs but this phenomenon highlights the need to interpret lexical frequency and diversity profiles not simply in pure quantitative terms but also in qualitative terms. There may well be texts which score similar values in diversity and rarity but which are in fact very different in terms of how the lexis is used productively.

Semantic knowledge is important for development; as Schoenemann (2009, p.163) argues, semantic knowledge is a prerequisite for the grammatical knowledge to develop. Schoenemann explains that complex language requires the ability to code high level semantic information and that "language semantics require a conceptual structure for words and grammar to map onto, a rich conceptual world translates into the potential for more complex language" (*ibid*, p.170). If a learner is not grammatically sensitive, then it is likely this learner is not sensitive to semantically complex information. Complexity, then, in L2 lexis appears to be built upon the interdependence of grammatical sensitivity, semantic information and conceptual structure. However, if a learner does not have the L2 language resources to code the language in a complex manner then grammatical sensitivity will be compromised.

This is an important point because previous research by Morris and Cobb (2004, p.82) has shown that TESL students' scores in pedagogical grammar negatively correlates, albeit moderately, with function words. The implication the researchers make is that less reliance (i.e. below 50% in a text) of function words in a text, the better the grammar grades. What my research suggests is that it is not the accumulation of function words per se but the stable use of semantically opaque function words which is associated with grammatical sensitivity. Grammatical sensitivity also appears to be indirectly related to the holistic quality ratings of texts. In Study 5 (Chapter 8), learners who scored exceptionally well in Analysis tended to obtain better holistic ratings of their texts.

To end this section, a dynamic metaphor is presented based on Conrad Hal Waddington's epigenetic landscape (van Geert, 2003, pp.648-650). Waddington's landscape featured a marble on the cusp of a hill with valleys which irreversibly shape the route the marble actually takes. The metaphor comes from Waddington's own biological work on genes and embryogenesis. Instead of genes carrying the full description of the organism's form, Waddington showed that genes are the starting point for development and that it is the process of embryogenesis which determines how the body is actually constructed. The analogy with the landscape is that when the marble rolls down the hill its destination is not fully predetermined before the journey but is shaped as it travels.

Figure 9.1 borrows from Waddington's landscape idea. As we have seen from the previous empirical work, there is stability in lexical profiles from learners who are particularly perceptive of the grammatical relationships that are encoded in words, whereas learners who do not have this approach to learning and are perhaps more concerned with the memorisation of words tend to produce lexical profiles which are more unpredictable.

Figure 9.1: The landscape of analysis on words

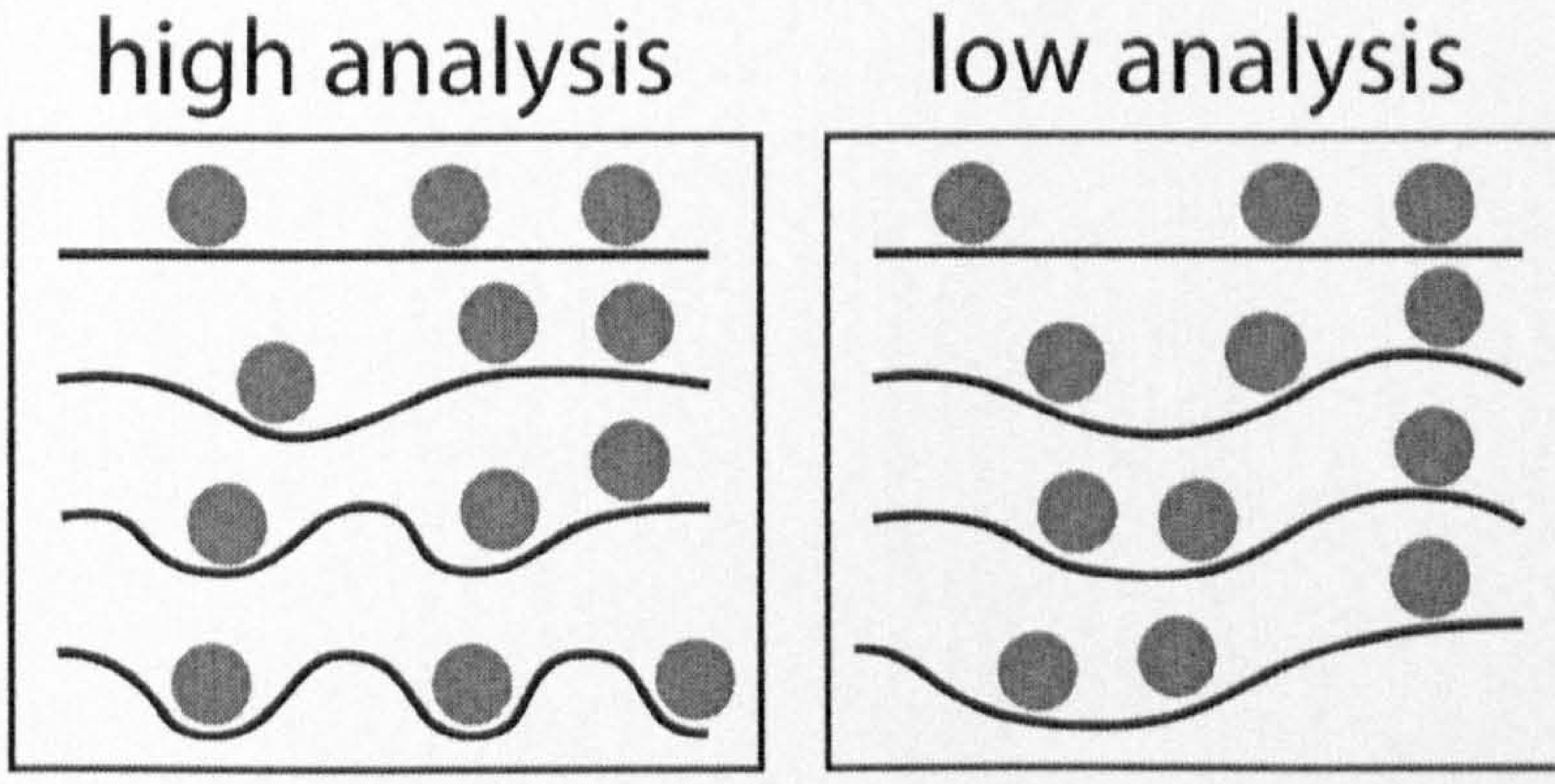


Illustration: Paul Wood

The valleys in Figure 9.1 represent what Pinker (1999, p.174) describes as "...an abstract mental scaffolding around words". Learners who are strong in Analysis are thought to make semantic and grammatical connections, whereas learners who are not strong in Analysis tend to make more random or weak connections. The marbles in the valleys represent the emergence of some type of equilibrium which is found with words that are analysed. The marbles in the under-defined landscape represent variability found with words that are under-analysed. This dynamic metaphor chimes with Dynamic Systems Theory which, according to de Bot *et al.* (2007, p.14), emphasises the way change is visualised rather than measured through the more traditional ways based on probability and variation. My results will be discussed in light of this theory.

9.5 Development from a Dynamic Systems perspective

The findings from the empirical work lend some support to Dynamic Systems Theory (DST). Some of the findings will be put forward to integrate this theory with second language vocabulary. In particular, the reoccurring themes which have run through my empirical work which have some parallels to DST are variability in lexis, the assembly of lexis within the sub-systems of the internal learner variables (memory and analysis) and the external variable of the context in which lexis is produced, and the drive for development through growing complexity. Before discussing some of the findings in light of this theory, it is necessary to give some background information on DST.

9.5.1 Dynamic Systems Theory (DST)

Lexis can be conceived of as a dynamic system which lends itself to a Dynamic Systems Theory (de Bot *et al.,* 2007). Originally a branch of mathematics, DST can be used to describe simple systems in which complex behaviour emerges from the interaction of components. Thelen and Smith (1994) helped to develop dynamic systems principles out of their research into human motor and cognitive development. They explain that "[t]he central tenet of dynamic systems is that order, discontinuities, and new forms emerge precisely from the complex interactions of many heterogeneous forces" (Thelen and Smith, 1994, p.37). The emergence of new forms which is not predetermined is helpful in understanding that lexis is part of a system which interacts in complex ways. In order for a system to be dynamic it must develop. The variability inherent in a system is a sign of development (Verspoor *et al.,* 2008). Traditionally, variability in individual development patterns has been regarded as what de Bot *et al.*

(2007) term as "noise" and not as an important internal development characteristic. Variability gives us important information on the nature of the development process. Rather than ignore variability, Thelen and Smith (1994, p145) argue that "a dynamic view of development considers the origins and functions of variability as absolutely central for understanding change". It is a sign of a system in transition in which old patterns break down to make way for new patterns. It is a process-orientated rather than static-orientated focus on the system. In complex systems we find that there are periods when the system appears to settle into specific states which are called "attractor states", where there is equilibrium within the system, and other periods when states are not preferred and which are called "repeller states", where there is high variability within the system (de Bot *et al.,* 2007, p. 8). In language we can interpret this as the self-organisation of lexis during which the process of reorganisation can be seen over time.

9.5.2 The assembly of lexis

L2 lexis can be conceptualised as a system in development. A Dynamic Systems Theory perspective describes this as "systems of interacting forces (can) have a natural tendency to evolve towards some equilibrium state, which is dynamically maintained as soon as it is reached" (van Geert, 2003, p.645). In this thesis, memory and analysis are two interacting forces under examination. It seems inevitable that learners will utilise whatever memory and analysis resources they have available to them in relation to their L2 lexical system and some type of equilibrium will evolve from that system. In other words, it does not seem an "either...or..." process. Memory and analysis are used as part of the learning process and they appear to be dependent upon each other. Lexis which is acquired in the early stages may draw upon associative memory because of the poverty of lexis in the L2 lexicon. First and second language associative bonds may be necessary for the learner to put L2 lexical items into some type of context in order for them to be integrated into the system as a whole. Integration, in Mandler's sense (1980, p.255), would focus on "the general reactivation of the relations among the constituent features". In this case it could be the semantic and syntactical features of the lexis which would be driven forward by analysis. Learners' lexical production interacts with memory and analysis (and other) processes which drives forward development.

In Study 4 (Chapter 7), we saw that over time, analysis-orientated learners developed rare lexis beyond the 2,000 frequency band. Interestingly, memory-orientated learners developed erratically and their development was not so significant. It was the learners whose lexis beyond 2000 correlated most strongly between Time 1 and Time 2 who developed significantly in terms of rare lexis. It could be argued that these learners' lexis was closer to an equilibrium state indicated by the strong correlation. However, on an individual level, in the following Study 5 (Chapter 8), we saw that learners can progress and regress in lexical frequency and diversity over time and with different tasks. Nobody would argue that they actually "lost" lexis; nevertheless, it is the use of lexis in relation to the task in hand which appears to influence the lexical profile trajectory.

What this means in terms of L2 vocabulary production is what Thelen and Smith (1994, p.243) describe as "behavior is assembled in the here and now". In other words, different tasks will make salient different lexis. In previous research studies (e.g. Laufer and Nation, 1995), the role of different topics or tasks have been downplayed in the elicitation of lexis. The local conditions affect, but do not dictate, individual behaviour which may be hidden by group statistics. In Larsen-Freeman's work (2006) with Chinese learners of English we can see this process of free variation in lexis in response to the same written task over five different points in time during a period of five months. An example from a microanalysis of the data revealed variations between "I lived **in** Detroit" and "I lived **at** Detroit" with the two prepositions competing for use during the five month period (Larsen-Freeman, 2006, p.611). What this learner appeared to be doing was assembling lexis and that the choice of lexis was shaped by the interaction between the task and the developing language.

9.5.3 Development through increasing complexity

Central to a dynamic systems approach is the notion of development. Van Geert (2003, p.641) states that "...development has a connotation of increasing progress, of increasing complexity, structure and order". Without going into the philosophical debate of whether development entails predestination or coming-into-being, lexical development needs to be looked at analytically (i.e. statistically) and holistically (i.e. qualitatively) and the two need to be considered together to determine development. If development is defined as a statistical value from the vocabulary tests as used throughout this project we start to run into problems. Holistic quality ratings of texts do not necessarily correlate to lexical profile scores. Despite Laufer and Nation's (1995, p.318) claim that "the true lexical quality of a piece of writing is determined by the proportion of all other words at the more advanced frequency levels", learners can use a high proportion of rare lexis but the text can be strewn with errors which have a negative effect on quality. This has been particularly apparent when transcribing learners' texts. Lexical diversity (*D*), over a certain point, seems to be negatively correlated with holistic ratings of quality (Jarvis, 2002, p.78) and complexity (Skehan, 2009, p.117). Analytic and holistic measures do not seem to coincide, which makes the notion of development difficult to define.

9.5.4 Holistic quality ratings in relation to diversity and rarity

A subsequent analysis of holistic ratings, diversity and rarity was conducted from Study 3 (Chapter 6).

Table 9.1 Correlation between holistic quality ratings and lexical richness measures

			Holistic ratings
Spearman's rho	**Diversity (*D*)**	Correlation Coefficient	-.078
		Sig. (2-tailed)	.549
		N	61
	Rarity (Lambda)	Correlation Coefficient	-.084
		Sig. (2-tailed)	.518
		N	61

In Table 9.1 holistic quality ratings do not correlate to either lexical diversity or frequency. There could be two reasons. Firstly, there was only a moderate correlation between the two raters which could indicate that quality ratings can be highly subjective and difficult to quantify. The impact when it comes to statistical measurement is that any subtle patterns are masked by the differences in markers quality ratings. Another reason might be that quantitative measures in diversity and rarity do not directly measure quality. In other words, you cannot quantify the quality of learners' texts to the same degree of precision as you can lexical diversity and frequency. Learners may use rare words but not necessarily correctly, see below.

Participant 48 lexical profile

%	Frequency band
79.77	1k
4.99	2k
9.09	AWL
6.16	O/L

Participant 48 text (quality rating 4.5)

since English language schools has boomed several decades the needs of international business are driving the cultures awareness boom consider too many international companies it has many problems which is come from a different culture this is because of the process of globalisation which rise a number of cross cultural communication problem

in business especially international business can be an easy problem as they have to contact with people in the other country which have a different culture there are many cases in crossing cultures issues for example in Japan when they offer a business card to counterparts should be considered for a moment before keep it carefully in a wallet or cardholder otherwise a person who offer will upset as it demonstrates that it is disrespected way by a counterpart moreover in general white colour means peace or innocent but in India it used for death meaning working style is the other issue in cross cultural communication problem as us working style is too direct to offend everyone while Japanese usually underline key sentences which makes uk upset however Japanese is upset by brits as they send reminders of the things that Japanese is in discussion

in fact it has many solutions which could solve this problems firstly training in schools which is already started in many schools in Europe it is the increasing priority teaching in secondary and tertiary education in inter cultural subject it helps to understand the different or the cultural background secondly training in business culture for example training in cross cultural programs and business or cultural training in email thirdly respect individually it is this case it is easy to say but hard to practice but at least people should both try to respect and respect that which it worth to try

cross cultural communication is the problem in globalisation these day however it is not a serious problem if we just understand each other in a different culture business will run throughout the globalisation by respect each other which everyone have to adapt themselves

In the first text (Participant 48), it is not necessarily a lack of vocabulary but the use of words which makes this text difficult to read. Lexis beyond the one thousand frequency band may be produced but a lack of morphology, grammar and syntax can make the meaning imprecise. Compare the above text with the text below.

Participant 47 lexical profile

%	Frequency band
89.49	1k
3.36	2k
4.03	AWL
3.13	O/L

Participant 47 text (quality rating 7)

according to brumfit the global language has changed since early numbers one reason is that change is the use of internet another reason according to crystal is that using a world language such as English is easy to compare the work of people for example scientists work these essay elaborate to the problems of using a world language and gives possible solutions

the use of English as a global language has not only good effects are also has bad effects to other languages and people the most important problem as crystal indicates is the death of many languages this has as an effect the loss of culture such as the traditional music another problem is the only rich people will have the chance to learn the global language and so poor people will have a disadvantage in addition by using only one language all over the world it is not necessary for people to learn second language so they become lazy and think that it is a waste of time

there are many reasons that explain the rise of English as a world language as grace expressed one reason is that many companies are not with employees from different countries this helps manufacturers to understand its country culture and increase their sales the only way to communicate people from different countries is only the use of the global language according to wylie international students to study abroad use only English at their universities and this helps them to learn not only the world language but also to learn different cultures crace believes that working with people from different countries it is a good experience

crystal propose some possible solutions about how to learn English the first solution is that children must start learning English since they are very young by using useful training materials and by maintaining continuously it will help children to learn English and to not have disadvantage against people whose main language is English the big problem of this solution is that it is very difficult to be implemented because it costs a lot to governments each country education system must change new books must be written and more teachers must be trained for that purpose another possible solution according to wylie is that it is easier for people to learn English alongside with international students such as the pre sessional English course at Kingston university

in conclusion the use of English as a global language has both positive and negative effects to other languages and people it is important to have one global language because we can communicate with people from different countries but we must not let our language to die away

When learners' texts are holistically rated in terms of quality, the ratings do not relate to quantitative measures of lexical rarity or diversity. There is not a linear relationship between greater rarity or diversity and quality. This may help us to understand why L2 learners who are classified into groups according to the amount of L2 instruction produce lexical diversity profiles which are highly heterogeneous (Jarvis, 2002). Lexical diversity seems to be related to sentence structure which needs a certain amount of lexical recycling in order to obtain complexity and coherence. Lexical frequency and quality scores seem even more distantly related. There appears to be no way of knowing the quality of the written discourse simply based on a measure of lexical rarity. Extremely high or low *P-Lex* lambda scores indicate large or small lexicons but complex language, in English, is not necessarily coded in rare lexis. Moreover, learners may use relatively rare lexis but inaccurately. Greater semantic and grammatical sensitivity may encourage a more accurate use of lexis. It seems clear that lexical diversity and frequency values need to be interpreted against quality measures, otherwise, a bare statistical value of a text could be misleading as to how words are assembled off the cuff in real time.

In my own empirical work, holistic quality ratings of texts did not correlate with diversity or frequency. The implication here is that quality ratings relate to increasing language complexity. However, our notions of what complexity is in language are difficult to define. We have our own intuitive notions of what complexity is in a text but when we come to measure complexity, problems arise. Deutscher (2009, p.247) sums up the problem as "...our intuitive ideas of what is meant by complexity include a list of separate notions, which do not coincide, and which require different measures". The notions of complexity, Deutscher goes on to explain, tend to gravitate towards grammar but that "grammar" is a vague notion drawn from supposedly regular patterns (*ibid*, p.248). In his attempt to overcome these problems in describing the complexity of a language in one overall measure, he puts forward the notion of a vector (quantity that has magnitude and direction) of separate values ($A_1 \ldots A_n$), each value representing the measure for one of the *n* sub-domains (*ibid*, p.249). Deutscher states that as the orders of the subdomains do not necessarily coincide, the values will only be a partial order on the set of languages and so it will not be possible to compare overall complexity of any two languages (Deutscher, 2009, pp.249-250). Languages have their own internal logic and so their own internal complexity. However, Deutscher argues that two closely related languages may be compared or two diachronic stages of the same language (*ibid*, p250). Overall complexity in language, though, is a problematic notion because of the non-comparability of languages on many subdomains. Moreover, quantitative measures may be very narrow and so not take into account the overall complexity which resides in a text.

Complexity measured quantitatively through an index of subordination in speech units was compared to lexical diversity (*D*). Skehan (2009, p.117) found that *D* correlated negatively with complexity overall. Skehan argues that in speech, lexical recycling (i.e. avoidance of diversity) provides the means by which attention can be given to more complex structures. The relationship with lexical rarity was also mainly negative (Skehan, 2009, p.116). Less frequent words appear to trigger errors which are argued to be the price to pay for less frequent items (*ibid*, p.116). Skehan argues that lexis does not drive syntax in the same way it does for native speakers. More demanding lexis leads to more complex syntax which non-native speakers cannot cope with. This is where individual differences in grammatical sensitivity may come into play. Although there have been no direct studies in this thesis between lexis and syntax, learners in my studies have differing capabilities to cope with lexis which demands complex syntactical frames.

The results from my empirical work also suggest that a low Analysis score may encourage a "telegraphic" style which is partly due to a lack of the necessary function words to code precise meaning i.e. complexity (see 9.5.4 holistic quality ratings and lexical rarity). This in turn can increase the *D* statistic because of the lack of repetition of function words. It is possible that learners who actually strive for the memorisation of words increase their use of rare words but at the possible cost of a lack of accuracy. Foster (2001, p.89) found that when L2 learners had guided planning time, they increased the mean syntactic complexity (a measurement of clauses) of the language but these gains were at the cost of less accuracy than in the unguided planning time. In other words, they were probably stretched beyond their grammatical means. In terms of lexis, memorisation of semantically opaque words which can also carry the cost of non-salient grammar may cause problems in terms of accuracy if learners do not have the analytic learning style in order to cope with these demands. Memorisation of words and how words are analysed have played a central role in this thesis. The evaluation of these tests, LAT B (Memory) and LAT C (Analysis), is in light of the findings from my own empirical work.

9.6 Review of the learning style tests

There were two learning style tests. One tested visual memory for paired associates (LAT B) and the other which tested grammatical sensitivity (LAT C). These two tests were chosen because they measured learners' memory and analysis which is based on Skehan's theoretical framework of learning style.

9.6.1 LAT B: Memory for paired associates

The LAT B is a memory test of fictional words which learners have not seen before. LAT B is basically a test of recall in which the English translation (e.g. to sit) is given for the testees to recall the target item (i.e. duduk). The words are not embedded into any type of context. This test is timed so the words and their translations pass across the screen. After each set of verbs is presented five times in total, the learner is tested on the words in order to build up a score. The process is one of memorisation of words which the learner can do in any manner possible except physically writing the words.

After using this test many times with learners, my impression is that they find this test easier than the LAT C. Perhaps this is because the test simply requires learners to memorise a list of words which, in itself is not such an easy thing to do, but to language learners this may not be very different from what many of them actually do in practice. In some educational environments rote memorisation is a common learning style (Flowerdew *et al.*, 2000, p.126). My own experience of using this test with learners is that they understand the benefit of rote learning, but this may be one of several other learning strategies which they use. Informal interviews with learners have revealed that many of them prefer to watch films in L2 or make vocabulary notebooks.

LAT B is a test of recall which Mandler (1980, p269) describes as "...the retrieval process is a search for a holistically encoded pair of which the target item is a member". This test is not one of integration. As Meara (2009, p.18) explains, paired associate learning does not do justice to the complexities of learning vocabulary. It assumes a straightforward L1 to L2 mapping of the vocabulary and ignores the semantic and syntactical information embedded in words. Therefore, in this respect LAT B is a simplistic memory test of vocabulary.

Although the test is timed, it does not factor in the long-term effects of time. It is possible that paired associate learning of vocabulary will give a temporary impression that the item can be recalled but this type of learning could fade over time. Mandler (1980, p.253) explains that testees' organisation of words into categories of their own choosing is related to recall but that this relationship degrades over time. It is plausible then that paired associate learning, where there is no organisation of the lexical items, is only one "sub-category" of memory i.e. short-term. Long-term memory of lexical items may in fact need greater integration, otherwise the items could degrade over time.

In his review of learning and recall Skehan (1982, pp.333-4) found that the immediate memory tests after learning had stronger correlations with test performances than when delayed recall memory tests were used. This result is extremely convenient as long-term memory testing must be prohibitively difficult in a test situation because it would involve both a time 1 and time 2 test. However, we cannot ignore the role that long-term memory (LTM) must surely have in the production of lexis. Even though Skehan argues that learning skill is more important than simple retention of language in language acquisition (p.334), how individual differences in LTM relate to vocabulary profiles remains unanswered as yet.

Interestingly, we saw that LAT B (Memory) moderately correlated with *X-Lex* (Yes/No vocabulary test) when the high proficiency learners, but not low proficiency, were tested in Study 2 (Chapter 5). Both of these tests present lexis without any type of context, i.e. LAT B presents a word paired with its translation and the *X-Lex* presents words from the 1-5k frequency bands. In both cases testees do not need to know how the words are used in combination with other words. If we want to get an idea of the effectiveness of paired associate learning, the LAT B test might be an indication of how effective a learner might be in this respect. Although not a long-term memory test, paired associate learning may help lexis recall. However, for an item to pass into long-term memory then as Kandel (2006, p.210) explains, "...the incoming information must be thoroughly and deeply processed...by attending to the information and associating it meaningfully and systematically with knowledge already well established in memory". We can see how simply memorising the word itself and not processing the syntactic and semantic information which is encoded in the item will not guarantee long-term retention and may also compromise comprehension and use. Results from the *X-Lex* test show that frequency of occurrence of a word tends to correlate with paired associate learning of lexis even if both *X-Lex* and LAT B tell us very little of productive lexical use. Productive lexis may call upon lexis which is firmly integrated into the long--term memory, which paired associate learning alone may not be very effective in achieving.

Correlations of LAT B and word recognition (i.e. *X-Lex*) are more likely to be with high proficiency learners. When higher proficiency learners are required to produce lexis for a written text, they do not necessarily need to produce the full range of lexis at the rarer frequency bands. However, when high proficiency learners are tested on word recognition then they can display their full range of knowledge from 1k to 5k and this may be why there is a correlation with LAT B. This is what we saw in section 5.6.2 *Proficiency, vocabulary size, and learning style.* Vocabulary frequency recognition correlated with Memory for high proficiency learners but not low, whereas vocabulary frequency production correlated with Memory for low proficiency. Most of the low proficiency lexis tends to fall in the 1k frequency band and relatively little in the beyond 2k categories and so low proficiency learner profiles are skewed towards the high frequency lexis.

The mechanics of the LAT B give a score from 0 to 100%, which allows a very wide range of scores. In Study 2 (Chapter 5), we saw that LAT B correlated with the extreme ends of the frequency scale (with lexis in the one thousand frequency band a negative correlation; with Off-List and Academic lexis a positive correlation) for the low proficiency learners. It is possible that these correlations could be an artefact of the LAT B and the frequency profiles rather than any genuine associations between memory and lexis. What these correlations could reflect are the tendencies of low proficiency learners to use a high proportion of high frequency lexis and a low proportion of rare lexis which when coupled with the LAT B exaggerate the relationship between the variables.

On a positive note, the participants could use the LAT B without being in lockstep with the researcher. The computer program automatically restarts the test each time the testees responded and so learners have the same set amount of time to study the words as they pass across the screen. This has the benefit of allowing the participants to use any strategy in their repertoire to memorise the new words. A follow-up study could investigate which strategies are actually used and which are most effective in relation to learning style.

9.6.2 LAT C: Grammatical sensitivity

The LAT C is a test of not only how words are assembled together but also a test of sensitivity to function words which, for example, in this test can turn a statement into a question. Words like this are semantically opaque but are frequent in languages because of the need to code precise meanings and so are necessary for language complexity. It is not surprising then that this test proved to be more difficult for most of the participants. The test required the participants to guess which of two statements in the new language were correct. The more able learners scored over 50% because there is a 50-50 chance of guessing the correct answer each time without learning the artificial grammar. We are therefore left with a narrower range of scores for any individuals who show any kind of grammatical sensitivity above chance level. The question is whether this test is sufficiently fine-grained enough to highlight individual differences. A scoring system which does not rely on an either... or... choice for learners could be more effective in giving a wider spread of scores which could highlight more effectively subtle differences between participants.

It was argued in Study 2 (Chapter 5) that higher Analysis scores reflected the extent to which learners could develop a deeper knowledge of lexis i.e. to understand the syntactic and semantic information encoded in lexis. This may have connections with language proficiency in that greater language proficiency could be the result of depth of lexical processing. It is difficult to disentangle language proficiency with performances on LAT C. Although there tends to be no correlation between LAT C and proficiency, higher proficiency learners do tend to have higher LAT C scores than lower proficiency; however, it is also possible, but less likely, that a low proficiency learner can obtain a high LAT C score. The manual for the LAT C (Meara *et al.*, 2001, p.4) explains that this is one of the best tests that discriminates between potentially good and bad learners and I think the reason is that this is a test about language, i.e. how a language works. This tends to favour learners who have studied languages before and these learners tend to be the more successful language learners. Learners who are new to language learning may find it difficult to look objectively at a language, i.e. from outside their own L1. Future tests of learning style should make it possible for low proficiency learners to score above chance level. As the LAT C stands at the moment, an above elementary level of English is needed to participate in this test.

9.7 Some pedagogical implications of learning style and vocabulary acquisition

So far, the pedagogical consequences of learning style have not been discussed. Therefore this section considers pedagogical aspects which have emerged from my research in relation to second language learners. It is worth noting that many teachers appreciate that teaching contexts can differ widely. Furthermore, the relationship between SLA research and pedagogy is not a direct one. In other words, there is not a one to one mapping between research and teaching. However, it is worth highlighting that research can enable us to gain new insights into second language acquisition. The next section is intended to give teachers a better understanding of how my work can be beneficial to teaching in respect of L2 vocabulary learning.

9.7.1 The emphasis on the homogeneity of learners

One of the underlying assumptions which syllabus designers and publishers tend to make is that learners are homogenous. Few mainstream English language teaching publishers give any hints that learners may differ in terms of their approach to learning. My studies have shown how learners have particular strengths and weaknesses even when they are at the same L2 proficiency level. However these individual differences are sometimes ignored at the expense of the teacher who has to adapt on an ad-hoc basis the teaching materials and conditions to make teaching more effective. It would be helpful if there was more guidance for teachers who are sometimes unaware of the difficulties learners face when acquiring lexis. There is a danger that novice teachers and/or linear syllabuses which do not recycle particularly difficult lexis will not give learners enough opportunities to acquire lexis. For example, lexis which is particularly opaque and complex will be particularly onerous on memory and analysis because of the inherent difficulty of these words. My work suggests that learners who are particularly weak in grammatical sensitivity could need a stronger focus on how words of similar function call upon different grammar. Likewise learners who avoid memorization of lexis may need strategy training in memorisation techniques to increase their vocabulary size. One of the ways in which guidance could be given is in the form of learning style profiles and the learning strengths and weaknesses associated with them. Teachers and learners could then experiment with different approaches to recording and remembering lexis which complements but at the same time stretches learners to develop complexity.

9.7.2 The role of learning style tests

There is a danger, as with all learning style tests, that the Memory and Analysis tests can lead to a self-fulfilling prophecy. Learners who are tested can have their own fears confirmed through low scores on either of the tests. However, I think that is not the point of these tests. They need to be used to create an awareness of an individual's particular strengths and weaknesses. A learner who always seems to get a lot of corrections on his or her work should understand that it may be that they cannot, literally, see the patterns of the second language. Alternatively, a learner who scores relatively high on gap-fill exercises but cannot hold a basic conversation in L2 may think that it is due to not being very good at learning a second language. Without greater awareness that we all learn in different ways and have different strengths, it can be demoralising to the learner. One of the ways in which teachers can help is to be more aware of their teaching approach.

9.7.3 Mismatch of teaching and learning style

Part of the problem could be a mismatch between the teaching approach and the learning style. A deductive approach in which language is taught from the "principles" of the language and then worked down to the examples may suit some of the more analytical learners. Recall that in Wesche's study (1981) there were three distinct methods of teaching which related to the learning types. Although this study is now very old, it highlights that not all learners appreciate or even profit from a deductive approach. Nevertheless, as Felder (1981, p.677) argues, although "deduction is the natural human teaching style", at least in technical subjects, it is not the natural human learning style. Clearly, there may be something of a mismatch between approaches to language teaching and the approaches of the learner.

A greater appreciation by teachers of the learning processes via learning style awareness may lead the teacher to making better informed choices in the language classroom. A syllabus can be negotiated by the learners, which helps learners to feel that they "own" the course and are not simply recipients of what the teacher decides. Learners can express how they learn best as well as what they want or need to learn. Although learners, in my experience, typically express themselves as needing more grammar and vocabulary, greater awareness of the learning processes will help them to make informed choices on the process. It may also highlight to learners how diverse the class may be in terms of their own preferred ways of learning and those of others and so appreciate that there can be different paths to language development.

9.7.4 Specialised vocabulary

Another challenge faced by learners is that they do not always have the specialised vocabulary they need in order to communicate with any degree of expertise. Foster (2009b) makes the point that learners may not have the technical jargon and so may rely on formulaic language. In Booth (2010), the technical vocabulary (words beyond the 2k frequency band and not on the Academic Word List) of native and non-native speakers was analysed. Surprisingly, the technical vocabulary profiles were remarkably similar which suggests that a lack of technical jargon is not the problem these learners face. It was apparent from inputting the texts into the *D-Tools* software that non-native speaker texts were lacking in the morphosyntax. All of the participants in this study followed the same core university module and so it is possible that as it was taught in English they had acquired the necessary technical vocabulary through being exposed to the lectures, texts and discussions surrounding the course. However, what some needed was the knowledge of how to use this jargon accurately in context.

Although learners may be aware of and use specialised vocabulary, they may lack the accuracy and complexity which are associated with this type of lexis. By downloading sentences from the British National Corpus which contains lexis learners may find useful (e.g. technical vocabulary), the authentic language can be manipulated in various ways to scaffold the learner to produce language which is more target-like. There are various ways in which this can be done. For example, tasks which encourage learners to construct full sentences from sentences which have all the function words removed force them to notice and grammaticise the language. Errors of parallel structure can be inserted so that learners need to notice how to reconstruct the text. Sentences can be fused together so that the learner has to reconstruct the text into coherent sentences. These types of tasks have been used in an English for Academic Purposes (EAP) context (Booth, 2010).

By encouraging learners to analyse technical vocabulary, which may not be their preferred learning style, they may recognise that this type of lexis is useful for their studies. Therefore, even if some learners may not give weight to language analysis, they may give weight to this type of lexis and so recognise the importance of using technical jargon accurately and appropriately. The goal for the teacher is that these learners may be encouraged to extend language analysis, and memorisation, to other lexis and so help learners to recognise and compensate for a predisposition to bypass the morphosyntax of lexis and focus on form as well as meaning.

9.7.5 Learning burden

One of the recurring themes of this thesis is that not all lexis is equivalent in terms of the processing burden placed upon the learner. Lexis can be broadly categorised as semantically transparent or opaque. Words can also have multiple meanings, which can make the form-function mapping complex. For example, technical jargon may be highly rare outside the discourse community in which it is normally found but it can have a highly specific meaning which makes it semantically transparent for the learner. On the other hand, Ijaz (1986) found that some words e.g. the preposition *on* can have core meanings which broadly map onto the learner's L1 conceptual mapping but peripheral meanings which do not (e.g. dogs must be kept *on* a leash). The author found that "*[o]n* was either under or over-used by ESL learners in contexts which emphasised the non-central meanings of the word and *over* was underused in a context involving one of its noncentral meaning features" (Ijaz, 1986, pp.440-1). Also demanding in terms of the learning burden is lexis (e.g. phrasal verbs) when the L2 form does not map onto an equivalent L1 form and so tends to be avoided by the learner (Sjöholm, 1998). These and other factors can make the learning burden particularly heavy for the L2 learner. This is where learning style awareness is appropriate in that learners should be aware that some words will require more analysis and memory than others.

There are many teaching and learning strategies which have been well documented in the literature to help teachers teach lexis (e.g. Nation, 2001) but I have not referred to them here. Instead, I wanted to give a more global and hopefully more central account of the relationship between pedagogy and L2 lexis acquisition. There are teacher training courses which focus on teaching lexis and which help the teacher with strategies to use in the classroom. What I hope to have achieved in this section is a chance to step back and consider that lexis is a wide area and that words are not neutral in that they interact with the learning processes and context in which they are used.

9.8 Conclusions

This section summarises the contribution that my empirical work has made. The contributions stated below relate to our understanding of the nature of L2 lexis, individual differences, analytical and holistic appreciation of lexical quality and L2 pedagogy.

The interaction between lexis and learning style

This thesis has shown how learning style relates to the variability of lexical diversity. Decreasing levels of variability have been associated with an analytical approach to language learning, whereas a memory-based approach is more unpredictable.

It has been argued that greater analysis leads to restructuring and therefore the complexity of lexical production. A memory-based approach to learning has been shown to be highly unpredictable in terms of both rarity and diversity lexical production. Development beyond the two thousand frequency band is associated with an analytical approach. The empirical work in this thesis has shown how previous studies in L2 lexical production need to be reconsidered in light of learning style differences to help explain the variability shown L2 lexis. We need to reconcile the differences found at the macro and micro level in researching L2 lexis. Learning style could be one lens in which we look through in order to make sense out of conflicting or chaotic data.

The variability of lexis

The empirical work in this thesis shows that L2 lexis is dynamic in the sense that it changes over time in a non-linear manner. The profiles from L2 learners inform us how single measures may miss important development patterns as they unfold. The heterogeneity of group profiles point toward the need to look more closely at variability as an important indicator of developmental processes. Moreover, the interacting factors such as learning style, context and proficiency which are involved in the production of L2 lexis have shown that development is difficult to predict. Moreover, one-off studies miss the dynamism of L2 lexis.

The heterogeneity of lexis

All words are not semantically equal for learners. The empirical work has shown that semantically opaque lexis which is used for sentence structure can be particularly problematic for learners who are not predisposed to analyse the grammatical and semantic information encoded in words. Differences shown in lexical diversity could impact on grammatical knowledge of the learners. As diversity in particular is related to the text coherence and sentence structure, extreme lexical diversity scores can give insights into learners' grammatical strengths and weaknesses. Studies of productive lexical frequency profiles which underplay the context in which words are used in response to task demands are in danger of ignoring how the context influences lexical rarity. My work has shown how the context interacts with lexical rarity.

Quality is not only quantity

This work has shown how the relationship between statistical measures of lexical richness (e.g. diversity and rarity) does not correlate with holistic quality ratings. This throws into question whether we can classify L2 learners into proficiency levels based on their lexical production. Whereas word recognition can give us an estimation of vocabulary size and therefore proficiency, it is how learners assemble lexis off the cuff to form a coherent text which gives us an indication of lexical richness. Rarer or more diverse lexis is not linearly related to quality in lexical production. Although quality is difficult to quantify, my empirical work has shown how bare quantitative values may miss subtle differences between texts of the same profile score.

Learning through noticing and restructuring

My work helps to inform pedagogy in which a genuine appreciation of learning style differences can mean that some learners will need considerably more guidance in noticing and restructuring their L2 than others. Learners who "get by" with formulaic or even degraded L2 may need more guidance to not necessarily produce more rare or diverse lexis but restructure and complexify their language which can draw upon semantically opaque lexis.

Pedagogical implications

The work points towards the need for learners to appreciate their own strengths and weaknesses in learning but also for teachers to see beyond stereotypical terms as far as learning style. This could mean a more open and negotiated syllabus and curriculum which meets the diverse learning styles of language learners.

A Dynamic Systems Theory approach to methodology

Dynamic Systems Theory provided a valuable post-hoc framework for the analysis of the results and some of the findings in fact supported some of the claims of this theory. Against a DST backdrop, Larsen-Freeman and Cameron (2009, pp.241-242) make suggestions for researching language and language development. In this thesis it has been especially useful in terms of the following:

1. to understand that the context in which lexis is produced is part of the L2 system;

2. to consider that self-organisation, i.e. restructuring, and emergence are central to the system;
3. to look for reciprocal relationships i.e. memory and analysis;
4. to avoid dualistic thinking i.e. variables co-adapt and coalesce;
5. to perceive timescales as an intrinsic part of the process.

The work has shown that statistical tests which focus on central tendencies need to be reconsidered in the light of variability. This is not a call to disregard statistical tests which examine central tendencies; however, it has been shown that learners take individual paths to lexical development which may not coincide with central tendencies. Group patterns may not show how individuals are influenced by context, task and subject as they assemble lexis on an ad hoc basis. This is germane to a dynamic systems approach: it is how the variables interact which is important to the developmental processes. We have seen how it is variability around the mean which can show us how stable or variable the L2 lexical system is and that variability may be a precursor to lexical development.

9.9 Limitations of the work

Despite the strength of going beyond unverifiable self-report accounts of how lexis and learning style interact, there are shortcomings which need to be addressed, hopefully through further research.

1. The participants in the research studies were mainly volunteers which may have impacted upon the results. These were learners who, all other things being equal, were perhaps more motivated than learners who did not volunteer to take part. Their motivation could have implications in so far as the learners in my studies were perhaps more successful L2 learners than the ones who did not participate. It would be interesting to find learners who perhaps scored well on the LAT B and C but are, nevertheless, only learning an L2 for extrinsic reasons. How far motivation interacts with scores on the LAT B and C and lexical production is hard to quantify but motivation does seem to be related to L2 development and so must be related to L2 lexis.

2. L2 proficiency has mainly been measured by IELTS scores. There is anecdotal evidence from the BALEAP mailing list that learners from certain test centres can have very jagged profiles which can inflate their overall IELTS score in relation to listening and reading. The inflated scores for listening and reading have been thought to come from IELTS orientated teaching and pooling of memorised listening/reading elements. The effect is an overall grade which does not reflect the language skills of the learner. This can mean that learners from different countries with similar IELTS scores can be of different proficiency levels. There is a possibility that this could have happened with the participants in my empirical studies.

9.10 Future research

This research project is a first step in investigating productive lexical profiles in relation to learning style. More research is needed to verify (or dispute) the results and to make the case for the transferability to other contexts and other languages. Many of the participants were university students and so other types of participants could be investigated who come from different backgrounds, different contexts and are different ages. For example, in Study 5 (Chapter 8) the participants were employees from a Swiss bank and were enrolled in a language school. Participants such as these would be worthwhile candidates to investigate further. Moreover, it would also be interesting to investigate lower level language learners to understand better L2 in a more embryonic state. However, as has been discussed, the learning style LAT C does not lend itself to low proficiency levels.

Interestingly, it was learners who scored well on the Analysis test who tended to develop lexis beyond 2000. More longitudinal research is needed in this area. Does "a grammatical framework" (Skehan, 1982, p.312) provide an organising framework which encourages lexical development? The sub-groups were small in my study which suggested that it does and so larger numbers are needed to confirm the results. Moreover, English has been the L2 in all of my studies. More work is needed which investigates other languages. It would be interesting, for example, to investigate languages which are cognate with English so as to make comparisons.

More work is needed which looks at the interplay between grammatical and lexical complexity (Bell, 2009, p.126). Indeed, the whole notion of whether lexis drives syntax or whether prefabricated chunks push forward grammatical complexity needs to be investigated further. We have seen how lexical sophistication can be quantified but also purely quantitative measures have their limitations so a mixed methodology is needed here. This interplay is time dependent so any future work in this area will need to investigate different time frames because of the dynamic nature of lexis. My own intuition is that it is a reciprocal process in which each drives the other.

An implication from Study 5 (Chapter 8) is that it would be useful to pursue the notion of whether a memory-based approach to vocabulary learning encourages a focus on the core meaning of lexis rather than the more peripheral meaning of semantically opaque lexis. A memory-based only approach could be more superficial in the sense that learners would avoid analysis of non-core meanings and so may over- or under-use lexis in its peripheral context. However, this hypothesis needs to be tested which could be done by experimentation of individual words in relation to learning style. As shown by the literature, Ijaz (1986) and Sjöholm (1998), the learners' L1 would be a significant factor in this.

More research needs to be done on how L2 lexis develops over time. In Thelen and Smith's (1994, p.37) account of cognitive development, they argue that "what is known and how that knowledge is organised and interconnected determines how it is encoded, retrieved, attended to, and strategically used". It is how knowledge is constructed that affects how it is used, and so, too, there must be parallels with L2 lexical development. So far we know that lexical knowledge is not hierarchical but develops in an idiosyncratic manner. The work conducted in this thesis has shown how learning style has helped to give more insights into this development. More could be known about learners at the very early stages of L2 development and how learning strengths, context and L1 background interact with the developing L2 system. As has previously been discussed, not only is time an important factor but also different levels of magnification bring to the fore patterns in development that are not apparent from one-off group studies. This thesis has brought to light how important it is to get different perspectives on something as complex as L2 lexis. One of the major lessons learnt from this thesis is that L2 lexis and learning are multifaceted and so researchers need to embrace this complexity in their research design.

References

Bell, H. (2002) *Using frequency lists to assess L2 text.* Unpublished PhD thesis, University of Wales, Swansea.

Bell, H. (2009) 'The messy little details: a longitudinal case study of the emerging lexicon'. In Fitzpatrick, T. and Barfield, A. (eds.) *Lexical processing in second language learners*, Bristol: Multilingual Matters, pp.111-127.

Bialystok, E. (2002) 'Cognitive processes of L2 users', in Portraits of the L2 user, Cook, V. (ed), Clevedon: Multilingual matters.

Biber, D. (1988) *Variability across speech and writing*. Cambridge: Cambridge University Press.

Bogaards, P. (1996) 'Lexicon and grammar in second language learning', in Jordens, P. and Lalleman, J. A. (eds) *Investigating second language acquisition,* Berlin: Mouton de Gruyter

Bogaards, P. (2000) 'Lexical units and the learning of foreign language vocabulary', *Studies in Second Language Acquisition*, 23 (3) pp.321-344.

Booth, P. (2010) 'The vocabulary performance of native and non-native speakers and its relationship to learning style', *Malaysian Journal of ELT Research*, 6, pp.46-84. Available from: http://www.melta.org.my/modules/tinycontent/index.php?op=edit&id=80

Boston, J. S. (n.d.) 'How suitable are EGP textbooks for ESP classes: an analysis of Passport and Passport Plus', Module 3: Syllabus and Materials. Available from: http://www.cels.bham.ac.uk/resources/essays/Boston3.pdf [Accessed 24 December 2010].

Bradley, D. C., Garrett, M. F. and Zurif, E. B. (1980) 'Syntactic deficits in Broca's aphasia'. In Caplan, D. (ed), *Biological studies of mental proccsses*, Cambridge, MA: MTI Press.

Cambridge Advanced Exam Teaching Resource (2008) General impression mark scheme. Available from:

http://www.cambridgeesol.org/teach/cae/writing/aboutthepaper/assessment/general_imp_mark_scheme.htm [Accessed 10 March 2008]

Carr, T. H. and Curran, T. (1994) 'Cognitive factors in learning about structured sequences', *Studies in Second Language Acquisition*, 16, pp.205-230.

Carroll, J. B. (1981) 'Twenty five years of research on foreign language aptitude' in Diller, K. C. (ed) *Individual differences and universals in language learning aptitude*, Rowley, Mass: Newbury House, pp.83-118.

Carroll, J. B. and Sapon, S. M. (1959) *Modern Languages Aptitude Test*. New York: Psychological Corporation.

Carroll, J. B. & Sapon, S. (2002). *Modern Language Aptitude Test: Manual 2002 Edition*. N. Bethesda, MD: Second Language Testing, Inc.

Chipere, N. (2009) 'Individual differences in processing complex grammatical structures'. In Sampson, G., Gil, D. and Trudgill P. (eds.). *Language complexity as an evolving variable*. Oxford: Oxford University Press, pp.178-191.

Chotloss, J. W. (1944) 'Studies in language behaviour: IV. A statistical and comparative analysis of individual language samples'. *Psychological Monographs*.

Cobb, T (2002) *Web VocabProfile*. (*v1.5*) [Online] Available from: http://www.er.uqam.ca/nobel/r21270/cgi-bin/webfreqs/web_vp.cgi

An adaptation of Heatley & Nation's (1994) *Range*.

Cobb,T. *Web VocabProfile (v2.7)* [Online] Available from: http://www.lextutor.ca/vp/ [Accessed 28 June 2005].

Cobb,T. *Web VocabProfile/BNC-20* [Online] Available from http://www.lextutor.ca/vp/ [Accessed February and May 2007].

Coffield, F., Moseley, D., Hall, E. and Ecclestone, K. (2204) 'Learning styles and pedagogy in post-16 learning: a systematic and critical review'. *Learning and Skills Research Centre.* Available from: https://crm.lsnlearning.org.uk/user/login.aspx?code=041543&P=041543PD&action=pdfdl&src=WEBGEN [Accessed 10 June 2011].

Cohen, J. (1988) *Statistical power analysis for the behavioural sciences.* 2nd edition. Hillsdale, N.J.: Lawrence Erlbaum Associates. In Kinnear, P. R. and Gray (2004) C. D. *SPSS 12 Made Simple.* Hove: Psychology Press

Corson, D. (1997) 'The learning and use of academic English words', *Language Learning,* 47 (4), pp.671-718.

Coxhead, A (2000) 'A new academic word list', *TESOL Quarterly,* 34(2), pp.213-238.

Craik, F. I. M. and Lockhart, R. S. (1972) 'Levels of processing: A framework for memory research', *Journal of Verbal Learning and Verbal Behaviour,* 11, pp.671-684.

Daller, H. and Xue, H. (2007) 'Lexical richness and the oral proficiency of Chinese EFL students', in Daller, H. Milton, J. Treffers-Daller J. (eds). *Modelling and assessing vocabulary knowledge.* Cambridge: Cambridge University Press, pp.150-164.

Das, J. P. (1988) 'Simultaneous-successive processing and planning'. in Schmeck, R. (ed.) *Learning strategies and learning styles.* New York: Plenum Press, pp.101-129.

De Bot, K., Lowie, W. and Verspoor (2007) 'A Dynamic Systems Theory approach to second language acquisition'. *Bilingualism: Language and Cognition* 10 (1), pp.7-21.

Deutscher, G. (2009) '"Overall complexity": a wild goose chase?' in Sampson, G. Gil, D. and Trudgill, P. (eds.). *Language complexity as an evolving variable.* Oxford: Oxford University Press.

Dörnyei, Z. and Skehan, P. (2003) 'Individual differences in second language learning', in Doughty C. J. and Long M. H. (eds), *The handbook of second language acquisition.* Oxford: Blackwell Publishing, pp.589- 630.

Ehrman, M. E. and Leaver, B. L. (2003) 'Cognitive styles in the service of language learning', *System,* 31, pp.393-415.

El Euch, S. (1997) *Les types d'apprenants à partir du MLAT.* Actes des Journées Linguistique (Proceedings of the Day of Linguistics Conference), 11th, Quebec, Canada, March 20-21, 1997, Laval University, Editors C. Caouette and P. Larrivee.

Ellis, N. C. (1996) 'Phonological memory, chunking, and points of order', *Studies in Second Language Acquisition.* 18: 91-126.

Ellis, N. C. (2001) 'Memory for language', in Robinson P. (ed.). *Cognition and second language instruction.* Cambridge: Cambridge University Press, pp.33-68.

Engels, L.K. (1968) 'The fallacy of word counts', *IRAL* 6, pp.213-231.

Everitt, B. S. (1980) *Cluster analysis.* 2nd edn. London: Heinemann Educational.

Everitt, B. S., Landau, S. and Leese, M. (2001) *Cluster analysis,* 4th edn. Oxford: Arnold.

Felder, R. M. (1988) 'Learning and teaching styles in engineering education', *Engineering Education* [Online]. 78 (7), pp.674-681. Available from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.92.774&rep=rep1&type=pdf [Accessed 14 April 2009]

Finkle, E. (2007) 'Labyrinth of memory', *Cosmos* 13, pp.57-64.

Flowerdew, J. and Miller, L. and Li, D. C. S. (2000) 'Chinese lecturers' perceptions, problems and strategies in lecturing in English to Chinese speaking students', *RELEC Journal.* 31(1): 116-138.

Forster, K. I. and Chambers, S. M. (1973) 'Lexical access and naming time', *Journal of Verbal Learning and Verbal Behaviour.* 12, pp.627-635.

Foster, P. (2001) 'Rules and routines: A consideration of their role in the task-based language production of native and non-native speakers', in Bygate, M., Skehan, P., and Swain, M. (eds.), *Language tasks: teaching, learning and testing.* London: Longman, pp. 75-93.

Foster, P. (2009a) 'Lexical diversity and native-like selection: the bonus of studying abroad', in Richards, B., Daller, H., M. Malvern, D., Meara, P., Milton, J., Treffers-Daller, J. (eds) *Vocabulary studies in first and second language acquisition: the interface between theory and application.* Basingstoke: Palgrave Macmillan, pp.91-106.

Foster, P. (2009b) Personal communication, *Language, Learning, and Context*, 42nd Annual Meeting of the British Association for Applied Linguistics, 3 September 2009, Newcastle University.

Gleason, J. B. and Ratner, N. B. (1998) (eds), *Psycholinguistics.* 2nd edn. Orlando: Harcourt Brace.

Guiraud, H. (1954) *Les caractères statistiques du vocabulaire*, Paris: Presses Universitaires de France.

Harley, B. and Hart, D. (1997) Language aptitude and second language proficiency in classroom learners of different starting ages, *Studies in Second Language Acquisition* 19, pp. 370-400.

Hatch, E. (1974) 'Second language learning – universals?' *Working Papers on Bilingualism*. 3, pp.1-18.

Heatley, A. and Nation, P. (1994). *Range*. Victoria University of Wellington, NZ. [Computer program] Available at: http://www.vuw.ac.nz/lals/.

Henriksen, B. (1999) 'Three dimensions of vocabulary development', *Studies in Second Language Acquisition*. 21 (2), pp. 303-317.

Honoré, A. (1979) 'Some simple measures of richness of vocabulary', *Association for Literary and Linguistic Computing Bulletin*, 7 (2), pp.172-177.

Ijaz, I. H. (1986) 'Linguistic and cognitive determinants of lexical acquisition in a second language', *Language Learning*. 36, pp.401-51.

IELTS org. [Online] Available from: http://www.ielts.org/PDF/UOBDs_WritingT2.pdf

[Accessed 22 March 2010].

James A., Kulik, J. A., Chen-Lin C., Kulik, R., and Bangert, L. (1984) 'Effects of Practice on Aptitude and Achievement Test Scores', *American Educational Research Journal*, 21 (2), pp.435-447.

Jarvis, S. (2002) 'Short texts, best-fitting curves and new measures of lexical diversity' *Language Testing* 19 (1), pp.57-84.

Johnson, K. (1996) *Language teaching and skill learning*. Oxford: Blackwell.

Kandel, E. R. (2006) *In search of memory: the emergence of a new science of the mind*. New York: Norton.

Larsen-Freeman, D. (1997) 'Chaos/complexity science and second language acquisition'. *Applied Linguistics*. 18 (2), pp.141-165.

Larsen-Freeman, D. (2006) 'The emergence of complexity, fluency, and accuracy in the oral and written production of five Chinese learners of English'. *Applied Linguistics*. [Online] 27 (4), pp.590-619. Available from: http://dx.doi.org/10.1093/applin/aml029. [Accessed 5 February 2008].

Larsen-Freeman, D. and Cameron, L. (2008) *Complex systems and applied linguistics*. Oxford: Oxford University Press.

Laufer, B. (1990) 'Why are some words more difficult than others? Some intralexical factors which affect the learning of words', *IRAL*, pp.28: 293-307.

Laufer, B. (1991) 'The development of L2 lexis in the expression of the advanced learner', *The Modern Language Journal* 75(4), pp.440-448.

Laufer, B. (1994) 'The lexical profile of second language writing: does it change over time?', *RELC Journal*. 25(2), pp.21-33.

Laufer, B. (1995) 'Beyond 2000: A measure of productive lexicon in a second language', in Eubank, I., Selinker L., and Sharwood Smith M. (eds.), *The current state of interlanguage*. Philadelphia: John Benjamins Publishing Company, pp 265-272.

Laufer, B. (1997) 'What's in a word that makes it hard or easy to acquire?'. in Schmitt, N. and McCarthy, M. (eds.) *Vocabulary description, acquisition and pedagogy*. Cambridge: Cambridge University Press, pp.140-155.

Laufer, B. (1998) 'The development of passive and active vocabulary development in a second language: same or different?', *Applied Linguistics* 19(2) pp. 255-271.

Laufer, B. and Nation, P. (1995) 'Vocabulary size and use: lexical richness in L2 written production', *Applied Linguistics*. 16 (3), pp.307-322.

Laufer, B. and Nation, P. (1999) 'A vocabulary size test of controlled productive ability', *Language Testing.* 16 (1), pp.33-51.

Lightbown, P. M. (1985) 'Great expectations: second language acquisition research and classroom teaching', *Applied Linguistics.* 6, pp.173-89.

Littlemore, J. (2001) 'An empirical study of the relationship between cognitive style and the use of communicative strategy', *Applied Linguistics* 22 (2), pp.241-265.

MacWinney, B. (2000) *The CHILDES project tools for analyzing talk.* 3rd edn. Vol 1: *Transcription format and programs.* Mahwah, NJ.: Erlbaum.

Malvern, D., Richards, B., Chipere, N., Durán, P. (2004) *Lexical diversity and language development.* Basingstoke: Palgrave Macmillan.

Mandler, G. (1980) 'Recognizing: the judgment of previous occurrence', *Psychological Review.* 87(3), pp.252-271.

McKee, G., Malvern, D. and Richards, B. (2000) 'Measuring vocabulary diversity using dedicated software', *Literary and Linguistic Computing.* 15 (3), pp.323-337.

McLaughlin, B. (1987) *Theories of second-language acquisition.* London: Edward Arnold.

McLaughlin, B. (1990) 'Restructuring', *Applied Linguistics.* 11, pp.113-28.

Meara, P. M. (1992) *EFL vocabulary tests.* Centre for Applied Language Studies: University of Wales Swansea.

Meara, P. M. (1996) 'The dimensions of lexical competence' in Brown, G., Malmkjaer K. and Williams J. (eds), *Performance and competence in second language acquisition*, Cambridge: Cambridge University Press.

Meara, P. M. (2001) P_Lex: a test of productive lexical resources. v1.1. Swansea: Lognostics.

Meara, P. M. (2004) 'Modelling vocabulary loss', *Applied Linguistics.* 25 (2), pp.137-155.

Meara, P. M. (2005) 'Lexical frequency profiles: a Monte Carlo analysis'. *Applied Linguistics.* [Online] 26 (1), pp.32-47. Available from: http://dx.doi.org/10.1093/applin/amh037 [Accessed 4 April 2007]

Meara, P. M. (2007a) *P_Lex. v 2.0.* Swansea: Lognostics.

Meara, P. M. (2007b) P_Lex The Manual [Online] http://www.lognostics.co.uk/tools/index.htm [Accessed 26 October 2007]

Meara, P. M. (2009) *Connected words: word associations and second language vocabulary acquisition.* Amsterdam/Philadelphia: John Benjamins Publishing Company.

Meara, P. M. and Bell, H. (2001) 'P_Lex: A simple and effective way of describing the lexical characteristics of short L2 texts', *Prospect,* 16 (3), pp.5-19.

Meara, P. M. and Milton, J. L. (2003a) *X_Lex: The Swansea Vocabulary Levels Test. v2.00.* Swansea: Lognostics.

Meara, P. M. and Milton, J. L. (2003b) *The Swansea Vocabulary Levels Test. The Manual.* Newbury: Express.

Meara, P.M., Milton, J. L. and Lorenzo-Duz, N. (2001) *Language aptitude tests.* Newbury: Express.

Meara, P. M. and Miralpeix, I. (2007a) *D_Tools.* v2.0. Swansea: Lognostics.

Meara, P. M. and Miralpeix, I. (2007b) *D_Tools: The Manual* [Online] http://www.lognostics.co.uk/tools/index.htm [Accessed 26 October 2007]

Melka, F. (1997) 'Receptive versus productive aspects of vocabulary', in Schmitt, N. and McCarthy, M. (eds.) *Vocabulary: description, acquisition and pedagogy*, Cambridge: Cambridge University Press, pp.84-102.

Milton, J. (2007) 'Lexical profiles, learning styles and the construct validity of lexical size tests', in Daller, H., Milton, J., and Treffers-Daller J. (eds.) *Modelling and assessing vocabulary knowledge.* Cambridge: Cambridge University Press, pp.47-58.

Mondria, J-A. and Wiersma, B. (2004) 'Receptive, productive, and receptive + productive L2 vocabulary learning: What difference does it make?', in Bogaards, P., and Laufer, B. (eds.) *Vocabulary in a second language: selection, acquisition and testing*, volume 10. Amsterdam/Philadelphia: John Benjamins Publishing Company, pp.79-100.

Morris, L. and Cobb, T. (2004) 'Vocabulary profiles as predictors of the academic performance of Teaching English as a Second Language trainees', *System* 32, [Online] pp.75-87. Available from: http://dx.doi.org/10.1016/j.system.2003.05.001 [Accessed: 17 August 2006]

Morris, L. and Tremblay, M. (2002) *The interaction of morphology and lexis in the development in ESL learners*. Paper given at the Canadian Association of Applied Linguistics Conference, Toronto.

Myles, F. Hooper, J. & Mitchell, R. (1998) 'Rote or Rule? Exploring the role of formulaic language in classroom foreign language learning', *Language Learning* 48 (3), pp. 323-363.

Nation, I. S. P (2001) *Learning vocabulary in another language.* Cambridge: Cambridge University Press.

Nation, I. S. P. (1983) 'Teaching and testing vocabulary', *Guidelines* 5 (1), pp.12-25.

Nation, I. S. P. (1990) *Teaching and learning vocabulary*. New York: Heinle and Heinle.

Nation, I. S. P. (2001) *Learning vocabulary in another language*. Cambridge: Cambridge University Press.

Nation, I. S. P. (1984) (ed.) *Vocabulary lists: Words, Affixes and Stems*, English University of Wellington, New Zealand: English Language Institute.

Neufeld, S. and Billuroğlu, A. (2005) 'In search of the critical lexical mass: How 'general' is the GSL? How 'academic' is the AWL?' [Online] available from: http://www.lextutor.ca/vp/tr/BNL_Rationale.doc [Accessed: 13.01.06.]

Olson, D.R. (1994) *The world on paper: the conceptual and cognitive implications of reading and writing*. Cambridge: Cambridge University Press.

Orlov, Y. K. (1983) 'Ein model der häufigkeitsstruktur des vokabulars', in *Studies on Zipf's Law*, Bochum: Brockmeyer, pp. 154-233.

Pimsleur, P. (1966) *Language Aptitude Battery and Manual, Form S*, New York: Harcourt, Brace and World.

Pinker, S. (1999) *Words and rules: the ingredients of language*. London: Weidenfeld & Nicolson.

Politzer, R. L., and Weiss, L (1969) An experiment in improving achievement in foreign language learning through learning of selected skills associated with language aptitude. Stanford, California: Stanford University. [Eric Document Reproduction Service, ED 046 261.]

Read, J. (2004) 'Plumbing the depths: How should the construct of vocabulary knowledge be defined?', in Bogaards, P., and Laufer, B. *Vocabulary in a second language: selection, acquisition and testing*, volume 10, Amsterdam/Philadelphia: John Benjamins Publishing Company, pp.209-227.

Read. J. (2005) 'Applying lexical statistics to the IELTS speaking test', *Research Notes*. Issue 20, pp.12-16.

Riding, R. J. (1991) *Cognitive styles analysis user manual*, Birmingham: Learning and Training Technology, in Sternberg, R. J. and Zhang, L. F. (eds) (2001) *Perspectives on thinking, learning and cognitive styles*, Mahwah, N. J.:LEA.

Riding, R. J. (2001) 'The Nature and Effects of Cognitive Style', in Sternberg R.J. and Zhang, L.F. (eds.) *Perspectives on Thinking, Learning and Cognitive Styles*. Mahwah, N.J., Laurence Erlbaum Associates, pp.39-60.

Riding R. J. and Cheema I. (1991) 'Cognitive styles - an overview and integration', *Educational Psychology* 11 (3 & 4), pp.193-215.

Robinson, P. (1995) 'Aptitude, awareness, and the fundamental similarity of implicit and explicit second language learning', in Schmidt, R. (ed.) 'Attention and awareness in foreign language learning', *Technical Report* 9, Hawaii: University of Hawaii Second Language Teaching and Curriculum Centre, pp.303-357.

Robinson, P. (1997) 'Individual differences and the fundamental similarity of implicit and explicit adult second language learning', *Language Learning*, 47 (1), pp.45-99.

Rutherford W. E. (1987) *Second language grammar: learning and teaching*. London: Longman.

Sasaki, M. (1996) *Second language proficiency, foreign language aptitude, and intelligence: quantitative and qualitative analyses*. New York: Peter Lang.

Schmidt, R. (1990) 'The role of consciousness in second language learning', *Applied Linguistics*, 11, pp.129-58.

Schmitt, N. (1998) 'Tracking the incremental acquisition of second language vocabulary: A longitudinal study', *Language Learning.* 48 (2), pp.281-317.

Schmitt, N. and Meara, P. (1997) 'Researching vocabulary through a word knowledge framework', *Studies in Second Language Acquisition.* 19 (1), pp.17-36

Schoenemann, P. T. (2009) 'Evolution of brain and language', in Ellis N. C. and Larsen-Freeman D. (eds.) *Language as a complex adaptive system.* Oxford: Wiley-Blackwell, pp.162-186.

Selinker, L. (1972) 'Interlanguage', *International Review of Applied Linguistics* 10, pp.209-31.

Shi, L. and Cumming, A. (1995) 'Teachers' conceptions of second language writing instruction: five case studies', *Journal of Second Language Writing* 4 (2), pp.87-111.

Sinclair, J. McH. (1991) *Corpus, concordance, collocation.* Oxford: Oxford University Press.

Sjöholm, K. (1998) 'A reappraisal of the role of cross-linguistic and environmental factors in lexical L2 acquisition', in Haastrup, K. and Viberg, Å. (eds.) *Perspectives on lexical acquisition in a second language.* Lund: Lund University Press, pp.209-237.

Skehan, P. (1982) *Memory and motivation in language aptitude testing.* Unpublished PhD thesis, University of London.

Skehan, P. (1986) 'Cluster analysis and the identification of learner types'. In Cook, V. (ed) *Experimental approaches to second language acquisition.* Oxford: Pergamon, pp. 81-94.

Skehan, P. (1998) *A cognitive approach to language learning.* Oxford: Oxford University Press.

Skehan, P. (2009). 'Lexical performance by native and non-native speakers on language learning tasks', in Richards, B., Daller, H. M., Malvern, D., Meara, P., Milton, J. and

Skehan, P. and Foster, P. (2001) 'Cognition and tasks', in Robinson P. (ed.). *Cognition and second language acquisition.* Cambridge: Cambridge University Press, pp.183-205.

Smith, J. D. and Kemler Nelson, D. G. (1989) 'Analytic and holistic processing in refelection-impulsivity and cognitive development', in Globerson T. and Zelinker T. (eds.) *Cognitive style cognitive development.* Norwood NJ: Ablex, pp.116-140.

Soars, J. and Soars, L. (1987) *Headway upper-intermediate.* Oxford: Oxford University Press.

Teichroew, F. J. (1982) 'Receptive versus productive vocabulary: A survey', *Interlanguage Studies Bulletin – Utrecht,* pp 5-33.

The BALEAP Guidelines on English Language Proficiency Levels for International Applicants to UK Universities (1999, 2003).

The British National Corpus [Online]. Available from: http://corpus.byu.edu/bnc

Thelen, E. and Smith, L. B. (1994) *A dynamic systems approach to the development of cognition and action.* Cambridge, MA: MIT Press.

Treffers-Daller, J. (eds.) Vocabulary studies in first and second language acquisition: the interface between theory and application. Basingstoke: Palgrave Macmillan, pp.107-124.

Tweedie, F. J. and Baayen, R. H. (1998) 'How variable may a constant be? Measures of lexical richness in perspective', *Computers and the Humanities*, 32, pp.323-352.

van Geert, P. (2003) 'Dynamic system approaches and modeling of developmental processes', in Valsiner J. and Conolly K. J. (eds.) *Handbook of developmental psychology*. London: Sage, pp.640-672.

van Geert, P. (2007) 'Dynamic systems in second language learning: Some general methodological reflections'. *Bilingualism: Language and Cognition.* [Online] 10 (1), pp. 47-49. Available from: http://doi:10.1017/S136672890600280X

van Geert, P. and van Dijk, M. (2002) 'Focus on variability: New tools to study intra-individual variability in development data', *Infant Behavior and Development.* 25, pp.340-374.

van Gijsel, S. D., Speelman, D. and Geeraerts, D. (2005) 'A variationist, corpus linguistic analysis of lexical richness', in Proceedings of Corpus Linguistics 2005, Birmingham, UK. Available from: http://www.corpus.bham.ac.uk/pclc/ [Accessed 12 May 2007]

Verspoor, M., Lowie, W., and van Dijk, M. (2008) 'Variability in second language development from a dynamic systems perspective', *The Modern Language Journal.* 92 (2), pp.214-231.

Vidal, K. (2003) 'Academic listening: a source of vocabulary acquisition?', *Applied Linguistics* 24 (1), pp.56-89.

Walpole, R. (1982) *Introduction to statistics*, (3rd edn). London: Macmillan.

Ward, J. H. (1963) 'Hierarchical groupings to optimize an objective function', *Journal of the American Statistical Association*, 58, pp.236-244.

Wesche, M. B. (1981) 'Language aptitude measures in streaming, matching students with methods, and diagnosis of learning problems', in Diller, K. C. (ed.) *Individual differences and universals in foreign language aptitude.* Rowley, Mass.: Newbury House, pp.119-154.

Wesche, M. and Paribakht, T. S. (1996) 'Assessing second language vocabulary knowledge: depth versus breadth'. *The Canadian Modern Language Revue*. 53(1), pp.13-40.

West, M. (1953) *A general service list of English words*. London: Longman, Green & Co.

Wilks, C. and Meara, P. (2007) 'Implementing graph theory approaches to the exploration of density and structure in L1 and L2 word association networks'. in Daller, H., Milton, J. and Treffers-Daller, J. (eds.) *Modelling and assessing vocabulary knowledge*. Cambridge: Cambridge University Press, pp. 167-181.

Wray, A. (2002) *Formulaic language and the lexicon*. Cambridge: Cambridge University Press.

Xue, G. and Nation, I.S.P. (1984) 'A university word list', *Language, Learning and Communication*, 3 (2), pp.215-229.

Yule, G. U. (1944) *The statistical study of literary vocabulary*. Cambridge: Cambridge University Press.

Appendices

The appendices contain supplementary information which corresponds to the following studies and chapters:

Appendix 1 Study 1 (Chapter 4)

Background and test form.

Scores: X-Lex (vocabulary test), LAT B and LAT C (test of Memory and Analysis). Instructions for X-Lex and LAT B and C.

Appendix 2 Study 2 (Chapter 5)

Scores: VocabProfile. Cartoon story

Appendix 3 Study 3 (Chapter 6)

Scores: Diversity (D-Tools), LAT B and LAT C.

Appendix 4 Study 4 (Chapter 7)

Scores: VocabProfile, X-Lex, LAT B and LAT C.

Appendix 5 Study 5 (Chapter 8)

Scores: Diversity (D-Tools) and rarity (P-Lex), LAT B and LAT C. Writing tasks.

Handwritten notes (data from Study 3)

Additional Material (CD):

1. Uncorrected proof: Booth, P. (2009) 'The development of vocabulary proficiency in relation to learning style', in Benati A. G. (ed), *Issues in second language proficiency*, London: Continuum, pp. 95-115 [Based on Study 5, Chapter 8].

2. Learners' texts from Studies: 2, 3, 4 and 5.

Appendix 1a: Background and test form

<table>
<tr><th colspan="2">Background information</th></tr>
<tr><td>Name (first name + family name)</td><td></td></tr>
<tr><td>KU number</td><td>K</td></tr>
<tr><td>Date of birth (day, month, year)</td><td></td></tr>
<tr><td>Male or female</td><td></td></tr>
<tr><td>Nationality</td><td></td></tr>
<tr><td>Mother tongue (first language)[22]</td><td></td></tr>
<tr><td colspan="2">Results of any English language examinations e.g. IELTS, TOEFL, CB TOEFL, etc. Specify:
• the exam ______________________________
• your overall result ______________________________
• your writing result ______________________________</td></tr>
<tr><td>Any other language (specify)</td><td></td></tr>
<tr><td>Are you an undergraduate or postgraduate student?</td><td></td></tr>
<tr><th colspan="2">Computer tests</th></tr>
<tr><td colspan="2">Memory (LAT B) score (%)</td></tr>
<tr><td colspan="2">Analysis (LAT C) score (%)</td></tr>
<tr><td colspan="2">Identification (use name code from LAT tests):</td></tr>
</table>

[22] If your first language is Chinese, please write if it is Mandarin, Cantonese, or other (specify).

Appendix 1b: Study 1 X-Lex, LAT B and C scores

X-Lex test scores (error score below 5%) and LAT scores															
ID	lexical profile													memory	analysis
	1K	1K%	2K	2K%	3K	3K%	4K	4K%	5K	5K%	error	raw score	adjusted	LAT B	LAT C
kumni	20	100	20	100	20	100	17	85	11	55	1	4400	4150	86	65
singi	20	100	20	100	20	100	16	80	17	85	2	4650	4150	68	50
kumra	20	100	20	100	20	100	18	90	16	80	5	4700	3400	62	40
borma	20	100	20	100	20	100	20	100	19	95	1	4700	4050	18	30
gavgi	20	100	15	75	18	90	16	80	11	55	2	4000	3500	38	45
faufa	20	100	19	95	20	100	16	80	12	60	1	4350	4100	40	65
jawal	20	100	19	95	15	75	15	75	11	55	1	4000	3750	40	55
hasfa	19	95	12	60	13	65	11	55	5	25	3	3000	2250	12	60
muvub	19	95	15	75	14	70	10	50	7	35	2	3250	2750	8	35
samso	19	95	11	55	13	65	10	50	9	45	3	3100	2350	10	45
sadat	18	90	12	60	10	50	8	40	5	25	1	2650	2400	0	50
dahha	16	80	16	80	12	60	11	55	6	30	2	3050	2550	32	45
ahmlu	18	90	16	80	13	65	10	50	11	55	0	3400	3400	14	?
khash	15	75	11	55	12	60	11	55	5	25	0	2700	2700	30	45
rajmo	20	100	12	60	6	30	9	45	3	15	0	2500	2500	42	60
asimm	11	55	9	45	9	45	4	20	5	25	2	1900	1400	20	?
abdfa	20	100	16	80	16	80	12	60	16	80	2	3700	3200	?	?
briciu	20	100	17	85	18	90	17	85	13	65	4	4250	3250	18	55
budai	19	95	15	75	18	90	13	65	8	40	0	3650	3650	80	65
dogan	20	100	18	90	16	80	13	65	13	65	4	4000	3000	78	50
farska	19	95	15	75	15	75	16	80	10	50	1	3750	3500	68	50
havri	20	100	18	90	13	65	12	60	14	70	1	3850	3600	80	60
heten	20	100	19	95	15	75	17	85	13	65	1	4200	3950	48	30
hodap	20	100	18	90	15	75	18	90	13	65	2	4200	3700	24	55
horci	20	100	16	80	14	70	13	65	6	30	2	3450	2950	70	55
rycht	20	100	16	80	13	65	11	55	8	40	1	3400	3150	68	45
szila	20	100	15	75	18	90	11	55	10	50	1	3700	3450	70	45
uzun	17	85	9	45	8	40	7	35	7	35	1	2400	2150	18	55
vajne	20	100	19	95	18	90	14	70	12	60	2	4150	3650	82	55
vance	19	95	17	85	17	85	15	75	9	45	5	3850	2600	26	55

Appendix 1c: Vocabulary Test Instructions

Click on the **Start** in the bottom left hand corner.
Go to **All Programs, Languages,** then **Vocab Test.**

1: Double Click on the **Vocab Test** icon to start the program.
2: Enter your name in the ID box.
3: Select the test: English 5K
4: Set the randomisation sequence. ⇩
5: When you have made these choices, click
6: To start the test, click the ⇨ button.
XLEX will then present you with a set of 120 words. Some of these words are real words that you ought to know. The other items are imaginary words that do not exist. You have to decide whether you know what each of these words means or not .If you know what the word means, you click the **YES** button. If you don't know, or if you aren't sure, then you click the **NO** button. XLEX penalises you if you claim to know a word that does not exist.

7: When you have completed all 120 words, XLEX will show your score. XLEX scores vary from 0 to 5000. Two scores are reported. The **raw score** is an estimate of the maximum number of words you know from the word set being sampled. The **adjusted score** is a lower number that takes into account the number of mistakes you made: XLex penalises you for claiming to know a word that doesn't actually exist. If your score is very low, then you are probably saying YES to too many imaginary words.

8: The blue and yellow graphs show your score for each of the separate sub parts of XLex. Normally, the graph on the left, representing the 1k words, will be higher than the graphs on the right. The graph on the extreme right, shown in black, tells you how many errors you made.

You must write **your score** and your **adjusted score** on your paper. Then click to exit.

9. The results from each run of XLex are recorded in a file called **Vocab test results** (Click on the **Start** in the bottom left hand corner. Go to **All Programs, Languages**). Your vocabulary profile will look something like this: Napoleon Bonaparte: 4700: 3900: English 5K **20 17 16 11 4: 5**

Make sure you have written your <u>profile score</u> and <u>error score</u> on your paper.

Source: Meara, P. M. and Milton, J. L. (2003b) *The Swansea Vocabulary Levels Test. The Manual.* Newbury: Express.

Appendix 1d: LAT B Test Instructions

Click on the **Start** in the bottom left hand corner.
Go to **All Programs, Languages,** then **Aptitude test B**

LAT_B tests your ability to remember pairs of words when they are shown to you in writing. You will see a list of words in a language you will not know and next to each words its meaning in English. You are given a short time to memorise the pairs and then you are tested to see how many you remember. Don't worry if you cannot remember all of them the first time because the words will be shown to you several times and you will be tested several times.

1. Type your name in the boxes provided.

2. Below the name boxes is a box with a pull down menu – make sure it reads English version and click on ⇨ to start the test.

3. You will see a screen with a score bar, click on ⇨ to start the test.

4. A list of words in English and their translation in a fictional language will move across the screen. Try to remember as many of these words as you can.

5. When all the words for learning have disappeared, a new screen will appear. In the top left hand corner of the ⇔ box is a word in English. Look in the box for the word's translation and click on the button to the left of the translation. A new word will now appear in the top left hand corner. Click on the button to show the translation for this word. Continue until you have translated all the words. The previous screen with the words and their translations will now appear again.

6. The words and the tests will repeat 5 times.

7. As you answer the questions the score bar will move to show your score.

8. After the final test the score bar will remain to show your final score. <u>You must write your final score on your sheet: **Language Aptitude Tests** LAT B score (%).</u>

9. Click on ⮷ to exit the test.

Adapted from: Meara, P.M., Milton, J. L. and Lorenzo-Duz, N. (2001) *Language aptitude tests*. Newbury: Express

Appendix 1e: LAT C Test Instructions

LAT_C is a test of your ability to find or infer language rules from examples from a language you will not know. It is not a memory test and you do not have to remember the new words of the language; a dictionary is provided at the bottom of the screen for you to use at all times. You will see a series of sentences and phrases in a new language. You should try to understand the rules of the language.

- There are some practice questions where you can test yourself to check you understand.
- There is then a test where you are given pairs of sentences in the new language, one of which is right and one wrong. You must choose the correct answer. You can see your score on the score bar at the top of the screen.

1. Type your name in the boxes provided. Below the name boxes is a box with a pull down menu – make sure it reads English version and click on ⇨ to start the test.

2. You will see a screen like this. At the bottom there is a panel with several words in grey boxes. You can click on these boxes and the translation of the words will appear. You can go back and check the vocabulary at any time during the test.

3. Click on ⇨ to start the test.

4. Words will now appear in the top section. Read the example phrases and translations in the top panel. You should be able to understand some of the rules of the language.

5. In the bottom section is a phrase in English and two translations in the new language. One is right and one is wrong. Click on the one you think is right to check your understanding. The correct answer will stay the same colour but the wrong answer will go dark.

6. Click on ⇨ for the next set of examples.

7. There are five sets of examples for you to work through, and then you are tested on how well you understand the rules of the new language. There is a score bar at the top to show your score and a question box with two choices at the bottom as before. You can continue to use the vocabulary box.

8. Read the phrase at the top of the question box and click on the correct translation. The incorrect answer goes dark to help you. Click on ⇨ for the next question. Continue until the test is complete.

9. After the final question the score bar will remain to show your final score. You must write your final score on the sheet provided.

Adapted from: Meara, P.M., Milton, J. L. and Lorenzo-Duz, N. (2001) *Language aptitude tests*. Newbury: Express.

Appendix 2a: Study 2 VocabProfile test scores

						Web VocabProfile		
Participant	ID	VP 500	VP K1	VP function	VP content	VP K2	VP AWL	Offlist
1	chiin	81.52	93.94	56.97	36.97	2.42	1.52	2.12
2	umyoo	72.89	87.35	43.07	44.28	4.22	3.31	5.12
3	kiata	82.54	88.25	56.51	31.75	6.03	3.17	2.54
4	wanqi	84.24	92.28	48.87	43.41	2.57	1.61	3.54
5	chalz	80.07	89.35	49.14	40.21	6.53	1.03	3.09
6	kimhy	82.07	90.69	57.24	33.45	5.52	0.34	3.45
7	leehy	82.72	91.03	57.14	33.89	5.32	1.33	2.33
8	mikyi	84.47	95.34	57.45	37.89	2.48	0.62	1.55
9	kimdo	85.13	92.42	53.64	38.78	3.21	2.33	2.04
10	abema	84.15	93.6	54.57	39.02	3.35	1.52	1.52
11	baeji	82.34	91.58	53.53	38.04	4.62	1.63	2.17
12	benam	81.82	88.41	54.09	34.32	3.41	4.09	4.09
13	cheyu	82.77	93.23	49.58	43.38	3.08	1.54	2.15
14	gosar	78.19	88.48	52.45	36.03	5.15	2.21	4.17
15	hirsu	72.93	88.32	53.28	35.04	5.98	4.27	1.42
16	kimna	71.19	86.09	46.69	39.4	5.96	3.31	4.64
17	limka	81.4	89.04	50.17	38.87	1.66	5.98	3.32
18	lincu	76.35	90.2	46.28	43.92	1.69	1.01	7.09
19	lopal	78.4	84.57	50.31	34.26	6.48	2.47	6.48
20	luying	74.75	82.72	47.84	34.88	9.97	2.99	4.32
21	ngyue	81.33	85.87	54.13	31.73	7.47	3.47	3.2
22	punpa	81.31	89.84	52.79	37.05	7.87	1.31	0.98
23	qunin	81.11	91.53	54.72	36.81	2.93	2.61	2.93
24	rucpa	79.87	88.78	49.83	38.94	4.29	4.29	2.64
25	tatsh	82.53	89.38	44.52	44.86	5.14	1.71	3.77
26	chosu	72.67	83.92	51.13	32.8	7.07	2.57	6.43
27	suppi	82.96	91.9	50.28	41.62	4.19	1.12	2.79
28	tsoch	80.45	87.99	50.28	37.71	5.59	1.96	4.47
29	jarna	76.28	85.59	50.45	35.14	6.01	2.7	5.71
30	limin	79.27	89.82	45.45	44.36	6.55	1.09	2.55

31	jirna	84.59	91.86	51.16	40.7	4.36	2.33	1.45
32	junyo	79.08	84.4	47.52	36.88	9.22	3.9	2.48
33	malar	84.19	91.61	60	31.61	2.9	3.87	1.61
34	takka	76.78	92.21	48.09	44.11	5.14	1	1.66
35	masml	82.89	95.06	55.51	39.54	3.04	1.52	0.38
36	houme	78.63	90.08	53.05	37.02	6.11	1.15	2.67
37	baeyo	76.95	86.99	49.07	37.92	8.18	1.12	3.72
38	yioge	81.89	87.17	52.83	34.34	4.91	3.4	4.53
39	daihi	74.44	89.26	50	39.26	3.7	1.11	5.93
40	kimye	75.53	89.63	51.33	38.3	5.59	1.86	2.93
41	ichyo	79.1	89.27	53.67	35.59	2.54	0.85	7.34
42	leeji	80.65	90.74	53.95	36.78	5.45	0.54	3.27
43	carge	78.1	86.03	51.11	34.92	6.35	2.54	5.08
44	kimil	75.53	89.63	51.33	38.3	5.59	1.86	2.93
45	ivaal	82.71	92.88	50.51	42.37	2.37	0.68	4.07
46	prean	81.42	90.46	56.23	34.23	4.65	2.93	1.96
47	salle	72.22	79.74	48.37	31.37	4.58	5.88	9.8
48	arrju	79.55	89.46	50.8	38.66	5.43	1.92	3.19
49	guecy	80.66	88.85	51.15	37.7	2.95	3.61	4.59
50	domyu	81.25	88.16	47.7	40.46	3.62	4.61	3.62
51	massh	78.92	90.96	53.61	37.35	6.93	0.6	1.51
52	satyo	80.13	90.57	50.84	39.73	4.71	1.35	3.37
53	srisi	75.68	85.96	51.37	34.59	6.16	1.71	6.16
54	sursu	82.37	90.26	52.89	37.37	3.68	3.68	2.37
55	zhali	80.66	91.61	50.73	40.88	4.74	0.73	2.92
56	setka	82.39	93.31	51.41	41.9	3.17	2.11	1.41
57	ubona	80.95	88.89	53.97	34.92	4.76	2.22	4.13
58	mikri	76.53	86.5	49.2	37.3	6.75	3.22	3.54
59	tsioi	80.36	90.63	50.45	40.18	4.23	3.32	1.81
60	patbh	81.21	89.01	42.2	46.81	6.03	2.48	2.48

Appendix 2b: Study 2 LAT B and C scores

	LAT	
Participant	B memory	C analysis
1	76	30
2	90	70
3	46	75
4	56	70
5	46	50
6	68	40
7	70	95
8	16	40
9	34	55
10	60	55
11	40	55
12	64	70
13	23	80
14	88	40
15	58	70
16	10	70
17	98	80
18	44	65
19	66	55
20	82	30
21	42	60
22	62	60
23	48	60
24	68	55
25	55	45
26	94	55
27	72	80
28	64	40
29	62	40
30	24	65
31	24	60
32	96	50
33	46	55
34	82	70
35	26	45
36	66	50
37	60	70
38	64	80
39	34	65
40	84	85
41	48	85
42	62	35
43	32	90
44	28	55
45	32	80
46	62	65
47	90	45
48	10	45
49	80	35
50	20	45
51	0	50
52	88	75
53	84	75
54	76	60
55	34	45
56	58	70
57	40	70
58	88	35
59	64	50
60	32	40

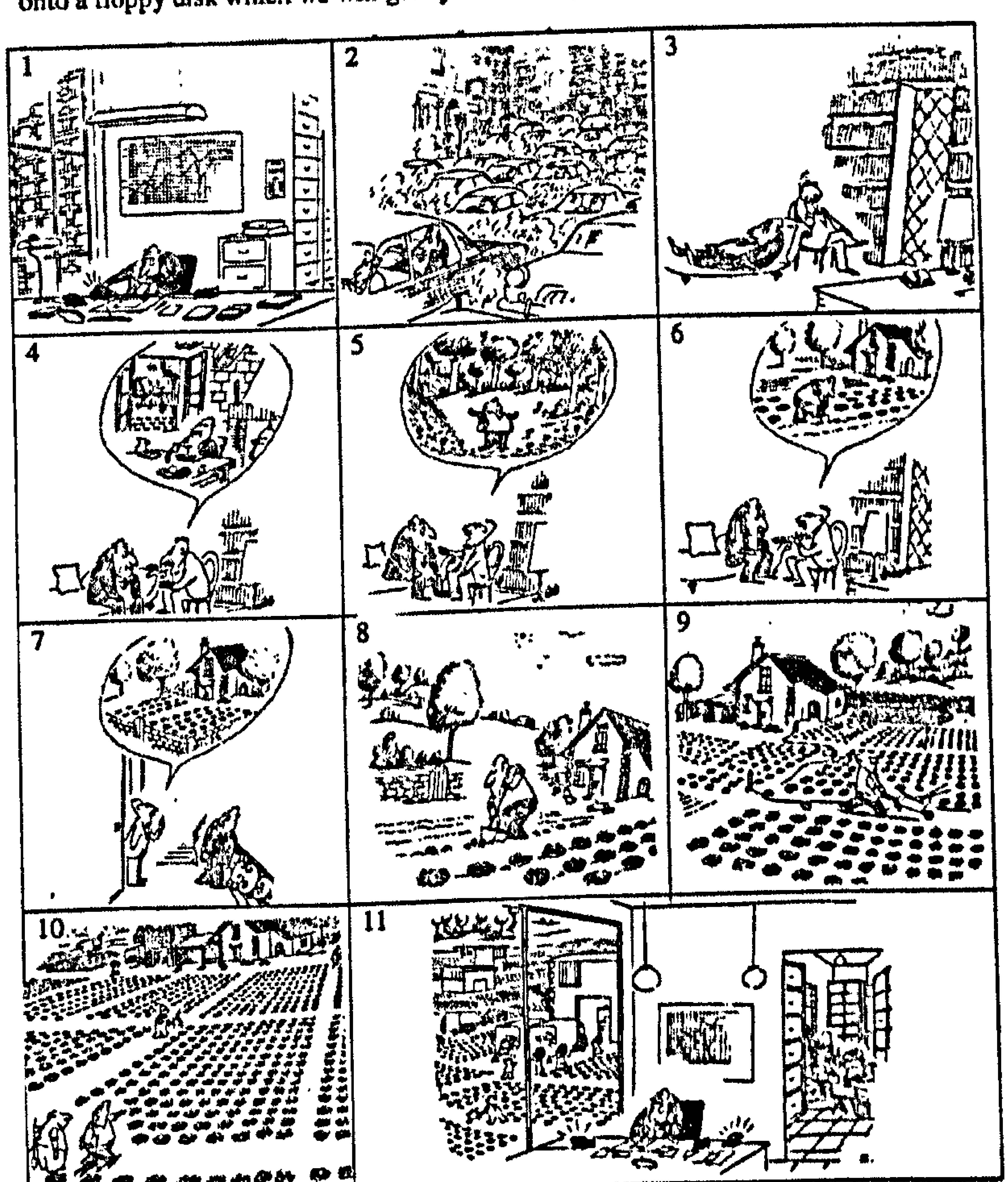
Appendix 2c: Study 2 X-Lex scores

	X-Lex							
Participant	XLex1	XLex2	XLex3	XLex4	XLex5	Error	X-Lex Raw	X-Lex Adjusted
1	20	17	19	15	14	3	4250	3500
2	20	20	20	20	17	2	4850	4350
3	20	16	19	13	9	0	3850	3850
4	20	19	19	15	9	2	4100	3600
5	20	11	14	11	10	0	3300	3300
6	20	18	18	18	15	1	4450	4200
7	20	20	19	20	17	4	4800	3800
8	20	16	15	13	9	4	3650	2650
9	20	14	18	17	8	1	3850	3600
10	20	19	20	19	13	3	4550	3800
11	20	20	20	18	18	10	4800	2300
12	20	20	20	20	19	0	4950	4950
13	20	16	14	14	14	5	3900	2650
14	20	20	20	19	17	6	4800	3300
15	19	18	18	17	15	0	4350	4350
16	20	20	20	18	17	3	4750	4000
17	20	20	20	20	18	5	4900	3650
18	20	20	19	17	17	8	4650	2650
19	20	18	20	18	16	2	4600	4100
20	20	20	19	18	12	2	4450	3950
21	20	19	18	17	16	1	4500	4250
22	20	19	19	16	13	3	4350	3600
23	20	18	19	14	10	0	4050	4050
24	20	17	16	18	15	1	4300	4050
25	20	18	18	15	13	1	4200	3950
26	20	20	20	20	19	13	4950	1700
27	20	18	18	19	18	3	4650	3900
28	20	17	19	15	15	3	4300	3550
29	20	20	20	20	18	8	4900	2900
30	20	12	13	8	8	0	3050	3050
31	20	20	19	18	12	3	4450	3700
32	20	20	20	18	18	2	4800	4300
33	20	17	19	20	11	1	4350	4100
34	20	20	20	19	15	2	4700	4200
35	20	20	20	20	16	4	4800	3800
36	20	18	18	15	12	3	4150	3400
37	20	19	19	18	14	0	4500	4500
38	20	20	17	18	11	2	4300	3800
39	20	20	20	19	16	4	4750	3750
40	20	19	20	18	19	1	4800	4550
41	20	18	20	19	17	2	4700	4200
42	20	20	20	19	14	1	4650	4400
43	20	18	15	14	8	0	3750	3750
44	20	20	20	20	17	6	4850	3350
45	.	.	.	.	.	0	4500	4500
46	20	18	20	17	16	3	4550	3800
47	20	14	12	14	9	0	3450	3450
48	20	20	20	20	18	19	4900	200
49	19	18	19	17	12	4	4250	3250
50	20	15	19	19	15	1	4400	4150
51	.	.	.	.	.	.	3550	3300
52	20	20	19	19	17	0	4750	4750
53	20	20	20	19	16	0	4750	4750
54	20	20	20	19	18	4	4850	3850
55	20	20	19	20	18	3	4850	4100
56	20	19	19	18	17	4	4650	3650
57	20	20	20	19	18	2	4850	4350
58	20	19	20	18	15	1	4600	4350
59	20	20	18	16	15	0	4450	4450
60	20	20	20	20	20	10	5000	2500

Appendix 2d: Cartoon story

Writing a story from the cartoon pictures.
This exercise is to find out the type of words you use in order to tell a story. Before you start writing look at the pictures to understand what happened in the story. Then write a story about the business man who works too much. This is not a test so there are no 'right' or 'wrong' ways to tell this story; however, the story you write should only be based on what you see in each picture. You do not have to finish your story within 40 minutes. I simply need a minimum of 300 words.

When you have finished writing, go to File, Save As...use your family name as the title of the Word document. Save onto H drive. You must also save your story onto a floppy disk which we will give you. Thank you for your help.



Source: Soars and Soars (1987, pp.44-45)

Appendix 2e: Study 2, IELTS only participants

In order to rule out the possibility that learners were not streamed correctly according to their proficiency level, the results were analysed again but this time only using learners whose IELTS scores were known. Learners were still grouped as low (IELTS 5.5 and below) and high (IELTS 6.0 and above) proficiency because of the relatively small sample size.

Memory and vocabulary profiles

Table 2.1: Correlations between Memory and vocabulary profiles at low proficiency

IELTS only		K1 Words %	K2 Words %	Academic Words %	Off-List Words %
Memory	Pearson Correlation	-.338(*)	.043	.389(*)	.224
N = 17	Sig. (2-tailed)	.038	.800	.016	.177

* Correlation is significant at the 0.05 level (2-tailed).

Table 2.2: Correlations between Memory and vocabulary profiles at high proficiency

IELTS only		K1 Words %	K2 Words %	Academic Words %	Off-List Words %
Memory	Pearson Correlation	-.131	-.080	.344	-.022
N = 21	Sig. (2-tailed)	.572	.731	.127	.926

The results from the IELTS only students' scores for Memory and the main frequency bands are encouraging because they mirror the trends from the main study (Study 2) in which students were grouped from different English language exams. At low proficiency, the higher the Memory scores the greater the production of rarer lexis. The pattern for the high proficiency group repeats the pattern from the previous set of data so there is a weak trend for higher Memory scores to be associated with rarer lexis.

Interestingly, there is also a weak negative correlation with Memory and the Off-List category which was similarly found in the previous set of data.

Analysis and vocabulary profiles

Table 2.3: Correlations between Analysis and vocabulary profiles at low proficiency

IELTS only		K1 Words %	K2 Words %	Academic Words %	Off-List Words %
Analysis	Pearson Correlation	.158	-.254	.230	-.182
N = 17	Sig. (2-tailed)	.545	.325	.374	.485

Table 2.4: Correlations between Analysis and vocabulary profiles at high proficiency

IELTS only		K1 Words %	K2 Words %	Academic Words %	Off-List Words %
Analysis	Pearson Correlation	-.199	-.192	.132	.344
N = 21	Sig. (2-tailed)	.387	.405	.570	.126

At a low proficiency level the results mostly mirror the previous set of data for Analysis and the main frequency bands. The only difference this time is that the correlation for Analysis and the AWL is positive rather than negative. At high proficiency the correlation at the K1 level is more markedly negative and the AWL correlation this time is positive rather than negative. Overall, none of the correlations for this set of data are statistically significant.

Memory and the sub-set of K1 words

Table 2.5: Correlations between Memory and the sub-set of K1 words at low proficiency

IELTS only		First 500 Words %	Content Words %	Function Words %
Memory	Pearson Correlation	-.195	-.350	-.052
N = 17	Sig. (2-tailed)	.454	.168	.844

Table 2.6: Correlations between Memory and the sub-set of K1 words at high proficiency

IELTS only		First 500 Words %	Content Words %	Function Words %
Memory	Pearson Correlation	-.060	-.032	-.092
N = 21	Sig. (2-tailed)	.797	.891	.693

At both low and high proficiency, all of the correlations for Memory and the sub-set of K1 words show a negative correlation. The correlations, though, are fairly weak and none of them reach statistical significance. The largest negative correlation is between Memory and content words at low proficiency. These results also reflect the same patterns from the data collected from all students classified as low proficiency except that for this IELTS only set of data the negative correlations are generally not as strong – especially for the low proficiency group between Memory and at the first 500 words.

Analysis and the sub-set of K1 words

Table 2.7: Correlations between Analysis and the sub-set of K1 words at low proficiency

IELTS only		First 500 Words %	Content Words %	Function Words %
Analysis	Pearson Correlation	.385	-.060	.178
N = 17	Sig. (2-tailed)	.127	.819	.494

Table 2.8: Correlations between Analysis and the sub-set of K1 words at high proficiency

IELTS only		First 500 Words %	Content Words %	Function Words %
Analysis	Pearson Correlation	.009	.047	-.232
N = 21	Sig. (2-tailed)	.969	.841	.312

There is little difference between this set of results for IELTS only low and high proficiency and the results from all students classified as either low or high proficiency. The only marked difference in this set of data is that there is a slightly greater negative correlation between Analysis and function words at the high proficiency level.

Appendix 3: Study 3 Diversity, LAT B and LAT C, proficiency and text quality

Participant	ID	Proficiency	IELTS	IELTSW	LATB	LATC	D	Rater1	Rater2	Mean Quality Rating	Learning Style Groups	words
1	alhal	2	6	5.5	60	60	85.71	7			1	304
2	abdah	2	6.5		12	45	49.55	5	5	5	1	244
3	alkal	1	5.5	5.5	72	70	86.83	4	4	4	4	353
4	caiyi	2	6	5.5	36	40	91.21	4	4	4	1	201
5	chedi	1	5.5	5.5	52	45	68.36	7	5	6	1	491
6	choju	2	6	6	78	60	96.75	5	5	5	2	426
7	davhi	2	6	5.5	54	65	95.38	6	4	5	3	453
8	dogel	2			56	55	69.08	7	6	6.5	1	724
9	euflu	2	6	6	46	65	78.14	9	6	7.5	3	475
10	huami	1	5.5	5.5	28	70	92.58	5	5	5	3	353
11	leeso	1	5.5	5.5	82	60	78.71	7	4	5.5	2	449
12	hanja	2	6	6	24	60	81.94	7	5	6	1	381
13	hochi	2	6	6	56	50	104.66	7	5	6	1	507
14	ishay	2	6	5.5	76	65	61.39	5	5	5	4	431
15	imosa	2	6	5.5	88	80	62.37	7	5	6	4	464
16	kimji	2	6	6	34	75	65.86	6	4	5	3	406
17	jabza	2	5.5	5.5	56	45	113.96	5	5	5	1	375
18	baeji	1	5	5	62	85	82.38	8	5	6.5	4	477
19	kimyo	2	6	5.5	18	50	94.78	5	4	4.5	1	396
20	mayoo	2	6	5.5	80	35	94.49	6	4	5	2	411
21	kaena	1	5.5	5.5	60	30	104.3	5	5	5	2	278
22	lueph	2	6	6	88	50	77.7	7	5	6	2	551
23	leeji	2			18	50	104.2	5	6	5.5	1	391
24	liush	1	5.5	5.5	88	70	77.94	4	4	4	4	190
25	luiin	1	5.5	5.5	50	45	86.43	7	5	6	1	427

26	lumin	2	6	6	46	50	71.54	6	5	5.5	1	471
27	masbi	2	6	5.5	18	50	53.48	5	4	4.5	1	340
28	maina	2	6	6	68	60	78.98	6	4	5	2	454
29	nadna	1	5.5	5.5	50	45	100.86	5	4	4.5	1	239
30	pitar	2	6	6	92	75	98.96	6	5	5.5	4	405
31	parhe	1	5.5	5	24	55	82.99	4	5	4.5	1	275
32	pstew	2	6	5.5	38	75	72.35	6	5	5.5	3	341
33	pathi	2	6	5.5	82	80	68.5	5	5	5	4	581
34	pamni	2	6	5.5	52	70	69.73	4	4	4	3	234
35	payna	2	6.5	6	88	85	75.83	6	6	6	4	353
36	sutru	2	6	6	82	65	79.62	8	4	6	4	369
37	shijo	2	6	6	62	70	91.14	7	5	6	3	491
38	saeyu	1	5.5	5.5	26	75	58.61	6	5	5.5	3	399
39	keshu	1	5.5	5.5	22	60	62.83	7	5	6	2	497
40	kimbu	1	5.5	5	40	55	84.82	7	5	6	1	362
41	shama	2	6		50	65	56.91	6	4	5	3	428
42	seoyo	2	6	6	92	60	74.01	7	5	6	2	404
43	sawol	2	6	5.5	68	60	44.69	7	4	5.5	2	417
44	shiaz	2	6	7.5	52	45	88.47	7	4	5.5	1	260
45	tinch	1	5.5	5	52	60	76.07	5	4	4.5	1	347
46	tinhi	1	5	5	62	70	90.81	6	6	6	4	510
47	tzoem	2	6	6	14	70	66.15	9	5	7	3	446
48	tanko	2	6	6	54	65	77.12	5	4	4.5	3	336
49	vedpa	2	6	5.5	36	70	102.53	5	4	4.5	3	505
50	wonma	2	6	5.5	92	55	56.44	6	5	5.5	2	395
51	wanio	1	5.5	5.5	43	60	91.09	6	5	5.5	1	363
52	parye	1	5.5	5.5	24	35	88.51	4	4	4	1	331

53	yangi	1	5	5	36	80	78.97	4	4	4	3	327
54	xunia	1	5.5	5.5	38	45	78.64	7	4	5.5	1	315
55	zhaxi	1	5.5	5.5	82	45	68.47	7	5	6	2	464
56	ziuka	2	6	5.5	28	60	75.89	6	4	5	1	310
57	mozal	1	5.5	6	66	55	68.42	6	5	5.5	2	356
58	parpe	1	5	6	30	100	59.46	4	4	4	3	243
59	rhese	1	5.5	6	88	60	77.03	5	4	4.5	2	303
60	jirso	2	6	5	48	80	73.6	5	4	4.5	3	267
61	leeyo	1	5		70	55	62.51	3	4	3.5	2	242
62	lujia	1	5.5	6	12	65	87.18	5	4	4.5	3	358

Appendix 4: Study 4 LAT B and C and Beyond 2k Time 1 and Time 2

Participant	B memory	C analysis	Beyond 2k t1	Beyond 2k t2
1	46	80	3.72	1.99
2	54	55	3.54	4.40
3	42	90	5.85	7.08
4	70	60	5.35	4.39
5	44	80	7.63	9.57
6	46	80	3.72	1.99
7	36	65	3.64	5.46
8	50	40	3.35	4.76
9	56	45	5.70	2.40
10	62	35	2.73	4.72
11	40	60	3.88	2.54
12	98	60	4.40	3.99
13	30	75	4.80	5.62
14	88	75	3.23	5.85
15	96	75	4.70	7.14
16	28	50	4.29	3.97
17	76	40	4.28	2.80
18	2	80	3.12	5.11
19	66	70	11.78	10.19
20	88	50	6.99	5.60
21	18	50	7.97	4.36
22	46	30	1.60	2.00
23	100	60	1.92	5.82
24	46	70	1.20	1.60
25	36	45	5.54	4.80
26	64	15	4.83	7.18
27	40	75	3.14	4.33
28	56	75	3.60	2.81
29	82	70	3.99	3.19
30	58	50	4.11	1.60
31	50	45	3.97	9.16
32	94	65	4.79	3.51
33	74	75	5.05	3.51

Appendix 5a: Study 5 LAT B and C, Diversity (D), Rarity (Lambda)

Participan t	ID	B memory	C analysis	text 1 D	text 2 D	text 3 D	text 4 D	text 5 D	words 1	words 2	words 3	words 4	words 5	Mea n
1	biafa	66	45	71.29	72.26	68.17	74.52	62.09	159		292	289	343	271
2	imose	90	65	71.88	64.33	101.42	76.62		195	258	268	226		237
3	bngta	32	75	83.89		90.00	76.91	75.29	204		233	314	319	268
4	klama	16	45	93.39	99.92	69.86	113.13	79.32	163	288	238	270	298	251
5	vonm e	70	55	66.21	73.18	67.42	75.31	64.52	204	350	238	259	308	272
6	vukma	54	40	88.69	100.60		61.47	84.51	242	287		220	280	257
7	maran	80	45	65.21	76.95	79.33	57.06	64.13	162	291	244	282	261	248
8	hemi	70	65	70.75	66.40	60.68	79.93	79.29	182	320	267	233	315	263
9	wenph	88	90		66.48	81.98	83.60	59.63		288	292	269	345	299
10	staad	20	40	84.61	71.42	72.37	56.74		242	285	196	189		228
11	datre	72	60	72.99	89.90		71.20	72.70	199	269		279	355	276
12	carol	22	25	84.56	82.93	98.60	86.47	68.21	151	213	168	246	242	204

Participant	Text 1 Lambda	Text 2 Lambda	Text 3 Lambda	Text 4 Lambda	Text 5 Lambda
1	2.02	1.65	3.36	2.58	1.84
2	1.48	1.52	1.98	2.46	.
3	1.41	.	3.08	2.34	1.84
4	1.64	1.77	3.11	2.52	1.99
5	1.31	1.73	3.38	2.29	1.81
6	1.67	1.61	0	2.95	2.35
7	1.5	1.59	3.27	2.21	1.77
8	1.92	2.15	2.81	2.22	2.36
9	.	2.09	3.16	2.8	2.07
10	1.35	2.1	3.97	2.61	.
11	1.44	2.29	.	2.56	2.61
12	1.33	2.22	2.96	2.18	2.1

Appendix 5b: Writing tasks

Text 1

A family in Britain is looking for a young person to take care of two young children and to do some light domestic work during the summer. A friend of yours has applied for the job, and the family has asked you to write a reference. Your reference should indicate your relationship with the applicant and how long you have known him/her, and include relevant information about your friend's:

Character and personal qualities

Attitude towards children

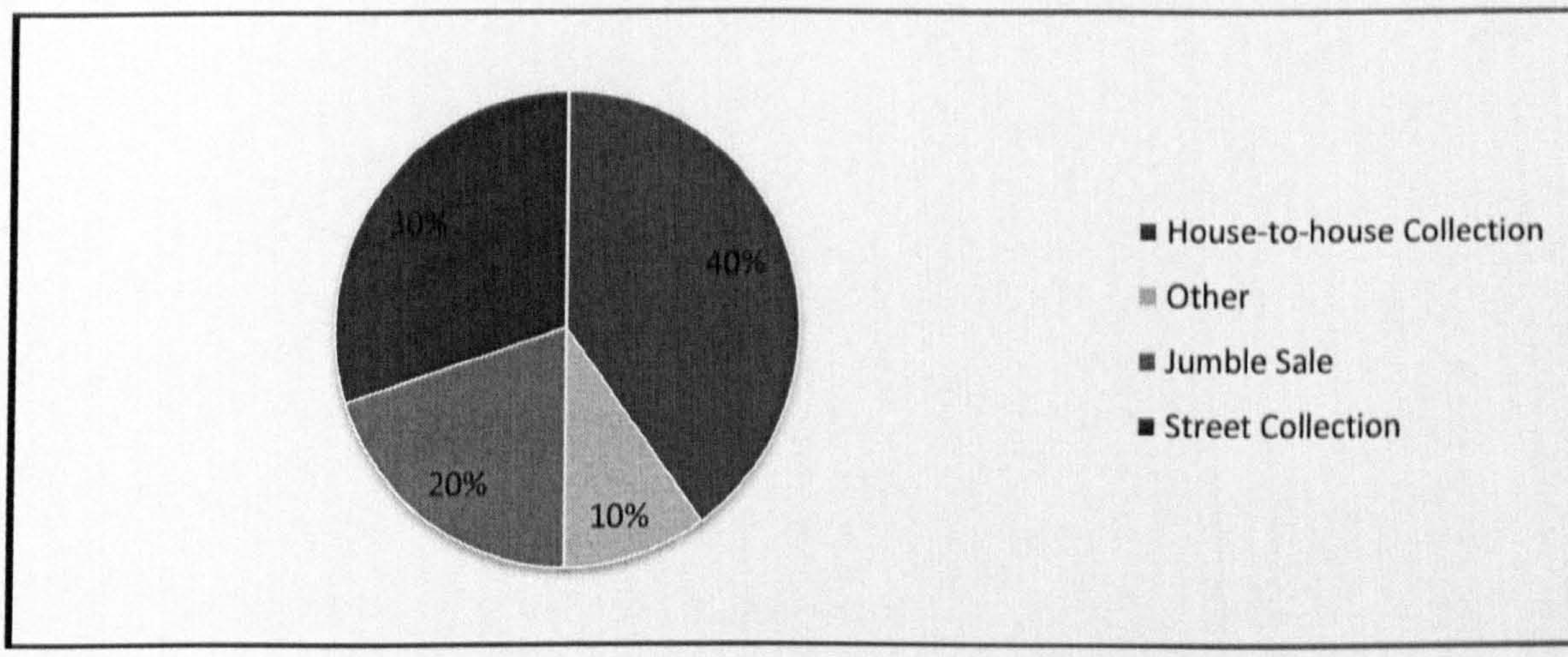
Any relevant skills and experience.

Write your reference in approximately 250 words.

Text 2

You are working in Britain, and in your spare time you help a charity organisation which raises money for disadvantaged children. Recently you organised a fund-raising day for the charity, and the director of the charity has asked you to write a report for the Board of Governors describing the day, and making recommendations for what to do next year. Read the note below, on which you have made some notes, and the pie chart you have prepared. Then using the information carefully write the report requested by your director.

I'm glad the fund-raising day went so well and you managed to raise so much money. It sounds as if it was fun. I was wondering whether you could write a report, providing an overview of the day, and saying who was involved, how they raised the money and what recommendations you would make for a similar event next year.	More than last year. Yes, a good time was had by all. Not too many problems. About 50, mostly students from the university – they were great! + a few friends from work. Greater variety of activities, e.g. sponsored runs, street parties (?!), etc.; providing collectors with special badges – some people thought we weren't genuine.



Now write your report to the Board of Governors as outlined above (approximately 250 words). You should use your own words as far as possible.

Text 3

Your company has decided to invest some of this year's exceptionally high profits in the following areas:

New computers

Language training courses

Special bonus payments

You have been asked to write a report recommending how profits should be invested and what benefits would be achieved. Write 200-250 words.

Text 4

A few months ago you joined an international friendship club which organises regular meetings in your town. You soon realised that although there is a friendly atmosphere, the meetings are rather dull. You have talked to other members who agree that some changes should be made and you have volunteered to write to the chairperson of the committee, Ms Jane Dennis.

Problems

Membership falling…new blood needed!

Av. Age of committee 40+

Younger members want more lively meetings

Clubroom small and depressing

Publicity for club boring

Members' suggestions

Visit to a nightclub disco

Barbecue

Quiz night

Karaoke night

Fancy-dress party

Theatre trip (musical)

Treasure hunt round town

Concert

Sports tournament

Below is the club's programme and the notes you made while talking to the members. Read the programme and the notice. Then using the information provided write the letter outlined.

Now write your letter to Ms Denise explaining why it is felt that some changes would be a good idea. Make two or three suggestions for some rather different activities for future programmes and indicate why they would be successful (about 250 words). You do not need to include addresses. You should use your own words as far as possible.

THE INTERNATIONAL CIRCLE
THE CLUB FOR EVERYONE
September programme

Sept 1	New members' meeting -come and welcome new arrivals coffee and soft drinks in the clubroom 8-9pm.
Sept 15	'A travelling life' Talk with slides by Carlo Maragna, retired teacher, about the countries he has visited during his long career. Clubroom 6-9pm
Sept 29	Musical evening Songs from around the world, led by Susanna Woodall at the piano. All your old favorites!

Text 5

You have received a letter and a newspaper cutting from a teacher at KPD School, where you attended an English course. Read the extract from the letter below and the newspaper cutting. Then, using the information provided, write the letter and note listed.

I'm sure that you'll be interested in this article from the local paper of 11 September. It's terrible! They've made lots of mistakes - I've marked some of them. Mrs Driver has asked everybody to write to the paper to complain so that they have to print a correction - she's very worried that students will stop coming to the school. I thought I'd let you know. As an ex-student who had such a good time at KPD (and such excellent exam results) you are just the right person to point out their mistakes. I hope you aren't too busy to help. If you do write to the paper, perhaps you would let Mrs Driver know too.

Take care and hope to see you soon. Andrea

Low standards at well-known school

Today 'Spotlight on Education' looks at the KPD School. This local school (Principal Mrs K. Driver) claims to offer excellent tuition but our investigation has shown that standards are in reality extremely low. Here are some examples of what we were told.

Most teachers are lazy and don't prepare their lessons properly - perhaps that is the reason why students often leave the school knowing no more than when they started. And perhaps that is why very few students from the school pass any exams!

But apart from academic standards, there are other things wrong at KPD. Their brochure promises inexpensive social activities most afternoons and every weekend, but in the last six months there has been only one trip to another town - and that was too expensive for most students to afford. Speaking of the price, the food served in the so-called 'restaurant' downstairs is incredibly expensive and the quality, like most other things at the school, is extremely poor. No wonder everyone at KPD is so unhappy...

Now write:

A letter to the Editor of the paper, as requested by Andrea (about 250 words)

A relevant note to Mrs Driver (about 50 words).

You do not need to include addresses. You should use your own words as far as possible.

Appendix 5c: Learner notes (Participants from Study 3)

Participant 48

1 language

English as a global language

situation - advantage

- disadvantage — scient

problem 1. benefit → English as mother tongue

2. native speaker lazy to learn language

3. lost of minority language

4. equality

5. logistic cost

solution 1. early education in language learning

2. using artificial language (5)

3. change mindset of native speaker

early

~~evaluate~~

~~2 Culture~~

problem - understand in non-verbal

solution - respect and relish that

3 culture

situation - the need

problem - opportunity

Solution - study together with international students on ship!

evaluate - not stick on one country, network, oppor ← good

4 language

situation - non-native communicate with other non-native more than native speakers.

great majority non-native speaker talk each other | accent doesn't matter

solution no need to understand English culture as they don't speak to English people books and internet

5 language

situation Eu don't want to speak English too much

costs increase solution translation

6 culture → chicken and egg

situation: how to change (culture awareness)

British Council focus on culture study

Problem: Many people come from variety countries, don't understand British culture

Solution: - business ~~to make organization~~?

training in school → change by question about attitude (psychological, voice, question)

training for teacher → training booming

Solution

7 culture (cross culture in business)

Situation business world → create some problem

problem lack of communication

1. misunderstanding

3. business style, idea → have their own

Solution 1. high cultural consultant → ~~make~~ ~~[illegible]~~

2. training about business culture

3. ~~similar~~ culture avoid misunderstanding

4. website → show the culture

5. respect individual | measure

6

Since ~~[illegible]~~ English language | has boomed in 1970s, 1990s

virtual teams

Participant 49

Date:- 7/9/09

Hand-written Notes

In-classed Essay :-

① LANGUAGE :- [Phillipson. R (2003), "Union in need of lang equality", The Guardian, 30, January, [on line] Available AT: http://www.guardian.co.uk/education/2003/jan/tefl/e/

④ - Eng. lan using more by people
- teaching methods
- Speech & accent
- Non-native speaker
- learning English very easy
- 2nd lan Eng shifts cult

Brumfit, C (2001), "No time to fall behind in class", The Guardian, 22 november [on line], Available AT: http://www.guardian.co.uk/education/2001/nov/22/tefl

Non-language :-

② Thumb - hand usage statistic
Tic - sound gesture
Meishi - Japanese bus. card
Slip off shoes
Inter-gender beha. in east

Mccrum, R (2007), "mind your non-lang.", The Guardian, 11 October [on line] Availabel AT: http://www.guardian.co.uk/commentisfree/2007/oct/11/mindyournonlanguage / (25/8/09)

⑤ - EU insti. & Eng lan. (25/8/09)
- Equility in lan
- French cult, dominat^n of Eng
- Translators

① Danger of global lang:-

Prob: ① will cultivate an elite monolingual linguistic class
② will make ppl lazy abt learning other lang
③ small langs are dying
④ lang. learning is waste of time

Arguments :-

=> Linguistic Power :- eg. Scientist & senior manager bilingual & research

=> Linguistic complacency :- motivat^n for adult will eliminate
ⓐ - people are very lazy
ⓑ eg. to sort out lang. diffi, some companies had growth in some countries. Aust. teach Japanese as 1st foreign lang. & both UK & US teach Spanish

=> " death :- Small lang will die
- dominat^n of global lang & history
- 80% of world's 6,000 langs will die

⦿ CULTURE :-

③ => Scholarship :-
- Collaborat^n b/w 5 uni & Caribbean cruise
- 700 student, 16 week semester
- 5 learning circle

Adv. :- ① cross-cult^n communicat^n skills
② Internat^n exp.
- The busn. school at manchester metro politian
- London busi. school. "Busi. has become global".

Wylie. I. (2006), "water course", The Guardian, 18 Feb [on line] Availabel At: http://www.guardian.co.uk/money/2006/feb/18/careers.students (25/8/09)

⑥ Cult awareness training
- ELT R&D, sietar, www.dialogin.com
- understanding busi cultural values & attitudes
- incu project
- Training in schools :- "Lang & Culture are a bit like the chicken & egg
- Assessing competence :-
- Training for teachers ;

Tomalin. B. (2006), "Understand a new culture", The Guardian, 10 march [on line], Availabel At: http://www.guardian.co.uk/education/2006/mar/10/tefl4/ (25/8/09)

⑦ To establish busi. in other country, 1st know its culture & hire consultant to guide them staff;
- Crossing cult - inte. probs lead
- Every nuance - colour
- Emai - to expand busi by training cult
- Virtual teams -
- Light-hearted quiz in website

Grace. J (2003), "Crossing Cultures", The Guardian, 14 October, [on line] Availabel At: http://www.guardian.co.uk/education/2003/oct/14/furthereducation.uk4/ 25/8/09

Participant 47

Notes

Global language

probs: 1) only for rich (1) ✓
2) make people lazy (1) ✓
3) die away effects (1) ✓
4) waste of time (1) ✓
5) social harmony (1)
6) power compared (1) ✓
7) native speakers (1)
8) globalisation (5)

sols: 1) education → evaluation (1)
2) your own style not apps (4)
3) improve your language (5)

Culture

probs: 1) communication gap (2)
2) behaviour (2)
3) foreign culture aspect (2)
4) contract loss (3)
5) unemployment (3)
6) misunderstanding (7)

sols: 1) respect the culture (2)
2) mix workers (3) (7)
3) training in school (6)
4) psychological profile (6)
5) training for teachers (6)
6) higher culture consultant (7)
7) respect individuals (2)
8) measure awareness (7)

Participant 8

Vocabulary

to offend s/o
to be offensive
to be disrespectful
to raise cultural awareness
to be bi-lingual
→ a native speaker vs. a non-native speaker
a lingua franca [a language used by non-native speakers to communicate w/ each other]
a global language
to have cross-cultural competence
a person's range of skills or knowledge
dominant language

Clare McGinn wyt

Problem: misunderstanding of customs, body language, codes of politeness → in business (while doing business) (in global business)
(crossing cultures) ex: Japan, etc

Evaluation: effect of different cultures → (qut. → (union in need of ...)
example of
misunderstanding because of the globalization (increase in glob.) in business relations.
can result in offending people therefore it affects the business relations.
have a negative effect on deal.
much more cross-cultural contact through globalized commerce.
(an unintentional action can lead ...)

Solution: cultural training programme in email. ②
cross-cultural communication skills (to gain) ①
ex. international experience
ex. raise the cross-cultural awareness
(can be raised ...) +
(crossing cultures)
(water course)
(to cause offence)
also (understand a new culture .. yourself)

Participant 9

[– EXAM PAPER –]

07.Sept.09

ideas for the essay-plan:

INTRODUCTION

1. background information on the topic
2. definition of terms in the title (if necessary)
3. Reference to other writers who have discussed this topic (e.g.) A number of experts have ~~examined~~ This issue …
4. Your purpose of writing and the importance of the subject. It is worth examining…
5. Possible limitations that you set yourself. Only…
6. Giving an indication of the organisation of the rest of the essay
   - An assessment will first be made of…

MAIN BODY Explaining the issue, providing examples and referring to writers or experts

CONCLUSION Summarizing your main points of the introduction

ARTICLES ABOUT CULTURES

- CROSSING CULTURES cultural business communication in the global world; Body language and expressions, communication; CULTURAL TRAINING PROGRAMMES for BUSINESS; MONEY
- MIND YOUR ~~OWN~~ NON-LANGUAGE non verbal communication; old habits die hard; CULTURAL openmindedness; RESPECTS.
- WATER COURSE overseas experience, learn from different culture; better CV, STAFF culturally diverse, business schools
- UNDERSTAND A NEW CULTURE… YOURSELF — intercultural training; KEY qualities, Intercultural work on immigrants and migrants APPROACH; understanding point, MINDSET CHANGING; change attitude.

ARTICLES ABOUT LANGUAGE

- X UNION IN NEED of LANGUAGE equality English language; language POLICY; EUROPEAN UNION (EU), students mobility; Language SERVICES; democracy; CRITERIA
- X ENGLISH as a GLOBAL LANGUAGE RISKS, elite, linguistic power; linguistic complacency, economy, investments, statistic, LINGUISTIC death, emergency, Tragedy; disappearance of diversity, recording, isolate
- X NO ONE TO fall behind in class, Werner; english language ~~Tea~~ Teaching; global change, ~~Speech~~ speech; REPERTOIRE of both ling and non-linguistic experience

USEFUL TERMS: Therefore (This means that…) (these); Moreover; In addition; Indeed; Nevertheless (Tuttavia) As; In conclusion (The major problems are…); Although; On the contrary, It is widely believed that…

e.g. Eufemia L. states, argues, verifies, points out…, According to…

- (quando non sei d'accordo): Other critics argue…

On one hand, on the other hand

- As we have seen.

ISSUE (SITUATION)

Problems — solutions

Participant 13

(1) Jay Kettle-Williams: "Language amounts to 20% of communication at most, the rest is body language and expression"

(2) failures in communication → damage international business deal, ex: Paraguay, some countries like Arab

From shaking hands to eye contact, even color can be an issue.

ex: India → purple means virginity, white ~~means~~ used for death shrouds.

(3) Richard Cook → one of the biggest growth = cultural training in email.

more companies → virtual terms based in different countries

Richard Cook → "necessity of netiquette

e.g. The US: too direct

The Japanese: underling ~~key~~ sentences

The UK: sending reminders

(4) A Clear message: if in doubt, resort to stereotype

therefore / in conclusion / thus / hence

describe/state/define/argue/dispute/conceded/investigate/estimate/believe/recognise/predict/analyse/compare/comment/conclude/criticise/demonstrate/discuss/illustrate/indicate/note/observe/point out/report/show/suggest

Δ The academic programme built up 5 learning circles — 1. international business and communication; 2 sustainable development; 3. global cultures; 4. social change; 5. art and cultures

Δ The unique selling point → the Scholar Ship = experience of living in a transnational community.

Δ Business schools → Aware that students are increasing attracted to courses given them international experience e.g. Short secondments to partner universities, campus aboard.

Δ Manchester Metropolitan, business school → biggest and most diverse in UK

→ 500 students from 50 countries

Δ Also important: Staff are internationally and culturally diverse.

Δ London Business School (LBS) → students come from 124 countries. 15% from UK

Δ Most large companies want graduates have skill of cross-culturally-management.

Δ Julia Tyler: "Business has become global"

Δ Mark McCrum: Local still rules

Δ Thumb up → don't do it in Sardinia or Iran

Δ Pig → means unclear in Saudi Arabia

non-verbal communication is as important as language

first/first of all/at the outset

similarly/equally/likewise/in the same way/

also/too/again/besides

in addition/as well as/either/too/not only... but also/neither... nor

furthermore/moreover/what is more

Δ Adjusting may be harder when the demands of foreign cultures are more stuffy than exotic.

Δ Westerner → liberal-minded; easterner → inter-gende behavior

Δ 1970~1980 → the boom of learning English in private schools → international trade (ELT)

Δ Sietar + www.dialogin.com → support intercultural training in business and academic

Δ important work of intercultural training (Inca Project)

1. increase understanding of business cultral values and attitudes

2. See how they reflected in behavior

Δ 4 keypoints to succeed across cultures (Dr. Michael Byram, Durham University)

① openness to others ② curiosity about other cultures ③ tolerance of difference

④ flexibility and willingness to embrace change

Δ Inca → interculturality = exchange of other cultures by individual attitude and behavior

cross-cultural awareness = the understanding and adaptation to different ways of doing things

Δ Culture can be found not only in texts but also in illustrations, captions and other textbook elements

Δ Newcastle & Luton Universities → offer cross-culture MA's

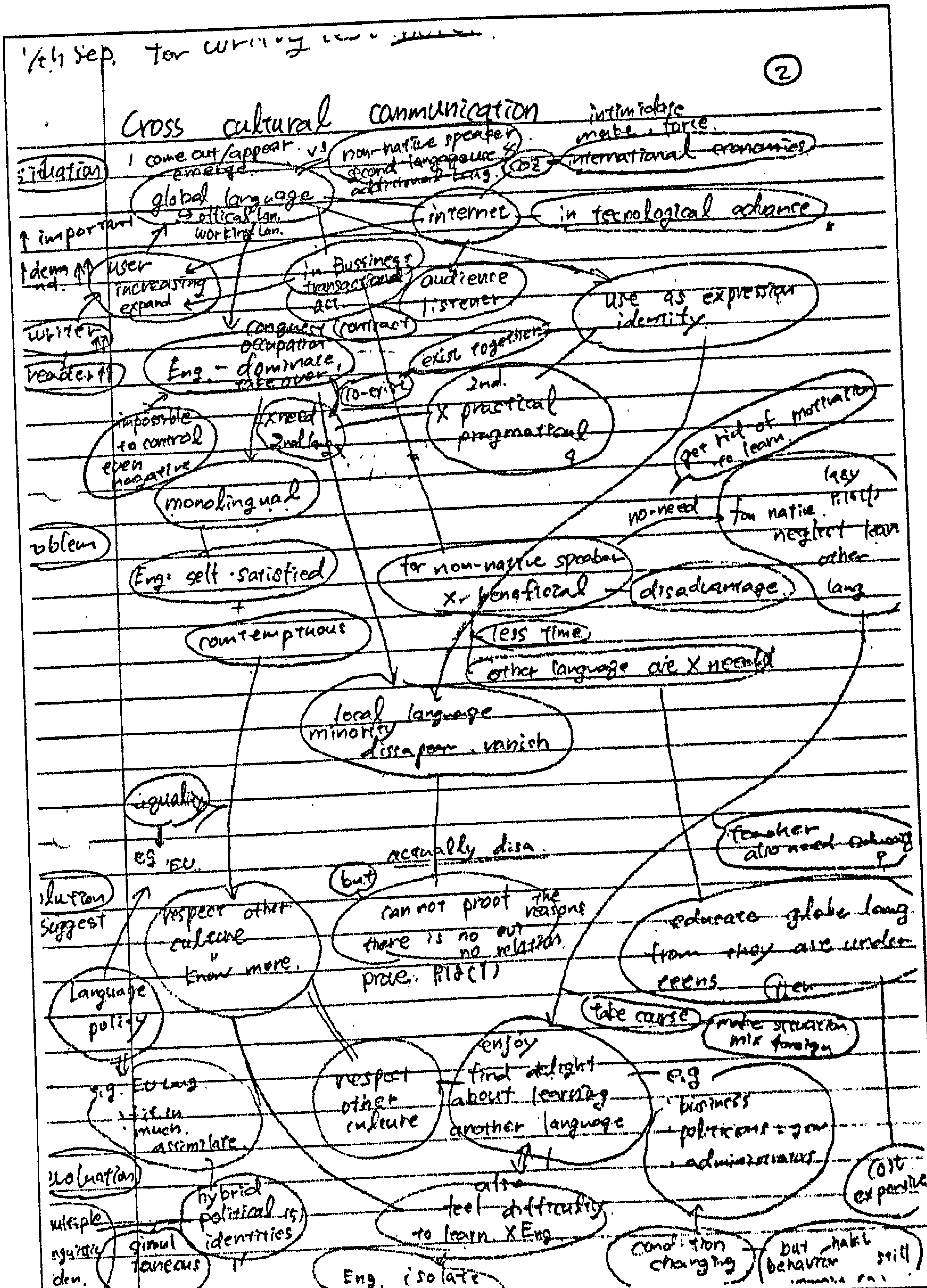
Δ People go through cultural awareness training, they become widely modest to people from different ~~ct~~ cultures

alternatively/a different perspective on this/others argue that/

Problem – Solution

however/on the other hand/nonetheless/nevertheless/in spite of/despite/at the same time/even though/by contrast/although/on the one hand ... on the other hand/in fact

Participant 15



Participant 37

Joungmin Shin (K0853317) Brighton

NOTE

Appearance of cross cultural communication
Growth (Immigration population & international student)
Increase (international Business)
Spread of awareness of CCC
→ Misunderstanding due to cultural & conventional differences
→ Difficulties / to adapt to different cultures / to acquire foreign language
Cross Cultural training program
Offer international experience to students
Offer employment opportunities for foreigners
OK Respect different cultures
Development of relationship between nations
Importance of 3C in global society.
Benefits from understanding and respecting
expression & gesture → impolite in other countries
Failure of I.C ← different idiosyncrasies
No consider & understand behaviours & attitudes by cultural & conventional differences
Foreigners (immigrants & international students)
→ suffer Learn about the country (where they will live)
Difficult → no time or in short time
language acquisition → communication X
Indispensable factor
Difficult < talking in foreign language / impossible to learn all of foreign language
∴ Foreigner → hardship & disadvantage (B) language barrier
cross cultural training program → overcome
offer employment to foreign workers (or international
Benefits → Domestic worker's experiences
Exchange student program contribute
→ can acquire faster → development
Good chance — understand behaviours, expression (attitudes)
Suggestion helpful — respect — different culture
→ relationship development — (sales productivity
globalisation — contact to other culture
3C → important to progress society

- multi-cultural society (environment)
- substantial → considerable = significant = meaningful
- ethnic culture
- seek = find = try to obtain
- cultural exchanges
- employment opportunities for immigrants (foreigners)
- on behalf of
- native populations → openminded
- narrow-minded, intolerant, hidebound
- idiosyncrasies (the particular way of expression)
- possibility, solution, answer
- cross-cultural awareness
- indifference (public indifference)
- be tolerant of / tolerate / allow
- foreign cultures / unusual cultures (exotic cultures)
- incomprehensible
- homogenising behaviour
- transnational community
- sufficiently qualified workers
- language barrier
- It is widely accepted that...
- advance (progress) of technology ~
- experience various exotic cultures
- important issue → 3C (different culture)
- curiosity and interest of exotic culture
→ more opportunity → communicate others
- 3C) significant in international (B)
- successful communication / counterpart
→ success of international Business
- understanding diverse culture
→ significant factor in global society
People → awareness of importance 3C
NOT EASY — ∴ make mistake
→ many serious problems

Grace J. (2003) Crossing Culture, Cambridge
Jonathan B. (2005) Understand cross culture
Wire, (2004) Water cause

Participant 42

situation - briefly
problem - major causes
solution.
evaluation - what things should be happen

conclusion - summarise main points of essay
mention about introduction

. People and Migration (2006) available online at : http ______ (Accessed on 07. 09.09).

. Guardian News (2008) available at : ______ (Accessed on ___).

* John Crace . "Crossing cultures", Guardian, (2003) http ______ (Accessed on ___)
Speaking same language ≠ saying same thing
company : cultural consultant $\xrightarrow{\text{potential mistake}}$. staff
eg) nuance. colour (national flag)
HSBC bank : direct expression "... ___ money"

20 % communication
80 % body language & expression.

describes / states / defines / argues / disputes
conceded / investigated / evaluated / estimates
believes / recognised / predicted
analysed / compares / comments / concludes
discusses / illustrates / points out / reports / shows

Mark McCrum
* "Mind your non-language" : Guardian , (2002) ______ ( )
non-verbal communication = important language.
cultural DNA eg). Jumping line ← UK - immoral ; Italy, Arab, China - OK.
accepting incomprehensible → cultural open-mindedness
√ globalisation → homogenising behaviour (- the youth).
√ old habits [illegible] respect & rebel [illegible]

eg) Japan - business card

. similary / equally / likewise / in the same way
. also / in addition / besides / as well as / not only but
. furthermore / moreover / indeed / what is more
. however / on the other hand / despite
. by contrast / although / in fact.
therefore / as a result / as a consequence.
. in conclusion / thus

* Ian Wylie . "Water course" : Guardian , (2006) ___ ( ).
overseas experience = international study cross the globe
. learning circles
only university on seas
experiential learning → cross cultural communication skill
. work cross culturally . managers
no hierarchies , same chances.

*. Barry Tomalin. " Understand a new culture .. yourself"
Guardian, (2006) ___ ( )
booming learning English (70 - 80)
∵ international trade
- important intercultural training
. [illegible] business cultural values [illegible]
. [illegible] keywords. succeed cross culture.
open observe / interested in other culture change
tolerance of difference / flexibility to embrace
√ education for understanding multi culture
∵ immigration & migration

* Robert Phillipson, Union in need of language equality , Guardian
strengthen national language ≠ [illegible] learning English
[illegible] official & working [illegible]
. new member [illegible] → same rights

culture - expressing human being.
uniting others. forming a group. defining an identity.
distinguishing themselves.
. cultural expression - create activity. practice symbols
cultural identity & notions of culture → every human society
globalisation, migration, technological advancement
human being → role of culture . human existence.
cultural value & tradition ↓ risk
but global cultures in contact
starting point. our identity → others
↳ complex & characteristic
misunderstanding.

* Christopher Brumfit. No time to fall behind in class, guardian ( )
internet ___→ internet audience
. English = widely spoken . (2nd lang users > native)
[illegible] dying langu- [illegible] international economies & global culture
. effects ← creative writer → using 2nd langu-
supra-regional langu- [illegible] regional & local [illegible]
English teaching [illegible] ← communication non-native real.
2nd lang- [illegible] express identity
reading & writing on internet [illegible]
using English [illegible]
problem - [illegible]
- mixed model

In other words. / to put it another way. / to explain.
Generally speaking / in most cases. /
two types of / kinds of / classes of
can appear to others as. / obviously /

* Crystal. D. "What are the dangers of a global language ? "
English as a global language . Cambridge : Cambridge University Press 1997, 13 - 15
danger of global langu- ← more ability to think & work [illegible]
- by learning other langu-
- ↓ minority lang-
- monolingual langu
linguistic advantage - economy, good for foreign investment
38% British companies - other language
(European business survey), 1996
dying local language ∵ global language
Try to revive - Emergency languages, [illegible]
global langu- ← waste of time learning langu -
↳ one lang- in one world
less [illegible] communication but not guarantee social harmony

Crace, J. (2003) "Crossing cultures" The Guardian, 14 Oct [online]. Available at . http
(Accessed : 07 09. 2009).