ARISTOTLE UNIVERSITY OF THESSALONIKI

The second language mental lexicon: some evidence from Greek advanced learners of English

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Abstract

A fairly widely held view in psycholinguistics is that the L2 mental lexicon is more 'phonological' than the L1 mental lexicon, namely, that a qualitative difference exists between the two lexicons. In this study word association test data together with C-test data elicited from Greek advanced learners of English are presented which challenge the above view. The findings seem to suggest that the way words are processed is not so much related to the status of the language (L1 or L2) to which they belong, but rather it depends on the level of familiarity of native speakers or learners with particular words at a particular time. A lexical item will trigger different types of response (form- or meaning based) at different stages of its internalization into the mental lexicon; the status of the language this word is a token of or the overall proficiency level of a speaker in that language will not determine the type of response. The basic assumption is that unfamiliar lexical items tend to elicit form-based responses because they have not yet become part of the speaker's semantic structure while very familiar items are well-integrated into the speaker's mental lexicon, which means that they are well-connected to the networks of lexical meanings, therefore they tend to be processed predominantly with respect to their meaning. This alternative approach is argued first with the help of the word-association data which indicate that there are certain similarities in the L1 and L2 lexical operations of native speakers and advanced learners; the subjects produce equal proportions of paradigmatic, syntagmatic and other semantic responses both in relation to the Greek and the English set of stimuli. The few phonological (clang) responses in the L2 seem to reveal the more restricted L2 lexical knowledge of particular subjects with respect to certain unfamiliar stimuli; these findings seem to indicate that formal processing plays an important role in the early stages of the integration of a word in the mental lexicon, followed by semantic processing as the word becomes well-integrated in the lexicon. The C-test findings also suggest that familiar L2 words are processed in semantic terms for the most part, at least where advanced learners are involved, while even L2 lexical errors seem to be semantically related to the stimulus context. The existence of a few lexical creations and a certain divergence in the responses of particular subjects in relation to a few C-
test slots which were proven to be the most difficult items in the C-tests is an indication that the level of familiarity of a learner with a lexical item will provoke different types of responses in the L2.
PART 1

Research Review
INTRODUCTION

My interest in the mental lexicon can be traced back to the year I spent in Dublin teaching a course in M. Greek to a group of adult beginners, native speakers of English. I very distinctly remember that my learners used to feel frustrated about their vocabulary errors and they considered them to be even more serious than grammatical errors. In a questionnaire that I used among other instruments of research in order to probe into the L2\(^1\) lexical operations of these very learners, for the purposes of my M. Phil. thesis, I found out that vocabulary was considered by far the most difficult part in learning M. Greek. This did not come as a surprise to me as the same finding had been reported by several researchers not only in respect to learners of a foreign language (e.g. Levenston, 1979: 147) but also in relation to native speakers (Meara, 1984: 229). In addition, Meara (ibid.) reported that lexical errors were three times more numerous than grammatical errors in one corpus of advanced learner errors. It would seem that this general feeling of the difficulty of vocabulary results from the fact that lexical errors tend to interfere with communication while grammatical errors usually end up by being understood by the listeners thanks to the surrounding structure (Gass, 1988: 92).

\(^{1}\) L1 will refer to a person's first (native) language. L2 will refer to a person's second or foreign language. A distinction is not made here between 'second' and 'foreign' language, thus I do not differentiate between learning situations in the use of the terms. The term L2 could also refer to a person's L3, L4 and so on. However, L2 is normally used to refer to any language use after the native language has been learned.
Despite the fact that the lexicon appears to be the most important component for learners, earlier research in the area of second language acquisition pointed out that the lexicon had been largely neglected (Meara, 1984; Gass, 1988). It is true that the emphasis of second language acquisition research during the first two decades of its existence (1960-1980) was mainly on morphology and syntax; researchers were heavily influenced by the progress of theoretical linguistics in the fields of phonology, morphology and syntax. Only in the past twenty years did we notice a rash of publications in the area of vocabulary which was aimed particularly at teachers (e.g. Carter 1987; Carter & McCarthy 1988, Hatch & Brown 1995, Lewis 1997).

The interest in L2 vocabulary, and especially in relation to the lexical dimension in the L2 teaching field, reflects an interest in the lexicon as well. The mental lexicon can be broadly defined as a flexible store containing all the lexical items in a person’s mind, including their organization. All these lexical items are listed together with information about their orthography, pronunciation, meaning, grammatical characteristics, collocational links, local colligation. It is often suggested (e.g. Allan, 1986: 223) that the lexicon should contain the lexical rules used for creating new vocabulary or that idioms and fixed expressions are listed in the lexicon as single units. These claims will be dealt with in the subsequent chapters.

The lexicon is still seen as this area of a linguistic model which deals with ‘idiosyncratic information’ (Radford, 1981: 118ff.). What has changed is the fact that language operations are perceived by many linguists to contain
much more idiosyncratic information than was previously thought possible. Even proponents of the Chomskyan approach such as Cook & Newson (1996: 19) acknowledge that the lexicon ‘plays a dynamic and necessary part in the syntax’ and that the ‘syntax itself is considerably simplified by the omission of many rules, at the cost of greatly increased lexical information’. The implication is here that the acquisition\(^2\) of the L1 or an L2 depends quite a lot on the lexicon. As syntax becomes increasingly more simplified the learner will have to deal with an increasing bulk of vocabulary learning. Language teachers may have intuitively known for quite some time that vocabulary is central to the language acquisition process but this is also acknowledged by second language acquisition researchers: ‘Knowing words is the key to understanding and being understood. The bulk of learning a new language consists of learning new words. Grammatical knowledge does not make for great proficiency in a language’ (Vermeer, 1992: 147).

In respect to L1 acquisition and processing a range of research (e.g. Aitchison 1994) has focused on the lexicon (e.g. acquisition of first words and concept development). The area of psycholinguistics has also focused on the organization of L1 lexical knowledge, the relationship between input and output, and also the roles of form and meaning in the lexicon (Garman,

\(^2\)‘Acquisition’ and ‘learning’ will be used interchangeably in this study. Both terms will refer to the process of the internalization of knowledge. The distinction between acquisition as an unconscious process and learning as a conscious one is avoided. Most researchers tend to agree that all learning is cognitively controlled, at least to some degree. Consequently, the distinction between learning and acquisition is rather a matter of degree, not of kind.
Research in L1 verbal memory has also attracted an increasing amount of interest (Wingfield & Byrnes, 1981).

Research in the L2 mental lexicon is not so abundant; there have been some important contributions, though, in this area which this study attempts to bring into focus. It is obvious that L2 lexically-oriented research focuses on more or less the same issues as the relevant L1 research. Of course, a major difference between the two disciplines lies in the fact that when more than one language is involved in a person's mental lexicon certain issues arise regarding, first, the degree to which the L2 lexicon is similar to the L1 lexicon in relation to the roles of form and meaning, and secondly, the question of separation and/or integration of the L1 and the L2 mental lexicons. The former issue is the focus of investigation in this study and an attempt will be made to shed some light in the second issue as well. It should be noted here that this study involves native speakers of Greek, a language hitherto not discussed or investigated in any detail under this particular light in the literature (see Joannopoulou, 1992).

In this study I will not go very deep into the psycholinguistic research regarding the structure of the mental lexicon or lexical access. The study addresses broad issues and it will concentrate on L2 lexical acquisition, organisation and processing in the perspective of the two aforementioned questions. However, a large part of the thesis will also investigate L1 lexical research and its implications on L2 lexical operations. The similarities and differences between L1 and L2 lexical development will also be touched
upon in the context of illuminating the way in which lexical knowledge is internalized.

To be a little more explicit about the content and the structure of this thesis, the study involves both a theoretical and an experimental part. Part I, offers the theoretical background of the thesis and is composed of the present introduction and Chapters I and II. Part 2 consists of Chapter III, which is devoted to the findings of the experiments, and Chapter IV, the concluding remarks. Two appendices follow with detailed tables of results.

More specifically, Chapter I ‘On the mental lexicon: theoretical issues’, begins with some general considerations on language, thought and reality which lead to a discussion about the definition of the word; different approaches are presented and commented upon in an effort to explore the difficulties inherent in such attempts. A section on the lexicon follows and some suggestions on the kind of lexicon items to be included in the human word store are offered. Given the importance assigned to the lexicon in language acquisition and processing this chapter finally attempts to outline the way the lexical construct relates to other aspects of language by including relevant sections on lexical semantics, lexis and grammar, lexis and phonology, collocational aspects of the lexicon and lexis and orthography.

Chapter II ‘The L2 mental lexicon: acquisition, organization and processing’ begins with the issue of L1 development and more specifically with early vocabulary acquisition. The questions touched upon relate to the phase
during which the child is trying to discover what words are, how they can be used to refer and what category of real world entities can specific words be applied to. The subsequent sections focus on the similarities and differences between L1 and L2 lexical development in respect to the syntagmatic-paradigmatic shift in the word associations of native speakers or learners. Earlier research suggested that native speakers seem to follow a shift in the type of associations they make between words in word association experiments. While children were noticed to give priority to syntagmatic links, adults seem to rely more on paradigmatic associations, thus the shift was considered to be related to age in the L1. Second language learners are supposed to follow a similar shift in their associations as their overall proficiency increases. The nature of the shift in the L1 and the L2 is examined and it is partly challenged in favour of S+derman’s (1989, 1993) theory of lexical development which suggests that the shift in response types seems to be related to proficiency in respect to particular words: a particular word will elicit different types of response (phonological or semantic [syntagmatic/paradigmatic]) at different levels of its integration into a person’s mental lexicon irrespective of the language (L1 or L2) it belongs to and of the person’s proficiency level in the particular language. The inferences drawn on the issue of similarity between L1 and L2 development are used on the subsequent discussion of the main topic of this study which deals with the semantic and phonological links between words and their respective roles in the L1 and L2 mental lexicon. More particularly, the issue is addressed of whether the roles of forms and meaning in the L2 mental lexicon are qualitatively different in respect to the
roles of form and meaning in the L1 mental lexicon. Finally, the question of
the relative interdependence or separateness of the L1 and the L2 lexicon
of a second language learner is also addressed, the focus of the study
being, however, on the former issue.

Chapter III, is concerned with the experimental part of the study. It outlines
the study’s subjects (adult advanced learners of English, native speakers of
Greek) and the methodology used, it includes two sections on the validity of
the experimental instruments employed (word association tests and C-
tests), and, finally, it presents the findings which are followed by discussion.

Chapter IV offers some concluding remarks on the discussion in the
previous chapters and a number of implications both for research and for
teaching.
CHAPTER I

On the mental lexicon: theoretical issues

This chapter deals with the domain of the lexicon seen under the way it relates to other aspects of language. Precisely which parts of language are to be assigned to the lexicon or which are to be considered lexicon-independent is not an issue that this chapter will attempt to resolve at length. However, I do include a section on the kind of items that should be part of the lexicon in an effort to delimit its domain. In this respect, I treat as lexical those areas which are self-evidently language-specific, that is those aspects of language that have to do with ‘local’ phenomena. These include the meanings of lexemes of a language, their phonological and orthographic forms, their grammatical status and the meaning relations that exist between lexemes. The chapter begins with some remarks on the relationship between language, thought and reality, that is, with how it is that people can use language to describe the world. The chapter, then, explores the issue of the definition of the word-concept by outlining and assessing different theories that have been proposed so far. Finally, the greater part of the chapter addresses the problem of establishing the limits of the lexicon by including discussion on lexical semantics, lexis and grammar, lexis and phonology, collocational aspects of the lexicon and lexis and orthography.
1.1 Language, thought and reality

1.1.1 Reference and denotation

All languages allow people to describe what they perceive in the outside world. This action of picking out objects, locations, individuals and also properties or processes is usually called referring or denoting. For example, in the phrase *Socrates was born in Athens* the word *Athens* is used to refer to or denote the city. The entity denoted, that is the city, is the referent. Generally speaking, the term ‘referent’ is used for any object or state-of-affairs in the outside world that is represented by a word or expression and the term ‘reference’ for the concept which mediates between the word or expression and the referent. In this sense the term reference is employed for what is usually called denotation. Lyons (1977: 207) makes a distinction between denotation and reference. Denotation of a lexeme is considered to be ‘the relationship that holds between that lexeme and persons, things, places, properties, processes and activities external to the language system’. Reference is the relation between a word form *in context* and something which this word form picks out either in the real or conceptual world. Basically the difference between the two terms is that denotation has to do with properties of words whereas reference is related to the action of a speaker in picking out classes of items in the world. Another difference is that reference is utterance-dependent and does not generally apply to single word-forms. The denotation of a lexeme is utterance-independent, that is, it is part of the meaning which the lexeme has in a language system, independently of its use on particular utterances. Denotation
applies only to lexemes. Lexemes do not have reference but can be used as referring expressions in particular utterances on particular occasions.

1.1.2 Reference and sense

In referential theories (e.g. theories of formal semantics which use logic in semantic analysis), meaning is a product of language being attached to reality, thus in order to provide a semantic description for a given language the linguist would need to exemplify how the expressions of the language can be grounded in reality. In its simplest form such an approach would propose that reference identifies entities in the outside world. Kempson (1977: 13) shows that such a theory would suggest that, for example, common names denote names of individuals or that verbs denote actions. Obviously, a number of problems arise from this approach. First, it deprives of meaning words like within or but for which one cannot really find a referent in the ‘real’ world. Secondly, speakers frequently use expressions that do not seem to have a referent in the outside world but which nevertheless are equipped with meaning (e.g. Spiderman does not really exist but one cannot claim that the expression does not convey meaning). Thirdly, sometimes two or more expressions share the same referent. For example, one might refer to an individual as the headmaster, my uncle or the kind old gentleman living next door. It is evident that all these expressions differ in meaning, yet they make use of the same referent. Finally, it is possible for someone to use expressions like the Prime Minister and the Head of the Cabinet but to be unaware of the fact that they refer to the same person. Consequently, meaning is more than just reference.
Sense is another important function of language. Lyons (1995: 80) defines sense ‘as the central meaning of a linguistic form, seen in conjunction to the way it relates to other linguistic items’. It is with the aid of sense that we are able to clarify cases of synonymy (expressions that have approximately the same descriptive meaning) or polysemy (expressions with different meanings which sometimes share the same form and sometimes do not).

1.1.3 Referential and representational theories of meaning
The notion of sense is important because it can be seen to place a level of mental representation between words and the real world. This view of the sense of a word behaving as a conceptual representation in a person’s mind frees the linguist from having to relate every word expression to reality but brings forward the issue of defining the notion of mental representation. Representational theories of meaning vary in the approaches they follow in order to define such a concept. A first approach was the suggestion that these mental representations are images and that these images resemble the equivalent entities in the real world. This might account for the existence of cases like the kind old gentleman living next door but would not work quite as well with common nouns as different individuals may not have common images about the same entity (e.g. their images about the entity car might be entirely different). The next step forward for a representational theory is to move from images to concepts, that is, to suggest that what is involved is not a visual image, mental though it might be, but something more abstract. However, the difficulty in defining what a concept really is still persists in the work of psychologists. Kempson
(1977: 16?17), in favour of a referential theory of meaning states that it would be pointless to build a theory of semantics on reference, if reference relies on concepts. She refers to Sapir’s³ (1949: 32) definition of the meaning of word as ‘the symbolic, linguistic counterpart of a single concept’ and claims that such a definition is problematic as ‘it does no more than substitute for the problem term meaning the equally opaque term concept’ (Kempson 1977: ibid.). However, there have been suggestions for models of concepts from proponents of representational theories of meaning who have tried to illuminate the way language reflects our conceptual structures. In this section some basic criteria for describing concepts will be presented.

1.1.4  Concepts

1.1.4.1  Necessary and sufficient conditions

A first issue in relation to the term concept is related to its form⁴. One way of describing concepts is by using a set of necessary and sufficient conditions⁵. For example, the concept man would have to contain such information which would make someone reach a decisive conclusion about

³ According to the Sapir?Whorf hypothesis the language one speaks influences one’s thought processes and the way one interprets reality. Language, then, determines thought (Sapir, 1949; Whorf, 1956).

⁴ Concepts may be lexicalized, that is, they may refer to a single word or alternatively they may refer to whole phrases. Concepts may become lexicalized once the criterion of utility is served, that is, if something is referred to often then it is lexicalized. For example, the term joyriding which refers to the phenomenon of young people stealing a car and driving around in it at high speed did not exist twenty years ago but it was coined to lexicalize the concept.

⁵ According to the traditional objectivist view of meaning all rational thought involves the manipulation of abstract symbols (i.e. words and their mental representations) and these symbols get their meaning by corresponding with entities in the external world. These symbols are considered to be internal representations of the external world. Abstract symbols are also identified which are independent of particular properties of entities. The objectivist view relies also on the notion of categories (the term concept can be also used). Entities belong in the same category if and only if they share the necessary and sufficient conditions which define the category. According to this theory all conceptual categories
whether an entity is a man or not. This information could take the form of a set of conditions, i.e.:

\[ x \text{ is a man if and only if } L. \]

where \( L \) is a set of conditions (e.g. human, adult, male etc.). These conditions are called necessary if the entity must have them to be a man. Furthermore, they are called sufficient conditions if one can identify the exact set which is enough to define a man. A first difficulty with this theory is that speakers do not seem to agree on which should and which should not be the necessary and sufficient conditions for particular concepts. Kripke’s example (1980: 119-121) about the tiger states that such a stereotype would include the information that tigers have stripes. What about the existence of tigers, though, that are entirely white? Would they be excluded from the family of tigers? Such questions raise the issue of the definition of a concept. If we cannot agree on the definition of a concept then how can we use it as a term?

Another objection to the necessary and sufficient conditions approach is Putnam’s suggestion (1975: 104) that speakers are often ignorant about the characteristics of the referent. For example, many speakers do not seem to be able to identify the characteristics of the metal silver but do, nevertheless, continue to use the word even without knowing very much about the referent. Putnam suggests that speakers engage in such
activities because they presume that there are experts in the community system who would know how to use the word correctly. This claim is related to Putnam’s natural kind theory. Natural kind terms are natural kinds of entities in the world (animals, plants, minerals but also man-made artifacts) and what characterizes them is ‘some ‘essential nature’ which the thing shares with other members of the same kind’ (*ibid*.). Since a natural kind term like silver shares properties with other members of the same category (e.g. gold) those speakers who use the term without correctly identifying its characteristics rely on the assumption that there are experts in their community who can define it correctly. Consequently, only these expert uses of a word would justify the existence of necessary and sufficient conditions, the non-scientific uses, however, would not.

### 1.1.4.2 Prototype theory

In an effort to deal with such problems arising from the necessary and sufficient conditions approach other theories of concept have been put forward. One of the most well-known ones is the prototype theory proposed by Eleanor Rosch (e.g. 1975: 198). Her model views concepts in a two-fold way: first, there are primary, central or typical members of a category (examples of categories being that of bird, clothing or carpenter’s tools) and, secondly, less typical members. For example, sparrows and canaries were found to be more typical members of the category bird than penguins or ostriches and shirts and dresses more typical in the category clothing than aprons and earmuffs. The prototype, then, is the best example of a category. Rosch carried out her experiments with students of psychology
and she was able to demonstrate experimentally that some concepts are more typical than others (or better examples) and that this is not simply related to frequency of usage or the appearance of an entity. Rosch’s findings led her to the initial conclusion that categories do not represent arbitrary divisions of the phenomena of the real world but have a cognitive basis and that prototypes play a decisive role in the formation of categories\(^6\).

Prototype theory can be useful in understanding how people deal with untypical entities of a category. For example, an untypical member of the bird category, the ostrich, can still be regarded as a bird because it shares some of the characteristics of the bird category (e.g. it has feathers).

However, distinctions between categories are not always clear cut; different degrees of typicality are involved as, for example, the categorization of colours, birds and shapes suggests. The philosopher Max Black (1949: 32) imagines a ‘chair museum’ with ‘a series of chairs differing in quality by

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\(^6\) Rosch’s work has been the basis for prototype theory and categorization in the cognitive framework which is an approach to language that is based on people’s experience of the world and on the way people perceive and conceptualize it. Cognitive linguists try to illuminate the ways in which linguistic structures reflect people’s perception and categorization of the world. The importance of metaphor in shaping languages is prevalent in the cognitive paradigm (e.g. Lakoff 1987). For example, there exist metaphors which condition a variety of expressions and which seem to be related to the way humans perceive the world (the metaphor life is a journey can be detected in a range of expressions: The baby has arrived; She sure knows where she’s going). Moreover, scientists embracing the cognitive approach attempt to analyse linguistic structures in relation to perceptual and conceptual categories like figure and ground, location in space, events and states, frames and scripts (mental models of events and real world entities) and categories and hierarchies (e.g. Ungerer & Schmid, 1996). For example, experimental psychology has shown that the mental classification of physical properties such as colours, temperature and shapes into scales (e.g. blue vs green) is structured by a system of reference points for orientation. This mental process of classification (otherwise called categorization) results in the formation of cognitive categories (e.g. the colour categories). It has been shown that cognitive categories of colours and shapes and also of concrete entities and organisms are based on the cognitive capacities of the mind and are strongly attached to conceptually important prototypes which are determining factor in the formation of categories (e.g. Labov, 1973; Rosch 1975).
least noticeable amounts’. ‘At one end of a long line? might be a Chippendale chair: at the other, a small nondescript lump of wood. Any ‘normal’ observer inspecting the series finds extreme difficulty in ‘drawing the line’ between chair and non-chair’. It seems, then, that concrete entities and natural phenomena (e.g. colours) are organised in prototype categories, their boundaries, however, being fuzzy. Labov (1973: 340-41) in a series of experiments with cups and cup-like containers investigated the fuzzy nature of category boundaries and proved experimentally that categories may merge into each other. He showed students pictures of containers and asked them to label them as cups, vases or bowls. The students agreed on some shapes but they became confused with shapes that could fit the description of both, for example, a cup and a bowl. Labov (ibid.) remarked that ‘in any kitchen, there are many containers that are obviously bowls, cups, mugs, and dishes. But there are others that might be called cups or might not; or might be a kind of cup, according to some, but a kind of dish according to others’. Labov also observed that the fuzziness of category boundaries has many aspects, one of the most important being context-dependence. For example, the students tended to describe a container as a bowl if it was full of mashed potatoes, but it became a vase if it contained flowers. Generally speaking, Labov’s work points to the fuzziness of category boundaries and also suggests that cognitive categories contain members which range on a typicality scale from good to bad examples. Rosch (1978: 40-41), however, in her later work suggests that such effects are superficial and do not point to something direct about the nature of categorization: ‘to speak about a
prototype at all is simply a convenient grammatical fiction; what is really referred to are judgements of degree of prototypicality? Prototypes do not constitute a theory of representation of categories’.

1.1.4.3 Frames, scripts and ICMs

An attempt to explain those typicality effects comes from frame theory (Fillmore 1985: 223ff.), script theory (Schank & Abelson 1977: 42ff.) and ICMs, that is, idealized cognitive models (Lakoff 1987: 68ff.), all of which belong to the cognitive framework. These theories show that there is a relationship between linguistic knowledge and encyclopaedic knowledge as speakers draw on their experience from the world to form folk cultures. Frames were first seen as ‘specific unified frameworks of knowledge, or coherent schematizations of experience’ (Fillmore, ibid.) and later on received a cognitive status: ‘cognitive structures? knowledge of which is presupposed for the concepts encoded by the words’ (Fillmore & Atkins 1992: 75). For example, a flying on the plane frame would include a pilot, a flight attendant, a safety belt, safety instructions, a meal, etc. Scripts, an extension of frames, are considered to be knowledge structures that are especially designed to describe frequently occurring event sequences. Scripts are more than just a motley collection of categories as frames are; scripts have sequential structures: For example, a flying on the plane script would include predictable temporal events in which one stage precedes another stage: going to the airport, checking in, boarding the plane, sitting down and fastening one’s seat belt, taking-off, getting a meal, landing etc. According to script theory such general prototypes for particular events
make it possible to fill in information gaps that may have been omitted by a
text on the basis of our knowledge about the world. Finally, idealized
cognitive models represent a cognitive, in essence a psychological, aspect
of the stored knowledge about a certain field. As psychological states are
basically private and personal experiences, then, descriptions of cognitive
models must be idealized and depend on the culture an individual grows up
and lives. Cognitive, then, models are very much based on cultural models,
which in turn may be seen as cognitive models that are shared by
individuals belonging to the same community. How is, then, this basic
description of these three theories related to the typicality effects of
prototypes? Lakoff (1987: 70) illustrates how these folk theories work by
means of the word *bachelor* (originally used by Fillmore, 1982). It is evident
that the word *bachelor* would not ideally describe the Pope. The reason
probably lies in the existence of two types of knowledge: linguistic
knowledge which would define the word *bachelor* as unmarried man and
general world knowledge which includes cultural knowledge about
bachelors and marriage; this second type of knowledge would be included
in a frame or ICM. The word *bachelor* would be applied in a typical
marriage frame or ICM: a monogamous marriage with two people of
marriageable age. This model would discourage the use of *bachelor* for
priests or homosexuals. This combination of linguistic knowledge and
encyclopedia knowledge is involved in the use of a word and their relation
may result in typicality effects.
So far a number of approaches has been briefly reviewed in an effort to shed some light on what concepts are. Since the focus of this study is on the lexicon it would probably be of interest to investigate the relationship between concepts and words. It was pointed out above that under the cognitive framework cognitive categories (e.g. the colour terms) are kept in the human mind as mental concepts and it is suggested that these categories are ‘signalled by the words of a language’ (Ungerer & Schmid 1996: 19). However, it is not to be assumed that there is a one-to-one relationship between categories and words. For example, the colour term red does not just denote a particular colour; reference can be made here to a specific political party. Therefore, one word may denote different categories, in other words, there is an indication here of the polysemy of certain lexical items.

This particular section will close with the issue of the relations between concepts which is related to the section on sense relations that is included in this chapter; since it is important to distinguish between the several different ways in which the meanings of words may be related it would also be of interest to investigate how concepts are linked.

1.1.4.4 Relations between concepts

The relational nature of conceptual knowledge was investigated by Rosch et al. (1976: 435ff.) once again under the cognitive framework. Three levels of generality were identified in conceptual hierarchies: a superordinate, a basic and a subordinate level. For example, in the case of vehicle, the superordinate level is vehicle, which has few characteristic attributes (e.g.
moves people and things around), the basic level would include car which has more attributes when compared to vehicle (e.g. a motor vehicle with room for a small number of passengers) and the subordinate level would include jeep (a small four-wheeled vehicle that can travel over rough ground) which has more specific attributes than the other two levels. The basic level seems to be the most cognitively important: ‘basic object categories should be the basic classifications made during perception, the first learned and first named by children, and the most codable, most coded and most necessary in the language of any people’ (Rosch et al., ibid.). The basic level offers the largest amount of correlated attributes about the objects and organisms of the world. These attributes are gathered in their most complete form in the prototype (car in the case of vehicle), thus it seems that basic level categories operate as such because they are formed like prototype categories (e.g. of all vehicles the car attracts the largest number of common attributes shared inside the category of vehicle).

However, evidence from first language acquisition has partly confirmed Rosch’s suggestion that learners acquire basic-level terms first. It is true that children learn the word cow first before animal. But children sometimes learn the more specific subordinate term first before the basic or the superordinate item. It is likely, for example, that children may learn the name of their cat first before learning the term cat and subsequently the term pet. Some evidence from second language development also shows that second language learners acquire specialised subordinate terms first than common superordinate items. Yoshida (1978: 92) refers to the case of
a 3½ year old Japanese boy learning English in the US who used terms like *submarine* and *ambulance* or *parachute* and *cliff* but he was unable to use basic-level terms for common objects like *dress* or *skirt*. One possible explanation would be that the young boy was interested in vehicles and outdoor activities and this interest led him to an early acquisition of these terms. Still, I feel that there is some vagueness in the definition of superordinate, basic and sub-basic terms. Three-level dimensions do not always work for all descriptions. Sometimes it is far from easy to decide what constitutes a basic level. For example, one might use the word *chair* as a basic-level word to describe a particular type of *seat*, and also the compound *high chair* to describe a particular type of *chair*. This classification gives us three levels. However, there is also a higher level, that of *furniture*. How can this fit in the three-level classification? Of course, one can always change levels (make *chair* a basic term for *seat* and a subordinate term for *furniture*) but, then, we would have two basic-level terms, *seat* and *chair*, in two different hierarchies. Which one would be acquired first according to the hypothesis that basic-level terms are learned first?

This difficulty in trying to make the three-level dimension work for all kinds of descriptions is not the only instance of ‘fuzziness’ in prototype theory. There is also vagueness in what constitutes the dimensions on which words are different in meaning from the prototype concept. For example, the prototypical *bird* may be a sparrow in Greece but a penguin at the South Pole. Still, the concept *bird* will include most of the features that a
Greek or an Eskimo associate with it. Both these areas, the variability of changing prototypes and the ‘fuzziness’ in the three-level dimension of conceptual hierarchies may be an interesting area for cognitive scientists but they will not be discussed in length in this study. The status of concepts, scripts and frames will be dealt with exclusively in relation to the role they have for lexical semantics in the subsequent sections of this chapter. My attention is, therefore, diverted from the nature of mental representations to the issue of word meaning and the sense relations between words in a language.

1.2 Words and word meaning
Words are the most important element in the human system of communication but it seems that while most people think they know what a word is few of us actually consider their central role in everyday communication. In the course of everyday transactions people recognize real words and reject pseudo-words in extremely short periods of time and they perform equally well in word production. But what exactly is a word? Linguists have long been tantalized by this question but the answer is by no means straightforward as there is no such thing as a simple definition. A first difficulty lies in the ambiguity of the term ‘word’. For example, a word may be seen as a form, either spoken or written, or it may also be considered as an expression combining both form and meaning. In addition, many different criteria play a role in the definition of word, something which makes its definition complicated.
1.2.1 Words as types or tokens

A first attempt to define the word concept has to do with the distinction of words as tokens or types (Lyons, 1995: 49). The following expression \textit{waste not want not} may be considered to contain either four words (\textit{waste, not, want, not}) or three words (\textit{waste, want, not}) since \textit{`not`} occurs twice. The first case is an example of words operating as tokens (actual instances of items) and the second case can be thought of as words operating as types (items which don’t have similar identities). Generally speaking, it is relatively straightforward to distinguish which sense of a ‘word’ is intended in everyday communication (e.g. it should be clear that when someone is told that a telegram costs 1,000 drs a dozen words that a reference is made to tokens and not to types).

1.2.2 Lexemes and word forms

A second distinction in relation to the definition of word is related to the difference between words behaving as forms and words behaving as expressions. In the following example \textit{I am really excited to see you are back} there are nine forms and each form behaves as a token. However, two of these words (\textit{am, are}) could be seen as different forms of the same word, therefore the sentence could be said to include seven word expressions. Consequently, a distinction is to be made between a lexeme or word expression which is considered to be an abstract unit comprised by a group of forms and eventually behaving as a separate lexical entity and the word forms which are the actual concrete instances of the word expression. It is evident that the ambiguity of the definition of the ‘word’ is
related to the level of abstraction at which people function in everyday communication. The problem of differentiating properly between word forms and word expressions in respect to what we mean by ‘word’\textsuperscript{7} accentuates the difficulty in providing a generally-agreed on definition of the word.

1.2.3 Content words and grammatical words

More difficulties in relation to what is meant by ‘word’ appear when one considers the role of semantic content in the definition of word. The distinction, for example, between content words and grammatical words presents problems in respect to such a definition. More explicitly, content words are those which are thought of being semantically distinct even out of the bounds of context (e.g. \textit{car, flower, computer}) while grammatical words are those whose meaning is not so independent out of context but have mostly a grammatical purpose (e.g. affixes or independent words like \textit{a, of, it}). However, certain grammatical words seem to carry semantic content (e.g. conjunctions like \textit{although} or prepositions like \textit{throughout}) which makes the distinction not so straightforward.

1.2.4 Orthographic and phonetic definitions of the word

Many different approaches as to the definition of ‘word’ have been proposed, their essential difference being in the various criteria used. One

\textsuperscript{7} In this dissertation the term ‘word’ will be used in the sense of lexical item (lexeme), or a unit of meaning. A lexical item can be defined as ‘a bundle of lexical entries sharing the same morphological specification and the same syntactic specification’, a lexical entry being a combination of the morphological, syntactic and semantic specification of a linguistic unit (Leech, 1974: 228). Idioms and phrasal verbs (e.g. \textit{make up}) will be considered one ‘word’ or a single lexical item because of their unpredictable meaning.
such attempt is to classify a unit as a word at the level of writing, making such an identification on the basis of it being separated by blank space from other units. This obviously would work as a rule for languages such as Greek or Italian which use writing systems but it would not be the case with languages that do not have a writing system (e.g. the languages of the Aborigines in Australia). One would have, then, to turn to the level of phonetics in order to identify the word. However, I believe that it is far from easy to distinguish individual words as distinct units during speech, as most second language learners would readily testify. One alternative approach proposed by Lyons (1968: 199-200) along this line is the definition of the word ‘as any segment of a sentence bounded by successive points at which pausing is possible’. However, it has been noticed that speakers may pause for other reasons other than to distinguish one word from the other during speech. For example, it could be for stressing the next word unit or searching for the right word. In those cases pauses may occur in the middle of the word. Even Lyons (1968:199) eventually remarks that speakers do not seem to pause between words at least during the normal flow of speech and the criterion proposed is ‘a procedural help to the linguist working with informants’.

1.2.5 Phonological definitions of the word

Phonological definitions of the word have been also proposed since there are strings of sounds which might show evidence of a separate structure within the word. For example, Ullmann (1962: 43) refers to the case of

\[\text{make up} \text{ may be one lexical item but it has several word forms: making up, makes up etc.}.\]
vowel harmony in the Finno-Ugric languages where the type of vowel in the stem of a word influences the selection of vowels in its suffixes. However, one cannot reach a conclusion about the concept of word solely on the basis of phonological characterizations since they are mostly language-specific. Another criterion that has been used for defining the word is that it is not supposed to have more than one stressed syllable. It should be pointed out, though, that certain grammatical words (e.g. if, and, but) are not usually stressed in normal speech flow.

### 1.2.6 Semantic definitions of the word

Turning now to the level of meaning a semantic definition of the word also presents problems as it has been noted that speakers of different languages assign meanings to words in very different ways. As Sapir (1949: 32) pointed out ‘it is impossible to define the word from a functional standpoint at all, for the word may be anything from the expression of a single concept ? to the expression of a complete thought’. Another semantic definition of the word as ‘the minimum meaningful unit of language’ comes from Carter (1987: 5). However, the same difficulty of assigning meanings to single words is again evident. Carter (1987:5) remarks that sometimes a single unit of meaning is carried by more than one word (e.g. bus conductor). Something that can be related to the suggestion that words are minimum meaningful units of language is the existence of tense (e.g. the ed in boiled) or bound morphemes (e.g. the s in pots) which operate as semantic units below word level.
1.2.7 Grammatical definitions of the word

A grammatical definition of the word seems more promising. Bloomfield’s definition of the word (1984: 178) as ‘a minimum free form’ stresses the distributional independence of words; a ‘word’ is a word if it can stand in isolation, if it can be a one word utterance. This definition holds for most words but leaves units like a, and the, hanging in mid-air. Such units are normally thought to be words and people write them separately as in the pony. However, they cannot be used as one word occurrences, therefore, they are not words according to Bloomfield’s definition. Bloomfield (1984: 181) is aware of the fact that his criteria cannot be strictly applied as ‘many forms lie on the borderline between bound forms and words, or between words and phrases’.

Based on Bloomfield, Lyons (1968: 202-204) uses the criteria of ‘positional mobility’ and ‘internal stability’ to define the word (see also Cruse, 1986: 35-36). Words are not fixed to particular positions in a sentence; they are positionally mobile. For example, in the following sentence the order of the elements can be altered: A pan of potatoes was boiling merrily on the gas stove can become a pan of potatoes was boiling on the gas stove merrily or merrily a pan of potatoes was boiling on the gas stove. ‘Internal stability’ indicates that the attachments between morphemes within words are firm and consistent; thus the morphemes of potatoes, boiling, merrily cannot allow permutations, therefore, *spotatoe, *ingboil, *ilymerr, cannot be considered as variants of the former words. Lyons (1968: 203-204) remarks that both ‘positional mobility’ and ‘internal stability’ could operate independently of each other. For example, there are words which are internally stable but their position in a sentence cannot be altered; the definite article is one of these
cases as it cannot be separated from the noun it modifies. The fact that only one of the criteria can be applied in some cases is an indication that these items (e.g. the definite article) do not qualify as ‘words’, at least in comparison to other items which comply to the restrictions of both criteria. Since items which are not positionally mobile seem to be almost exclusively grammatical words then the distinction between content words and grammatical words is further illuminated.

In conclusion, I believe that a grammatical definition of the word offers more possibilities for a universal characterization of its concept as it seems to be the least language-specific. In relation to orthographic and phonological characterizations they make intuitive sense but they are language-specific; Lyons (1968: 206) points out that ‘what we call words in one language may be units of a different kind from the ‘words’ of another language’. However, one should not assume that the term ‘word’ can be used in an arbitrary way across languages since it has been noticed that ‘the relevant features whereby words are established for different languages all tend to support their identification as structural units’. Finally semantic and phonetic characterizations are useful for field research but are of little value when the question of a universal definition arises.

1.3 The lexicon

The lexicon does not rely so much on the exact characterization of the ‘word’ in any particular language but it deals with that kind of linguistic knowledge which has to do with ‘local’ phenomena. These include the meanings of lexemes of a language, their phonological and orthographic forms, their grammatical status and the meaning relations that exist
between lexemes. What follows is a brief discussion on the kind of lexicon items that should be included in the lexicon together with certain important additive processes used to create new terms for meanings. It should be pointed out that the list of processes described in this section is not exhaustive. What is aimed at is a general outline of the contents of the lexicon which will serve as a springboard for the discussion on the relation of the lexicon to other aspects of language.

1.3.1 Lexicon items

A general definition of the lexicon assumes that it contains a list of all the lexemes in a language together with idiosyncratic information about them. Allan (1986: 225) specifies that the set of lexicon items to be included in the lexicon comprise all inflectional\(^8\) and derivational morphemes, all lexemes (as wholes) and all lexical stems\(^9\) (including roots). It makes intuitive sense that all non-derived (root) lexemes and inflectional morphemes (e.g. the plural morpheme -s in *dogs*) are listed in the lexicon because their meanings cannot be derived from constituent parts. On the contrary, the meanings of words consisting of a lexeme and inflectional morphemes (e.g. *dogs*) will have to be derived from the meanings of their composing items (*dog* + -s) with the help of the appropriate lexical rules. It is less clear, however, whether derived lexemes and derivational morphemes are to be included in the lexicon. It is also difficult in certain cases to establish what

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\(^8\) Inflection is variation in the form of a word. This variation depends on the grammatical context in which the word is used. Derivation is a process of constructing new words by adding affixes to already existing words.

\(^9\) A root is a minimal common form (or morpheme), which cannot stand alone and which appears in all the different forms of an individual word. A stem consists of a root plus a
constitutes a lexeme. For example, in the case of prefabricated expressions like idioms (e.g. *rain cats and dogs = rain heavily*) should they be considered as a single lexeme or depending on the number of their constituents should one assume that they consist of different lexemes? The general assumption is that formulaic language of this sort should be listed in the lexicon as a whole (along with morphemes, lexical stems and lexemes) because their meaning cannot be arrived at from the meaning of their constituent lexemes (even though in the above example of ‘rain cats and dogs’ the lexeme *rain* has a standard meaning). I will return to the issue of idioms in the section of collocation and the lexicon where collocational aspects will be explored at a greater length.

To return to the issue of derived lexemes and derivational morphemes and whether they are listed in the lexicon or not we can take an example from zero derivation, that is, the process whereby a morpheme with no corresponding morph (a zero affix) is attached to a lexeme and, thus it makes it change its lexical class. The new lexeme takes the syntactic and

\[\text{suffix; it still cannot stand alone but if an ending is added to it, then, a word form is produced.}\]

An idiom is an expression whose individual lexical items have ceased to have independent meaning (e.g. in an expression like *at sixes and sevens* (= to be uncertain and confused) not many people could assign a meaning to *sixes* or *sevens* individually). In addition, it is usually more than a single word unit and is non-substitutable. Carter (1987: 58), in relation to idioms, points to the existence of ‘different degrees of possible fixity, both syntactic and semantic’.

\[\text{It is often difficult to establish clear criteria for distinguishing between idiomatic and non-idiomatic expressions and consequently it is not easy to decide which expressions should be listed in the lexicon. For example, the idiom to pull one’s leg (= make fun of someone by deceiving him) can be passivised? in contrast to rain cats and dogs which cannot? which makes the phrase Julia had her left foot pulled a possible candidate for literal interpretation. Other polylexemic idioms have a range of different forms: for example, be/go/pass (right) above/ over one’s head (= be beyond one’s ability to understand) which make matters more complicated. In this respect, Allan (1986: 239) proposes that scholars would have to settle for a convention “declaring which figurative polylexemic expressions are idioms to be}\]
morphological characteristics of the new class (e.g. the noun shop can be changed into the verb shop as in We went shopping all day long yesterday). Based on an analysis of zero derivation Allan (1986: 222) claims that its basic characteristic is ‘the variability in the correlation between the meaning of the source lexeme and that of the derived lexeme’. In certain cases the meaning of the derived lexeme can be predicted from the meaning of the source lexeme (the noun and the verb experience are closely connected semantically-wise), but in other cases the meaning is yet from close (the noun and verb age are very distant semantically). All other three kinds of derivational morphology (prefixing, suffixing and combinations of bound\textsuperscript{12} morphemes) also exhibit such an inconsistency in the predictability of their meaning. For example, the suffix -ize is usually taken to mean ‘cause to become’. This is perfectly clear in cases such as legalize (which means ‘cause to become legal’) but not so transparent in computerize (= make suitable for feeding in a computer) or womanize (= chase women). Consequently, since derived lexemes are rather inconsistent in relation to whether their meaning can be successfully derived from the meaning of their constituents the solution would be to list every derived lexeme as a whole in the lexicon. Derivational morphemes also have to appear in the lexicon as they are needed for coining new words and also because they relate semantically many sets of words. For example, the prefix non- relates the following words with the notion of negation or ‘lack of’ (e.g. non-transitive, non-reflexive, non-verbal).

\textsuperscript{12}listed in the dictionary’. The meanings of other figurative expressions would be derived from the meanings of the constituents and contextual information.
Other kinds of lexicon items to be included in the lexicon are expressions of native origin, borrowed expressions, loan translations, blends, acronyms and abbreviations, the extensions of proper names, onomatopoeic and reduplicative expressions, conventional compounds and phrasal verbs. What follows is a brief discussion of the most important processes used for creating new lexemes.

1.3.2 Processes in word building

1.3.2.1 Compounding

Compounds are lexemes which are composed from two or more free forms (e.g. blackbird, greenhouse, mother-in-law). Their meaning is not always predictable from the meanings of their constituent items. In relation to compounds one difficulty lies in the actual definition of the term. One test has been that if stress falls on the first section of the compound then we can talk about a ‘real’ lexical compound. For example, armchair would be classified as a compound while chocolate cake which carries stress on cake would not. However, since chocolate cake can be considered to be a meaningful unit of its own one could claim that it is a compound. Another diagnostic test is that the only inflectional morphology that can be applied, for example, to a noun compound is that of noun morphology (i.e. the plural suffix: blackbird ? blackbirds, mother-in-law ? mothers-in-law).

Morphological variation within compounds is not permitted (she is a stay-at-home not * she is a stays-at-home). In addition, other lexemes cannot be placed within compounds (the compound equal opportunity employer)

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12 Bound morphemes (e.g. -ness) can never stand alone but they should always be
cannot be expanded into equal in opportunity employer). The only exception is that compounds allow expletives (e.g. the compound man-in-the-street may become man-in-the-bloody-street). The most common compounds are two nouns behaving as a unit whose meaning usually differs from that of each of its composing parts, as in footnote. However, all kinds of combinations are possible and as was pointed out beforehand, sometimes, compounds consist of several parts (e.g. second-class citizen).

Downing (1977: 841) makes a distinction between conventional compounds (those that are based on permanent, non-predictable relations of a range of semantic types like bus-stop, small talk, oil refinery, teaching profession, night owl etc.) and novel compounds (newly-coined compounds, such as fork-spoon, head-hat, butler-maid). She concludes that conventional compounds of the sort described above are listed in the lexicon as lexemes and are assigned meanings as wholes since the relationship between the component meanings of a conventional compound is considered as permanent by speakers and since they ‘often serve as ad hoc names for entities or categories deemed nameworthy’. On the other hand, novel compounds, like any other newly-coined lexeme are not listed in the lexicon as wholes, and their meanings are arrived at from the meanings of their constituent words and the context.

1.3.2.2 Clipping

Clipping is a process whereby a piece is removed from a word (e.g. bra from brassiere, pants from pantaloons, flu from influenza). Clippings are attached to at least one other morpheme within a lexeme. An instance of a combination of a bound morpheme would be abbess (consisting of abb- + -ess).
usually a characteristic of informal language. It is obvious that clippings retain the meaning from the clipped word, the only difference being in the level of formality. In respect to the lexicon if both forms are used in a language (e.g. phone and telephone) they could be listed as variants of the same lexeme.

1.3.2.3 Phrasal verbs

Phrasal verbs (e.g. give up, break down, make do with) resemble compounds with the difference that some of them are ‘discontinuous’, that is, noun phrases can be inserted between the verb and the particles (e.g. cut the tree down, chop the meat up). However, this discontinuity is severely constrained? neither the by-phrase nor the majority of adverbials can be inserted in between the verb and its particle (e.g. *The tree was cut by my father up). Therefore, phrasal verbs are to be included as wholes (verb + particle) in the lexicon.

1.3.2.4 Blending

In blending pieces of two words are combined (brunch from breakfast and lunch). Blending is usually productive, that is, it combines senses of the target words and it makes use of the context. Nevertheless, many blends such as smog (smoke plus fog) are not readily interpretable; speakers do not seem to realise that they are blends nor can they identify the source lexemes. Consequently, because of their idiomatic nature they cannot be readily derived at from the meanings of the source lexemes and should be included as wholes in the lexicon. The meanings of new blends could be
arrived at from the surrounding context and from what the hearers consider to be the source lexemes.

1.3.2.5  
**Acronyms and abbreviations**

Acronyms and abbreviations should also be listed in the lexicon. An acronym is a word created by the initial letters of a phrase and it can be pronounced as a word (e.g. *laser* from *light amplification by the stimulated emission of radiation*). On the contrary, an abbreviation must be spelled out (*CIA, BBC*). Since their meanings cannot be arrived at from the phrases of origin both acronyms and abbreviations have to be included in the lexicon.

1.3.2.6  
**Extensions of proper names**

Extensions of proper names are numerous. One category is the one where names of people are used to name things with which they are characteristically associated. For example, the word *sandwich* was named after Lord Sandwich who was the first to think of such a snack. These kinds of generalizations on proper names will have to be entered in the lexicon since they are generally unpredictable (i.e. the source is not always clear or known).

1.3.2.7  
**Borrowing and loan translations**

Borrowed words also feature in the lexicon. All languages borrow words from other languages. The motivation is usually twofold: either the borrowed word is unfamiliar to speakers of the borrowing language or although the borrowing language already has such an expression it is thought to be more prestigious if a borrowed word is used instead. For
example, after the Norman conquest of England the English adopted a large number of lexical items from French (e.g. *sovereign, religion, service*). Since the etymology of many borrowed words is not so obvious to the majority of a population borrowings usually have idiomatic meanings. In addition, in many cases the meaning of the borrowed word cannot be derived from the meaning of its constituent parts. Consequently, in those cases such lexemes would have to be listed as wholes in the lexicon. Loan translations (i.e. translated expressions from the target language: *ουρανοξύστης* is the loan translation for *skyscraper*) are also usually idiomatic and as such they have to be entered in the lexicon.

**1.3.2.8 Effects of sound on word coining**

Turning to the effects of sound on coining new words, it is not clear whether onomatopoeic words, that is, words that mimic the sounds they name (e.g. *moo, miaow* in English) need to be listed in the lexicon or are interpreted from their phonetic form and contextual information. Reduplicative words, on the other hand, (e.g. *hush-hush, ding-dong, flip-flop*) are idiomatic and should be listed in the lexicon.

In conclusion, on the basis of the above it becomes clear that the set of lexicon items in a given language includes all those expressions of that language whose meaning needs to be exemplified in a dictionary because it cannot be arrived at in any other way. When an expression is formed from more than one lexicon item its meaning is determined from the combined meanings of its constituent lexicon items. In the case when this
is not possible then one may assume that this expression constitutes a single lexicon item.

1.4 The lexicon and meaning

This section will delve into some of the ways in which lexical meaning has been discussed by linguists and will eventually point to certain implications about the concept of lexicon.

1.4.1 Mentalistic theories of meaning and structuralism

One of the first approaches to lexical meaning is that of Ogden & Ritchards (1936: 11) who derive their theory from the traditional view of language communicating meanings through concepts. According to their mentalistic theory of meaning each word is associated with a concept and each concept is the mental representation of a referent in the ‘outside’ world. An obvious problem with such a theory is that not all words can be related to a mental image and some word forms have a variety of meanings greater than one and only association. Cases, then, of polysemy are not accounted for nor are cases of synonymy, where a single meaning is associated with more than one word form. Moreover, words are not the only units carrying meaning. Meaning may also be conveyed by morphemes, as was pointed out beforehand, or by larger units such as sentences. Finally, meaning is not just reference. People not only communicate to describe persons, things, events and characteristics but also express their attitudes in relation to all the above and, in addition, context has to be taken into account, that
is, the way a word relates to other words. The connotation\textsuperscript{13}, then of a word, and its sense relations are to be taken into consideration from any theory of lexical semantics.

Structuralism stresses the role of the relationship between words in order to describe adequately the linguistic system. Lyons (1977: 231), based on the work of Ferdinand de Saussure, gives a brief account of the central line of structuralism: ‘every language is a unique relational structure?and the units which we identify?in analysing the sentence of a particular language (sounds, words, meanings, etc.) derive both their essence and their existence from their relationships with other units in the same language system’. It should be pointed out here that structural linguistics do not diminish the importance of the relationship between words and referents in the ‘real’ world (the key concept in Ogden & Ritchards theory) but they stress that this is not the only relationship to be taken into account. Words are also related to each other in various ways in the lexicon and these semantic links between words constitute an aspect of their meaning. Ferdinand de Saussure (1974: 15) showed these two relationships by means of a well-known example. He compared the English word \textit{sheep} with the French equivalent \textit{mouton}. In particular occasions they can be used to refer in a similar manner but their meaning is different since they are part of different language systems and can be used in different ways. For example, in English there exists an additional word for meat (\textit{mutton}),

\textsuperscript{13} The connotation of a word is generally thought of as the communicative value of an expression which is additional to its central, conceptual meaning. Connotation refers to ‘the real world experience one associates with an expression when one uses it or hears it’,
whereas in French the same word has to be used to convey both the meaning of animal and of meat. Consequently, the meaning of a word derives both from the physical entities it refers to and from the way it is semantically related to other words of the same language. Lyons (1977: 270ff.) gives emphasis on the meaning relations that exist between expressions and labels them sense relations\(^{14}\) (see also Cruse, 1986: 84ff.). Some of the most important sense relations will be briefly discussed below.

1.4.2 Sense relations

The meaning of a lexeme is partly derived from its relation to other lexemes in a given language. Every lexeme is connected in some way to other lexemes in a language. Two types of such links are especially evident according to structuralist thought (the original distinction was proposed by F. de Saussure, 1915). Syntagmatic (or combinatorial) links are those that exist ‘typically, though not necessarily, between expressions of different grammatical categories (e.g. between nouns and adjectives, between verbs and adverbs, etc.), which can be put together in grammatically well-formed combinations (or constructions)’ (Lyons 1995: 124.) Examples of syntagmatic relations are: e.g. happy ? child (happy child), down ? earth (down to earth) or sit ? sofa (sit on the sofa). Therefore, in this mutual association of two or more words in a construction the meaning of each word is affected by the other(s). Another kind of relation may be thus it is to be viewed as an affective or emotive part of the conceptual meaning of an expression (Leech, 1974: 12-14).

\(^{14}\) Sense relation is one of the several ways in which the meanings of words may be related (synonymy, hyponymy etc.).
substitutional (or paradigmatic). Paradigmatic links are those which exist
‘between intersubstitutable members of the same grammatical category’
(Lyons, 1995: *ibid*.: for example, *white* ? *grey* or *dove* ? *bird*). Instead of
saying *I saw a white dove* we can say *I saw a white bird* or *I saw a grey
dove* and we can use numerous other combinations. The paradigmatic
relation is one of choice. One chooses from a number of words that could
fill the same construction. These words may be semantically related as in
the previous examples or may be unrelated (e.g. *I saw a white dove* may
become *I saw strange house*). Paradigmatically related lexemes which are
semantically related can be related in various ways (e.g. one may be the
hyponym of the other as in the case of *dove*: *bird*, or they may be
incompatible with each other as in *white*: *grey*). Some of the most important
meaning relations distinguished between members of the same paradigm
are synonymy, hyponymy, incompatibility, meronymy and polysemy.

Lyons (1995: 60-65) defines synonymy in terms of reciprocal entailment,
that is if two expressions entail each other and are different only in relation
to a lexical item, then these items are synonymous: ‘John is *rich*’ entails
and is entailed by ‘John is *wealthy*’; consequently *rich* and *wealthy* are
synonyms. There is not an easy way to characterize synonyms. Cruse
(1986: 267) defines synonyms as ‘lexical items whose senses are identical
in respect of ‘central’ semantic traits, but differ, if at all, only in respect of
what we may provisionally describe as ‘minor’ or ‘peripheral’ traits’. In the
previous examples *wealthy* and *rich* do not have identical meanings but
when we say *John is rich* there is not a striking difference with *John is
wealthy nor is there a need to use rich as more appropriate than wealthy. When one pair of the synonyms is rejected as inappropriate usually the other is rejected too (unless it becomes imperative to look out for details usually due to context). In addition, synonyms are found to co-occur in expressions where clarification of the meaning of a word is required (e.g. The journalist verified, that is, checked the truth of the story). Sometimes synonyms are used in a contrasting way precisely for the purpose of highlighting the ‘minor’ differences in their meaning (e.g. He was killed, or rather, poisoned).

It is obvious that absolute synonymy is extremely rare. If the term synonymy is strictly defined (Lyons ibid.) as the relation that holds between words with identical meanings, between words that are synonymous in all contexts and which are semantically equivalent on all dimensions of meaning, then the term can hardly be applied to any pair of words in any language. Palmer (1981: 89ff.) points out that synonyms sometimes have different distributions due to a number of factors. For example, they could be part of different dialects and they may become synonyms for people using both dialects, like British English lift and American English elevator. The words could be also found in different styles of language, registers, like wife, which is more formal than missus. In addition, the synonyms may differ in connotation, in the way people attribute values to words. For example, frugal carries a positive note of approval, while stingy is negative. It is also clear that collocational restrictions may occur. Since most words have more than one meaning, synonymy is restricted to one of the
meanings of words. Thus *tough* is a synonym of *difficult* in *tough childhood*, but not in *tough luck*.

Absolute synonymy is to be seen as standing on one end of a continuum with non-synonymy at the other extreme. As it was pointed out above different degrees of synonymity may exist in between. For example, two lexical items may be propositional (or descriptive) synonyms. This is the case when a pair of lexical items are a) syntactically identical and b) when they are incapable of producing sentences with different truth conditions when substituted for each other in a sentence. (e.g. Why don’t you take the *lift*? entails and is entailed by Why don’t you take the *elevator*?). Propositional synonyms have certain semantic features in common but may differ in others. For example, two propositional synonyms may be different in respect to expressive traits (in respect to the previous examples *stingy* and *frugal* may carry the same propositional meaning but they differ in that the former carries disapproval). Expressive meaning usually carries emotion or attitude (positive or negative). It is suggested that most lexical items carry both a propositional and an expressive meaning (Lyons, 1995: 64). After all, it is true that both the expressive and the propositional meaning of a lexeme are part of a person's competence.

Hyponymy is the term used to denote a relation between more specific (hyponymous) and less specific (superordinate) items. For example, *cat* is a hyponym of *animal*. Hyponymy is a case of unilateral entailment, that is, one meaning includes the other but the opposite is not true: *I saw a cat* entails *I saw an animal* but the opposite cannot be claimed. Hyponymy is
an interesting sense-relation because superordinate terms denote classes and it would be interesting to visualize the vocabulary of a language organized in groups or subgroups of words. However, certain problems do appear: First, not all groups of related words seem to have a superordinate (e.g. there is no English vocabulary item that includes uncle and aunt), thus there are instances of lexical gaps. In respect to polysemous words one meaning may be generic and operating as a superordinate to another meaning (for e.g. man: man, woman, child). More specifically, two subcases of hyponymy can be identified: the adult?young and the male?female relation. Gaps seem to exist, once again, in these relations. For example, in the male-female relation sometimes there is a distinct general term for an animal, as in sheep: ram, ewe whereas in other cases the male name is general, as in lion: lion, lioness. An interesting characteristic of hyponymy is its hierarchical nature: one term may function as the superordinate to a number of hyponyms but at the same time it may function as a hyponym to a higher superordinate. For example, butterfly and spider are hyponyms of insect and insect can be considered to be a hyponym of animal. In this case, one may assume that the relationship is transitive so that butterfly and insect are both hyponyms of animal.

In relation to incompatibility three types of this relationship may be identified: complementarity, polar antonymy and converseness. Incompatibility can be defined in terms of negative entailment (Lyons, 1995: 128; Cruse, 93). For example, the colour terms are incompatible: Maria’s car is red entails Maria’s car is not blue or green. Regarding the three
subtypes of incompatibility, there is a relation of complementarity between two items when the assertion of one term entails the denial of the other and vice versa: Chris passed the exam entails Chris did not fail the exam or The cat is dead entails The cat is not alive. In the case of adjectives a feature of complementary items is that they are not gradable: *The cat is very dead. In contrast, polar antonyms are gradable. The relation between the items in the following pairs is that of polarity: hot/cold, young/old, big/small. All these adjectives permit intermediate positions. Consequently, the assertion of one item entails the denial of the other but the denial of the one does not necessarily guarantee the assertion of the other. Rita is poor entails Rita is not rich, while Rita is not rich does not entail that Rita is poor since one may think of an intermediate position between poor and rich (comfortable). The last subtype of incompatibility, converseness, can be defined as the relation between two expressions in sentences (different only in terms of the expressions in question) which entail the denial of each other but also entail each other after changes in the syntactic patterns of the sentences. For example, Jeannie sold a car to Tina implies the denial of Jeannie bought a car from Tina but Jeannie sold a car to Tina entails and is entailed by Tina bought a car from Jeannie. Thus sell and buy are in a relation of converseness.

Apart from synonymy, hyponymy and incompatibility other sense relations are often referred to in literature. The first one is meronymy which refers to part-whole relationships between lexical items (e.g. foot: body). Meronymy is different from hyponymy in that and I make a reference here to the
example of foot: body? a foot is part of a body not a kind of body. Phrases such as ‘feet and other kinds of body’ make no sense. It seems that part-whole relations are as diverse as hyponymy. A difference between these two sense relations is that meronymy is not always transitive. A transitive example is the following: ankle as a meronym of foot and foot of leg. Ankle is a meronym of leg because we can say for example: This boy’s leg has an injured ankle. A non-transitive example is the following: pane is a meronym of window (A window has a pane) and window of house (a house has a window) but one cannot claim that pane is a meronym of house as we cannot say A house has a pane. The difference, however, between meronymy and hyponymy is not always clear. It has been argued (Lyons, 1977: 314) that other parts of speech apart from concrete nouns may stand in a part-whole relation and in this case the distinction between the two relations is difficult. For example, abstract nouns may function both as hyponyms to a superordinate and as parts to a whole. Humility, for example, may be thought of as a kind of virtue and as part of virtue. It could, then, be suggested that both relations share common characteristics for certain types of lexical items.

A number of other sense relations similar to meronymy are also identified: member?collection and portion?mass relations. Member?collection is the ‘relationship between the word for a unit and the usual word for a collection of units’ (Saeed, 1997: 71). Examples like flock: sheep and fish: shoal belong in this category. Portion-mass is ‘the relation between a mass noun
and the usual unit of measurement or division’ (Saeed, 1997: 72). A characteristic example would be *loaf: bread*.

It must be clear from the discussion of the above sense relations that lexical fields are an important organizational factor in the lexicon. A lexical field is a group of lexemes which form part of an area of knowledge or a particular activity (e.g. the color terms or furniture items). Lexical relations seem to be more common between lexemes in the same lexical field. This is especially evident in the case of polysemy. First, a distinction has to be made between polysemy and homonymy. Homonyms are words with the same pronunciation but which differ in sense and may or may not be spelled the same. Different types of homonyms exist, the difference depending on syntax and spelling. For example, one can identify lexemes which belong to the same grammatical category and share the same spelling (e.g. *club* ‘a social organization’ and *club* ‘a heavy stick’). There are also homophones, that is, lexemes of the same grammatical category but with different spelling (e.g. *night* and *knight*). In addition, homophones with different spellings and different categories can be identified (e.g. *not* and *knot*). Finally, lexemes of different categories but with the same spelling can be found (e.g. the noun *hand* and the verb *hand*). Polysemy, on the other hand, deals with similar senses of a word that have a single phonological representation (e.g. the noun *head* can be seen to have similar meanings when we speak of the *head of a person, the head of a firm or the head of a table*). Because of the similarity in meaning polysemous words are usually listed under the same entry in dictionaries,
while homonymous words are given separate entries. There are certain criteria according to which polysemous words are assigned such an identity: firstly, the historical development and the etymology of the items and secondly, speakers’ hunches. However, there are many cases where it is difficult to distinguish whether a word belongs to the relation of homonymy or that of polysemy. For example, the adjective gay has two meanings; the first one is ‘cheerful and lively’ and the second is ‘homosexual’. The latter meaning is a recent arrival on the scene and it is derived by the former. However, one might argue that two homonyms are involved here since many speakers would intuitively think that the two senses are quite different.

Turning now to the second type of sense relations, syntagmatic relations hold between words combined with each other in a syntactic sequence. Collocations, idioms and compounds are included in this category. Collocation can be defined as the term used ‘both for the linguistic phenomenon whereby a given vocabulary item prefers the company of another item rather than that of its ‘synonyms’ because of constraints which are not on the level of syntax or conceptual meaning but on that of usage, as also for the word combinations which represent this phenomenon’ (Van Roey, 1990: 48). The combination of words of a language into a syntactic construction is governed by constraints which are a result of the selection restrictions of those words. Three kinds of selection restrictions can be identified: grammatical, semantic and usage-determined. For example, the
following combination *Anna refuses go is unacceptable because the verb is characterized by the grammatical feature /+marked infinitive/. Semantic selection restrictions may apply as well: in *The principal drank the hamburger the object hamburger is incompatible with the verb to drink which has the feature /liquid object/. Finally, usage-determined selection restrictions can also be identified: the unacceptability of *wide shoulders is not because of grammatical selection restrictions (as adjective + noun is acceptable in English) or because of semantic selection restrictions (as the conceptual meanings of wide and shoulders are compatible). The constraints in this case are restricted to usage. Native speakers of English would prefer to use the adjective broad rather than wide in combination with the noun shoulders. Certain vocabulary items can be found to occur in almost exclusive combinations: ruddy face/cheeks, rancid butter/bacon. Because of the interdependence of the two items such collocations are close to compounds (e.g. photocopy, handshake) or idioms (to kick the bucket (= to die), to catch someone in the act). However, there are differences to be found. First, the elements of compounds and idioms usually constitute one inseparable item16, something one cannot claim for close collocations (e.g. rancid or fresh butter). Secondly, the meaning of idioms and sometimes of compounds cannot be usually derived from the meaning of the individual items they include, something which does not apply to collocations (although, as will be pointed out in the next section,  

15 Selection restrictions are mechanisms which pose restrictions on the combining of pairs of lexemes in various grammatical constructions resulting from their meanings (Allan, 1986: 281ff.).  
16 For example one cannot say to kick the broom and mean ‘to die’. However, the word order of some idioms may change: to catch someone in the act may be changed into to be
there seem to exist collocations whose meaning is not interpretable in terms of the individual meanings of their constituent parts: *heavy smoker* does not denote ‘a smoker with a weight problem’).

Co-occurring words could be separated by several words, for example in the case of idioms or collocations. Examples like *loud* ≠ *clear* (*loud and clear*), and *stomach* ≠ *butterfly* (*have butterflies in one’s stomach*) can be considered to be syntagmatically related even if the words are separated. Syntagmatic sense relations form part of the collocational and colligational domain of the lexicon which will be discussed in subsequent sections.

Two important points about sense relations will be highlighted here since I believe they will be useful for later discussion. Firstly, sense relations can be seen as existing not only between individual words but also between words and multi-word units: ‘One might well say, for example, that the phrase *female fox* and *male duck* are synonymous with the lexical items *vixen* and *drake*, respectively’ (Lyons, 1968: 451). Sense-relations may also exist between two or more multi-word units: *to go through the roof*, *to hit the ceiling* and *to fly off the handle* are synonymous in the way synonymy was defined above.

The second important point has to do with the defining role of context in respect to sense relations. It is obvious that utterances identical in form receive different meaning when used in different contexts. Listeners are

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*caught in the act.* Other idioms resist change: *to kick the bucket* cannot become *the bucket was kicked.*
able to distinguish the meaning of such utterances just by keeping the relevant context in mind. For example, the utterance *the eye was watching me* could have at least two different interpretations: It could be the eye of a camera filming someone or a private eye tailing a person. These two points that characterize sense relations will be discussed later on in this chapter.

1.4.3 Semantic feature analysis

Certain linguists (e.g. Katz & Fodor 1963) have attempted to broaden the scope of structural semantics by trying to explain sense relations between words in relation to ‘components’ of meaning. Componential or semantic feature analysis has as its primary goal to find those features\(^\text{17}\) of a word that are distinctive, that have consequences for the grammar of a language and that clarify the various senses of the word. For example, in a male-female lexical relation *stallion* may be analysed as [+horse, ?female, +adult] and *mare* as [+horse, +female, +adult]. This theory has been very useful in clarifying polysemy. For example Katz & Fodor (1963: 186) chose the polysemous word *bachelor* (denoting an unmarried man, a graduate with a B. A. degree, a sea animal etc.) and diagrammed the features needed (e.g. +human, +male etc.) in an attempt to account for its different meanings.

Componential analysis has been criticized over the years (e.g. Lyons, 1977: 318ff.) A first issue has to do with the identification of semantic features. Fodor (1970: 430) claims that the identification of semantic features is equivalent to the necessary and sufficient conditions approach to defining concepts and, subsequently, word meaning. As we have already
seen, it is very difficult to end up with a generally agreed on definition of word meaning. Consequently, it becomes increasingly difficult to find a set of semantic features which is universally valid. A second issue is related to whether these features are psychologically real, that is, whether they are part of our cognitive structure. Fodor et al. (1975: 512) claim that the psychological reality of semantic features cannot be verified experimentally and that people appear to handle words as single atoms of meaning and do not compose words out of semantic components. This claim has been answered by componentialists (e.g. Jackendoff, 1990: 37ff.) who suggest that it is words that are actually responsible for processing and not features. This is the reason why semantic features are grouped into word units: because these groupings are cognitively useful. I would like to point out here that further evidence for the importance of semantic features comes from the area of language acquisition. There is developmental evidence that learners rely on semantic features in processing the meanings of words and in assigning words to referents. For example, in a study of his bilingual child, Leopold (1939, cit. in Hatch & Brown 1995: 17) noticed her use of wau-wau for dog. The child, then, used the [+furry] feature of texture to use wau-wau for furry slippers and for someone wearing a furry coat. It has been noticed that such overextensions¹⁸ are usually related to perceptual qualities of size, shape, sound, taste, movement, and texture (E. Clark, 1993: 34). Consequently, one may argue

¹⁷ According to the componential analysis theory the meaning of a word can be broken up into a limited number of features or components, each with a value (e.g. plus for present, minus for absent).
¹⁸ Overextensions take place when a child uses ‘a semantic’ feature to generalize to other entities. For example, a child might refer to a cow or a dog as a bird, simply because all three can move.
that there is considerable evidence of the importance of features in the acquisition of words.

Classic componential feature analysis has also been attacked for the unsystematic and subjective use of labels to identify word meaning. Critics of this theory (e.g. Saeed 1997: 260) claim that ‘attaching a set of primitives to a word or phrase is not a semantic analysis in the deepest sense’ and that the labelling of the features is at best an arbitrary language which is not grounded to reality. One of the theories that tries to detach itself from such arbitrary metalanguages and to construct an analysis based on physical experiences is that of cognitive theory, certain aspects of which were dealt with earlier on.

Finally, another problem in respect to componential analysis is the difficulty with the use of features in the metaphorical interpretation of words. For example, how can an analysis such as [-human, +male, +adult] be correlated with the utterance he is a real pig which might be used to refer to someone’s greed or unkindness? The notion of metaphor\(^{19}\) and contextual effects were more successfully dealt with by other theoretical frameworks (e.g. Lakoff 1987: 380ff.). Generally speaking, componential analysis has been useful in clarifying polysemy and since it is based on a structural

\(^{19}\) It has been established that metaphorical processes are as important as literal reference in semantics. Since componential analysis hides the pervasive nature of metaphor other models have been proposed which reveal the role of metaphor as a cognitive and social semantic process. Lakoff (1987: 380ff.) notes that we often talk about abstract concepts using terms restricted to more concrete objects (e.g. we may talk about ideas as though they were food: *cook up an idea*). Metaphor is universal, that is, it is common in all languages and dialects and it appears not only in everyday language but in literature as well. Lakoff has demonstrated in his experiments that metaphor is both a perceptually based system and a socially based system.
notion of sense it is not incompatible with approaches to structural semantics.

1.4.4 Semantic field analysis

Semantic feature analysis has been extended in descriptions of semantic fields. Semantic field analysis uses features to identify the relationship of words within a field. For example, the word *iron* would be included in the household appliances field together with *coffeemaker, toaster* and *mixer* or, alternatively, it could be included in the metal field together with *steel* and *copper*. Polysemy here is not really an issue as in semantic feature analysis since each field is studied separately. Field analysis has been extremely useful to anthropologists in their effort to understand kinship terms. As semantic field analysis uses feature criteria in an attempt to associate items within a given semantic field it is obvious that it is burdened with the problems discussed above in relation to semantic feature analysis. However, the importance of semantic field analysis is not to be undermined since research in this area has yielded interesting findings. More specifically, the field analyst Lehrer (1983: 108) analysed the vocabulary of wine, first, by listing the relevant terms for the field and, secondly, by further dividing the field into related domains. In her investigation of the way people talk about the wine she found that people used a wide range of terms which could be bunched into a series of domains relevant to taste (e.g. age, body, acidity, balance, smell etc.). Moreover, terms showing an

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20 Kinship terms are a system of terms available in a language for describing relations between relatives. Such a terminology varies widely among languages but most kinsip terms can be analysed with a few primitive features: [male], [female], [parent], [offspring], [sibling], [spouse].
evaluation were identified, including those of high praise (elegant, fine), low praise (simple), mildly derogatory (bland) and highly derogatory (awful).

Lehrer’s work is interesting because by analysing conversational data she showed how these terms were negotiated in interactions; thus she tried not only to reveal the structure of the semantic field but also to identify the semantic relations between the terms used. Another attempt to describe in a different way the semantic relations in a field comes from Lewandowska-Tomaszczyk (1990, cit. in Hatch & Brown 1995: 44) who uses a system including three criteria to describe the characteristics that distinguish meanings. The three conditions that have to be met are that of necessity, centrality and typicality. For example, the separation of meanings for the terms included in the furniture field would look like the following analysis:

**Necessary condition:** artifact

**Central condition:** [function] for people to sit on, keep things in, etc.

**Typical condition:** HAVE [surface]

- to sit on = stool, chair
- to lie on = bed
- to sit or lie on = couch
- to put things on = table, desk

HAVE [container] to keep things in

- with shelves for books = bookcases
- with rod or hooks for clothes = wardrobe

The above attempts go beyond classic semantic field analysis to the relation of terms within a field. Still, I feel that prototype theory (e.g. Rosch 1978) would probably be a greater help than componential analysis at
clarifying situations where a pig (as in the previous example *he is a real pig*) may be human.

Having now gone through some interesting aspects of the development of lexical semantics I will divert my attention to their implications about the nature of the lexicon. A first point is related to the discussion of word meaning. It seems that lexical meaning is no different from other language domains in being a function of the group of interrelationships between the relevant units. The meaning of a word seems to be partly defined by the relations it holds with other words in a given language. One might infer, then, that we cannot really deal in a satisfactory way with the meaning of a lexical unit without having access to the ways this unit is related semantically to other units. A second point of interest has to do with the range of sense relations. It was pointed out that sense relations are not restricted to relating semantically single lexical items but they also hold between words and multi-word lexical units and also between groups of multi-word units. This is a clear implication that the lexicon is not simply a listing of single items but must include a wide range of combinations of words. A third point to be made involves the role of context in the definition of sense relations. The influence of context on meaning is one of the most primary factors in the issue of describing semantic relations between lexical expressions in the best way possible. The inference drawn is that the lexicon is context-sensitive and it is more successful in treating the meaning of individual lexical items when they are surrounded by context.
1.5 Grammar and the lexicon

This section will deal mainly with the phenomenon of colligation which used to refer to the ‘specifically grammatical relations along the syntagm’ (Carter, 1987: 56). Colligation has been used to describe a number of relationships – the relationship between a verb and a complement construction (e.g. agree to + infinitive) or the relationship between an adjective and a preposition (e.g. aghast at). However, in recent years the separation of grammar and lexicon is not considered to be as straightforward as it used to, something which had as a result a constant re-evaluation of the types of phenomena which ‘belong’ in the two domains.

A first illustration of the interaction between lexicon and grammar comes from the area of lexicography. It is well-known that conventional dictionaries are limited in relation to the mental lexicon both in terms of organization and content. Nevertheless, the dictionary metaphor is still used to refer to the mental lexical construct, despite the obvious fact that the differences between words in books and words in the mind are great. However, it would be interesting to see how lexicographers treat lexis and grammar in the contents of a dictionary and where they draw the line (if they do) between the two domains. Dictionaries are supposed to offer mostly lexical information to the reader, still, everyone can attest that they actually provide much more than that. Here follows an example taken from the Longman Dictionary of Contemporary English (1978: 576):

injure / / v.trans. 1 to hurt (a living thing): She was injured badly in the accident 2 to offend: I hope I didn’t injure (her feelings)
USAGE One can be *slightly/badly/seriously injured* – see WOUND

It is evident from this example that together with phonological and orthographic information about *injure* and its most frequent senses, this entry offers information about its grammatical status and subcategorization (v. trans. = transitive verb), its complement (noun phrase) and some possible collocates (*injure one’s feelings, seriously injured*). The role of the grammatical information is to make it easier for the user of the dictionary to use this lexical item together with other words and to enable him\(^2\) to reject as ungrammatical combinations that violate the restrictions imposed by the information in the entry.

Lexicographers (e.g. Carter 1987: 128ff.) have consumed a lot of time and thought in order to find the best way to specify accurately and unambiguously such grammatical information in dictionary entries, a fact which stresses the difficulty in drawing the borderline between lexical and grammatical information. This is particularly evident from research in computational lexicography. Gross (1991: 107ff.), for example, is working on electronic lexicons of French which will be used by computer programs for machine translation and the exploitation of data banks. Obviously, the putting together of such lexicons would involve certain difficulties: the level of coherence, for example, would have to be high since the lexicons would have to perform independently of native speakers and their intuitions about the particular words selected or the grammaticality or not of the generated
phrases, not to mention the actual recognition or the deciphering of a word. One of the major problems Gross had to deal with was the separation of lexical and grammatical information as it was found that the comprehension of the meaning of a sentence relies heavily on lexical information because a given syntactic structure does not produce only one kind of syntactic-semantic operation. Two of the examples he uses to illustrate this point are:

Luc a avoué ce vol à Guy. The self-evident interpretation here is
('Luc confessed this theft to Guy.') that Luc is the agent of the theft.

Luc a attribué ce vol à Guy. The interpretation here is that Guy is
('Luc attributed this theft to Guy.') ? or may be ? the agent of the theft.

This difficulty in distinguishing between lexical and grammatical phenomena has been also attested from theoretical linguists. For example, passivization which was handled as a syntactic transformation under the early framework of transformational-generative\textsuperscript{22} grammar (Chomsky, 1957), was subsequently considered to operate within the lexicon through a set of restructuring rules (Radford, 1981: 136ff.). In addition, the 'Projection Principle' which operated within the 'Government-and-Binding'\textsuperscript{23} version of

\textsuperscript{21} Throughout this dissertation he, his and him will be used as neutral pronouns referring to both male and female learners, subjects, researchers and so on. Whenever she, her and hers are used, reference is made to a specific female person.

\textsuperscript{22} Transformational-generative grammar is a particular type of grammar introduced by Chomsky (1965). One of its basic principles is that a sentence has more than one level of structure. In addition to the surface structure (the obvious one) there is also a deep structure which may be different. What is crucial in this theory is that certain generalizations about the structure of sentences may be arrived at more easily in terms of deep structures (which are more abstract) than surface ones. Furthermore, it is easier to pinpoint the meaning of a sentence from its deep structure.

\textsuperscript{23} The Government-and-Binding theory (GB) is a descendant of transformational grammar proposed by Chomsky (1981). According to GB the grammars of all languages are included in a universal grammar and there is a group of universal principles which apply with equal force to every specific grammar. In addition, within the framework of universal
the Chomskyan framework involved the projection of the properties of lexical entries on the syntax of the sentence. Cook (1988: 11) remarks that ‘the lexicon is not a separate issue, a list of words and meanings; it plays a dynamic and necessary part in the syntax. The knowledge of how the verb like behaves is inseparable from the knowledge of syntax? GB does not segregate syntactic and lexical phenomena’. It might, therefore, be assumed that a lot of language phenomena which were handled as syntactical phenomena from earlier models are now dealt as idiosyncrasies of lexical items. Indeed, Chomsky in his ‘Minimalist Programme’24 (1995, cit. in Cook & Newson, 1996: 319) advocates the view that the aim of language acquisition resides mostly in determining lexical idiosyncrasies. He claims that the process of forming structures has as its initial point the lexicon since lexical elements seem to play a decisive role in the fixing of the content of a given expression. Generally speaking, it seems that contemporary syntactic theories are slowly converging on the notion that sentence structure can be predictable mostly from word meaning.

The blurring between lexical and grammatical knowledge has also been noticed by psycholinguists. Garman (1990: 161) reports that, in relation to slips of the tongue, grammatical class is of prime importance in lexical retrieval. Examples such as No ? I’m amphibian (ambidextrous) or it doesn’t sympathise (synthesise) it show that the grammatical class of both the error and the target word tend to be the same. In addition, evidence

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24 The minimalist programme is a progression of the GB theory (Chomsky, 1993) which aims at reducing the grammar to its minimum.
from brain-damaged patients shows that certain grammatical categories are stronger than others for aphasic patients. An excerpt from an aphasic patient’s description of a picture known as the ‘cookie theft picture’ illustrates the point: ‘cookies ? can ? candy ? cookies cookies ? he ? down ? That’s all. Girl ? slipping water ? water ? and it hurts ? much to do’ (Obler & Gjerlow 1999: 41). Nouns are the most common words here; verbs also occur but less frequently. This can be taken as an indication that links between words of a particular word class are strong. This suggestion is also corroborated from word-association experiments which show that the most common responses that adults produce in respect to a given stimulus are of the same word class as the stimulus (Meara, 1982: 30).

Second language research points also to the difficulty into fully distinguishing between lexis and grammar. Little (1994: 114) is a proponent of a lexical approach to pedagogical grammar25 and he is of the opinion that ‘the largest part of language learning is the learning of words and their properties, and therefore that pedagogical grammar should be inseparable from vocabulary learning/teaching’. This suggestion that the greatest part of language acquisition is the learning of words is corroborated by theoretical linguists, such as Radford (1990: 243) whose work on a substantial corpus of children’s spontaneous utterances led him to the conclusion that children’s earliest structures are basically lexical and thematic: ‘Early child grammars of English are characterized by the acquisition of lexical category

25 The term pedagogical grammar usually refers to the kind of grammatical analysis and instruction designed for the needs of second language learners.
systems (nouns, verbs, adjectives, prepositions and their projections) and their associated grammatical properties, and by the nonacquisition of functional category systems (determiners, auxiliaries, complementizers and their properties) and their associated grammatical properties’.

On the whole, it seems that a number of phenomena which were in earlier decades characterized as having no particular lexical affiliations are now considered to be lexically-driven. Still, there are linguistic phenomena that are lexically-independent like that of structure dependency26. Consequently, it may be logical to assume that whether or not one complies with the suggestions of Chomsky about ‘Universal Grammar’, there may always be certain language domains that remain outside the lexical aspects of particular languages.

1.6 Collocation and the lexicon

It is evident from the above discussion that the lexicon covers a range of grammatical phenomena. It must also be clear from the discussion of the section devoted to the lexicon that a large number of items included in the lexical construct are multi-word items (e.g. idioms, compounds). If this is so, then the lexicon must include collocational aspects, that is, the phenomena whereby individual words operate in a lexical environment of other words. These patterns of co-occurrence can be grammatical, in that they may be derived from syntactic dependencies (e.g. consent to + infinitive) or they may be lexical, in that, the patterns derive from the fact

26 Structure dependency is a universal grammatical principle which ‘asserts that knowledge of language relies on the structural relationships in the sentence rather than on the sequence of words’ (Cook & Newson 1996: 4)
that certain lexical items will ‘keep company’ with each other in a linguistic environment. However, it should be pointed out that there cannot be a clear-cut division between these two types of collocation as the following discussion illustrates.

Native speakers and learners frequently have to deal with compounds that cannot always be interpreted in relation to their constituent parts (e.g. greenhouse does not necessarily refer to a green house). Indeed, Palmer (1971: 45) remarks that such difficulties are also evident in combinations of lexical items that cannot be really termed as compounds. For example, heavy smoker does not normally refer to a ‘smoker who is heavy’, nor a criminal lawyer to a ‘lawyer who has problems with the law’, nor the right person to a ‘person who is right’. Obviously, these are examples of adjectives which when used attributively have different meanings than when used in a predicative position. This grammatical ambiguity is related to the blurring between lexis and grammar but the different meanings of the above examples cannot be readily attributed to the position the adjective holds in a sentence. It is, after all, clear that heavy bag denotes ‘a bag that is heavy’, just as a criminal act ‘an act that is criminal’. The meanings of heavy smoker and criminal lawyer are less straightforward and can be explicated in terms of the interrelationship of the particular words.

The meanings, then, of two or more units combined together may or may not be arrived at from the individual meanings of the particular units. Nevertheless, the collocations of a particular word together with the meanings that may be assigned to its different environments need to be
considered as important elements in the word’s lexical status. In the
previous section it was shown that lexicographers tend to include in the
entries of dictionaries increasingly more grammatical information about a
lexical item and this phenomenon was presented as one of the arguments
in favour of an intermingling of lexis and grammar. It was also stressed that
there are profound differences between dictionaries and the mental lexicon.
Lexicographers have also taken an active interest in collocations as almost
any dictionary would demonstrate. Collocational patterns offer a lot of
information on lexical meaning and usage and contemporary dictionaries
seem to make the most of it. This is the reason for including here a section
on the work of lexicographers with the hope that it will illuminate the lexical
landscape together with the findings from psycholinguistics that follow.

The COBUILD project (Sinclair 1991: 1ff.) is based on a vast corpus of
authentic English data with the aim of producing dictionaries which form the
definitions of the entries based mostly on the collocational patterns
between words. The following COBUILD entry (1995: 1296) shows that its
meaning is derived from the collocations in which this word co-occurs with
in the data:

\[
\text{preparatory} / \quad / \text{ADJ}
\]

1 Preparatory actions are done before doing something else as a form of
preparation or as an introduction; a formal use. At least a year’s
preparatory work will be necessary before building can start. ? preparatory
talks for this week’s summit in the Maldive islands.

This interest in collocations is also apparent in the work of Carter (1987:
47ff.) who remarks that words may have different ranges in terms of
collocability. For example, items which refer to food qualities have usually restricted ranges (e.g. *addled* is restricted only to *eggs*, while *putrid* to *fish*). On the other hand, there are some evaluative adjectives which can collocate in a much greater range and are interchangeable when compared to *addled* and *putrid* (e.g. *awful* food, *film*, *dress* etc., *fantastic* food, *weather*, *performance* etc.). Finally, there are words which have a wide range of collocations but only in certain structures. For example, the words *mild* and *gentle* can collocate with *voice*, *breeze* and *soap* but each word has its own fixed collocations: *mild beer*, *gentle slope* etc. In addition, Carter suggests that combinations of lexical items can be more or less restricted syntactically and also their meaning may range from semantically transparent to semantically opaque. For example, one cannot decipher the meaning of the phrase to *smell a rat* (= become suspicious that something is wrong) only by reference to the meanings of *smell* and *rat* as separate items. This phrase is 'semi-fixed', that is, it imposes constraints to syntactic alterations (we cannot say *a rat was smelt*) and its meaning cannot be inferred to from the meanings of its constituent items. However, not all idioms are fixed as this one as was pointed out in the previous section of lexis and meaning (e.g. *he broke my heart* can be modified in terms of passivization ? *my heart was broken*? or be morphologically altered ? *broken-hearted*).

A lot of emphasis has been placed in the last decades on 'creativity' in respect to language use. Chomsky (1972: 100) suggested that mastery of a language shows that 'one is able to understand an indefinite number of
expressions that are new to one’s experience? and one is able, with greater or less facility, to produce such expressions? despite their novelty’. This ‘creativity’ of language is of course evident in all facets of human linguistic behaviour but one should not assume that language production is always ‘creative’. There is a vast number of fixed expressions that have various shapes and sizes and varying degrees of semantic opacity and fixity. For example, *a stitch in time saves nine* is a fixed proverb that cannot be syntactically divisible and is semantically opaque, *how do you do* is a cliché phrase that is semantically transparent and also syntactically and morphologically fixed, and *nice to see you* is both semantically transparent and it allows flexibility in its syntactic structure. The existence of such prefabricated expressions led Cowie (1988: 136) to the conclusion that we should regard ‘stability of various kinds as an omnipresent feature of normal vocabulary use’. His suggestion is corroborated from psycholinguistic studies (Peters 1983: 86) which show that the piecing together of such expressions facilitate enormously language production. Peters (*ibid.*) claims that ordinary conversation is almost entirely the product of ‘institutionalized’ phrases (e.g. *a little while ago, down with the king*) which are syntactically divisible but because of their frequency in everyday conversation they are stored and subsequently produced as a individual unit. It must be clear, then, that if we adopt such a view, lexical acquisition may involve the internalising of complete collocational combinations of items, which further means that lexis and syntax will eventually merge into a continuum which will range from complete creativity to complete prefabrication.
Sinclair (1991: 137) is also a proponent of such a view and he stresses the importance of prefabricated items in a given language which constitute for him an indication of the interrelation between grammatical and lexical choice: ‘In fact, it may well be argued on the basis of the work in this book (i.e. the COBUILD project) that when we have thoroughly pursued the patterns of co-occurrence of lexical choices there will be little or no need for a separate residual grammar or lexicon’.

In conclusion, it seems that there is evidence from work in lexicography, and psycholinguistics which points to the blurring of the distinction between lexis and grammar, something which was also suggested in the previous section. I believe that adequate data were presented in favour of the view that the wide ranges of collocations that are established between words together with the semantic interpretations they offer play a salient role in the lexicon.

At this point I would like to point out that theoretically it might be possible for any lexical item to co-occur with any other lexical item. Obviously, there would have to be higher and lower probability of occurrence in respect to whether lexical items can be seen to belong or not to the same lexical set. For example, one would expect the word rain to have high probability of co-occurrence with autumn, cold, weather etc. but a low probability of co-occurrence with clock, computer or pencil. These probabilistic criteria in relation to collocational behaviour have raised a number of methodological issues. The first one is related to the maximum distance that should be allowed between two items that are supposed to be in a collocational
relation. The solution proposed by Sinclair (1966: 415ff.) is somewhat arbitrary as it restricts the collocating items to a span of a number of words on either side of the node (the item whose collocations are under study). Sinclair eventually fixed a span of four words on either side of the node. This suggestion, however, would not, in the following quotation, allow for the words camel and needle to belong to the same collocational environment: ‘And again I say unto you, it is easier for a camel to go through the eye of a needle, than for a rich man to enter into the kingdom of God’ (authorised version of the Bible, Matthew 19; 24). For collocational patterns to be predictable one would have to explore semantic sets of words drawn from a naturally occurring corpus. Sinclair’s more recent work on the COBUILD project (1991: 42ff.) has made it possible to illustrate predominant collocational and also colligational patterns existing in text. Such a data base would be extremely useful in frequency counts for language learning materials and the design of lexicons with field-specific semantic sets.

1.7 The lexicon and phonology

This section will deal with the extent to which lexical and phonological phenomena interact with each other. So far it was shown that choices of a lexical kind have substantial impact on syntax but it would seem to be the case that lexical choice does not so readily influence phonological operations. However, there does seem to be evidence of a certain kind of interaction between lexis and phonology.
The theory of lexical diffusion (e.g. Hudson 1980: 168-69), that is, ‘the theory that a diachronic sound-change may spread gradually through the lexicon, rather than affecting all the relevant words at the same time and to the same extent’ can be seen to lend support to the existence of a part of phonology which is lexically determined. This theory, then, would cover cases of associations between particular sets of lexical items and specific sound probabilities. For example, the probability of a particular sound that occurs in a word may vary in relation to what that word is and may not depend on the general phonological properties of the word. A specific example comes from fieldwork on Belfast English (Maclean, 1976; Milroy, 1978 cit. in Hudson ibid.). In Belfast one of the variables\(^\text{27}\) is the vowel in such words as pull, put, took and could which varies between [ ] (as in cut) and [ ] (close to put). From the analysis of data collected by Milroy there was evidence of the vowel shifting towards [ ] but it was noticed that this shift affected different lexical items to different degrees: three-quarters of the sample of the speakers pronounced pull as [ ] while only one quarter of the subjects used [ ] for the word should. Consequently, it is possible that the use of a sound may be lexically influenced rather than attributed to general phonological differences between words. On the whole, it would seem that although lexical choice has, quantitatively speaking, more impact on syntactic operations it would not be unwise to suggest, based on the evidence presented above, that, in qualitative terms there is a certain interrelationship between lexis and phonology.

\(^{27}\text{Variables are ‘elements which are known in advance to have different realisations, such as words which have more than one pronunciation (house with or without [h], either starting with [i:] or with [ai] and so on’ (Hudson, 1980: 139).}\)
1.8 **Lexis and orthography**

The relation between lexis and orthography may well be represented by the example of the logographic writing system of the Chinese language. It is obvious that in this case lexical choice is inextricably connected to orthographic choice. For example, there is a character for the word *huo* ‘fire’ and another character for the word *che* ‘vehicle’, but the word for ‘train’ *huoche*, is represented with a combination of these two characters (Trask, 1999: 346). Therefore, an individual word does not always have a single character. Still, the relationship between the lexicon and orthography is well substantiated in the case of the logographic system.

With other types of writing systems (e.g. syllabaries and alphabetic systems) the relationship is not so clear but there are connections to be found. A first and obvious one is that the selection of a word will specify the selection of the symbols or letters. A second, and more subtle, involves the association of specific lexical items with particular domains of a writing system.

An illustration of this point is the case of the letter *c* in German which, when used alone and not in the consonant clusters *ck* and *ch*, it is almost exclusively related to foreign borrowed words. Berger *et al.* (1985: 160) remark that *c* is used in the orthography of foreign words such as *Caf?*, *Comics*, *Copyright*, *Cornflakes*, *Annonce*, *Service* etc.; native speakers also tend to pronounce such words differently from German words. However,
when such words are increasingly used in everyday communication they
tend to become more like native ones in spelling and pronunciation (e.g. 
*Copie* was succeeded by *Kopie* and *Penicillin* by *Penizillin*). There are
however instances where *c* is retained, especially in cases where it is a
marketing effort on the part of advertisers who try to give to their product a
more prestigious foreign style (*Cigaretten* rather than *Zigaretten*). The fact
that there is such a trend constitutes strong evidence for the association of
specific lexical items, in this case foreign words, with a particular letter.
Consequently, orthography may be influenced by lexical choice.

### 1.9 Conclusion

One possible question that may arise from the above discussion is how
closely should the lexicon be delimited. It was pointed out that a number of
phenomena that were, no more than a couple of decades ago, treated as
standing outside the bounds of the lexicon are now considered to be lexical
in nature. Still, it was also stressed that there are linguistic phenomena, like
structure dependency, that do not fall into the realms of the lexicon. It is
possible that one may always identify certain parts of language that cannot
be described with reference to lexical aspects of particular languages.

With regard to which aspects of language are part of the lexicon it was
pointed out that mostly ‘local’ phenomena are to be treated as lexical:
forms and meanings of words, certain aspects of colligation (e.g. verb
complementation), collocational phenomena. Overall, what I have tried to

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28 A syllabary provides a separate symbol for every distinct syllable in a language and it
works well with a language that has a small number of distinct syllables. Japanese uses
such a system.
show in this chapter is that the lexicon is not to be dissociated from all other linguistic or psycholinguistic domains. Strict separation between syntax, morphology and the lexicon cannot be easily maintained as the sections on the lexicon and lexicon and grammar illustrated. It was also shown that the lexicon includes an impressive amount of multi-word items and patterns; that it includes sense-relations which involve, apart from single words, also units larger than individual words; that context plays an important role in the lexicon; and that, finally, the phonological and orthographic aspects of language can be affected by lexical choice.
CHAPTER II

The L2 mental lexicon: acquisition, organization and processing

The mental lexicon, as we have seen, can be defined as a flexible store containing the set of lexicon items we have in our mind together with information relevant to these items. So far we have been dealing with the issue of establishing the domain of the lexicon, seen in accordance to the way it relates to other aspects of language. In this chapter we will look at L1 and L2 lexical acquisition, organization and processing; the focus will be mostly on L2-based lexical research. It is obvious that although research in the L2 mental lexicon deals with the same issues as L1-based lexical research, that is the way different dimensions of lexical acquisition, organization and processing interact with each other, matters become a little more complicated by the fact that more than one language is involved.

Discussion of research in this chapter will revolve around the following question: How do we acquire, store and process our lexical knowledge when an L2 is involved? Two points which are of great interest regarding the relationship between the L1 and the L2 mental lexicon are going to be dealt with in detail: the first one deals with the semantic and phonological links between words and their respective roles in the L1 and L2 mental lexicon. More particularly, it addresses the issue of whether the roles of form and meaning in the L2 mental lexicon are qualitatively different from their roles in the L1 mental lexicon. Discussion around this issue will provide the theoretical basis for the empirical part of this study where the
experimental findings will be called to shed some light on the issue. The second point addresses the question of whether the mental lexicon of a second language learner develops and functions separately or in an integrated way with the mental lexicon of a native speaker. However, I think it is necessary before I begin the discussion on these two points to give some insights on the issue of L1 and L2 development as I believe it will be useful for the subsequent discussion on the differences and/or similarities between the L1 and the L2 mental lexicon.

2.1 L1 lexical development following the beginning of word production

The first section gives a brief account of work on early vocabulary acquisition in a first language (L1). More specifically the issues to be treated here refer to the phase during which the child is trying to discover the nature of words, how they can be used to refer and what category of objects can specific words be applied to.

There seems to be great variation in the number of words children produce at the onset of their word production. Some children use only a few words before the age of 18 months while others start using words when they are under 1 years of age and by the time they reach their fifteenth month they can produce 30 different words (M. Harris, 1992: 70). Such variation is attributed to individual differences in the comprehension of words before children begin to produce words.

Another factor relevant to such variation is also variation, that is, individual differences from child to child, in the degree of efficiency of phonological
short-term memory in the creation of accurate memory representations for lexical forms that children encounter. Gathercole and Baddeley (1989: 211) were able to prove experimentally that short-term memory plays a role in the acquisition of vocabulary by young children: ‘Indeed the process of acquiring a new word for a child must involve at least in the initial stages the phonological representation of an unfamiliar spoken form’. Consequently, it wouldn’t be very far fetched to assume that children’s’ individual differences in phonological memory are a factor which contributes to the variation in their language production. Finally, I suppose that another more obvious factor that would be involved in the variation of language production is the amount of time and input the children receive from their parents.

In respect to how children apply their first words Clark (1993: 34) reveals the importance of the role of perceptual information in a child’s semantic representation of lexical items. Following semantic feature analysis Clark stresses the fact that words possess a set of semantic features but children initially come to grips with meaning by assigning meaning to what they perceive to be a word’s most salient characteristic. Children are known to overextend and to underextend the meaning of a word. In respect to overextension Clark distinguishes two types: ‘over-inclusions, where children extend a term to other categories from the same taxonomy, e.g. *dada* used for both the father and the mother, *baby* used for self-reference and all children? and analogical extensions where children use a term for
objects from other taxonomies on the basis of perceptual similarity, e.g. ?

*comb* extended to designate a centipede’.

In contrast to Clark’s assignment of meaning to perceptual features (e.g. shape, sound, touch, taste) Nelson (1974: 227) proposes that the child makes a distinction between words based on the functions or actions associated with the object. Therefore, a child would use the word *ball* not because he perceives it to be round as opposed to yellow or soft but because he perceives its essential semantic core to function in a specific way as a result of his actions (e.g. he may throw the ball, or it might bounce and then break something). I would like to point out here that these two approaches do not necessarily exclude each other; Nelson’s functional core concept does not totally dismiss overextension or underextension. Both approaches simply take a different perspective in an effort to interpret the semantic attributes of words. Therefore, one could reach the conclusion that both perceptual and functional criteria play an important role in early vocabulary acquisition in relation to concrete entities.

In this respect I would like to mention that research on semantic prototypes has challenged the approaches of Clark and Nelson. Bowerman (1978: 263) dismisses the assumption that sets of perceptual features are involved in the meaning acquisition of words. She refers to her daughter’s overextended use of *kick* which took place when she propelled a ball forward with her foot. She then used *kick* to refer to a number of situations: when she kicked an immovable door fan, at the movement of a insect fluttering on a table, when she pushed her stomach against a sink, at the
sight of cartoon tortoises kicking their legs in the air etc. It seems that the child had analysed the action of *kick* as possessing a series of different characteristics: a waving limb, sharp contact of her body with an object, and propulsion forward of the object. Bowerman’s interpretation is that it was not possible to pinpoint similarities between features or to conclude which particular feature(s) is ‘prototypical’. I believe that although this interpretation points to the existence of a certain vagueness and fluidity in early word meanings it does not exclude the possibility of children working from prototypes. Their overextensions could be attributed to wrong analysis, that is, children may analyse the characteristics of prototypes differently from adults. Therefore, I think, her research shows the kinds of combinations of features which need to be acquired by a child before they evolve and eventually become integrated into an adult’s lexicon.

Clark’s semantic feature theory was also criticized in respect to whether over-extension is truly the beginning of lexical semantic development as it was not found to be so prominent in child language production, in some cases actual counts of over-extensions were less than one third of total lexical production. Griffiths (1986: 300) suggests that underextension may be the actual starting point for lexical development. Underextensions, that is the restriction of the more general level of a category to only one subset of a possible variety of referents, can be divided into two types. Context-bound underextension which is of an associational type: e.g. a child’s use of the utterance *dut* (‘duck’) to refer to his knocking a toy duck off the edge of the bath; what is interesting here is that the same utterance was never
used when the duck was floating in the bathwater (Barrett, 1983 cit. in Aitchison, 1994: 171). The utterance *dut* seems to be a ritual for the child and it accompanies the whole scenario of taking a bath. On the other hand context-flexible underextension is restricted to the variety of referents to which a word is applied to. M. Harris (1992: 71) points to the use of ‘music’ to refer to a hi-fi system in a child’s home and ‘clock’ to refer only to a particular type of clocks, wall clocks. Griffiths (ibid.) in an analysis of early lexical development suggests that the low counts of overextensions in early lexical development is an indication that ‘the characteristic early path is for nominals to be underextended first and only later to apply to a wider range of entities’. I believe that this suggestion could be indicative of the actual process in early lexical development as it has been noticed that most of the first words produced by children are context-bound, associational underextensions (see Barrett, 1983). One, then, could visualise lexical development ranging on a continuum from bound to flexible underextensions and eventually to overextensions.

Finally, and in respect to what category of objects can specific words be applied to Rosch et al. (1976: 435) suggest that the ‘basic’ level of categorization is the one first learnt and produced by children and the most salient and necessary in any given language. This assumption has been challenged by researchers as it was pointed out in the previous chapter. Still, most studies on early language development report that the basic level is the one that appears first in children’s first conceptualizations (e.g. Waxman 1994: 234).
Overall, it seems that formal aspects are important during the beginning of word production but they are followed by strong semantico-pragmatic processes? from learning to refer to internalizing semantic categories as the child grows older. It remains now to be seen whether the principle operative processes are also semantico-pragmatically driven in the later stages of development.

2.1.1 The syntagmatic?paradigmatic shift in the L1

The next phase in L1 development is that of the vocabulary explosion period where lexical development accelerates in a very dramatic way until it reaches a stage where vocabulary is reorganised and subsequently internalised. The beginning of this phase is the preschool age and it may continue even till college entry stage. The lexicon in the preschool age is organised in two ways according to Harris (1992: 74): ‘One is the reorganization of lexical items into domains of related words, which allows the child to represent information about relationships between individual words. The other is the development of a more complex mapping between words and word domains on the one hand and concepts on the other’. This assumption about the semantic nature of lexicon does make sense but it would obviously need to be corroborated by experimental findings. The claim that the L1 lexicon is semantically organised is backed up from empirical evidence coming from word-association tests. The procedure for such tests is basically as follows: The subject is presented with a particular stimulus word (e.g. music) and he is asked to produce (either orally or in writing) the first word (or a series of words) he can think of in a limited
amount of time. It has been found that native speakers select words from
the semantic field of the stimulus word in a consistent way (Aitchison, 1994:
86; De Groot, 1992: 1001). However, there are differences in the way
adults and children respond to word association experiments in the L1.

In relation to the growth of word meaning Anglin’s research (1970: 13)
reports, among others, the following process in word association
experiments in the L1: a shift from syntagmatic to paradigmatic
associations in word meaning: ‘? the responses of young children in free
association are of a different part of speech than the stimulus words
(syntagmatic), whereas the responses provided by older subjects are
predominantly of the same part of speech (paradigmatic)’ (Anglin, ibid.). He
cites several researchers (R. Brown & Berko, 1969; Entwisle et al., 1964;
Ervin, 1961; Woodworth, 1938) in an effort to determine the exact period of
the occurrence of the shift, which takes place, according to Anglin, between
five and ten years of age. He also refers to Woodworth’s (1938) examples
of the most typical responses produced by children and adults in the
following stimuli: the stimulus table elicits eat from children but chair from
adults, while the stimulus dark elicits night from children but light from
adults. Anglin (1970: 14) is in accordance with the classic analysis of the
above findings: ‘The increase in paradigmatic responses can be viewed as
reflecting the accretion of semantic markers (McNeill 1968) and the
developing organization of vocabulary into syntactic classes (Brown &
Berko, 1960: 14)’. Anglin’s own study (1970: 29) reported that adults were
more likely than children to sort words in relation to syntactic class and that
adults made more paradigmatic associations in free association experiments than children. The inference here is that the production of paradigmatic responses in the L1 increases with age. Generally speaking, I believe that these findings point to an increasing realization on the part of the children of the syntactic, semantic and conceptual links between words. The differences in the responses of children and adults in respect to the syntagmatic ? paradigmatic dimension can be partly attributed to the development of word meaning as Anglin suggests below.

Anglin explains these findings as evidence for the development in older children and adults of a more abstract treatment of lexical meaning. He also makes a connection between this abstraction of word meaning and over-extension, this phase of lexical development during which the child over-extends word meanings (as opposed to the meanings of the words in question used by adults). Moreover, Anglin, distinguishes between (over-)generalization which occurs before the children are able to discriminate between entities (e.g., cats and cows) and (over) generalization that happens after discrimination has taken place (e.g. an adult would classify cats and cows as quadrupeds). Anglin sees this tendency towards abstraction/generalization as indicative of the development of the lexicon. In support of this point he refers to the following studies: Woodrow & Lowell (1916) who reported that children do not generate as many superordinate responses as adults in word-association experiments; and Bruner (Bruner & Olver, 1963; Bruner et al., 1966) who found a positive correlation between the ability to produce ‘equivalence relations’ (i.e., superordinate
markers of similarity) and age. Anglin (1970: 93) based on his own research in equivalence relations reported similar findings. I take these findings to be in accordance with the suggestion of Rosch et. al. (1976: 435) about the ‘basic’ level of categorization being the one first learnt and produced by children.

The syntagmatic ? paradigmatic shift and the development of abstraction/generalization can be also related to the development of hierarchy in word meanings: ‘”the child first appreciates the similarity among small groups of words and only later sees the similarity among increasingly broad classes. At first he might see that roses and tulips are flowers, that oaks and elms are trees ?Somewhat later he might realise that the objects he had classed as flowers are similar to the objects he had classed as trees, in that both are plants’ (Anglin, 1970:14). Again this suggestion can be related to the claim of cognitive linguistics about the development of cognitive categories in children who start by acquiring basic level items first and extend their knowledge to the superordinate items of a category in later stages.

Another explanation for the existence of the shift is that children may need more time to discover the criteria by which adults classify words as paradigmatic. A study by White (1982: 325) involving a group of three- to five-year-olds showed that the children would agree that prototypical birds like sparrows or robins were birds but would often disagree that ducks or hens were birds, they were just ducks and hens. This phenomenon could also be explained, I suppose, in relation to the development of cognitive categories. These children were able to identify the prototypical bird but
they did not believe that birds such as ducks and hens should be included in the bird category because in their own perception of the category (which is different from adults’ perceptions) ducks and hens do not share the same characteristics with the prototypical bird.

Aitchison (1994: 179) claims that efficient retrieval may account for the prevalence of paradigmatic responses in adults. A skill that young children need to acquire is fast word finding since they are found to be quite slow at naming objects (e.g. ice-cream) whose names are well known to them (Wiegel-Crump and Dennis 1986, cit. in Aitchison ibid.). Aitchison (ibid.) concludes that ‘perhaps the gradual shift-over comes in response to a need to organize and retrieve words quickly as the overall vocabulary gets larger’. This is not an argument to be discarded but it should be seen in accordance to Nelson’s findings from word association tests.

Nelson (1977: 109-110) studied the syntagmatic-paradigmatic shift and reported that it did not occur at the same time and as strongly for all types of words. Nouns seem to generate a majority of paradigmatic responses at all ages, and verbs are more likely to elicit an equal number of syntagmatic and paradigmatic responses. The shift has been reported especially in relation to high frequency adjectives. Nelson (1977: 109-113) gives two explanations for the origin of the shift. The first refers to a change in the child’s conceptual organization between preschool and early school years: ‘As the child becomes able to operate explicitly with coordinate concepts during the school years and as these operations are reinforced by the kind of tasks required by the school, these relations will become more salient
and will tend to be elicited by the word association task, thus leading to an increase in contrast and coordinate (both paradigmatic) responding for nouns and dimensional (including opposites) responding for adjectives’.

Nelson’s second explanation points to a different interpretation by children of the word-association task: children may perceive it as a meaningless activity.

My opinion is that Nelson’s second explanation about whether children perceive word association tests as a meaningless activity is just a speculation as researchers who have worked with children have not reported any such thing. Furthermore, it seems that studies on children’s’ word association responses have yielded similar results (see also below), a fact which justifies the use of the word association test as an instrument of research. Actually, I am more in accordance with Nelson’s first remarks about the shift not occurring at the same time and as strongly for all kinds of words and I will present below relevant studies which seem to be on the same line with this position. However, I would like first to focus on the syntagmatic?paradigmatic shift in the L2 and in contrastive L1?L2 word association studies before I reach an overall conclusion about the shift.

2.1.2 The syntagmatic?paradigmatic shift in the L2

Both Anglin’s and Nelson’s suggestions attempt to explain the origin and nature of the syntagmatic?paradigmatic shift in the L1. As it was pointed out Anglin claims that children initially produce more syntagmatic responses and as their age increases they produce more paradigmatic responses; this is taken as an indication that the shift in the L1 is related to age. Few
researchers, however, have focused on the syntagmatic-paradigmatic shift in learners' word association responses (both children and adult responses). Yet, these available studies seem, generally, to confirm the existence of a similar shift in the L2. Still, the results are not so consistent, for a number of reasons that will be subsequently dealt with.

Politzer (1978: 210), in a study of the word association responses of first-year learners of French in high school, found a majority of syntagmatic responses. Politzer reached the conclusion that syntagmatic responses are dominant in the first stages of language learning. He subsequently claimed that learners are like children in that they produce a higher number of syntagmatic responses. However, Politzer's subjects were absolute beginners and, thus his claim cannot be really substantiated. Therefore, his findings are of a limited value. Randall (1980) found many paradigmatic and syntagmatic responses in the associations intermediate learners of English gave to relatively frequent stimuli and this finding was taken as an indication that the proportion of paradigmatic responses increases with overall proficiency in a second language. However, I tend to think that what his findings really imply is that both types of responses are dominant in the subjects' lexicons. Meara (1978: 192), in a study of English students of O level French, conducted under the auspices of the Birkbeck Vocabulary Project, stresses the existence of considerable numbers of 'clang' associates, that is, of responses that are phonetically related to the stimulus words with no other obvious semantic link (e.g. *for* in response to *far* or *inn* to *in*). He also pointed out that not only his subjects' responses to
L2 stimuli were different from the responses of native speakers in respect to the same stimuli, but also the former seemed to diverge more from subject to subject than the respective native speaker responses. He also notes that the responses of young children in word association experiments in L1 are also marked by a high number of ‘clang’ associates. He concluded that the results revealed that the L2 mental lexicon is ‘quite different from that of the native speaker. It is more loosely organised, and the semantic factors are frequently overridden by extraneous phonological factors, such as the chance resemblance between a form in the L1 and another in the L2’ (Meara, 1984: 233-234).

There are a number of methodological problems with Meara’s results. Although Meara presents his results as being based on very common L2 words as stimuli, some of the actual items used are not very common; in fact they are quite rare, for e.g. *caque* (‘herring barrel’) or *toupie* (‘spinning top’). Consequently, it seems that the subjects’ associations to such infrequent words does not reflect so much an L2 mental lexicon differently organised from an L1 mental lexicon but rather a state of ignorance on the part of the students who relied on every clue that could help them deal with the rare items. A possible explanation for such associations is the existence of a similar pattern of behaviour in the L1 when native speakers encounter unfamiliar words (S-derman, 1989: 120, 1993: 180). Another possibility would be the misidentification of the infrequent items with words already known by the subjects. Hatch and Brown (1995: 378-379) refer to such cases based on an L2-L1 translation task where the L2 was English and
the L1 subjects were Japanese and Spanish. Meara himself considers these misidentifications possible as he makes a statement about ‘orthographic or phonological confusions’ (1984: 233). In fact, it seems that few of his subjects’ responses were actual ‘clang’ responses. Mar?chal (1995: 17) in her re-analysis of Meara’s word association tests (1978) observed that among the 100 French stimuli used by Meara 47 elicit exclusively semantically related responses, and only 18 exclusively phonologically related responses, these stimuli being the most difficult words on the list. She concluded that despite the fact that learners give more clang responses than native speakers they nevertheless give significantly more semantic, that is, syntagmatic and paradigmatic associations, than phonological associations, the latter being a response to less frequent stimuli.

Further support comes from a study by O’Gorman (1996: 15) who analysed word association responses from advanced Cantonese learners of English. The overwhelming majority of the responses shows semantic connections to the stimuli.

In relation to child/adult differences in L1 word-association experiments, S?derman (1989, 1993) incorporates L2 data produced by such tests in the general context of L1 data. S?derman points out the production by children of more ‘clang’ responses in L1 word-association tests than adults. She subsequently refers (S?derman 1989: 115) to a number of studies which point to ‘a shift in response type’ (from ‘clang’ to semantic associations) which occurs in L1 word association tests with native speakers of different

Sperber’s own work produced similar findings of a shift in response type (from more to fewer phonologically related responses) between learners at different levels of proficiency. The shift was also evident in relation to the amount of syntagmatic and paradigmatic responses the learners produced: as the learners became more proficient in the L2 the proportion of paradigmatic associations increased and the respective proportion of syntagmatic associations dropped. The interpretation of such findings is that the proportion of phonological associations indicates level of proficiency in a specific language rather than the status (native or non-native) of the language.

Cunningham (1990: 45) reported similar findings from her study of learners of Irish as a second language at different levels of proficiency. That study focused on the word associations of two groups of primary-school learners of Irish as a second language: the first was in an English-medium school and received instruction in Irish only during Irish lessons while the second was in an Irish-medium school and received instruction in Irish in all the courses (except during English courses). Her results are in accordance with Sperber’s findings that L2 learners who had received more instruction in the L2 (Irish) produced fewer ‘clang’ responses and more paradigmatic responses than did learners in the English-medium school who received less instruction in Irish.
Søderman carried out two experiments. In the first (1989: 116), she compared the associations of four different groups of learners (beginners to advanced) to the same list of frequent words taken from the Kent-Rosanoff list. In the second (1993: 91), she analysed the responses of advanced learners and native speakers in relation to frequent and infrequent stimuli.

Søderman draws two conclusions concerning the syntagmatic paradigmatic shift. The first is a new explanation for the origin of the shift. Previous research\(^{29}\) had assumed that the shift in the L1 was directly related to age (with the shift taking place between the ages of five and ten in children), and the shift in the L2 was a question of proficiency. Søderman claims that the syntagmatic paradigmatic shift (similarly to the shift from proportionally more to proportionally fewer clang responses) is related to the proficiency level of both a native speaker and a learner in respect to particular words: a particular word will elicit different types of response (phonological or semantic) at different levels of its integration into a person’s mental lexicon irrespective of the language (L1 or L2) it belongs to and of the person’s proficiency level in the particular language. This suggestion is corroborated by her findings. In her former experiment, the shift was apparent between beginners and more advanced learners always in respect to the same list of frequent words. In her latter experiment, she reported that for both advanced learners and native speakers infrequent words elicited more clang and unusual responses than frequent words.

\(^{29}\) e.g. Anglin, 1970; Meara, 1978; Nelson, 1977
S-diver's first conclusion offers a lexical, word-based explanation for the shift. It implies that the shift does not occur for all words at the same time. Being proficient in a foreign language or knowing one’s native language very well does not mean that all words stored in the mental lexicon are equally well known. Her conclusion also implies an absence of age limit regarding the shift. The lexical development is seen as a long process with new words appearing and new meanings becoming internalised. Indeed, Anglin (1970: 99), who was the first to suggest the existence of the shift, stresses that the non-stop integration of new words ‘appears to be an extremely gradual process which may never be complete’.

S-diver's second conclusion implies that the nature of the shift is different from what researchers had generally assumed. It does not seem to be the case that adult native speakers or advanced learners produce a significant majority of paradigmatic associations for words that they know well. Recent research (see below) has shown that both learners and native speakers give many paradigmatic and many syntagmatic responses to words that are well integrated in their lexicons. S-diver, subsequently, (1993: 149) suggested that the terminology should be abandoned: ‘It may be more accurate to claim that the individual words in the mental lexicon develop from a stage evoking clang or diverse responses to a syntagmatic or a paradigmatic stage. For this very reason, I would rather refer to these changes as a shift in response type than use the term syntagmatic?paradigmatic shift, which appears to be somewhat misleading.'
However, it was introduced in the early sixties and is still to be found in the most recent literature on the subject.

My opinion is that both the syntagmatic and the paradigmatic categories seem to be important. Aitchison (1994: 90) states that both kinds of links are ‘powerful and long-lasting’ and it is not clear whether one has priority over the other. Anglin’s suggestion (1970: 29) that the paradigmatic responses were associated with higher proficiency appears to be unsatisfactory since research has shown that one of the lexical aspects advanced learners find very difficult to master is the syntagmatic and especially the collocational dimension (e.g. idioms). Syntagmatic associations of this kind can be considered to be a sign of proficiency as much as paradigmatic associations are.

A final point that should be mentioned here is that, in respect to word association experiments, it is difficult to distinguish properly between syntagmatic and paradigmatic responses. Meara, for example, (1983: 30), points out that the syntagmatic-paradigmatic distinction ‘is very difficult to work in practice’ in the word association experiments since many responses could justifiably belong to the same category. Previous research (e.g. Meara 1983: 29; Nelson 1977: 93, Politzer 1978: 203) has often related paradigmatic and syntagmatic associations to homogeneous and heterogeneous associations (same word class and different word class, respectively). However, I believe, that words, can belong to the same word class and be syntagmatically associated (e.g., bread ? butter, up ? about) or words can belong to a different word class and still the syntagmatic
association may not be clear due to the low probabilities of collocational co-occurrence of certain words. (e.g. sickness ? outside, lamp ? painful).

Theoretically, of course, it could be possible for any item to co-occur with any other lexical item as was pointed out in Chapter I (1.6). Nevertheless, there are difficulties when one has to make decisions about the category (syntagmatic or paradigmatic) a word belongs to when this word is out of context. This difficulty is not generally commented upon in literature, yet, I feel that many researchers must have really felt the difficulty in properly distinguishing between syntagmatic and paradigmatic responses. For example, in my M.Phil. thesis (Joannopoulou, 1992: 35) where part of my experiments involved the analysis of word association responses of English and Irish adult beginners of Modern Greek, I find the syntagmatic?paradigmatic distinction difficult to maintain in practice since a number of responses seemed ‘unclassifiable’ in relation to the stimulus word in question. In respect to S´derman’s suggestion that learners and native speakers give many paradigmatic and many syntagmatic responses to words that are well integrated in their lexicons, in my results (Joannopoulou 1992), syntagmatic associations seem to have priority over paradigmatic associations for both the English and the M. Greek set. However, large numbers of paradigmatic responses were also produced, something which possibly points to the familiarity of the learners with the majority of the stimuli used, which were selected on the basis of familiarity (they were words that featured occasionally in the learners’ materials during the year of instruction). Finally, ‘clang’ responses were not many but they were produced in higher numbers in relation to the M. Greek set. A
possible explanation for the higher occurrence of the ‘clang’ associates in Greek might be the low level of familiarity of some of the learners with particular stimuli. To sum up, the overwhelming majority of the responses both in the L1 (English) and the L2 (Greek) were semantic (both syntagmatic and paradigmatic) while only a small proportion was phonologically related to the stimuli (in the Greek set), which is probably indicative of the unfamiliarity of some learners with some of the stimuli used.

Similar findings were reported by a study which was conducted under the realms of the Trinity College Dublin Modern Languages Research Project (TCD MLRP). Mar?chal (1995: 76) points out that the terms ‘syntagmatic’?‘paradigmatic’ need to be refined: ‘Earlier researchers have assumed that the consequence of the shift is that subjects give a majority of paradigmatic responses. Their definitions of the terms syntagmatic and paradigmatic were unsatisfactory, however. We can easily understand how, mixing paradigmatic responses with homogeneous responses and syntagmatic responses with heterogeneous responses, they concluded that adults link words predominantly in a paradigmatic way’. Mar?chal defines paradigmatic relations less broadly than other researchers (in terms of synonymy, hyponymy, incompatibility and antonymy) and also suggests that grammatical category is a necessary condition for paradigmatic relations but it is not sufficient. Her findings show that the great majority of responses are based on meaning rather than form (the percentage of clang responses is very small). In relation to the syntagmatic?paradigmatic shift,
she reports that both categories yielded considerable numbers of responses but that, contrary to previous research, syntagmatic relations have priority over paradigmatic relations in the responses of her subjects (advanced Irish learners of French) in both the L1 and the L2. Mar?chal remarks (1995: 80) that the smaller proportion of paradigmatic responses in the subjects’ associations does not mean that the shift (according to S?derman’s theory) has not taken place: ‘we can conclude that the shift from many clang and diverse responses to many syntagmatic and paradigmatic responses for these frequent words has taken place before the subjects entered university’.

2.1.3 The shift in L1 and L2 lexical development

Based on the above observations and findings it appears that if we still need to talk about a shift in lexical development we should probably talk about a ‘shift in response’ type rather than a ‘syntagmatic ? paradigmatic shift’. I believe, that the research discussed above often presents contradictory findings about which type of response (paradigmatic or syntagmatic) is more prevalent in native speakers and learners (beginners or advanced). Consequently, one cannot reach a satisfactory conclusion about which type of response is to be regarded as more indicative of language development. My opinion is that the way the ‘syntagmatic ? paradigmatic shift’ has been described so far by Anglin and other researchers does not clarify a few important points: for example, from the way it is described one would probably presume that this phenomenon takes place for all words in the lexicon at largely the same time, that is, it
occurs at a particular stage of learning or a particular age. This would mean that the shift would be directly related to age and language proficiency with the learner being more or less equally familiar with all the words in his lexicon, something which does not seem to be the case. S-derman’s findings seem to provide an alternative approach to lexical development; one which is more holistic and does not so readily discriminate between L1 and L2 lexical operations. It appears that the level of lexical knowledge of both native speakers and learners of a second language is a common factor regarding the integration of a word into the L1 and L2 mental lexicons. Advanced learners of a language are not as familiar with all words in their lexicon as they are with a group of words they often use. In addition, early learners do not have a limited knowledge for all the words in their lexicon. After all, it is evident from the studies presented above that even advanced learners are found to produce many syntagmatic and clang responses while early learners produce impressive numbers of paradigmatic responses. Consequently, the shift does not seem to be related to overall proficiency or age. I take this to be an indication of a common lexical process in L1 and in L2: every lexical item appears to go through certain stages of processing—from a more phonological to a more semantic stage—as it becomes internalized into the mental lexicon. Therefore, lexical development could be seen as a lifelong process rather than something exclusively associated with the early stages of language learning. Indeed, as we go through life not only do we constantly acquire new words but the already acquired words continue to develop. This is a process which will take place in both a native speaker’s and a learner’s
lexicon regardless of the level of overall proficiency of the learner and whether the language in question is his foreign or native language.

In respect to lexical acquisition I tend to believe that each word will have to go through different stages of lexical knowledge. These stages are probably influenced by certain factors, such as frequency, recency and the extent to which the word becomes automatized (e.g. in the case of idioms). As this is a process common to both the L1 and the L2, lexical development should not be entirely different in a native and a second language. Still, there would obviously be differences between the lexicon of beginners and that of adult native speakers and advanced learners in that the lexicon of the latter would be more developed. Of course, one should not forget that L2 lexical development usually takes place against an already acquired L1, thus certain differences would, naturally, have to be expected.

Finally, based on the above discussion I would also like to touch on the subject of whether the L1 and the L2 mental lexicons are qualitatively different from each other in respect to meaning and form. In the subsequent section relevant research will be discussed in an attempt to shed some light on this issue.

2.2 The L2 mental lexicon: Semantic and phonological links
The mental lexicon, as we have already seen, is not simply a list of all the words we know. Every word is accompanied by elements of meaning,
possible contexts, phonological and orthographic forms, and ways in which it collocates and colligates with other words.

Much debate has taken place recently on the respective roles of form and meaning in the acquisition and processing of words in the L2 mental lexicon. It is generally accepted that both aspects are important but in relation to the L1 mental lexicon the organisation is predominantly of a semantic nature. This claim is backed up from empirical evidence coming from word association tests as was already pointed out in the first section.

Nevertheless, one cannot safely assume that the same organisational pattern (namely, a semantic one) applies in the L2 as well. Some researchers claim that the links between words in the L2 lexicon are phonological rather than semantic (Meara, 1980: 238-39; Fromkin 1971: 50; Laufer, 1989: 17) while others provide evidence of a semantic organisation in the L2 similar to that of the L1 (Singleton and Little 1991: 65; S-derman; 1989:119-20).

An intuitive assumption would be that the second language lexicon is unlikely to be organised mainly on a phonological level because this would more or less conflict with the way in which we learn language. However, in the light of the evidence to be presented, it evolves that both kinds of organisation and processing are present in the L2 mental lexicon.

Let us now take a closer look at the work of different researchers on the above issue of phonological vs. semantic organisation and processing in
the L2 mental lexicon. The present section will start with the findings from the Birkbeck Vocabulary Project, which is usually referred to in support of the ‘phonological’ organisation and processing of L2 lexis. This suggestion has been challenged by evidence from the Trinity College Dublin (TCD) Modern Languages Research Project (MLRP) (Singleton and Little 1991: 65; Singleton, 1993-94b: 23; Singleton, 1994: 54). We will further explore evidence from research on L2-internal vocabulary learning problems, research into the use of context in lexical acquisition and processing, and research into the role of cross-linguistic influence. Finally, lexical memory research will also provide evidence for the importance of meaning in L2 lexical acquisition.

2.2.1 The Birkbeck Vocabulary Project and the TCD MLRP

The present section will review relevant research, starting with the findings from the Birkbeck Vocabulary Project word associations tests. In the previous section it was pointed out that Meara, the director of the project, after studying the word association responses of students learning French he reached the conclusion that while native speakers give a majority of semantically related responses, the students gave many responses which were phonologically related to the stimulus word (clang responses).

As we have seen, Meara’s interpretation of the results was questioned. Singleton and Little (1991: 63) claim that although Meara presents his results as being based on very common L2 words as stimuli, some of the actual items used are not very common; in fact they are quite rare. In addition, it was also pointed out that a re-analysis of Meara’s results
showed that only a few infrequent words elicited clang responses, the majority of responses being semantically related to the stimulus. Consequently, it seems that the subjects’ associations to such infrequent words reflects rather a state of ignorance on the part of the students than a differently organised L2 lexicon. In this respect S-derman’s approach could explain the phenomenon by relating it to the existence of a similar pattern of behaviour in the L1 when native speakers encounter unfamiliar words. For her a particular word will elicit different types of response (phonological or semantic) at different levels of its integration into a person’s mental lexicon irrespective of the language (L1 or L2) it belongs to and of the person’s proficiency level in the particular language. This suggestion corresponds to the above claim that some of the Birkbeck findings were caused by the rarity of the stimulus words and is also related to the way native speakers deal with unfamiliar words in their language. To sum up, it seems that the findings of the Birkbeck vocabulary project do not provide enough evidence for the suggestion that the L2 mental lexicon is primarily phonologically-driven.

More evidence to support S-derman’s approach comes from the TCD MLRP (e.g. Singleton and Little 1991; Singleton, 1993-94; Singleton, 1994) whose basic aim is to ‘monitor the second language development of university-level learners on a continuous basis and in relation to their previous educational and language learning experience’ (Singleton & Little, 1991: 61). The subjects involved in this project are undergraduate students from the departments of French, Germanic Studies, Italian, and Spanish of
the TCD. A number of lexicon-related issues have been explored within the TCD MLRP framework, some findings of which have already been presented (see 2.1.2) and others will be reviewed in the relevant sections that follow. In the next section the nature of the L2 mental lexicon will be further investigated with relevant research from L2 vocabulary-learning difficulties.

2.2.2 Research into L2-internal vocabulary learning problems

Research into L2 vocabulary-learning difficulties caused by L2-internal factors sheds light into the question of form and meaning in the L2 mental lexicon. Laufer (1990a: 147, 1991: 293, 1993-94: 98) identifies both formal and semantic ‘intralexical’ difficulty factors. The formal ones include pronounceability, length, morphological complexity and grammatical category while the semantic ones comprise specificity of meaning, polysemy, metaphorical meaning, connotational and stylistic nuances, synonymy.

2.2.2.1 Formal difficulty factors

As far as pronounceability is concerned, it seems that L2 learners avoid words with a difficult pronunciation (Levenston 1979: 147). It also appears that such difficulty leads to lack of comprehension. Gibson and Levin (1975) pointed out that learners seem to perceive more accurately words easier to pronounce. In that respect pronounceability plays a facilitation role in relation to word perception when access to meaning is not available. Rodgers (1969: 342) claims that an L2 lexical item is better retained in memory when it has an easy pronunciation. It was also pointed out in the
first section of this chapter that short-term memory plays a significant role in the acquisition of L1 vocabulary by young children. In this respect, one could suggest that pronounceability could play a role in L1 acquisition as well. If both children and L2 learners learn first words that are easy to pronounce (facilitated by short-term memory retention) then this could be a common process in L1 and L2 acquisition, that is, phonological processing would seem to be most important in the first stages of the acquisition of a word regardless of the language this word belongs to (L1 or L2) or the age or even the overall proficiency of a person.

Regarding word length, conflicting hypotheses have been put forth. Some researchers have found that word length (words with varying numbers of syllables) is not a significant factor in the processing of L2 words (Rodgers 1969: 327) while others (Hulme et al., 1991: 700) point to a strong word-length variable in verbal memorization tasks not only in L2 but also with L1 real words and pseudowords. They concluded that this difficulty factor exists for both the L1 and L2.

Turning now to grammatical category, Rodgers reported (1969: 342) that his L2 subjects found verbs and adjectives more difficult to learn than nouns and adverbs. In an effort to interpret such results, Laufer, suggests that the morphological complexity of verbs in Russian (one of the languages used by Rodgers (1969) in his study) and the confusion that certain adverbials create may be the cause of such findings. Ellis and
Beaton (1993: 533) offer another possibility, namely that verbs are more abstract than other categories and that is why they pose more problems than nouns. They state that vocabulary learning is greatly facilitated by the fact that learners create and use images when they learn new words and this is especially evident in the acquisition of nouns. A connection may be made here with L1 acquisition and especially with the ‘vocabulary explosion’ phase which ‘is characterised by a rapid acquisition of one particular type of word: names for objects’ (McShane, 1991: 146). Overall, based on these findings, L1 and L2 acquisition could be connected in terms of the acquisition of nouns.

With regard to morphological complexity, learners frequently confuse combinations of morphemes with similar combinations- e.g. *outline* with *out of line* (Laufer & Benoussan, 1982: 14). However, it should be pointed out here that morphological difficulties are to be encountered in L1 acquisition as well. In a study of the acquisition of L1 word derivation rules Smedts (1988, cit. in Singleton 1997: 217) reported that Dutch 7-year-olds showed evidence of having internalised only 14% of the derivational relationships that were tested and that the relevant knowledge of the 17-year-olds was around 66%. It seems, then, that morphology is a problem not only for L2 learners.

\[^{30}\text{Of course word length could be calculated in different ways (e.g. syllables, graphemes, morphemes, phonemes) and this could create problems when interpreting results from different studies.}\]
2.2.2.2 **Semantic difficulty factors**

In relation to semantic difficulty factors and as far as specificity of meaning is concerned, Blum and Levenston (1978: 399) conducted a study with L2 learners of Hebrew and reported that they had a tendency to use more general lexical items (superordinate) while native speakers preferred more specific ones (hyponyms). However, Laufer (1993-94: 106) interprets the results not on the basis of intralexical difficulties but suggests that what is involved is a lexical strategy the learners use in order to avoid making errors. Indeed, it wouldn’t be far fetched to presume that a given learner might prefer to use a superordinate item just because it can be used in a variety of contexts which would probably exclude the possibility of an error if a hyponym were to be used instead.

Difficulties in relation to the metaphorical usage of lexis have been reported by Dagut & Laufer (1985: 74) and Kellerman (1978). The former investigated the avoidance of English phrasal verbs by Hebrew learners of English as an L2. The phrasal verbs in question carried metaphorical meaning (e.g. *show off*, *let down* etc.). Kellerman (1978: 314) found that his subjects, Dutch learners of English, were willing to translate and use in English Dutch expressions only when these expressions included the core meaning of the constituent lexical items. When, on the other hand, the words had more peripheral meaning the learners reached the conclusion (sometimes wrongly) that direct translation was not possible. It appears that difficulties in the area of metaphorical meaning for L2 learners could be partly attributed to cross-linguistic differences.
As for connotational and stylistic variation, a study by Dagut (1977: 222) suggests that the L2 learner does not seem to grasp the connotational differences that exist between pairs of words (e.g. between *skinny* and *slim*). In addition, it has been suggested that L2 learners are often confronted with problems regarding register differences in synonymous items such as *about, around, more or less* (Halliday *et al.* 1964: 88). Cross-linguistic differences could also explain such difficulties encountered by L2 learners.

Lastly we need to focus upon the issue of synonymy. Laufer (1993-94: 109) reported that L2 learners (native speakers of Israeli) must have difficulties learning L2 synonyms as they were found to produce more repetitions than native speakers in their written assignments. Laufer concludes that learners seem reluctant to learn new meanings for a word they have already acquired because they think that one form for each concept is enough. Once again, as in the case of specificity of meaning, difficulties associated with synonymy could be interpreted as a result of a lexical strategy and not as a learning problem.

Finally, we will end this discussion of intralingual and intralexical difficulties with two interesting studies. In the first one Laufer (1989: 11) used ‘deceptively transparent’ words as an instrument of research. This term refers to ‘a word which seems to provide clues to its meaning but does not’ (Laufer, *ibid.*) Laufer used ‘synforms’ (words with similar lexical form, for e.g. *cute, acute*) in a study which focused on reading comprehension and on the translations of underlined transparent and deceptively transparent
words in context. Errors in the translation of synforms led her to the conclusion that L2 lexical operations are primarily phonological. ‘Synformic errors, particularly confusion of phonologically similar words (cute/acute, valuable/available), provide additional evidence for such organisation. In searching for the right word, the learner selects its neighbour in the lexicon which sounds similar, but is erroneous’ (Laufer 1989: 17).

However, it would be far-fetched to infer from the above study that the entire organisation of the L2 mental lexicon is primarily phonological. Errors of the above kind could be seen to reveal lack of competence. Laufer points to two sources of confusion: either one word of the pair was learned but not completely, so when the students tackle the other word from the pair they consider it identical, or both forms have been incompletely learned so that the links between form and meaning are not so strong. Bearing in mind, then, these sources of confusion we should, in all probability, associate these phonological connections with an early stage of acquisition.

Relative to that of Laufer (1989) is a study by Hulstijn & Tangelder (1993) who, however, focused not only on formally similar words but also on the extent to which form and meaning cause intralingual interference. Their experiments delved into whether learners of English of different levels were able to distinguish between English pairs of words similar in form and/or meaning (e.g. adulthood/adultery (similarity of form), medium/moderate (similarity of meaning)). They concluded that it was native speakers of English and advanced learners of English who were confused more by
meaning similarity than by form similarity. Intermediate learners of English produced similar amounts of confusion. This difference can be attributed to the number of words that had become part of the lexicon of the groups of learners in question and also to the degree of integration of the words. The researchers believe that the semantic integration of a word takes longer than the formal one. I suppose this is why native speakers and L2 learners are more vulnerable when it comes to semantic interference. To sum up, Hulstijn & Tangelder seem to be in accordance with the view that semantic integration seems to be the key regarding the acquisition of a word in any language and until this integration takes place the learner depends on form to decipher the lexical item.

To sum up, the studies referred to tend to confirm that intralexical difficulty factors are caused both by meaning and form. In addition, formal problems that exist in the L2 seem to exist in the L1 as well. Even Laufer (1993-94: 102) agrees that many difficulties in vocabulary learning are meaning-related. Consequently, research into L2-internal vocabulary learning difficulties has shown no convincing evidence that the L2 mental lexicon is primarily form-driven.

2.2.3 Research into the use of context in lexical acquisition and processing

In the previous section we saw that learning vocabulary is closely related to a learner’s perception of the difficulties of words. This difficulty, may arise from the relations of the word with other words, from the associations it creates, its polysemy, its pronounceability and generally other formal and semantic factors. The focus in this section is the use of context and its role
in lexical acquisition. Use of context has been under examination in many lexical studies, some dealing with the way context helps in the guessing of word meaning, others focusing on the role of context in lexical problem solving, while others looking at how inferring word meaning in context results in lexical acquisition. An example of the first is a study by Ittz’s (1991: 366), who suggested that Hungarian learners of English as an L2 were more successful in deciphering the meaning of words in context than of words in isolation. This is, of course, an obvious conclusion but the interest here lies in the fact that learners do exploit the surrounding context when dealing with unfamiliar L2 words. The attention is then diverted to whether context plays a decisive role in the learning of unknown words.

An affirmative answer to this question was actually challenged by earlier researchers (e.g. Seibert, 1930, cit. in Carter and McCarthy, 1988: 15) who claimed that learning foreign-language words in context might be inferior to learning words in lists of ‘paired associates’, that is, lists that contain a word from the target language and a translation in the mother tongue. Pickering (1982: 83) after having examined such claims with Finnish learners of English reached the conclusion that context facilitates learning slightly more than paired associates and that advanced learners benefit more from learning words from context. Cohen & Aphek (1980: 235) reached the same conclusion in their study of the role of mnemonic associations in foreign language lexical learning. They stress that the recall of words in context has a positive correlation to the proficiency level of the subjects
who participated in their study, hence, the more advanced the learners are
the more possible it is they benefit from learning words in context.

Concerning the role of context in lexical problem solving, this has been
extensively investigated by the C-test\(^{31}\) based studies conducted by the
researchers of the Trinity College Dublin Modern Languages Reseach
Project (Singleton and Little 1991; Singleton, 1994, 1993-94a, 1996a). The
C-test ‘sets the task of restoring to wholeness a text every second word of
which (after a contextualizing lead-in passage) has had its second half
deleted’ (Singleton 1997b: 218). Furthermore, since the C-test takers are
unable to change the order of the items of the test, it seems that the
knowledge investigated by the C-test is mostly lexical in nature?
knowledge of word structure, collocability, colligability, content words,
grammatical words, grammatical class adherence, subcategorization
frames. The results of the C-tests show that the overwhelming majority of
the responses were acceptable – an indication that L2 lexical processing is
context related. Furthermore, it was found that familiar L2 words are
processed primarily in a semantic way and that even most of the
unacceptable responses had semantic motivation. Introspective data\(^{32}\)
were also gathered and these also confirmed that the subjects resorted to
contextual meaning in the course of filling the gaps of the text with the
missing parts of the words.

\(^{31}\) Two C-tests in their full and mutilated versions are to be found in Appendix B.
\(^{32}\) The introspective instrument is administered immediately after the completion of the C-
test by the subjects and consists of a list of all the mutilated words of the C-test. The
subjects are asked to note the words that were problematic for them and to point out how
they reached a solution.
Researchers who have explored incidental\(^{33}\) vocabulary learning are interested in the role of context in both lexical guessing and lexical acquisition. Schouten-van Parreren (1989: 77) has produced an interesting amount of work in this area. She advocates the role of guessing meaning from context in L2 reading and suggests that this helps the retention of words in memory and not the isolated presentation of words and their meanings in lists. Other researchers who take the same approach to vocabulary learning are Nation (1993: 116) and Krashen (1989: 441).

Schouten-van Perreren claims that learners better retain new L2 vocabulary when they encounter these words in context because this means the learners have made a conscious effort to combine unknown words, surrounding context and existing knowledge. She proposes the following process: ‘guessing the meaning of the unknown word, verifying the guess (e.g. in a dictionary) and analysing the word form’ (Schouten-van Perreren, 1989: 79). In addition, Efstathiadis (1993: 63) suggests that context plays an important role in terms of better retention of L2 vocabulary because in this way learners appear to satisfy the following ‘naturalness criteria: a) to process and utilise sequences of linguistic elements in accordance with the normal contextual rules of the language being learned, and b) to comprehend and to relate meaningful sequences of linguistic content to extralinguistic context’.

\(^{33}\) There has been some debate about what exactly should be considered Incidental vocabulary learning. Some researchers (e.g. Paribakht & Wesche 1997) believe that it is a process whereby a learner makes a link between the form and meaning of a new lexical item without conscious effort but spontaneously and without applying any mnemonic techniques in order to retain the new lexical item in his memory. However, Hulstijn (1992)
Experimental research in incidental vocabulary acquisition by Hulstijn (1992: 123) supports the above suggestions. His findings lead him to the conclusion a) that the reader focuses his attention to these words in the text which are of informational interest to him, b) that the reader acquires new words ‘incidentally’ from context but in a limited number, and c) that if the reader makes a focused effort to decipher the meaning of an unknown word using both contextual and formal clues then this word might be more easily retained in memory.

I believe that these results point to a connection between words, reading objectives and contextual meaning; in respect to the issue of form and meaning in the L2 mental lexicon this leads to the implication that both semantic and formal processing are present in incidental L2 vocabulary acquisition. It also seems that advanced learners benefit more from learning words from context, something which points to the semantic orientation of the lexicon in later stages of learning but without excluding the possibility of formal processing and its contribution as the study by Hulstijn (ibid.) suggests.

2.2.4 Lexical memory research

My attention is now diverted from L2 vocabulary learning problems and the use of context in L2 acquisition and processing to the area of lexical memory research which is found to support the main theme of this section; the role of meaning in the acquisition and processing of L2 vocabulary is,

and Schouten-van Parreren (1989) do not exclude the notion of the learners using some focused effort when they try to make an association between a word’s form and its
unexpectedly, supported by recent research in the field of phonological short-term memory in the acquisition of L2 lexis. Short-term memory has been defined as ‘the capacity of the brain to hold information in a kind of immediate-access store for a short period after it has been presented’ (Evans, 1978: 334). The terms working memory\(^{34}\) or speech processing memory are used to describe the short-term phonological store in which linguistic material is kept while its phonological representation is shaped into constituents.

Relevant research includes Baddeley et al’s (1988: 586) study which focused on an Italian speaker with a deficient short-term memory who was successful in learning pairs of meaningful words in her L1 but failed to a great extent to learn new vocabulary in an unfamiliar language (Russian). Papagno et al. (1991: 331) studied the effect of articulatory suppression on L2 vocabulary learning in children. They found that when they tried to prevent the construction of short-term phonological representations (by asking subjects not to silently repeat to themselves the words they were asked to memorize) this did not impede the learning of L1 paired associates but did impede the learning of L2 vocabulary – except in cases where a semantic association between an L2 lexical item and a word in the L1 was made.

\(^{34}\) It is often suggested that the tone group (which usually coincides with the grammatical clause) is the operating unit of working memory. McDonough (1981: 63-4) claims that there should be ‘some kind of short-term storage for linguistic material and, since it is rather severely limited, the problem for both native and non-native speakers of the language is to extract the important information from it by calling up the necessary knowledge from long-term storage and applying interpretative processes as quickly as possible’.
Service’s research (Service, 1992: 21; Service & Kohonen, 1995: 155) examined the learning of English as an L2 by Finnish children. The results showed that the children’s performance in copying and repeating back English pseudo-words in tests before the beginning of the English course was much better than their efforts to match syntactic-semantic pairs in their L1. This is an indication that L2 lexical operations would be primarily phonological.

Another study by Service & Craik (1993: 608) which examined the relationship between working-memory phonological representations and the acquisition of L2 lexis by English-speaking adults showed that their capacity to repeat unfamiliar foreign words accurately was a positive step towards the memorization of these items. She also found a similar significant correlation between the learning of pairs of familiar L1 words with Finnish words and the subjects’ ability to acquire the latter.

Ellis & Beaton (1995: 107) focused on English-speaking undergraduates of psychology in an attempt to investigate whether there are significant correlations between how easy the pronunciation of a foreign word is and the learnability of that word. They found that the easier the word is, in relation to its pronunciation, the easier it is to learn.

Evidence of the above kind would appear to suggest that a qualitative difference exists between the L1 and the L2 mental lexicon in that the L2 lexical operations are mostly ‘phonological’. However, I would like to take a closer look at the findings of researchers who focus on L1 vocabulary
learning and stress the importance of a short-term phonological store, and see whether a different picture emerges. First, Gathercole & Baddeley (1989: 358) studied the L1 vocabulary development of young children and found that their phonological memory performance results after a pseudo-word repetition test correlated significantly with the size of their vocabulary at age 4 and the learning of new vocabulary. This would mean that short-term memory plays a significant role in the acquisition of L1 vocabulary by young children. Similar findings emerged from a study of L1 language disorders in children. Gathercole & Baddeley (1990: 336) have found that the poor memory performance of the language disordered children who participated in their study ‘is unlikely to be due to either impaired perceptual processing or to slow articulation rates’ but rather this deficit of phonological storage in working memory may underpin their poor memory performance and could play a significant role in their disordered language development. Therefore, it seems that whatever the exact nature of phonological memory in relation to vocabulary learning they could be related to some extent for both the L1 and the L2.

Second, the L2 research (e.g. Service *ibid.*) on short-term phonological representations of L2 words has been based on new, unfamiliar items – that is, words that had not been yet semantically internalised by the subjects. My opinion is that it would not be far-fetched if one expected that the phonological shape of the word were more prevalent in such cases. In relation to L1 acquisition, the formal characteristics of words could become more important in childhood or when someone encounters a word for the
first time (as the research by Söderman suggests)? in both cases we deal with an early stage of lexical integration.

Third if we take a closer look at some of the above-mentioned studies we will realise that the semantic aspect may be present even in early L2 lexical acquisition. In one of the above-mentioned studies Service & Craik (1993) found that the subjects’ ability to learn unfamiliar words significantly correlated not only with repeating accurately foreign words but also with their performance on learning pairs of familiar L1 words – this task being of a semantic nature. These findings led them to the conclusion that the learning of L2 lexis relies on the establishment of phonological and semantic representations in working memory and also on the connections between the representations in long-term memory. Another study mentioned above, that of Papagno et al., provides us with interesting results. They investigated the learning capacity of Italian subjects with Russian vocabulary and English subjects with nonsense syllables and Finnish words. They discovered that in both groups subjects wanted to rehearse the items subvocally. This was not the case however when the English group was confronted with learning Russian vocabulary. The English subjects later said that they were able to learn the Russian words by associating them with English words. An association test administered to the English and Italian subjects uncovered the fact that the specific Russian words elicited more associations from the English than from the Italian group. An explanation would be that when there is no possibility for subjects to create phonological representations, they will turn to semantic
associations. Consequently, it seems that the construction of semantic representations is equally important with that of phonological representations in the processing of new L2 vocabulary, taking into account, however, limitations caused by the experience of the learners and the particularities of the words in question.

In conclusion the above-mentioned studies tend to corroborate the view that the L2 mental lexicon operates in a similar way to the L1 mental lexicon and that the phonological aspect is not a peculiarity of L2 lexical processing but it is important in the early stages of the acquisition of L1 and L2 items. Semantic processing is not, however, to be excluded even in these early stages as the two previous studies suggest.

A study by Hulme et al. (1991: 688) on the importance of the role of long-term memory in relation to short-term memory span confirms the above suggestion. Long-term memory is defined as ‘a separate form of permanent memory representation that boosts recall in immediate memory tasks and that is not synonymous with short-term memory’ (Hulme et al., ibid.). Evans (1978: 212) defines the concept of memory span as ‘the maximum number of items that an individual can recall after they have been presented to him once’. Hulme et al.'s study involved two experiments in verbal memorization. The subjects, native speakers of English, showed evidence of a lower memory span for English-like pseudowords than for actual English words. In the second experiment the memory span of the subjects was lower for Italian words than for English words but when they were given the English translations of the Italian words in question the subjects'
memory span increased. Hulme et al. suggest that forms stored in long-term memory play a significant role in short-term memory span. They do, however, admit that long-term memory ‘is a system that relies on semantic rather than phonological information’ (Hulme et al. 1991: 688) and believe it is possible ‘that semantic coding in long-term memory is also beneficial to performance in memory span tasks’ (ibid.: 699).

In relation to the importance of semantico-pragmatic aspects in the integration of a word in the mental lexicon, Henning’s (1973: 192) research sheds some light into the way memory functions in L2 lexical operations. Henning administered English tests of short-term memory, vocabulary recognition and language proficiency to two groups of subjects: native speakers of English and students of English as an L2 from four different proficiency levels. Similarly, tests in Persian were administered to native speakers of Persian and to learners of that language. Henning’s error analysis revealed that low-proficiency L2 learners seem to integrate vocabulary more by phonological associations than by semantic similarities, while learners at a high level of proficiency depend more on meaning than on form. Moreover, Henning, based on a post-test, reported that – in relation to the English data – the words which had elicited phonological errors in the short-term memory test were known to the L2 subjects at a low-level of proficiency. I believe that this phonological behaviour can be accounted for by the fact that while these subjects might generally have known the particular words they, nevertheless, had a limited experience of the lexis in question, thus the words were not internalised in such a way as
to activate rapidly semantic responses. As far as the high-proficiency learners are concerned it seems that their semantically-motivated errors show that they had been quite exposed to the particular words so that they were able to form networks of semantic associations in relation to these items.

Some interesting research on semantic factors of retaining L2 words in memory has explored the devices of image formation and imageability. R. Ellis (1994: 554) cites T. Brown’s & F. Perry’s (1991) study of L2 vocabulary-memorizing strategies by six upper-intermediate groups of learners of English at the University of Cairo. The following techniques were compared: a) the keyword strategy, b) the semantic strategy (the process of integrating the target word with existing semantic representations) and c) a combination of a) and b). The findings point to the effectiveness of the combination of keyword and semantic strategies. This result suggests that the possibility of retention of L2 words in memory increases alongside with the number of factors of L2 word meaning involved.

Cohen (1987: 43), in a review of key-word strategy studies, reports that a visually-based technique is more effective when concrete, as opposed to abstract items, are involved (something which I suppose would be expected). He continues that young children do not seem to produce many

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35 Nation gives an example of the keyword technique in relation to an Indonesian learner of English who tried to learn the English word *parrot*: ‘First the learner thinks of an Indonesian word that sounds like *parrot* or like a part of *parrot* – for example, the Indonesian word *parit*, which means ‘a ditch’. This is the keyword. Second the learner
visual images. Ellis & Beaton (1995: 114) review a number of studies on verbal memory research which shows that ‘the greater the imageability of a word – that is the degree to which it arouses a mental image – the more likely it is to be recalled’ and they continue that ‘FL (foreign language) vocabulary items are learned in fewer trials and with fewer errors if non-verbal referents rather than native language words serve as stimuli’. In relation to the keyword strategy they stress its importance in both L1 and L2 vocabulary learning and they cite, among others, a study by Atkinson & Raugh (1975) who claim that the technique is effective when the selected keyword reminds the learner of the L2 word (and vice versa) and also when the keyword becomes part of an easily-remembered image link. Ellis & Beaton’s own study is in accordance with Atkinson & Raugh’s results and, moreover, it suggests that ‘keyword imageability is more important in translating from foreign to native language than from native to foreign language’ (Ellis & Beaton, 1995: 152). The implication is that imagistic associations help the retention of a word in memory. Such a technique links form and meaning and it appears to be effective in the early stages of L1 and L2 vocabulary learning as it helps memorization.

Another study on the issue of image formation and vocabulary is that of Tomlinson (1996: 260) who claims that visualization during the reading of a text (in the L1 or L2) helps not only the comprehension but also the retention of the content (including the lexical one). Tomlinson also refers to the study of Padron & Waxman (1988) and concludes that his own imagines a parrot lying in a ditch! The more striking and unusual the image, the more effective it is’ (Nation, 1990: 166).
research shows that visualization is a more prevalent phenomenon among L1 readers than L2 readers, but that the L2 readers who have better retention of the text seem to be those who visualize. A possible reading of these findings, offered by Singleton (1999), points to the fact that maybe L1 readers visualise more than L2 readers and more-proficient L2 readers engage in that strategy more often than less proficient ones. The implication would be that this dimension of the semantic processing of words would become more significant as lexical proficiency reaches a more advanced level. Consequently, it does not seem far-fetched to infer from the foregoing that semantic processing increases in relation to the stages of internalization of a word in the mental lexicon.

Our final topic in this discussion of lexical memory research is the question of the nature of the form in which a word is encoded into a learner’s memory. Service (1992: 21) claims that the most prevalent representations in memory, in terms of accessing vocabulary, are the sounds of words and not so much their written form. Service refers to studies by Brady and others (Brady 1986; Brady et al. 1987) and reports that in L1 studies a significant correlation was found between accuracy of pseudo-word repetition and high capacity in reading and spelling. Service’s own work on Finnish children gave evidence of a similar correlation between a) accuracy of pseudoword repetition and accuracy of the delayed written copying of pseudowords and b) success in learning a foreign language. She also reports that both accuracy of pronunciation and accuracy in delayed written copying of words rely on the state of traces in the phonological store. The
findings of her study lead her to the conclusion that long-term L2 vocabulary learning depends quite a lot on strong phonological traces. Consequently, what transpires from the above reasoning is that phonology plays a very important role in the formal dimension of vocabulary learning (something which I suppose makes intuitive sense).

In the realms of the TCD MLRP, Singleton (1996a: 79) investigates this issue of the primacy of phonology in relation to the formal aspect of lexical learning in a study of French C-tests and of accompanying introspective instruments. First of all, though, he provides evidence that the majority of the C-test responses in the above study are meaning-related (being related to the surrounding context) and that the same applies to most of the introspective comments of the students who also refer to the facilitating role of the surrounding context in their finding the correct word. He focuses, however, on the few comments that pointed to a formal dimension of solutions offered. Such comments refer, firstly, to graphological form (e.g. the word’s spelling) and, secondly, to phonological form (e.g. the way it sounds). The graphological comments are to be expected since the C-test is a written activity. The phonological references, though, are more unexpected. The fact, however, that the subjects – while taking the C-test – were observed to mouth words silently in an effort to ‘listen’ to themselves provides evidence of the importance of phonological representations. More evidence in relation to the ‘phonological’ comments is offered by introspective findings using a ‘think-aloud’ format36 (Feldman & Stemmer

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36 The ‘think-aloud’ format is an introspective instrument which usually accompanies a translation task. The subjects are asked to translate a text into a foreign language and
1987, cit. in Singleton 1996a). Students involved in translation tasks were observed to silently repeat words. Consequently, this is probably a strategy used for the purpose of assisting them recall the target items, which is also the case with C-test takers.

It is worth mentioning that most of the ‘phonological’ comments in Singleton’s study refer to sound. Form-related introspections were considered by the subjects as either ‘positive’ (for e.g. ‘looks right’, ‘sounds familiar’ etc.) or ‘negative’ (for e.g. ‘not certain about the spelling’, ‘have never heard it before’ etc.). It seems that the students considered ‘phonological’ comments as ‘positive’ and ‘graphological’ comments as negative.

Singleton is led to the conclusion that when form-oriented solutions were offered by the subjects their decisions relied more on phonological considerations than graphological ones. Graphological considerations emerged only when the subjects had made a decision about the actual form of the word to be filled in. Finally, he suggests that when a word is accessed with difficulty, the phonological factor prevails over the graphological one. This conclusion is in line with Service’s (1992) findings and with the above-mentioned studies which claim that phonological representations are of prime importance in relation to the processing of unfamiliar lexical items or words that have not been well internalised into a person’s mental lexicon.

during this process they are encouraged to ‘think aloud’, that is, to express their thoughts as they move on with the translation.
2.2.5 Research into the role of cross-linguistic influence

Cross-linguistic influence plays a very important role in L2 lexical operations and both formal and semantic aspects of lexical items are affected by it (see e.g. Ellis R., 1985; Ringbom, 1987). The L1 is a resource of knowledge which learners use in order to compare and contrast the L2 data in the input and to perform in the best way in the L2. How exactly this knowledge of the L1 is used depends on many factors, i.e. the formal and pragmatic features of the native and target language and also the learner’s stage of development. The influence of the L1 is evident in L2 phonology (the phenomenon of ‘foreign’ accent) but is also present in many aspects of the L2 (e.g. vocabulary and grammar, as most teachers would readily testify). It has been also noted that L1 is susceptible to transfer as well.

L2 -d L1 transfer has been reported by many researchers in the past (Jacobovits, 1969; James, 1971) and has been re-introduced as an issue more recently in relation to immigrant speech and L1 attrition (Backus 1996; Boyd; 1993). Consequently, one may argue that there is evidence of cross-linguistic influence in both the L1 and the L2.

The role of cognates and false cognates has been studied in relation to the issue of formal and semantic L2 lexical processing. Laufer (1990a: 148; Benoussan and Laufer, 1984: 15) reported that learners make efforts to

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37 Overt cross-linguistic influence generally refers to the process of using knowledge of the native language when learning the target language.

38 Overt cross-linguistic influence can be divided into transfer and borrowing. Transfer does not mean a carrying over of surface forms or unanalysed chunks from L1 to L2 but involves an analysis of patterns. The L2-pattern is assumed to be similar or identical to the L1 pattern… In the area of lexis, semantic extensions on the basis of L1 and loan translations are examples of transfer…Borrowing, which occurs only at the domain of lexis, may result not from a gap in knowledge but from inadequate control (Ringbom, 1987, p. 51-52)
create links between new words in the L2 and languages already known to them and the same phenomenon is attested even between languages that are unrelated. In addition, in the cases where learners believe that there is a high degree of similarity between the L2 and other languages they know, they will try to establish links between words (Kellerman, 1979: 37; Ringbom, 1987).

This particular dimension of lexical acquisition is interesting in terms of the relationship that exists between L1 and L2 lexical knowledge which is the topic of the next section. The focus in the present section lies in the suggestion that semantico-pragmatic processes are evident even at the early stages of the learning of a new word, and as was noted by the above-mentioned studies of Papagno et al. and Service, these processes help in the integration of new words in the meaning systems of the lexicon by way of connecting them to words that are already internalized.

This suggestion is related to what was discussed in the previous subsections. First, word-association test findings do not provide evidence of an L2 mental lexicon being primarily phonologically organised as opposed to an L1 mental lexicon being primarily of a semantic orientation. Secondly, it was shown that L2 lexical acquisition is to a certain extent affected by formal factors which is also, however, the case with L1 lexical acquisition. In addition, it was suggested that semantic factors are of primary importance in both the L1 and L2. Thirdly, it was shown that both formal and semantic factors play a role in context-based L2 lexical acquisition. Finally, in relation to the establishment of L2 lexical memory
representations there is evidence of the importance of meaning even in the early stages of this process.

2.3 The L1 and the L2 mental lexicon: Integration/ Separation

In this section the question will be examined of whether the L2 mental lexicon is integrated with the L1 mental lexicon or whether they are separate. This issue has two important aspects. First of all, the question is of extreme importance to psycholinguists who need to know whether their models of lexical processing should include separate lexicons for every language the individual knows and whether or not connections between the L1 and L2 lexicon should be included – if, that is, they are separate. Secondly, language teachers are preoccupied with the question of the L1-L2 integration/ separation as they are concerned with the issue of L1 interference on L2 acquisition and performance, and are worried about how to account for it, and what steps to take to deal with it.

To start exploring the issue we need to mention that one argument against integration comes from the modularity hypothesis, that is, the idea that language is acquired and processed by a separate language module. There seems to be a difference of opinion among the proponents of the modularity theory as to which dimensions of lexical operations are part of the language module. Some modularists (see, e.g. Emmorey & Fromkin, 1988: 125) believe that a great part of the operation of the L1 mental lexicon is intramodular and some (see, e.g. Bley-Vroman, 1989: 42) claim that L2 knowledge internalized beyond childhood is extramodular. This means that the L1 and L2 lexical processing by an L2 learner who has
started learning the target language beyond his childhood years are completely separate.

Formal cross-language differences also provide an argument for the 'separatist' hypothesis. An individual in the process of deciphering morphologically complex words will turn to the phonological structure of more familiar lexical items and make a parallelism. (Stemberger & Mac Whinney, 1988: 101). As the languages the individual has acquired may be very different in phonological terms this would mean that this effort to make a parallelism depends on scanning the lexicon of each language separately.

Turning now to the integration hypotheses, such evidence comes from the overlapping areas of bilingualism research, research into cross-linguistic influence and research into communication strategies. Relevant studies for the integration and separatist hypotheses will be discussed in the following sub-sections.

2.3.1 Bilingualism Research

Many of the findings of bilingualism research seem to be in favour of Cook's (1992: 557) idea of 'holistic multicompetence', that is, the integration of language competence (lexical competence included) across languages. The following evidence is cited by Cook: Caramazza & Brones (1979) reported that reaction time to a word in a given language can be

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39 Bilingualism, in this context, will refer to studies involving subjects with advanced levels of knowledge of more than one language. In addition, subjects who have acquired two or more languages simultaneously from very early childhood will be included.
correlated with the frequency of its cognate in another language.

Christofanini, Kirsner & Milech (1986) claim that there is a significant correlation between morphemic similarities in two known languages and translation performance. Beauvillain & Grainger (1987) found that when an interlingual homograph is processed, such as *coin* (French ‘corner’, English ‘form of money’) bilinguals do not access the meaning specific to the language being used but in both the languages in question.

More evidence in relation to the integration question comes from Kirsner et al.’s (1984: 520) results who reported that when a subject is presented with a stimulus in a language he knows this will activate a relevant stimulus in one of his other languages. In another study Green (1986: 221) found that in the case of balanced bilinguals words are activated in both languages but those in the language not being currently used are stopped from reaching surface level. It seems to me that although all these studies appear to rule out the view that the L1 and the L2 mental lexicon are completely separated from each other they still do not provide sufficient evidence for complete integration. It could be possible that the L1 and L2 mental lexicons are separately stored but still in communication with each other, for example, with direct connections between individual lexical L1 and L2 representations (which could be especially evident in the case of cognates or homographs).

As far as arguments against integration are concerned one comes from the fact that bilinguals use one language at a time (the case of code-
switching\textsuperscript{40} deserves special attention and will be discussed below). This leads to the implication that some degree of separation exists between the L1 and L2 lexicons. More evidence comes from cases of language loss by bilinguals/multilinguals who suffered brain damage. In some of these cases there is evidence of a complete loss of language at the beginning and a subsequent recovery of the languages known by the individual. Grosjean (1982: 260) refers to the case of native speaker of Swiss German who first recovered a language he had learned as an adult – French, then High German, but never recovered Swiss German, his L1. Similarly, Whitaker (1978: 27) reports the case of an English classics scholar who, after a serious brain damage, recovered his languages in reverse order: Greek, Latin, French, and lastly, his native language English.

In relation to the question of how bilinguals access the lexicon they need Grainger (1994: 225) is interested in the question of when bilinguals use the information about the language a word belongs to in order to identify the specific word. He suggests that a possible location for such information could be at an individual lexical entry level or again the information could be located at a higher level of lexical organisation. According to the former possibility, the information about the status of the language a word belongs to would be retrieved from the same entry which includes phonological, semantic and syntactic information about the lexical item. According to the latter possibility this information would be part of the structuring of the

\textsuperscript{40} Code switching refers to the following phenomenon: bilinguals change their language code (by inserting units of another language (e.g. words, clauses)) in the course of speaking.
lexicon and, in this case, the lexical items of each language would belong to two separate networks.

Grainger cites several studies (e.g. Macnamara, 1967; Kolers, 1966; Soares & Grosjean, 1984) which support the idea that context is important in the processing of words in one language or another and that bilingual speakers find mixed stretches of speech such as *Ils ont mangé du sausages* et de la salade more difficult to process than unilingual stretches (for e.g. *Ils ont mangé du saucisson et de la salade / They ate sausage and salad*).

According to these researchers, this shows that the first words of a sentence trigger the appropriate lexicon in one or another of the individual’s languages and that lexical searching occurs, at least at the beginning, in that lexicon. The above stance is supported by research on interlingual homographs (such as *coin* (French ‘corner’, English ‘form of money’)), whose accessing in lists of words in one or other of the individual's languages will be based on how frequent that word is in that specific language (Gerard & Scarborough, 1989: 305).

Grainger, however, also cites research which suggests the existence of a relationship between the L1 and L2 mental lexicons. He refers to Preston & Lambert’s (1969) findings from a study based on the Stroop\(^4\) task, where the subjects are asked to name the colour of the ink in which a word is

\(^4\)Meara (1989, p: 233) gives the following description of the Stroop technique: ‘Subjects are given lists of words to read which have been printed in different colours. Typically three sets of words are used: a) a set of neutral words or colour patches; b) a set of colour words congruent with the printed colours, e.g. *red* printed in red?; c) a set of colour words that are incongruent with the printed colours, e.g. *red* printed in blue? The subjects’ task is to ignore the actual printed words, and to state the colour that the word is printed in. Thus given *red* printed in green ink, the correct response is green and not red’. 

written. They report that the subjects showed an increase of response when the written stimulus was different from the colour to be named (e.g. GREEN written in red) and this was also the case when the language of the written stimulus was different from the one in which the subjects were asked to say the colour of the ink. Grainger also refers to his own research on interlingual homographs (Beauvillain & Grainger, 1989 – cited above) which shows that an interlingual homograph triggers both meanings of the target word in both of a bilingual’s languages.

All in all, Grainger seems to reject the implication that bilingual lexical search evolves in a sequential way, that is language by language; rather he opts for the triggering of all appropriate lexical representations in both languages as a response to a stimulus item and the subsequent suppression of those representations that are not part of the contextual information or are not so distinct. More specifically, Grainger believes that, initially, lexical representations that resemble formally the stimulus item are activated from both languages. However, with the introduction of context a stage of selection begins in which lexical representations in the inappropriate language are suppressed whereas lexical representations in the appropriate one are activated. This becomes especially evident when the surrounding context comes from a dominant language. However, I think that this model does not exclude a level at which there is a separation between the two languages, where the lexicon of each language is activated separately by the triggering of lexical representations before
context comes into play and makes selection of the appropriate lexical item possible.

De Groot (1993: 27, 1995: 151) is another researcher who sheds some light on the way different lexical items are processed. She claims that a mixed representational system exists for a person who knows more than one language. Such a system includes concrete words and cognates stored in a ‘compound’ pattern and abstract words and non-cognates stored in a ‘co-ordinate’ pattern. This distinction points to Weinreich’s (1953) categories of bilingualism (co-ordinate, compound and subordinative). Two levels of representation are included for each of the above categories, the lexical and the conceptual (see fig. 1). For the co-ordinate bilingual translation equivalents are represented by two lexical items connected to two separate concepts. For the compound bilingual translation equivalents have one conceptual representation but two separate lexical representations. Finally, subordinative bilingualism is characterized again by a single conceptual representation but in this case the L2 word form is connected to L1 meanings through connections to L1 forms. Weinreich associates these three categories of bilingualism with different ways of learning the L2: subordinative bilingualism, when an individual learns the L2 through the L1; compound bilingualism, when school-based learning is involved or when the individual comes from a bilingual family where two languages are used equally; and co-ordinate bilingualism, when learning takes place in totally different environments. All
other things being equal, Weinreich points out that an individual's or a
group's bilingualism may be of a mixed type (cit. in De Groot, 1993: 33).

Fig. 1: The three types of bilingualism according to Weinreich
co-ordinate (A), compound (B), subordinate (C)  (in De Groot, 1993: 28)

Turning to De Groot’s mixed representational system she refers to her own
work and other studies in relation to her suggestion that concrete words are
stored in a ‘compound’ manner. De Groot et al. (1994: 601 ) focused on
Dutch /English bilinguals who showed that they were able to translate faster
congructe words than abstract ones. In addition, word association
experiments by Kolers (1963) and Taylor (1976) showed that the subjects
produced more translations as responses to stimuli that were concrete
words than to those that were abstract ones. Experiments on semantic
priming provide further evidence in favour of the compound model. Jin’s
research (1990) on Korean/English bilinguals showed that semantic
priming was evident interlingually in the case of concrete words but not
where abstract words were involved.

\[42\] By semantic priming is meant ‘the phenomenon that in a number of experimental tasks
a word is processed faster when it is preceded by a word (from the other language in the
bilingual version) to which it is semantically related’ (De Groot & Nas, 1991, p. 91).
De Groot also cites several studies in relation to cognates. Experiments on repetition priming\(^4\) (Kirsner \textit{et al.}, 1984) show that semantic priming between languages is ‘larger for cognates than for noncognates or that it occurs for cognates only’ (De Groot, 1995: 173). Furthermore, studies on word-translation tasks (De Groot, 1992: 1001; De Groot \textit{et al.} 1994: 600) provide more evidence of the suggestion that concrete words and cognates are stored in a compound manner.

A mixed representational system is also suggested by Kirsner \textit{et al.} (1993: 228) who claim that cognates may be ‘represented and stored as variants of the first language vocabulary’. This suggestion that there may be integration at the formal level in respect to cognates points to a ‘subordinative’ structure which according to Kirsner \textit{et al.} is a characteristic of bilingual lexical organisation in relation to cognates and not only at lower levels of proficiency as certain researchers have proposed (e.g. Kroll & Kurley 1988, see below) but at other levels of proficiency too. What is suggested, here, I think, is that formal aspects of words are of course important in the way they are represented in both the L1 and the L2 mental lexicon, something which was also pointed out in the discussion of the previous section.

So far, it seems that a total separation between the L1 and the L2 mental lexicons is not to be considered very probable. Data on code switching are

\(^4\) Repetition priming refers to the ‘phenomenon that a word is responded to faster in, for instance, a lexical decision task, when it is encountered a second time (or when it is preceded by its translation equivalent in the bilingual version of the task) during an experimental session’ (De Groot & Nas 1991, p. 90).
also used to shed light on the separation/integration question. Such data seem to exclude a totally separatist or integrationist system. De Bot & Shreuder (1993) seem to rule out the idea that bilinguals ‘switch on’ a given language and ‘switch off’ the other. Instead they provide evidence (by citing also Green, 1986; 1993 and Paradis, 1981) of a continuous activation of both languages at different levels. They conclude (1993: 212) that in activation models ‘words from the non-intended language may always slip in’, thus making complete separation between languages an impossibility. I believe that the sheer existence of cases of code switching where bilinguals insert either one-word or longer stretches of their second language in the course of speaking in their native language is an argument against complete separation.

The issue of lexical development of bilinguals from early infancy to puberty is also relative to the integration/separation question. Volterra & Taeschner (1978: 311) suggest that a single representational system exists for bilingual children under the age of two which has only one representation (from one language or the other) for every internalised meaning. The obvious, then, reading of these findings is that bilingual children begin to perceive the differences between languages after the age of two, which is thought to be the age when the separation of the lexicons becomes apparent.

Quay (1995: 370) produces counter evidence against Volterra’s and Taescher’s suggestion. In a re-analysis of their data Quay points out that they contain many cross-language equivalents. In one of her own studies
she reports the case of an English/Spanish bilingual child who at the age of one and a half had Spanish equivalents for 36% of her English vocabulary and English equivalents for 40% of her Spanish vocabulary. Zurer Pearson et al. (1995: 345) also reported similar results. However, one should not exclude entirely the possibility of a developmental process in bilingual lexical organisation. De Groot (1995) refers to a number of studies (e.g. Kroll & Kurley, 1988; Chen & Leung, 1989) which stress the role of proficiency in bilingual lexical organisation: low proficiency in adult bilinguals is matched with the subordinative structure and high proficiency in adult bilinguals with the compound structure. What is implied here of course is that a person’s lexical organization moves on a continuum, from subordinative to compound structure as overall proficiency increases.

However, I am a little sceptical about this notion of overall proficiency. As it was pointed out in respect to the word association test data it may be the case that bilingual lexical organisation depends on the gradual integration of words, passing from a more ‘phonological’ to a more ‘semantic’ status as they become internalised in the L1 and the L2, and not on an overall, a global proficiency in both languages. Lexical organization, then, both in the L1 and the L2 would consist of connections between words which differ from each other in terms of the degree of their integration. One explanation for overall quantitative differences in bilingual studies such as the ones referred to above (Kroll & Kurley, 1988; Chen & Leung, 1989) could be that if a person is quite proficient in a particular language, the more likely it is that a great many lexical items will have been well integrated and will have
established strong connections with other items, hence the claim that high proficiency is an indication of a compound structure.

2.3.2 Cross-linguistic influence

The role of cross-linguistic influence was discussed in the first part of the chapter in relation to its importance in lexical operations and some studies were presented in favour of the suggestion that the L2 mental lexicon, like the L1 mental lexicon, is mostly meaning-driven. Some relevant studies were presented in the above section of bilingualism research which excluded the possibility of a total separation between the L1 and the L2 mental lexicons. In the following section we will further explore the issue of cross-linguistic influence regarding the separatist/integrationist hypotheses.

It has been shown that learners try to make connections between new vocabulary in their target language and words in languages that they know even if there are no apparent relations between these languages (Laufer, 1990a: 148; 1993-94; Benoussan & Laufer, 1984: 15). These connections can be both of a semantic and a formal nature. For example, Giacobbe (1993-94: 29) refers to the case of a Spanish-speaking individual who in the process of acquiring French naturalistically showed evidence of both semantic and form-oriented processes: when encountering the French word *cuisine* she either associated it with the Spanish word for ‘kitchen’ – *cocina* –, thus generating forms like [kosin] and [kosi] or she tried to reproduce the French form faithfully, thus generating forms like [kusin] and [kwisin]. In an attempt to interpret the above findings we could say that
complete separation at the lexical level between the L1 and the L2 mental lexicons does not seem entirely possible.

Error analysis is an area which has produced many cross-linguistic findings in relation to lexical operations. In a study of the written errors in German committed by first-year university students of German, Grauberg (1971: 261) found that 50% of the 102 lexical errors identified had cross-linguistic influence (35 were the result of faulty notions of equivalence between English and German and 16 were the transfer of English expressions). Singleton (1987: 337) reports similar results from a study of cross-linguistic influence on the semantic and grammatical dimensions of the French interlanguage of a native speaker of English learning French. The majority of the transfer errors are of a lexical nature as in Grauberg’s study. However, the area of transfer seems to be not so much English, the L1, but Spanish, one of the subject’s L2s. Singleton explains this as arising from the fact that the subject perceived Spanish to be closer to French than to English – a reference here to the psychotypology argument (e.g. Kellerman, 1979: 37; Ringbom, 1987). Furthermore, Singleton's findings contain many coinages based on English and/or Spanish words (e.g. [tipi'kal] for typique (cf. English typical)).

In respect to L2 coinages, findings from the TCD MLRP point to an ‘existence of at least an interface between L1 and L2 lexical operations’ (Singleton 1996b: 248). Coinages are lexical forms that native speakers
would not recognise as existing in their language. For example, the following innovations reported from a TCD MLRP French C-test illustrate the fact that the formal idiosyncrasies of L2 lexical coinages can be attributed to cross-linguistic influence: *volcanos* (C-test stimulus vol-, required word *volcans*, cf. English *volcanoes*), *excludait* (C-test stimulus excl-, required word *excluait*, cf. English *excluded*). It would not be easy to explain such coinages without the existence of some kind of interaction between the L1 and the L2 mental lexicons.

Productive transfer errors such as the above could be explained in terms of ‘borrowing’ (e.g. Krashen, 1981: 67) which is a communication strategy that involves not only the continuous consultation of the lexicon or lexicons of the language which is the medium of communication at a given time but also the consultation of knowledge from another lexicon in order to make the borrowed lexical items ‘presentable’. It is obvious that this interpretation suggests that the lexicons of languages can be consulted at any given time during the communication process.

The cross-linguistic dimension is also apparent when it comes to the deliberate learning of vocabulary. Stoffer (1996, cit. in Singleton, 1997) conducted a study in order to assess the use of vocabulary-learning strategies by a large group of American students of different foreign languages. The analysis of the data revealed nine factors of which the most frequently occurring one was ‘Strategies Used to Create Mental Linkages’;

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Psychotypology or perceived language distance refers to the learners’ perception of the degree of similarity or distance between their target language and other languages at their
the most dominant of the strategies included under this category was that
of linking L2 words to L1 words. I think that such links would not be
possible if the L1 lexicon were not in some way connected to the L2 lexicon
in order to facilitate the comparison of the lexical items.

However, one cannot safely assume that complete integration exists
between the L1 and the L2 lexicon. Many L2 errors are not attributable to
L1 influence (e.g. over-/under generalization can also be responsible for L2
errors). A number of studies in the error-analysis area reported that no
more than a third of the L2 errors of the learners in these studies were
committed because of cross-linguistic influence (e.g. Lance, 1969; George,
1971, cit. in Singleton, 1981: 4f). Consequently, it seems that a substantial
part of L2 productive processing does not rely on L1 knowledge.

2.3.3 Communication strategies

The area of communication strategies will be analysed here in relation to
the integration/separation question. We will first look at the way
communication strategies exploit the lexical knowledge of languages other
than the one the speakers are using for communication at a given time.
Secondly, an area of interest pertaining to lexical organization is the
similarity that appears to exist between communication strategies employed
in L1 and those used in L2.

\[\text{disposal.}\]

\[\text{Communication strategies are generally thought to be responses to problematic areas}\]
\[\text{the learners face during communication. Faerch et al. (1984: 154) define them as}\]
\[\text{‘problem-solving devices that learners resort to in order to solve what they experience as}\]
\[\text{problems in speech production and reception’}.\]
With regard to the first aspect, many researchers have reported the use, in many ways, of lexical knowledge of languages other than that the speakers are using for communication at a given time. More explicitly, Tarone (1977, cit. in Faerch & Kasper, 1983b: 47), refers to ‘conscious transfer’ which is seen to comprise ‘literal translation’\(^{46}\) and ‘language switch’\(^{47}\). In addition, Faerch et al. (1984: 154) include in their list of strategies one called ‘L1-based strategies’ which covers ‘code-switching’. It is evident that the application of such strategies relies on the existence of a connection between the mental lexicons of the languages in question.

Concerning the similarities between strategies used by L2 learners and those employed by L1 users, Kellerman (1991: 153) has pointed out to those that advocated the formal teaching of strategic language use\(^{48}\) to L2 learners that ‘such behaviour is surprisingly commonplace amongst native speakers’: for example, there are cases where in a group of people there is an expert and the others are novices who need to find out what an item is called in the L1 (Kellerman, 1991: ibid.). In the present discussion such evidence should be analysed in relation to the resemblance of processing mechanisms between the L1 and the L2 mental lexicons. Since strategic language use is a part of language processing, then, the evidence

\(^{46}\) ‘If a lexical item is adjusted to IL (interlanguage) lexical level (e.g. translating compounds or idiomatic expressions from L1 verbatim into L2), then the strategy of interlingual transfer is sometimes referred to as «literal translation»’ (Tarone, 1977). (Faerch & Kasper, 1983b: 47).

\(^{47}\) Both ‘code-switch’ or ‘language switch’ (Tarone 1977, Corder, 1978) are used to refer to the switching from L2 to either L1 or another foreign language in the course of communication. They ‘may involve varying stretches of discourse from single words up to complete turns’ (Faerch & Kasper, 1983b: 46).
presented about strategic language use being common among L1 and L2
techniques indicates that the L1 and L2 mental lexicons are in
some way connected.

2.4 Conclusion
In this chapter relevant research concerning the L2 and the L1 mental
lexicon was reviewed. Two issues in particular are of interest: a) the issue
whether the L2 mental lexicon is basically more form-driven than the L1
mental lexicon which is considered to be more semantically-driven, and b) the issue of the connectedness or not of the L1 and L2 lexicons.

In respect to the first question what appears to emerge from the discussion,
which reviewed a range of research areas, is that there is enough evidence
that the L2 mental lexicon is not qualitatively different from the L1 mental
lexicon in relation to form and meaning; formal processing plays an
important role in both L1 and L2 in the early stages of the acquisition of a
word but it is semantic processing rather than formal processing that is
prevalent in lexical acquisition – in terms of the integration of the word in
the mental lexicon – again in both L1 and L2. It seems that the
predominance of semantico-pragmatic links or phonological associations in
the processing of a word depends not on the status of the language (L1 or
L2) in which this word exists but on the level of proficiency of the speaker
(native speaker or second language learner) with that particular word: the
less familiar the speaker is with the word the more likely is phonological

48 Strategic language use refers to ‘the means by which a system can perform beyond its
formal limitations and communication can proceed from a limited linguistic system’
(Bialystok, 1990: 147).
processing to be triggered – as the word has yet to become part of the
speaker’s internal semantic schemata, while the more familiar he becomes
with the lexical item the more likely is semantic processing to be triggered.
This particular issue will be investigated in the empirical part of this study in
an effort to provide further evidence for this viewpoint.

In relation to the second issue it appears that the L1 and the L2 mental
lexicons are not totally separated from each other nor completely integrated
with each other. It would appear that the two lexicons are separately stored
but they communicate with each other, possibly with direct links between
individual L1 and L2 lexical items. It also appears that the relationship
between an L1 and an L2 lexical item will not be the same for all
individuals, that different factors seem to influence such relationship, such
as the way the words were acquired, the level of familiarity of the individual
with the words in question, and finally the extent to which the individual
perceives formal and/or semantic resemblances between the L1 and the L2
lexical item. The issue of whether the L1 and the L2 mental lexicon are
interconnected or not will also be addressed in the empirical part of the
thesis but no hypotheses will be put forward as the focus in this study is on
whether the L2 mental lexicon is intrinsically more form-driven than the L1
mental lexicon.
PART 2

Experiments and Discussion
CHAPTER III

This chapter introduces the experimental part of the study. The first three sections offer a description of the subjects who participated in the study, outline the methodology, and present the particular instruments and procedures used to elicit the data. The subsequent sections deal with the actual empirical part of this thesis followed by discussion based on the findings.

3.1 Subjects

The twenty seven (27) subjects involved were all full-time first-year students enrolled at the School of English Language & Literature of Aristotle University of Thessaloniki. All the students were asked to fill in a questionnaire about their general education and more specifically about their language-learning experience. The questionnaire used was a modified version of the TCD MLRP\textsuperscript{49} questionnaire. The first part was devised by the present writer and it included questions in Greek about the subjects’ previous and current, at the time, education (primary, secondary education and university-entrance exams). The second part was based on the TCD MLRP questionnaire and focused on language learning and more specifically on the subjects’ reasons and experiences for learning English and other foreign languages. Large amounts of information were collected, as expected; what will be used in this study is only the relevant information about the subjects’ level of English. It evolved that all the subjects were

\textsuperscript{49} TCD MLRP stands for Trinity College Dublin Modern Languages Research Project.
advanced learners of English, something which can be also attested by the fact that they all had high grades in the foreign-language module (English) of the state run university-entrance exams: on a scale of 0–20, 14 of the students were graded from 17.5–18.5 and 13 from 18.5–20. In addition, all twenty-seven students had sat successfully the Cambridge Proficiency Examination which was taken as further indication for their level.

3.2 Methodology
Samples of the L1 and L2 performance of the subjects were collected via word-association tests and C-tests. The particular instruments and the procedures used to elicit the data will be discussed in detail below. However, before I begin the discussion it would be worth mentioning a few things about the gathering of the data. My aim was to include in the study all the undergraduate students enrolled in the course ‘Contemporary English Language I’ which I was involved in teaching at the time (1995). Soon, it became clear, though, that this aspiration was not to be fulfilled. Certain difficulties arose in relation to the elicitation of the samples. In order to make sure that the elicitation procedure would take in all the enrolled students it became necessary to schedule the sessions during (at the beginning or the end) the teaching of the above-mentioned course. This obviously meant that I had to operate on borrowed time and that extra care was needed in order to make sure everything would run smoothly under such tight constraints. Secondly, another difficulty had to do with the fact that since the class was not compulsory (as many courses in this University) I did not have 100 per cent attendance. Each time a partly differently composed set of students would turn up for the class. Given the
nature of the study, the students had to participate consistently in two word-
association tests, two C-tests and a questionnaire in order for the study to
generate reliable results. This meant that the only the students who participated
in all five elicitation sessions could be considered. After the completion of
the five sessions it emerged that thirty-six (36) students had sat through
every one of the five sessions. However, I had to exclude nine students
from the sample after it emerged that their grade in the English language
module of the state university-entrance exams was below 17; my aim was
to test the performance of advanced students of English and therefore I
had to be careful in the selection of the students.

3.2.1 The C-test as elicitation instrument
One of the elicitation instruments used to probe into the subjects’ L2
competence in this study is the C-test. The C-test was first developed in
Germany (Klein-Braley, 1985a; Raatz, 1985; Raatz & Klein-Braley, 1985).
The subjects have to restore to wholeness a short written text, every
second word of which has had its second half deleted. To elaborate on
that, the first sentence of the text is left unmutilated to provide the subjects
with some context. Single letter words are left intact. Words which have an
odd number of letters have one more letter removed than is left standing.
All proper nouns are left undeleted. To ensure contextualization the text is
left running on, unmutilated, after the end of the deletions.

Klein-Braley & Raatz advocate the use of the C-test for a number of
reasons. First, because when compared to the deletions in standard close
tests, the C-tests offer more densely distributed deletions. Secondly, the
deletions may include examples of all grammatical categories in a given
text. Moreover, since native speakers find C-tests rather easy to complete,
it would be interesting to investigate the difficulties the C-tests pose for
learners and what these reveal about L2 processing. Furthermore, since
the C-test takers are unable to change the order of the items of the test, it
seems that the knowledge investigated by the C-test is mostly lexical in
nature?knowledge of word structure, collocability, colligability, content
words, grammatical words, grammatical class adherence,
subcategorization frames (Little & Singleton, 1992: 176).

3.2.1.1 The C-test in relation to L2 acquisition and processing

We will further explore the question of the use of the C-test in relation to L2
acquisition and processing. The C-test cannot be included in those
methods used to elicit data in a spontaneous way and it has had its share
of criticism over the years. For example, Ellis and Beattie (1986: 229) claim
that ‘an over-concentration on isolated decoders processing text has
caused psycholinguists to spend a lot of time and effort discovering things?that a greater awareness of the conversational decoding would have made
more obvious and less surprising’. However, Ellis & Beattie concede that
much can be learned by such experimental data.

The above criticisms regarding experimental findings which come usually
from the area of psycholinguistics are based on the claim that the
experimental instruments employed are outside the context of natural
language use and that the language stimuli used in such methods of
research are decontextualized. In respect to the question of naturalness
Singleton & Singleton (1998: 157) argue that the C-test could be seen as bridging the gap between an experimental and a naturalistic approach in respect to data-elicitation. It is experimental in the sense that it imposes a task to the subjects, a task that is not usually related to their use of the language. However, the subjects do not have to deal with decontextualized language items but with real, authentic text. In addition, it can even be suggested that the C-test resembles some ‘real-life’ linguistic tasks where a person is faced with decoding or reconstituting a written piece that has been ‘ill-treated’ (e.g. by inkstains, raindrops, tearing etc.).

My own opinion is, that there is no reason why researchers should not use a range of methods of gathering evidence provided that the analysis of the data is sensitive to the techniques and conditions under which they were elicited.

More evidence in respect to the naturalness of the C-test is offered from the field of psycholinguistics. While Fodor (1983) claims that the processing of gapped written material must depend on mechanisms outside the area of normal linguistic communication since, according to his view, this kind of processing is unnatural (and so it is excluded from his idea of the ‘language module’), the majority of psycholinguists seem to believe that, regarding the subjects’ use of context, a degraded written item is more likely than an undegraded (intact) written item to generate processing that is similar to speech processing (e.g. Ellis & Beattie, 1986: 225 ? 226; Harris & Coltheart, 1986: 170).
Empirical work on the validity of the C-test reported high correlations with other factors relative to language proficiency (school grades, teachers’ reports, results of other types of valid language tests). Grotjahn (1992b), cites many studies\textsuperscript{50} in order to corroborate the suggestion that the performance of C-test takers is closely related to their language performance in other settings (cit. in Singleton & Singleton 1998: 157).

Certain researchers, mostly Baur & Meder (1989, cit. in Singleton & Singleton, 1998: 157) claim that the area of language proficiency investigated by the C-test is essentially that of the cognitive/academic proficiency\textsuperscript{51} as opposed to the interactive/communicative area. Grotjahn (1992b: 8) is in favour of this suggestion and comments upon the similarity of the above distinction with Cummins’s distinction (1980: 176) between ‘Cognitive/Academic Language Proficiency (CALP)’ and ‘Basic Interpersonal Communicative Skills (BICS)’. In view of the above, Grotjahn suggests that the C-test bears resemblance to a CALP-test\textsuperscript{52}. Singleton & Singleton (1998: 158) offer a number of counterarguments to this suggestion. First, one could argue that degraded written material (like that offered by the C-test) is more likely than undegraded written material to generate processing that is similar to speech processing (e.g. Ellis & Beattie, 1986: 225 ? 226; Harris & Coltheart, 1986: 170). Degraded written

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\textsuperscript{51} Successful performance in the following situations would mean a high level of cognitive/academic proficiency: writing professional letters, official documents, academic prose and press reports. Successful performance, on the other hand, in telephone and face-to-face conversations would be an indication of a proper use of basic communicative skills.
items behave like ephemeral spoken units in actually evoking use of context for their decoding and in making subjects use more ‘top-down’ strategies than would be necessary in the case of undegraded written units. Another argument would be that C-test results have had significant correlations with the results of tests that were designed to be ‘communicative’ (Wright, 1990). Finally, it seems that the CALP ? BICS dichotomy is somewhat hazy. Cummins (1980: *ibid*) does not make a clear equation between CALP and literacy skills and BICS and oral/aural skills.

To sum up, it could be suggested that the C-test does not assess those skills that are interactive in an immediate situation (e.g. turn-taking, interrupting); however, it is well known that communication involves more than interaction and that interactive communication is also based on competences that are used outside the context of interactive language use.

Chapelle (1994: 158f.) raises certain questions over the validity of the C-test as an instrument that sheds light into lexical competence. I think that one possible answer to whether the C-test can be used to investigate lexical competence would be that subjects are certainly engaged in word finding and lexical search. The C-test’s purpose is to assign appropriate lexical items to specific contexts; the initial elements of the degraded stimuli assist the subjects in their endeavour just as the equivalent cues (e.g. ephemeral spoken stimuli) assist people in word recognition and lexical search in language production. In respect to word recognition, experiments

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52 According to Cummins ‘s distinction between ‘Cognitive/Academic Language Proficiency’ and ‘Basic Interpersonal Communicative Skills’, a cloze test would be considered to be a CALP test whereas an interview would be thought of as a BICS test.
from ‘speech-shadowing’ tasks (Marslen-Wilson & Tyler, 1980; cit. in Aitchison 1994: 7-8) have shown that while native speakers need 369 milliseconds to say a word, they can identify a word in 200 milliseconds from its onset; a fact which indicates that recognition depends on the initial segments of words. In relation to lexical search in the productive mode, findings from ‘tip-of-the-tongue’ phenomena (R. Brown & McNeill, 1966: 235) suggest that the initial segments of a word are more prevalent in lexical search and they are not involved in errors as much as the medial or final elements of words.

In conclusion, it does appear that the C-test investigates L2 lexical competence. Little & Singleton (1996: 81) suggest: ‘Since the procedure allows for no intervention on the part of subjects in the order of elements in the text, their command of L2 syntax can be engaged only to a very limited extent and in its most lexical dimension (attribution of grammatical category, reading of subcategorization frames, etc.’). What the test investigates is the way subjects access and use L2 lexis which is semantico-pragmatically related to a given context. There are advantages

53 Shadowing is a quite common technique in psycholinguistic experiments: ‘The experimenter asks the subjects to wear headphones into which a stream of speech is played. Subjects are then asked to repeat what they hear as they hear it’ (Aitchison, 1994: 8).

54 An experiment involving a modified version of the C-test conducted by Joannopoulou (1992) showed that the above finding (word recognition taking place on the basis of the initial segments of words) applies to second language learners as well. The version of the C-test designed by the writer included three types of deletions: a) words that had their final half deleted, b) words that had their initial half deleted, and c) words that had only their middle part left standing, their initial and final parts being deleted. The results showed that for both native speakers and learners the initial segments of words are more salient than the final or medial segments, a finding which was interpreted as indicative of a similar lexical organization in the L1 and the L2.
that the C-test offers both in relation to the relative naturalness of the
language it elicits and in relation to the linguistic area it investigates.

3.2.2 The word-association test as elicitation instrument

Word-association experiments have existed since the beginning of this
century. Word-association research has been criticized mainly on the
grounds that it does not seem to offer a clear picture of the relationship of
words in the lexicon. R. Carter (1987: 161), referring to the word-
association data gathered by Meara (e.g. 1980, 1984) under the realms of
the Birkbeck Vocabulary Project, suggests that 'the use of discrete
vocabulary items may tend to obscure or even to misrepresent the map
drawn between words by speakers'. In addition, Aitchison (1994: 83)
suggests that as this method is somewhat unnatural it may not reflect the
processes involved in speech production. Nelson (1977: 112) claims that
due to the unnaturalness of the task we cannot draw conclusions about the
subjects’ linguistic knowledge or their knowledge of the world, but we can
understand what aspect of information associated with the word is salient:
'What will be elicited in the word-association task will depend upon the
salience of particular relationships for a particular word concept'. Meara
(1984: 232), on the other hand, feels that word-association tests are 'a
good way of gaining some insights into the semantic organization of the
mental lexicon'. I believe that findings from word-association tests, if
analysed in a sensitive and sensible way, can complement and lend credit
to findings that have resulted from studies of other types of lexical data.
Since word-association tests have been used so extensively in the area of
the L1 mental lexicon, and more recently the L2 mental lexicon, (e.g. Meara, 1980, 1984; S-derman, 1989, 1993; Singleton 1993-94b, 1994), it appears that any lexically-oriented study without a word-association test included in the instruments used to elicit data would probably have a face validity problem.

The word-association technique, in its simplest form, involves the presentation of a number of single words to the subjects who are then asked to respond with the first word that each of the stimuli makes them think of. The type of word-association test chosen for the present study is the ‘continuous association’ type: subjects are required to produce as many responses as possible to every stimulus word within a specified time limit (e.g. Randall, 1980). Meara (1980: 238) suggests that this method shows stable response patterns with as few as 15 subjects while the ‘traditional’ single-response test has been reported to produce stable results when larger numbers of subjects are involved (Deese, 1965). According to Randall (1980: B5) the continuous association type provides better insight in the organization of the mental lexicon and a better picture of the way the store changes.

The list of stimulus words that has been very widely used in a large variety of studies is the Kent ? Rosanoff list (1910) of 100 frequently occurring words which are emotionally neutral. Well documented sets of response norms exist for these 100 words, covering different geographical locations, types of subjects involved, and periods of data elicitation. This list has also been translated into some European languages (French and Italian by
Rosenzweig (1961), German by Russel (1970), and Spanish by Haworth (1979)). The translation made it possible to compare the associations of English-speaking learners of these languages with associations produced by native speakers.

Meara (1980: 234) reports that one of the most striking features of word association data is the high level of ‘associational stereotypy’ found among the responses of adult native speakers, who are found to produce highly predictable and stereotypical associations which are ‘noteworthy principally for their banality’. However, as Meara points out the levels of stereotypy vary from one culture to another. Children and second language users exhibit lower degrees of stereotypy, a finding which leads Meara (1983: 34) to believe that it reflects perhaps the fluctuations and internal chaos of the developing lexicon. A second finding relates to the syntagmatic?paradigmatic shift in the responses of both native speakers and learners55. Meara (1984: 233 ? 234) interprets both these findings as revealing that L2 lexical operations are predominantly phonological. However, as has already been pointed out (S<e>derman 1989, 1993; Singleton 1994) the syntagmatic?paradigmatic shift (similarly with the shift from proportionally more to proportionally fewer clang responses) seems to be related to the proficiency level of both a native speaker and an L2 learner in respect to particular words: a particular word will elicit different types of response (phonological or semantic) at different levels of its integration into a person’s mental lexicon irrespective of the language (L1

55 For a more detailed discussion see chapter II, sections 2.1.1, 2.1.2 and 2.1.3.
or L2) it belongs to and of the person’s proficiency level in the particular
language (L1 or L2). Actually Meara (1980:238) does point out the
existence of proficiency as a factor in word association response types.
However, this seems to imply that the shift in learners’ associations may
occur as a result of their general proficiency in the second language,
whereas it appears that the shift takes place both in the L1 and the L2 and
it depends on the learner’s or native speaker’s familiarity with a particular
word at a given time.

To move on now to the actual experimental part of this thesis. This part
begins with an outline of the aims of the present study. Two subsections
follow: the first one deals with the word-association tests and the second
with the C-tests. Both subsections include a presentation of the hypotheses
to be tested, a description of the methodology used to collect and analyse
data and finally an analysis of the results followed by detailed discussion.

3.3 Experiments
3.3.1 Aims of the study
The present study seeks to conduct an empirical investigation of the
relations that exist between words in the L2 learner’s lexicon. The
emphasis is on the lexicon of the advanced learner and the concern is to
investigate the extent to which L2 operations are similar to L1 operations in
respect to form and meaning. The majority of studies of this type (word
association experiments and C-tests) have focused on foreign learners of
English of different language backgrounds. This study involves native
speakers of Greek, a language not investigated in any detail under this light in previous research (see also Joannopoulou, 1992).

3.3.2 Experiment 1: Word association tests

3.3.2.1 Hypotheses

As outlined in chapter 2 word association research in the L1 has shown evidence of a shift in response type from syntagmatic to paradigmatic responses between five and ten years of age. There is evidence of a similar shift taking place in L2 development; the percentage of paradigmatic responses increases with proficiency and the numbers of clang responses (phonetically related responses) are found to diminish with increasing L2 proficiency. It was also pointed out that recent word association research indicates that both syntagmatic and paradigmatic links are prominent in the lexicon and it is not clear which has priority over the other. Moreover, the difficulty in the distinction between paradigmatic and syntagmatic responses in word-association responses was also stressed. Furthermore, researchers seem to abandon the use of the term ‘syntagmatic-paradigmatic shift’ in favour of the term ‘shift in response type’ which proposes a similar lexical development in both the L1 and the L2: a particular word will elicit different types of responses (phonological or semantic) at different levels of its integration into a person’s mental lexicon irrespective of the language (L1 or L2) it belongs to and of the person’s general proficiency level in the particular language. The shift, then, is directly related to the proficiency level of both native speakers and learners in respect to particular words, not in respect to overall proficiency.
Consequently, given that these are some of the characteristics of the lexicon in both the L1 and the L2 and bearing in mind that apart from a couple of stimulus words the rest of the stimuli are relatively frequent to the advanced learners who participated in the study (which is taken as an indication that the shift has already occurred), I hypothesize that when the two sets of responses are compared they will exhibit similar results:

1. significantly higher numbers of semantic associations (P+S+P/S+SI) when compared to phonological associations (clang responses) in both the L1 and the L2
2. low proportions of clang associates in the L1 and the L2
3a. high numbers of syntagmatic, paradigmatic and other semantic responses in both the L1 and the L2
3b. approximately equivalent proportions of syntagmatic, paradigmatic and other semantic responses when the two languages are compared

3.3.2.2 Presentation of the stimulus words and data collection techniques

Fifty stimulus words were selected from the Kent?Rosanoff list (1910) of 100 frequently occurring and emotionally neutral English words. The Greek translation of the words was provided by the present writer. All the main word classes were represented among the fifty stimulus words. The full list of words and their translation equivalents are included in Appendix A.

It is necessary at this stage to point out a few problems that I encountered in relation to the translation of the Kent?Rosanoff list. In many cases the translation of the stimulus words did not seem obvious. For example, the part of speech of some of the English stimuli is ambiguous: comfort,
command, whistle, wish, stem, dream, head and others may function as verbs or nouns. This is not the case in Greek, thus a verb or a noun had to be chosen. An effort was made to represent both classes. A second problem had to do with which sense of the English stimulus to translate, as this was not always clear. This difficulty in providing lists of suitable translation equivalents becomes obvious when one considers the fact that sometimes it is impossible to know which sense of a word the subjects will concentrate on. However, as this applies to both English and Greek it is not such a great drawback as the subjects are not disadvantaged as to the type of response they may provide in both languages. Still, I feel that the differences in the meaning of some words in the Greek and English list is a negative factor when the lists are compared.

Turning now to the actual presentation of the stimulus words, it was considered appropriate to administer the English set first to the students in order to discourage any influence by the Greek test in their foreign language responses. It was also felt necessary to administer the two sets on two separate occasions (a time interval of two weeks elapsed) in order to avoid the establishment of any chaining or switching pattern in the responses.

The word-association task used in this study is the ‘continuous association’ type. This type was selected as it seems to offer some advantages over the ‘traditional’ single response type.

56 These abbreviations stand for: P = Paradigmatic association, S = Syntagmatic association, P/S = Paradigmatic and Syntagmatic association, Si = Situational association.
The presentation of the stimuli proceeded as follows: The participants were informed that an experiment which would be the basis of my project was about to take place (the students had already given their consent to participate in the experiments on a previous occasion). The basic outline of the procedure was explained orally. The first stage was the distribution of the answer sheets (see copy of the answer sheet in Appendix A). and the presentation of an example. The stimulus τραπέζι (table) was presented on an overhead projector and the students were encouraged to respond with a series of words that came to their minds. Subsequently, the responses were written in the space allocated for the example, marked ‘0’. No restrictions were put on the response type. Two more examples followed. The next stage was the presentation of the fifty stimulus words using an overhead projector. Each word was presented for 30 seconds (timed by chronometer). At the end of the allotted time the number of the following word was announced, which was subsequently projected. The same exact procedure was followed for the English set after two weeks.

### 3.3.2.3 Classification of the data

The data have been classified into six main categories. A code letter has been assigned to each category for abbreviation purposes.

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>CODE</th>
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<tbody>
<tr>
<td>3.3.2.3a paradigmatic association</td>
<td>P</td>
</tr>
<tr>
<td>3.3.2.3b syntagmatic association</td>
<td>S</td>
</tr>
<tr>
<td>3.3.2.3c paradigmatic and syntagmatic association</td>
<td>P/S</td>
</tr>
<tr>
<td>3.3.2.3d situational association</td>
<td>Si</td>
</tr>
</tbody>
</table>
3.3.2.3a Paradigmatic association

In chapter I (1.4.2) it was pointed out that paradigmatic relations hold between words that can be substituted for each other in a construction. Paradigmatically related lexemes which are semantically linked can be related in various ways (e.g. they may be descriptive synonyms as in rich and wealthy). Some of the most important meaning relations that were identified in the responses of the subjects are those of synonymy, hyponymy, meronymy and incompatibility\(^{57}\).

For the purpose of classifying a wide range of words in this study synonymy is to be taken in the wider sense of the relation that holds between words with approximately the same descriptive meaning. Since two words almost never have the same syntactic occurrences and even where they share some syntactic patterns and referring expressions they usually differ in what they suggest, it would be contrary to the purposes of the present study to use absolute synonymy as a rule for classifying the subjects’ responses. Words which have the same descriptive meaning but different distributions will be considered as synonyms (e.g. hide/conceal). In addition, near-synonyms, that is, words with similar but not identical

\(^{57}\) See Chapter I, section 1.4.2. for definitions and a brief discussion on sense relations.
meanings will be included in this category. In this sense a lot of words in the vocabulary have several synonyms (e.g. fog/mist).

Numerous cases of hyponymy were identified in this study. However, I would like to point out a few problems I encountered in respect to hyponymy. First, not all groups of related words seem to have a superordinate (e.g. there is no English vocabulary item that includes uncle and aunt), thus instances of lexical gaps exist in this relation. In respect to polysemous words one meaning may be generic and operating as a superordinate to another meaning (for e.g. man: man, woman, child). More specifically, two subcases of hyponymy were identified: the adult?young and the male?female relation. Gaps seem to exist, once again, in these relations. For example, in the male-female relation sometimes there is a distinct general term for an animal, as in sheep: ram, ewe whereas in other cases the male name is general, as in lion: lion, lioness. An interesting characteristic of hyponymy is its hierarchical nature: one term may function as the superordinate to a number of hyponyms but at the same time it may function as a hyponym to a higher superordinate. For example, butterfly and spider are hyponyms of insect and insect can be considered to be a hyponym of animal. In this case, one may assume that the relationship is transitive so that butterfly and insect are both hyponyms of animal.

Some instances of incompatibility were identified in the responses of the subjects in this study. More specifically, words which belong to the same level of taxonomy, that is, to the same level in a classification system, were produced (e.g. the colour terms: red, green, blue, yellow etc.).
the colour terms red and green are sister members of the same taxonomy and are incompatible with each other. During the classification of the data cases of meronymy, that is, part-whole relations between lexical items were also identified: (e.g. foot : body).

It should be mentioned here that this definition of paradigmatic relations differs from the one usually employed by researchers using word association tests. The usual criterion for classifying a word as a paradigmatic association is equivalence of word class. Words belonging to the same word class were considered to be paradigmatically associated (e.g. Soderman, 1989, 1993; Meara, 1978, 1980; Nelson, 1977; Politzer, 1978). However, as was pointed out in Chapter II (2.1.2) the classification of the words into the syntagmatic or paradigmatic category needs to be handled with more care. Meara (1982: 30), for example, complained about the difficulty of actually distinguishing between these categories in practice. The criterion of equivalence of word class used for assigning words in the paradigmatic category is used as a determining factor in this study as well. However, not all words belonging to the same word class were classified as paradigmatic. It is possible for words which belong to the same word class to be in a syntagmatic relation with each other, for example in the case of collocations (bright red) or idioms (up and about). In the first case, for example, both bright and red are adjectives, so one could argue that they should be included in the paradigmatic category since they are of the same word class; however, closer attention would reveal the fact that these words form a collocation, and since they are involved in a grammatically
well-formed combination they should be included in the syntagmatic
category. Another difference from the traditional definition of the terms has
to do with the exclusion from this category of words belonging to the same
word class as the stimulus but which do not seem to have any semantic
relation to it (e.g. sickness ? clock). This decision was taken on the basis of
the aims of this study which has as its target to investigate the extent to
which L2 operations are similar to L1 operations in respect to form and
meaning. Therefore, my interest lies in the separation of the responses into
semantically motivated ones and form-originated ones (i.e. clang
responses). Actually, that is why the category of clang responses was first
introduced by researchers working with word association tests (e.g.
Söderman, 1989, 1993; Meara, 1978, 1980). Consequently, I have decided
to separate those few responses which seemed to me to be semantically
unrelated to the stimulus (but were not clang responses) for the same
reason.

3.3.2.3b Syntagmatic association

Syntagmatic relations hold between words combined with each other in a
syntactic sequence. Collocations, idioms and compounds are included in
this category. In this study it was noticed that the students sometimes
formed compounds that consisted of several parts (e.g. second-class
citizen).

Taken in its wide sense collocation ‘refers to any syntactic combination of
words’ (Van Roey, 1990: 46) and this relatively broad definition will be used
in the classification of the data. This includes examples like river bank,
working mother, very noisy, soft pillow. Combinations like a) πεταλούδα (butterfly) ? πετάω (fly) or b) αράχνη (spider) ? ιστός (web) have been included even if the verb is in the infinitive mode as in (a) or even if the genitive case should have been used as in (b) ?ιστός αράχνης (spider’s web). Co-occurring words could be separated by several words, for example in the case of idioms or collocations. Examples like loud ? clear (loud and clear), and stomach ? butterfly (have butterflies in one’s stomach) are syntagmatic associations even if the words are separated.

The approach taken in the classification of the data is different from the traditional view that all heterogeneous responses (words belonging to different word classes) are syntagmatically related (e.g. S-derman, 1989, 1993; Meara, 1978, 1980; Nelson, 1977; Politzer, 1978). It was pointed out in the previous paragraph that words may belong to the same word class (stomach ? butterfly) and be syntagmatically related. In the definition he gives of syntagmatic associations, Lyons (1995: 124), states that syntagmatic links are those that exist ‘typically, though not necessarily, between expressions of different grammatical categories’. The implication is that words may belong to different word classes but that does not automatically place them in the syntagmatic category. In addition, responses may belong to different word classes and be semantically unrelated (mutton ? inexplicable).

3.3.2.3c Paradigmatic and syntagmatic association
A number of ambiguous cases were identified during the classification of the data. It was decided that this category should be included in order to cover those cases where it was difficult to decide whether a response was paradigmatically or syntagmatically related to the stimulus word. This category includes examples like lion (stimulus) ? king (response) where the two words may be near-synonyms and therefore paradigmatically related or they could be in a collocational relation (lion king) and thus syntagmatically related. A number of other lexical relations similar to meronymy were also identified in the responses of the subjects: member?collection (e.g. flock: sheep and fish: shoal) and portion?mass relations (e.g. loaf: bread). In both these cases it is difficult to distinguish whether the subjects had a syntagmatic or paradigmatic association in mind as it is evident that these words could be either substituted for each other in a construction or could function as collocations (a flock of sheep, a loaf of bread).

3.3.2.3d Situational association

This category includes relations of a semantic kind between words that could be seen to belong to the same mental image or context with the stimulus (e.g. sickness [stimulus] ? hospital, injection, bed [responses]).

The inclusion of this category was considered necessary as many responses were found which were semantically related to the stimulus words but they could not be fitted into the frame of the different types of the systematic sense relations described above. For example, the responses hospital, injection, bed do not seem to be related to the stimulus sickness with abstract and systematic meaning relations such as synonymy,
hyponymy, incompatibility, or meronymy. However, it is clear that these responses are semantically related to the stimulus as they belong to the semantic domain of *sickness* and, obviously, some kind of meaning relations must hold between these responses and the stimulus. However, they would be sense relations of a very specific sort, too idiosyncratic and too numerous (if we are to examine all the responses which belong to this situational category) to be included and properly described here. In addition, they would not have equal semantic interest as the sense relations singled out and described in the first chapter (e.g. hyponymy, incompatibility etc.) which deserve special attention because they seem to be systematic, that is, they recur in a number of pairs or groups of lexical items. The criteria, then, for including responses in this category are: a) the fact that the sense relations between these responses and the stimulus words do not seem to be systematic and abstract, b) they do not appear to form combinations with the stimulus words, like collocations, idioms or compounds, and c) they belong to the same mental image with the stimulus words.

3.3.2.3e Clang association

This category includes words which have a clear phonological relation to the stimulus word (e.g. *button* as a response to *mutton*, *step* as a response to *stem* and *ξόδι* (*funeral*) as a response to *πόδι* (*foot*)). Certain criteria have to be met in order to classify a response as belonging to the clang category: first letter in common or last syllable in common or same stressed vowel. It is has been shown that the beginning and, to a lesser extent, the
end of a lexical item and also its stress pattern are more prominent in storage (e.g. Aitchison, 1987: 124).

3.3.2.3f Other types of association

This category includes miscellaneous responses of the following types:

1) Semantically unrelated responses: responses which do not seem to have any semantic connection to the stimulus word, as in smile as a response to stem. Theoretically, of course, it would be possible for any lexical item to co-occur with any other lexical item in the syntagmatic axis; still, the probability of co-occurrence of smile and stem would be very low (one cannot argue, for example, that they belong to the same semantic set). It would also be theoretically possible for any lexical item to be substituted for another lexical item in the paradigmatic axis so long as they both belong to the same word class. However, it was stressed in 3.3.2.3a that there is a need to separate those few responses that seem to be semantically unrelated to the stimulus for the purposes of this study. It must be pointed out here that the lack of context (since we are dealing with decontextualized items) makes it difficult sometimes to establish whether there is a semantic connection between stimulus and response, something which is especially evident in cases where there would be a low probability of co-occurrence of items such as smile and stem. Still, I would like to stress that in the great majority of responses the semantic relation between stimulus and responses was evident and straightforward. The existence of such cases (smile as a response to stem) will be accounted for and explained in the discussion of the results that follows.
2) Semantically motivated responses where the semantic connection has reference to: a) a misunderstanding of the stimulus word, as in food as a response to lamp where the stimulus word is understood as lamb, b) false cognates\(^{58}\), as in coffin as a response to fruit where the subject must have had the word basket (= κοφίνι) in mind or the response queen to the stimulus stem where the subject thought the stimulus had the same meaning with its Greek false cognate στέμμα (= crown), c) cases of chain effect, where one response is not directly related to the stimulus word but rather to the preceding response, like lamp (stimulus) ? electricity (1st response) ? and bills (2nd response) where bills is related to electricity rather than to lamp.

3) Cases where the subject makes a comment when he encounters an unfamiliar word, e.g. mutton (stimulus) ? unfamiliar word, unknown, inexplicable (responses).

3.3.2.3g Non-Greek or non-English association

This category includes Greek-like words in the English list (e.g. Pasqua (= Easter) as a response to mutton) and English words in the Greek list (e.g. τσίζμπουργκερ (=cheeseburger) as a response to cheese (=τυρί)).

3.3.2.4 Results

The analysis of the data will begin with the presentation of a few tables of results. The first two tables give individual results. More explicitly, Table 1

\(^{58}\) Cognates are lexical items which have the same or similar form and also similar meaning in two different languages. False cognates (or false friends) have the same or
lists the English word association responses which each student produced for all the 50 stimulus words in respect to each category. Table 2 lists the Greek word association responses. Each student is assigned a number (1-27). In order, then, to give a concrete example, according to Table 1 the first student (student 1) produced 35 paradigmatic responses, 83 syntagmatic responses, 138 situational responses, 5 paradigmatic and/or syntagmatic responses, and 0 clang, other and non-English associations. The total number of her responses are 261. I would like to stress here that these responses reflect the total number of responses that student 1 produced in respect to all 50 stimulus words. Both tables include the mean, that is, the average number of responses for each category and also the standard deviation which shows whether there are extreme individual differences in the responses of the subjects in each category. Generally speaking, there seems to be homogeneity in the subjects’ responses, that is there is no great dispersion in the numbers of responses of individual students when these are compared with each other, except for a number of cases which will be dealt with below.

Table 3 gives the total number of responses found in each category and table 4 turns these numbers to percentages.

In the formulation of the hypotheses it is claimed that second language learners, like native speakers, give priority to semantic links between words and produce phonological associations only when they are confronted with similar form in two languages but their meanings differ.
unfamiliar words. The subjects who participate in this study are advanced learners of English and are, therefore, expected to be familiar with the great majority of the stimulus words. Consequently, many semantic associations and only a few clang associates should be found in English and in Greek.

Table 1: English word associations

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59 Standard deviation is a measure of the dispersion or scatter of the values of the random variable about the mean.
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Total:  1214  2054  4163  111  8  135  1  7686

Mean  45,0  76,1  154,2  4,1  0,3  5,0  0,0  284,6
S.D.   22,2  18,3  32,5  2,2  1,2  6,5  0,2  51,9
Table 3:  Number of responses in each category

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Table 4:  Percentage of responses in each category

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<td>29,04%</td>
<td>52,74%</td>
<td>1,23%</td>
<td>0,16%</td>
<td>2,77%</td>
<td>0,01%</td>
</tr>
<tr>
<td>Greek</td>
<td>15,80%</td>
<td>26,73%</td>
<td>54,17%</td>
<td>1,44%</td>
<td>0,10%</td>
<td>1,76%</td>
<td>0,01%</td>
</tr>
<tr>
<td>Average</td>
<td>14,93%</td>
<td>27,88%</td>
<td>53,46%</td>
<td>1,34%</td>
<td>0,13%</td>
<td>2,26%</td>
<td>0,01%</td>
</tr>
</tbody>
</table>

The proportion of clang associates in both languages is extremely low, something which is evident in Table 4. The proportions of the semantic categories P, S and Si, taken separately, are significantly higher than that of the clang associates. To indicate clearly the relationship between the proportion of semantic and clang associates the percentages of the first four categories (which all represent semantic links) were added and the sum was compared to the proportion of the clang associates. Table 5 gives the results which show a striking proportion of semantically related responses in both Greek and English. The application of a Z-test shows that the difference between the proportions of the semantic answers (P+S+P/S+Si) in Greek and English is not statistically significant (Z=...
0.259). This suggests that advanced learners, like native speakers, rely heavily on semantic associations. These results allow us to accept hypothesis 1.

Table 5: Semantic and clang associates

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Semantic associations</td>
<td>Clang associations</td>
</tr>
<tr>
<td>(P+S+P/S+Si)</td>
<td>(P+S+P/S+Si)</td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>7431</td>
<td>12</td>
</tr>
<tr>
<td>Greek</td>
<td>7542</td>
<td>8</td>
</tr>
<tr>
<td>Average</td>
<td>14973</td>
<td>20</td>
</tr>
</tbody>
</table>

In the case of clang responses no semantic search of the lexicon is involved. It is evident from Table 3 that the overall number of clang responses is very small in both languages (12 responses in English and 8 in Greek). The application of a Z-test shows that no significant difference was found between the proportions (the Z-value is 0.061). Hypothesis 2 is, then, accepted on the basis of these results.

If one takes a closer look at the clang responses of the subjects in respect to the English list he will notice that most of these associations were produced in response to the two items in the list that were considered to be more 'difficult' or were even unfamiliar to the students. It was mentioned above that the great majority of the stimulus words are frequently used

\[ ^{60} \text{A Z-value greater than 1.96 would entail a statistically significant result at a 5\% significance level.} \]
words and were, therefore, familiar to the subjects. However, during the analysis of the data it was found that stimulus no. 7 *mutton* and stimulus no. 31 *stem* posed certain problems. First, almost all of the clang responses in the English list were produced in respect to these two items (e.g. *button, Burton* as responses to *mutton; stop, step, start, steam* as responses to *stem*). Secondly, the same stimuli elicited many responses which belong to the other-type-of-association category. For example, responses such as *unfamiliar word, unknown, inexplicable, darkness, unawareness, incapability, unsolved, zero* were produced which indicate the confusion of certain subjects (5 out of 27) as they encounter unfamiliar words. Moreover, the unfamiliarity of another 6 subjects with these two stimuli is also evident in the production of many responses which do not seem to be semantically related to the stimulus, like *wings, smile, path, hill, bird, agony* as responses to *stem* and *necklace* to *mutton*. Furthermore, 4 subjects misunderstood the stimulus *stem* by relating it to its Greek false cognate *στέμμα* (*crown*); responses such as *queens, kings, and expensive* appeared on their answer sheets. The confusion is also apparent in the many cases of non-responses: 12 students left their answer sheets completely blank in the case of *mutton* and 6 in the case of *stem*; these were the only instances where those subjects did not respond to the stimuli. There was even the case of a student who, when faced with the stimulus *stem* and being obviously at a loss, actually described the classroom environment: *write, read, learn, book, want, school, university, pen, pencil, classroom, desk, students, park, teacher, blackboard* were the string of her associations.
Generally speaking, one could assume from the above that the existence of the clang associations in the responses of 7 subjects is an indication of a low proficiency level of these learners in relation to the stimuli *mutton* and *stem*. It was shown that these two words were a factor of difficulty not only for those 7 students but also for the great majority of the subjects, a fact which obviously triggered the production of so many different types of responses (clang responses, responses with no obvious relation to the stimulus, misunderstanding of the stimulus, comments as to the unfamiliarity of the stimulus and non-responses).

A calculation of the average number of responses and of the standard deviations (tables 6 and 7 below) reveals that there are individual variations in the Greek list in respect to the clang responses (8 in total). One can note that they are produced almost exclusively by one subject (no. 26), something which is not the case with the English clang associates which were more spread out. Furthermore, if we take a closer look at the particular stimuli that elicited the Greek clang responses we will notice that many different stimuli are involved, that is, the phonological responses are not restricted to a couple of words in the list as is the case with the English clang responses. For example, the stimulus words πόδι (foot), αετός (eagle), and κεφάλι (head) elicited the clang responses ξόδι (funeral), αστικός (urban) and κανάλι (channel/ canal) respectively. One cannot claim that the stimuli πόδι (foot), αετός (eagle), and κεφάλι (head) are infrequent words in Greek, but even if we make a wild hypothesis that they are infrequent for the subject who produced them we will quickly realise that
this is not so as the clang responses were in all the cases followed by other
responses which were semantically related to the stimulus words: ξόδι
(funeral) was followed by χέρι (arm), ποδόγυρος (hem), and παπούτσια
(shoes); αστικός (urban) was followed by πουλί (bird), and αρπαχτικό
(predatory); and finally, κανάλι (channel/ canal) was followed by πρόσωπο
(face) and μάτια (eyes). Consequently, the production of the clang
responses could be attributed to the answering style of the individual
subject. In contrast, the clang responses in the English list were not
followed by semantically related responses, something which gives support
to the suggestion that the two English words (mutton and stem) that elicited
the clang associates were unfamiliar to the subjects.

Table 6: Average and standard deviation for English associations

<table>
<thead>
<tr>
<th></th>
<th>P</th>
<th>S</th>
<th>Si</th>
<th>P/S</th>
<th>C</th>
<th>O</th>
<th>N</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>39,9</td>
<td>82,3</td>
<td>149,6</td>
<td>3,5</td>
<td>0,4</td>
<td>7,9</td>
<td>0,0</td>
<td>283,6</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>18,3</td>
<td>28,9</td>
<td>44,4</td>
<td>2,6</td>
<td>0,8</td>
<td>10,1</td>
<td>0,2</td>
<td>76,3</td>
</tr>
</tbody>
</table>

Table 7: Average and standard deviation for Greek associations

<table>
<thead>
<tr>
<th></th>
<th>P</th>
<th>S</th>
<th>Si</th>
<th>P/S</th>
<th>C</th>
<th>O</th>
<th>N</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>45,0</td>
<td>76,1</td>
<td>154,2</td>
<td>4,1</td>
<td>0,3</td>
<td>5,0</td>
<td>0,0</td>
<td>284,6</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>22,2</td>
<td>18,3</td>
<td>32,5</td>
<td>2,2</td>
<td>1,2</td>
<td>6,5</td>
<td>0,2</td>
<td>51,9</td>
</tr>
</tbody>
</table>
To sum up, it is evident that the subjects do not give a higher proportion of clang associates in their second language. Instead, they produce an overwhelming majority of semantic responses in both their L1 and L2. Based on these results we can assume that L2 operations are not different from L1 operations, at least when advanced learners and frequent words are involved. It would be interesting to explore the L1 and the L2 lexicon by having advanced learners confronted with infrequent words in both their native and their second language.

Turning now to hypotheses 3a and 3b, it becomes clear from the results that high numbers of paradigmatic, syntagmatic and other semantic responses are found in both the Greek and the English list (see tables 3 and 4). Moreover, the order of importance given to every one of the four semantic categories is the same in Greek and English. Consequently, hypotheses 3a and 3b are accepted. Two points of interest are going to be discussed in respect to these findings.

First, if we take a closer look at the results we will realise that the percentage of syntagmatic associations is significantly higher than that of the paradigmatic ones in both Greek and English. According to Mc Nemar’s test the difference between the proportions of P and S responses is statistically significant at a 5% significance level and this applies to both languages. This is an interesting finding as it seems to differ from the results of some researchers. Certain earlier researchers (Politzer, 61)

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61 The Mc Nemar test checks whether differences among categories are statistically significant or not (Dixon & Massey, 1985).
1978; Randall, 1980, Meara, 1978) have suggested that the consequence of the shift is the production of a higher proportion of paradigmatic responses. I believe that the equation of paradigmatic responses with homogeneous responses and also the equation of syntagmatic responses with heterogeneous responses led earlier researchers to the conclusion that adults link words mostly in a paradigmatic way. However, It was pointed out that words may belong to the same word class (e.g. stomach ? butterfly) and be syntagmatically related; lexical items or groups of items (e.g. idioms, collocations, compounds) may belong to the same word class but that does not necessarily mean that they belong to the paradigmatic category. Consequently, if all such items were included in the paradigmatic category the number of responses in this category would certainly be by far increased.

Another explanation of the existence of fewer paradigmatic responses in both languages in my study would be the inclusion of the Si category in the classification system. The category Si includes mainly words that belong to the same class as the stimulus words and, thus these responses would have been considered paradigmatic by those researchers (e.g. Meara 1980) who used only four categories to classify the responses of their subjects, namely, paradigmatic, syntagmatic, clang and other. I, however, believe that the category Si should be included in such a classification system as many responses are found in word association tests whose meaning relations with the relevant stimuli are mostly idiosyncratic and have not been adequately described in literature, a fact which would not
justify their inclusion in the paradigmatic category which includes responses whose sense relations with the stimuli are systematic and abstract (e.g. synonymy, hyponymy). Moreover, responses included in the Si category do not appear to form combinations with the stimulus words, like collocations, idioms or compounds, a fact which excludes them from the syntagmatic category as well.

It has already been pointed out that both types of links (syntagmatic and paradigmatic) are very strong in the lexicon of adults and it is not clear which is more dominant (e.g. Aitchison, 1994; Söderman, 1989, 1993; Joannopoulou, 1992; Mar’chal, 1995). Moreover, Söderman (1989: 119) points that even the word associations of the most proficient learners in her group contained a ‘surprising amount of syntagmatic and clang responses’. In addition Mar’chal, (1995: 76) working with advanced learners of French found that both categories yielded considerable numbers of responses, but syntagmatic relations have priority over paradigmatic relations in the responses of her subjects in both the L1 and the L2. Therefore, there is evidence that considerable numbers of syntagmatic and paradigmatic links are to be found in the responses of adult advanced learners and native speakers, an indication that both types of links are dominant in the L1 and the L2 lexicon.

The second finding in the results points to the similarities of the organization of the L1 and L2 mental lexicon. We have already noticed that the subjects produce significantly more S than P responses in both Greek and English. Moreover, they give significantly more Si responses than S
responses again in both languages (at a 5% significance level by applying the Mac Nemar test). Furthermore, the percentages of the P/S responses is relatively small in both languages. Finally, the proportion of the clang associates is very low, once again in both languages. Table 4 lists the percentage of the responses in Greek and English. It is pretty clear that the respective proportions of the P, S, P/S, Si, C and even O and U are equivalent in both Greek and English, a finding which led to the acceptance of hypothesis 3b. This striking equivalence in the proportions suggests a similar equivalence in the organization of the L1 and L2 mental lexicons of the subjects. The overwhelming importance assigned to semantically related responses (97.06% in English and 98.14% in Greek) is an indication that meaning plays a very important role in L1 and L2 operations, at least where advanced learners and frequent words are involved.

A further point of interest is the total number of associations produced by the subjects. Table 8 shows a striking similarity in the numbers produced: 7,686 in English and 7,656 in Greek! It is not clear whether word association tests can be used as instruments for measuring the size of a native speaker's or a learner's lexicon. Word association tests can, however, be used for comparing the size of a person's lexicon in his L1 and his L2. Champagnol (1974: 95), in a study of the associations produced by French students in their native language and in English, suggested that the stronger and more numerous associative networks there are between words in a person's lexicon, the more likely this person is to produce many associations (either in the L1 or the L2). In the present study there is
practically no difference in the respective numbers of associations produced by the subjects in both their native and their second language. Consequently, one may assume that the associative links between the overwhelming majority of the stimulus words used are strong and numerous in both languages.

**Table 8: Total number of associations**

<table>
<thead>
<tr>
<th></th>
<th>English</th>
<th>Greek</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of responses</td>
<td>7656</td>
<td>7686</td>
<td>15432</td>
</tr>
</tbody>
</table>

Before concluding I would like to note here that I have not put forward a hypothesis relating to the issue of separate or interrelated lexicons in the L1 and the L2. Monolingual word association tests are not considered to be the optimal type of experimental instruments to investigate such an area. My data, then, do not permit me to draw conclusions in respect to this issue. I would, however, like to point out the rarity of Greek responses in the English list and vice-versa (in case there were many Greek responses in the English list and vice-versa one could claim that such instances of cross-linguistic influence indicates an interrelationship between the L1 and the L2 mental lexicons). There was only one instance of Greek-like response in the English list, namely, *Pasqua* to the stimulus *Easter*. Moreover, it was pointed out that the stimulus *stem* was a source of confusion by a few subjects who mistook it for its Greek false cognate *στέμμα* (=crown) and this could be indicative that the two lexicons are
interconnected, at least where cognates are involved. Similarly, I would like to point to the existence of a borrowing from the L2, namely τσίζμπουργκερ (\textit{=cheeseburger}) as a response to the stimulus \textit{cheese} (\textit{=tyrî}) in the Greek list. However, I would not go so far as to claim that this instance is a clear case of cross-linguistic influence. Many foreign words of this type are used in everyday Greek and are even listed in Greek dictionaries as assimilated items. Generally speaking, one cannot draw a conclusion as to the separateness or not of the L1 and the L2 lexicons on the basis of the findings of word association tests.

To sum up, I would like to point out that several trends have been identified in the associations made by the subjects. In relation to the three hypotheses the following conclusions may be drawn:

1. There are indications of a similar lexical organization in the L1 and L2 mental lexicons. Meaning seems to play an important role in the accessing of a word both for native speakers and advanced learners as from the findings it is evident that semantically related responses far outnumber clang responses in both Greek and English. Moreover, further evidence of a similar lexical organization comes from the fact that the subjects produce approximately equivalent proportions of syntagmatic, paradigmatic and other semantic responses when the two languages are compared.

2. The production of the clang responses in English in respect to the two stimuli that were unfamiliar to a small number of subjects is an indication
that restricted L2 knowledge in terms of certain words may lead to a formal associative behavior.

3.3.3 Experiment 2: C-tests

3.3.3.1 Hypotheses

The issue of whether or not the L2 mental lexicon is different in respect to the L1 mental lexicon in that the former is more phonologically driven (Laufer, 1989: 17, Meara, 1984: 233-234) rather than semantically driven is investigated in the second part of the study as well. Evidence of the importance of semantic links between words both in the L1 and the L2 mental lexicons has been presented in previous chapters, including the findings from the word association experiments in the present study. My opinion is that, as with word association responses one can isolate those which are related to the meaning of the stimulus, one can also isolate those responses which are semantically related to C-test mutilated slots and the surrounding context. The semantically related responses in the C-tests are obviously those which are found to be correct, namely those which are well-formed and relevant to the context. Based on this argument I hypothesize that the findings from the C-tests will exhibit the following results:

1. high proportions of correct (well-formed and appropriate to context) C-test responses
2. high proportions of semantically motivated errors in the numbers of incorrect responses

If both hypotheses are verified then this will be taken as evidence of a strong semantic factor in the elicitation of the responses.
3.3.3.2 Presentation of the C-tests and data collection techniques

The C-test as an elicitation instrument has been described in 3.2.1. The subjects have to restore to wholeness a short written text, every second word of which has had its second half deleted. The first sentence of the text is left unmutilated to provide the subjects with a context. Single letter words are left intact. Words which have an odd number of letters have one more letter removed than is left standing. All proper nouns are left undeleted. To ensure contextualization the text is left running on, unmutilated, after the end of the deletions.

The texts selected for the present study are authentic texts and were taken from two *Newsweek* issues. In this study a longer version of the C-test has been used instead of the 60?70-word text that was normally employed in earlier research. The C-tests used here ran to approximately 140 words, which is twice the length of the original conception of the C-test. Each C-test has 50 mutilated items. The reason behind the use of a longer C-test is basically an effort to provide more semantico-pragmatic context in order to ensure normal reading comprehension processes. In addition, the C-tests were also given a title for the same reason. Both C-tests and their unmutilated versions are to be found in Appendix B.

The two C-tests were administered separately to the subjects with a period of one week stretching between them. On each elicitation session the subjects were assured that the results of the test would not be used for assessment purposes. Subsequently, the subjects were given 20 minutes
to fill in the text. No subject ever gave the impression of being constrained by this time limit.

3.3.3.3 Classification of the data

The data have been classified in the following categories:

3.3.3.3a Correct responses

This category includes: a) all responses that coincided with the items in the original texts which were obviously considered to be well-formed and appropriate to the context, b) acceptable substitutes, that is, responses that were not the same as the relevant items in the original texts but which, nevertheless, were well-formed and relevant to the context (e.g. the original item in slot 28 in C-test 2 is false, the string preceding the blank being fa__, , and the phrase in which it is found being But have the critics been false?.

The alternative response fair in slot 28 is considered to be an acceptable substitute as, in this case, the phrase would be in accordance to the general theme of the text, namely the divergence of the opinion of critics in respect to whether television has negative effects on children or not).

3.3.3.3b Incorrect responses

This category is divided into two subcategories:

A) Semantically motivated errors.

This subcategory includes: i) semantically motivated errors which are well-formed, that is responses which are incorrect but are related, to some extent, to context (e.g. the response majority in slot 32 in C-test 2 which has as its target item many, the original phrase in which it is found being ‘researchers are discovering that many of the accusations show a poor
understanding? The response *majority does not fit syntactically in the environment of this phrase but it is definitely meaning-related to the surrounding context), ii) responses which are ‘creations’ and which seem to be semantically related to the stimulus (e.g. the response *labouresly in slot 5 in C-test 1 which has as its target item later, the original phrase in which it is found being A patient who has been pronounced dead and unexpectedly recovers later describes what? The response *labouresly may be taken to be a formally deviant form of the lexical item laboriously which, if fitted in the above context in the place of the other adverb later, would convey the meaning (in metaphorical terms) that the process of recovering, for the patient, was long and difficult), iii) misspellings of the target words (e.g. the response delinquancy in slot 13 of C-test 2 where the intended item is delinquency).

B) Contextually unrelated responses.
This subcategory includes: i) responses which do not fit the syntactic frame or the meaning of the context but which are, nevertheless, well-formed (e.g. the response tunes in slot 20 in C-test 1 which has as its target item tunnel, the original phrase in which it is found being a long, dark tunnel) and ii) responses which are ‘creations’ and are not semantically related to the stimulus, that is the mutilated word and the surrounding context (e.g. the response *resuste in slot 33 in C-test 1 which has as its target item

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62 ‘Creations’ are lexical forms which a native speaker would not recognize as being part of his native language. I make here a distinction between ‘creations’ and misspellings based on the observation that the target word is more easily identified in the case of misspellings than of ‘creations’.
resuscitate, the original phrase in which it is found being *a medical team’s hard efforts to resuscitate him*).

3.3.3.3c Non-responses

This category includes the slots which were left blank.

3.3.3.4 Results

The analysis of the data elicited by C-test 1 and C-test 2 will begin with the presentation of some tables of results. Tables 9 and 10 present the total numbers of responses in the 50 mutilated items for every subject in C-test 1 and C-test 2. More specifically, we can see detailed breakdowns of the responses into the three main categories (correct responses, incorrect responses and non-responses) and the two subcategories of incorrect responses (semantically-motivated errors and contextually unrelated responses). To give a concrete example, in Table 9 subject 3 was correct in 82% of her responses in C-test 1, she left 8% of the mutilated slots blank, and she was incorrect in 10% of her responses, out of which 6% were semantically motivated errors and 4% contextually unrelated responses (total 10%). Tables 9 and 10 also show the overall maximum and minimum performance of the subjects in each of the categories (e.g. in Table 9 subject 3 was 100% correct in all the slots in C-test 1, which was the ‘best’ performance, whereas subject 6 was only 62% correct, which was the ‘worst’ performance in the group).
### Table 9: C-test 1 (Life after Death)

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Correct Responses</th>
<th>Incorrect Responses</th>
<th>Non-responses</th>
<th>Semantically Motivated Errors</th>
<th>Contextually Unrelated Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>46 92%</td>
<td>4 8%</td>
<td>0 0%</td>
<td>4 8%</td>
<td>0 0%</td>
</tr>
<tr>
<td>2</td>
<td>33 66%</td>
<td>6 12%</td>
<td>11 22%</td>
<td>4 8%</td>
<td>2 4%</td>
</tr>
<tr>
<td>3</td>
<td>41 82%</td>
<td>5 10%</td>
<td>4 8%</td>
<td>3 6%</td>
<td>2 4%</td>
</tr>
<tr>
<td>4</td>
<td>44 88%</td>
<td>3 6%</td>
<td>3 6%</td>
<td>2 4%</td>
<td>1 2%</td>
</tr>
<tr>
<td>5</td>
<td>50 100%</td>
<td>0 0%</td>
<td>0 0%</td>
<td>0 0%</td>
<td>0 0%</td>
</tr>
<tr>
<td>6</td>
<td>31 62%</td>
<td>6 12%</td>
<td>13 26%</td>
<td>6 12%</td>
<td>0 0%</td>
</tr>
<tr>
<td>7</td>
<td>42 84%</td>
<td>7 14%</td>
<td>1 2%</td>
<td>6 12%</td>
<td>1 2%</td>
</tr>
<tr>
<td>8</td>
<td>44 88%</td>
<td>5 10%</td>
<td>1 2%</td>
<td>4 8%</td>
<td>1 2%</td>
</tr>
<tr>
<td>9</td>
<td>43 86%</td>
<td>6 12%</td>
<td>1 2%</td>
<td>5 10%</td>
<td>1 2%</td>
</tr>
<tr>
<td>10</td>
<td>43 86%</td>
<td>3 6%</td>
<td>4 8%</td>
<td>3 6%</td>
<td>0 0%</td>
</tr>
<tr>
<td>11</td>
<td>35 70%</td>
<td>6 12%</td>
<td>9 18%</td>
<td>6 12%</td>
<td>0 0%</td>
</tr>
<tr>
<td>12</td>
<td>35 70%</td>
<td>14 28%</td>
<td>1 2%</td>
<td>11 22%</td>
<td>3 6%</td>
</tr>
<tr>
<td>13</td>
<td>41 82%</td>
<td>8 16%</td>
<td>1 2%</td>
<td>5 10%</td>
<td>3 6%</td>
</tr>
<tr>
<td>14</td>
<td>36 72%</td>
<td>5 10%</td>
<td>9 18%</td>
<td>5 10%</td>
<td>0 0%</td>
</tr>
<tr>
<td>15</td>
<td>42 84%</td>
<td>2 4%</td>
<td>6 12%</td>
<td>1 2%</td>
<td>1 2%</td>
</tr>
<tr>
<td>16</td>
<td>44 88%</td>
<td>4 8%</td>
<td>2 4%</td>
<td>4 8%</td>
<td>0 0%</td>
</tr>
<tr>
<td>17</td>
<td>42 84%</td>
<td>4 8%</td>
<td>4 8%</td>
<td>4 8%</td>
<td>0 0%</td>
</tr>
<tr>
<td>18</td>
<td>47 94%</td>
<td>2 4%</td>
<td>1 2%</td>
<td>2 4%</td>
<td>0 0%</td>
</tr>
<tr>
<td>19</td>
<td>42 84%</td>
<td>7 14%</td>
<td>1 2%</td>
<td>7 14%</td>
<td>0 0%</td>
</tr>
<tr>
<td>20</td>
<td>45 90%</td>
<td>1 2%</td>
<td>4 8%</td>
<td>1 2%</td>
<td>0 0%</td>
</tr>
<tr>
<td>21</td>
<td>44 88%</td>
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<td>5 10%</td>
<td>1 2%</td>
<td>0 0%</td>
</tr>
<tr>
<td>22</td>
<td>44 88%</td>
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<td>6 12%</td>
<td>0 0%</td>
</tr>
<tr>
<td>23</td>
<td>42 84%</td>
<td>7 14%</td>
<td>1 2%</td>
<td>5 10%</td>
<td>2 4%</td>
</tr>
<tr>
<td>24</td>
<td>40 80%</td>
<td>5 10%</td>
<td>5 10%</td>
<td>4 8%</td>
<td>1 2%</td>
</tr>
<tr>
<td>25</td>
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<td>2 4%</td>
<td>1 2%</td>
<td>2 4%</td>
<td>0 0%</td>
</tr>
<tr>
<td>26</td>
<td>45 90%</td>
<td>2 4%</td>
<td>3 6%</td>
<td>2 4%</td>
<td>0 0%</td>
</tr>
<tr>
<td>27</td>
<td>42 84%</td>
<td>6 12%</td>
<td>2 4%</td>
<td>5 10%</td>
<td>1 2%</td>
</tr>
</tbody>
</table>

<table>
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<th>Min: 0%</th>
<th>Average: 6.9%</th>
<th>Max: 22%</th>
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<th>Average: 8%</th>
<th>Max: 6%</th>
<th>Min: 0%</th>
<th>Average: 1.4%</th>
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</table>
Table 10: C-test 2 (Children and TV)

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Correct Responses</th>
<th>Incorrect Responses</th>
<th>Non-responses</th>
<th>Semantically Motivated Errors</th>
<th>Contextually Unrelated Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>5 10%</td>
<td>0 0%</td>
<td>5 10%</td>
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</tr>
<tr>
<td>2</td>
<td>37 74%</td>
<td>5 10%</td>
<td>8 16%</td>
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</tr>
<tr>
<td>3</td>
<td>45 90%</td>
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<td>1 2%</td>
<td>4 8%</td>
<td>0 0%</td>
</tr>
<tr>
<td>4</td>
<td>46 92%</td>
<td>3 6%</td>
<td>1 2%</td>
<td>2 4%</td>
<td>1 2%</td>
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<tr>
<td>5</td>
<td>49 98%</td>
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<td>1 2%</td>
<td>0 0%</td>
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<td>6</td>
<td>39 78%</td>
<td>10 20%</td>
<td>1 2%</td>
<td>10 20%</td>
<td>0 0%</td>
</tr>
<tr>
<td>7</td>
<td>47 94%</td>
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<td>2 4%</td>
<td>1 2%</td>
</tr>
<tr>
<td>8</td>
<td>47 94%</td>
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<td>0 0%</td>
<td>3 6%</td>
<td>0 0%</td>
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<td>9</td>
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<tr>
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<td>6 12%</td>
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<td>11</td>
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</tr>
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<td>3 6%</td>
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<td>2 4%</td>
<td>5 10%</td>
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<td>14</td>
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<tr>
<td>15</td>
<td>48 96%</td>
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<td>0 0%</td>
</tr>
<tr>
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<td>47 94%</td>
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<td>0 0%</td>
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<tr>
<td>17</td>
<td>44 88%</td>
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<td>1 2%</td>
<td>5 10%</td>
<td>0 0%</td>
</tr>
<tr>
<td>18</td>
<td>44 88%</td>
<td>5 10%</td>
<td>1 2%</td>
<td>5 10%</td>
<td>0 0%</td>
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<tr>
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<td>5 10%</td>
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</tr>
<tr>
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<td>5 10%</td>
<td>4 8%</td>
<td>1 2%</td>
</tr>
<tr>
<td>22</td>
<td>46 92%</td>
<td>4 8%</td>
<td>0 0%</td>
<td>4 8%</td>
<td>0 0%</td>
</tr>
<tr>
<td>23</td>
<td>34 68%</td>
<td>13 26%</td>
<td>3 6%</td>
<td>11 22%</td>
<td>2 4%</td>
</tr>
<tr>
<td>24</td>
<td>47 94%</td>
<td>2 4%</td>
<td>1 2%</td>
<td>2 4%</td>
<td>0 0%</td>
</tr>
<tr>
<td>25</td>
<td>46 92%</td>
<td>3 6%</td>
<td>1 2%</td>
<td>2 4%</td>
<td>1 2%</td>
</tr>
<tr>
<td>26</td>
<td>44 88%</td>
<td>1 2%</td>
<td>5 10%</td>
<td>1 2%</td>
<td>0 0%</td>
</tr>
<tr>
<td>27</td>
<td>40 80%</td>
<td>8 16%</td>
<td>2 4%</td>
<td>8 16%</td>
<td>0 0%</td>
</tr>
</tbody>
</table>

Max: 98,0%  Min: 68,0%  Average: 88,1%
Max: 26,0%  Min: 2,0%   Average: 8,8%
Max: 16,0%  Min: 0,0%   Average: 3,1%
Max: 22%    Min: 2%     Average: 8%
Max: 4,0%   Min: 0,0%   Average: 0,6%

Table 11 presents the mean percentage of correct responses obtained by the students on each of the two tests and the percentage ranges of the subjects’ scores, which indicate the maximum and minimum correct responses in individual slots (e.g. Table 11 shows that in C-test 1 a particular slot was particularly problematic as it elicited only 7.41% correct responses from all the subjects, whereas other slots were easier to fill in and elicited 100% correct responses. In Appendix B one can find detailed
tables with information about the types of responses elicited by every slot in both C-tests). As was pointed out beforehand, the category of correct responses also includes responses which did not correspond to the items in the original texts but which were well-formed and relevant to the context. These acceptable substitutes constitute only a very small proportion of the category of correct responses, something which can be seen from the detailed lists of responses (including all categories and subcategories) which were produced in respect to the 50 mutilated items in both C-tests (see Appendix B for the detailed breakdown of responses).

Table 11: Mean percentage of correct responses and percentage ranges of subjects’ scores

<table>
<thead>
<tr>
<th></th>
<th>English C-test 1</th>
<th>English C-test 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct responses:</td>
<td>83.70%</td>
<td>88.07%</td>
</tr>
<tr>
<td>Range:</td>
<td>7.41% - 100 %</td>
<td>14.81% - 100 %</td>
</tr>
</tbody>
</table>

Before I begin the discussion of the results I would like to point out that in respect to the issue under investigation, namely that of semantics and L2 lexical processing, C-test responses are quite different from word-association responses in relation to the role of contextual environment. Word-association stimuli are obviously isolated lexical items and what is elicited is again a string of isolated items. The C-test, however, offers a context and the response it seeks to elicit is directly related to the surrounding context and the constraints of the relevant language. Still, it is
possible to find common ground in the two experimental instruments if one considers the fact that, as with word association responses, one can isolate those which are related to the meaning of the stimulus; one can also isolate those responses which are semantically related to C-test mutilated slots and the surrounding context. The semantically related responses in the C-tests are considered those which are found to be correct, namely those which are well-formed and relevant to the context. If a response coincides with the item in the original unmutilated text then one could claim that the semantics of the context and of the mutilated item are a strong semantic factor which plays a decisive role in the finding of the appropriate response. Based on the above I would like to stress that the great majority of the responses in both C-tests in this study are found to be correct (see Table 11) and this is taken as a strong indication that they are semantically motivated. Consequently, hypothesis 1 is accepted.

Surprisingly enough, more evidence for the semantic motivation in L2 processing comes from the close investigation of the incorrect responses produced by the subjects; in their greater part they can be related to the meaning of the context. For example, slot 49 in C-test 1 has as its target item *make*, the original phrase in which it is found being *his attention is drawn to other presences inside the room who try to make contact with him*, and the mutilated item preceding the blank being *ma__*. An incorrect response offered by a subject is *manage* which, although it cannot be used here due to collocational restrictions, is, nevertheless, semantically related to the context. Most of the responses in this category are misspellings of
the target words (e.g. *extends* instead of *extends* in slot 22 in C-test 2); the semantic motivation is clear in this case. Table 12 shows the percentage of semantically motivated errors in relation to the total number of incorrect responses. It is evident that the vast majority of the incorrect responses are semantically related to the stimulus context; therefore, hypothesis 2 is accepted. Table 13 shows the percentages of solutions which were unrelated to contextual meaning in relation to the total number of correct and incorrect responses. Once again, the very low proportion of these responses point to the semantic motivation of the overwhelming majority of responses. It should be noted here that non-responses were not included in the category of incorrect responses. This decision was taken on the basis of the argument that the absence of a response is an indication of a failure on the part of the subjects to understand the meaning of the text surrounding the relevant slots. I think that this effort from the subjects is essentially meaning driven, that is, the subjects try to establish meaning and failing to do so they leave the slots blank. Consequently, I believe that the origin of most of the non-responses is meaning related. However, even if one considers non-responses as having no semantic origin and includes them in the ‘incorrect responses’ category, we still find a preponderance of semantically motivated errors when the two categories are compared: Table 14 shows that the percentage of semantically motivated errors in relation to all incorrect responses and non-responses (counted as one category) is very high.

Table 12: Percentage of semantically motivated errors in relation to the total number of incorrect responses
Table 13: Percentages of solutions which were unrelated to contextual meaning relative to the total number of correct and incorrect responses

<table>
<thead>
<tr>
<th></th>
<th>English C-test 1</th>
<th>English C-test 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>85.04%</td>
<td>93.28%</td>
</tr>
</tbody>
</table>

Table 14: Percentage of semantically motivated errors in relation to all incorrect responses and non-responses

<table>
<thead>
<tr>
<th></th>
<th>English C – test 1</th>
<th>English C – test 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.51%</td>
<td>0.61%</td>
</tr>
<tr>
<td></td>
<td>49.09%</td>
<td>68.94%</td>
</tr>
</tbody>
</table>

So far, evidence has been presented pertaining to the semantic basis of L2 lexical processing in respect to the relevant C-tests. Another matter of interest in relation to this issue is the question of heterogeneity of response. As we have seen in Chapter II the results of the Birkbeck Vocabulary Project led Meara (1984: 233) to suggest that the L2 mental lexicon is ‘quite different from that of a native speaker’, in that it is predominantly phonologically organized and also more loosely organized. He reached this conclusion based on his observation that while native speakers give a majority of semantically-related word association responses, his subjects
gave many responses which were phonologically related to the stimulus word. He also pointed out that not only his subjects’ responses to L2 stimuli were different from the responses of native speakers in respect to the same stimuli, but also the former seemed to diverge more from subject to subject than the respective native speaker responses. My opinion is that the data yielded by the Birkbeck Vocabulary Project show the tendency of the subjects to differ in their responses when they encounter difficult stimuli and to converge in their responses when they deal with more familiar stimuli. It was suggested in chapter 2 that some of the stimuli that Meara used were rather rare lexical items and this, in all probability, caused the production of many clang responses. Moreover, it was pointed out that the subjects’ associations to these infrequent words does not reflect a different organization of the L2 mental lexicon but rather a state of ignorance on the part of the subjects who relied on phonological clues in order to deal with the rare items. This suggestion relating to the familiarity or not of the subjects with the stimulus words and the subsequent semantic or phonological processing is something which was also corroborated by the findings of the word association experiments in this study. My C-test data also point to this direction. A calculation of the number of C-test slots that elicited more than five different solutions shows that they caused more problems than slots which elicited fewer than five different solutions. Table 15 presents the mean percentages of correct responses associated with slots eliciting up to five and more than five different solutions; the idea behind this is that slots which elicited more than five different solutions are more difficult (since many different responses were offered, which means
that, in all probability, these slots were considered more difficult) than those which elicited fewer than five. The results show that the correct responses of the subjects to these slots that elicited more than five different solutions were significantly fewer than the number of correct responses to the slots that elicited up to five different solutions. A Z-test was applied to check the differences between the sets of slot-scores in the C-tests and in each case the difference was found to be significant at the p< 0.05 level. This evidence supports the view that subjects tend to differ in their responses when they encounter difficult stimuli and to converge in their responses when they deal with more familiar stimuli.

Table 15: Mean percentages of correct responses associated with slots eliciting up to 5 and more than 5 different solutions

<table>
<thead>
<tr>
<th></th>
<th>English C – test 1</th>
<th>English C – test 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 5</td>
<td>92.96%</td>
<td>91.85%</td>
</tr>
<tr>
<td>More than 5</td>
<td>46.67%</td>
<td>54.07%</td>
</tr>
</tbody>
</table>

However, I believe that this heterogeneity in the production of responses in respect to certain slots is indicative neither of a semantic nor of a non-semantic motivation in terms of processes involved. The heterogeneity of responses per se is not a criterion which could lead one to reach a conclusion about the processes involved in the production of these responses. Personally, I think that the heterogeneity of responses is connected with the difficulty factor, that is the subjects tend to give a variety of different solutions when they encounter difficult items. To illustrate this point: Tables 16 and 17 present the percentages of responses which the
most difficult slots elicited in terms of the three categories involved. A further breakdown of the incorrect responses in its two subcategories (semantically motivated errors and contextually unrelated responses) again where the difficult slots are involved is presented in figures 18 and 19. It is evident that all six slots (four from C-test 1 and two from C-test 2) elicited a limited number of correct responses in contrast to all the other slots in both C-tests which produced a great majority of correct responses (see Appendix B). It wouldn’t, then, be far fetched to claim that these six slots posed considerable problems for the subjects. However, if we carefully examine their incorrect responses (Tables 18 and 19) we will realize that in all cases but one the great majority of their incorrect responses are semantically motivated errors. Let us examine more closely one of the slots: Slot 15 of C-test 1 has the target word *repeated (repe___)*, the phrase in which it occurs being *According to a repeated account?*. It elicits 7 different solutions and the non-response solution. Six of these responses are formally deviant items either of the original item *repeated* or of other adjectives, the majority of which are semantically close to *repeated*: *repentative, *repeted, *repetious, *repetent, *repetited, *repelent. The last response *repelent* is a misspelling of *repellent* which could be also semantically related to the stimulus context if we took the subject’s response to mean that the patient in C-test 1 had a negative ‘near death’ experience. (e.g. *According to a repellent account?*). The seventh of these responses, namely *repent*, seems to have no apparent relation to the meaning of the stimulus context. Actually, I suspect that the subject had the adjective *recent* in mind (e.g. *According to one recent account?*) but was
constrained by the form of the slot (repe__). The same pattern, namely that of semantic motivation were the incorrect responses are concerned, is also evident in the production of responses of all the other remaining slots (see Figures 18 and 19), except for one: This is slot 33 of C-test 1 which has as its target item the word resuscitate (resus____), the original phrase in which it occurs being *looking down with curious detachment at a medical team's hard efforts to resuscitate him*. This item elicits 6 different solutions and the non-response solution. Of these responses 4 are ‘creations’ and have no apparent semantic relation to the stimulus context: *resuscu, *resuste, *resuse, *resuscue. On the contrary, the remaining 2 responses are misspellings of the target word: *resuscinate, *resuscitade; therefore, we do, in this case, have an apparent semantic motivation. The heterogeneity, then, of the subjects’ responses in all these six slots does not indicate anything about the nature of processing in the L2 lexicon as we notice that both semantically motivated errors and contextually unrelated responses are produced. However, I need to stress the fact that even where many different responses have been produced by a certain C-test slot the overwhelming majority of these responses are semantically related to the stimulus context. In relation to the only slot (= resuscitate) that elicited a majority of contextually unrelated responses I believe that their production is directly related to the difficulty factor, that is, the subjects were confronted with an unfamiliar word and produced a string of ‘creations’ in an effort to fill in the slot with a verb.

Figures here
More evidence for the suggestion that the heterogeneity of responses is linked with difficult items and the view that phonological processing is likely to occur when the subjects are confronted with unfamiliar items comes from Table 20 which lists in detail the responses to C-test slots which were correctly completed by a minority of students. It is evident that C-test 1 was slightly more difficult than C-test 2, something which can be also corroborated by the fact that the students produced more correct responses in C-test 2 (see also Table 11). In respect to C-test 1 0.25% of the students correctly completed 4% of the slots and in respect to C-test 2 0.25% of the students correctly completed 2% of the slots. These percentages of responses, 4% and 2% respectively, which were correctly completed by a minority of students (0.25%) actually represent the correct responses to the six difficult items referred to above; the few, then, correct responses to these items indicate, once more, the problematicity of the items in question. As we have seen, these items which the majority of students found difficult to complete elicited a number of different responses, some of which have a formal origin. Consequently, this is a further argument in support of the view that the heterogeneity of responses is associated with difficult items and that formal processing is more likely to occur when subjects deal with unfamiliar items.

Finally, I would like to point out that other studies on C-tests (e.g. Singleton & Little 1991: 76) have found evidence of cross-linguistic influence in their subjects' responses: blends of the type *fanacism (target word (French) fanatisme, English fanaticism) or permit? (target word (French) permis,
English permitted) have been interpreted as strong evidence for the interconnection of L1 and L2 lexical processing. No such blends were found in my data. The absence of blends of this type may be due to psychotypological factors, that is, the perceived language distance between English and Greek: the subjects perceive Greek not to be similar to English and, thus they are reluctant to use their L1 knowledge to deal with problems in their L2. It is, after all, common knowledge that Greek does not belong to the same branch of the Indo-European family-tree as English. However, one could argue that this is the case for English and French, and I am referring here to the two blends mentioned above. Nevertheless, many English words can be ‘turned into’ their French counterparts by means of phonological and orthographic ‘adjustments’, something one cannot claim for English and Greek words.
Table 20: Percentages of C-test slots that elicited correct responses from
0-25, 26-50, 51-75, 76-100 per cent of subjects

<table>
<thead>
<tr>
<th></th>
<th>0 - 25</th>
<th>26 - 50</th>
<th>51 - 75</th>
<th>76 – 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-test 1</td>
<td>4%</td>
<td>6%</td>
<td>8%</td>
<td>82%</td>
</tr>
<tr>
<td>C-test 2</td>
<td>2%</td>
<td>2%</td>
<td>4%</td>
<td>92%</td>
</tr>
</tbody>
</table>

A final point to be made in relation to whether L1 processing is similar to L2 processing has to do with the existence of a number of ‘creations’ in the subjects’ responses. Table 21 lists the ‘creations’ identified in both C-tests. It is evident that the proportion of ‘creations’ is extremely low when compared to the total number of correct responses (see Table 11). Moreover, we notice that C-test 1 elicited more ‘creations’ than C-test 2. This is not surprising as C-test 1 was proven to be more difficult than C-test 2 in terms of problematic slots (see Table 20). The existence of the ‘creations’, as mentioned above in relation to the heterogeneity issue, can be attributed to a state of ignorance on the part of subjects rather than to differences in L2 lexical processing. The argument that supports this suggestion is derived from the fact that the majority of these ‘creations’ are associated with the lower-scoring slots of the C-test. For example, the 6 ‘creations’ which are unrelated to context found in C-test 1 were elicited as solutions to slot 33 which has as its target item the word resuscitate (resus____): *resusc, *resuste, *resuse (recorded twice), *resuscue (recorded twice). Consequently, it seems that this kind of lexical creativity is employed as a strategy which solves lexical problems and is not indicative of an L2 lexicon that is more ‘loosely organized’ than a given L1 lexicon. In
relation to the issue of lexical creativity I would like to point to the fact that this is a common phenomenon in L1 situations as well. It is well known that speakers/hearers use word-formation (lexical redundancy) rules which allow them to produce a potentially infinite number of new items (Radford, 1981: 20, 133; Cruse, 1986: 50). An example of this type of creativity (which obviously differs from the ‘creations’ we have been discussing so far) is derived from C-test 2. Slot 28 of this test has as its target item the word *false (fa___), the phrase in which it occurs being *But have the critics been false? One subject completed it as *fatherful using the word-formation lexical redundancy rule which specifies how to form adjectives from nouns. The non-existence of *fatherful as a word of the English language does not diminish the fact that the subject actually used a rule that is also employed by L1 users. To sum up, it appears that lexical creativity in the Chomskyan sense occurs in both the L1 and the L2. In addition, lexical creativity which cannot be accounted for in respect to redundancy rules (of the *resuste type) seems to be a lexical strategy used for helping with problematic and unfamiliar items. This provides evidence for the view that the level of familiarity of a learner with an item will provoke different types of responses in the L2.

**Table 21: Numbers of creations in C-test 1 and C-test 2**

<table>
<thead>
<tr>
<th></th>
<th>English C – test 1</th>
<th>English C – test 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creations related to context</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Creations unrelated to context</td>
<td>6</td>
<td>1</td>
</tr>
</tbody>
</table>
In conclusion, the results of the C-tests tend to corroborate the findings from the word-association results. L2 processing seems to be semantically based for the greatest part in respect to advanced learners since the great majority of the slots were correctly completed. This can be interpreted as an argument against the view that the L2 mental lexicon is in its greatest part phonologically driven. On the contrary, it seems that L2 processing is similar to L1 processing which relies more on meaning. However, phonological processing does seem to occur with unfamiliar items: restricted L2 knowledge is a factor that may lead to formal operations when unfamiliar words are involved irrespective of a learner’s overall proficiency in the language in question. In addition, it appears that the heterogeneity of responses does not suggest a differently organized L2 mental lexicon where phonological processing is prominent but rather it seems to be associated with problematicity, that is, the existence of a wide variety of different solutions to a particular slot is indicative of the difficulty of the item in question. Finally, and in respect to lexical creativity, two points emerge from the discussion: first, that it is a common process both in the L1 and the L2, and secondly, that lexical creativity which cannot be explained in terms of lexical redundancy rules is related to problematic items. These findings tend to corroborate the view that the way in which a learner deals with a lexical task in the L2 is related to his level of familiarity with the particular task.
3.3.4 Conclusion

The empirical part of the study sought to investigate the respective roles of form and meaning in relation to the L1 and the L2 mental lexicon of adult native speakers of Greek who are advanced learners of English. The findings from the word association experiments and the C-tests allow me to suggest that there are certain similarities in the L1 and L2 lexical operations.

In respect to the word association tests it has been shown that native speakers and advanced learners seem to rely more on meaning rather than form during the processing of familiar words (the production of high numbers of semantically related responses to the stimuli provides such evidence). It was also revealed that the subjects produced equal numbers of syntagmatic, paradigmatic and other semantic responses in both English and Greek, a finding which was interpreted as an indication of a similar lexical organization in the L1 and the L2. The production of a slightly higher number of phonological (clang) responses in the L2 (which was, nevertheless, not statistically significant) is not indicative of a more phonologically-oriented L2 mental lexicon but rather it indicates problematicity, that is, it reveals the lower level of proficiency of particular learners in relation to certain words which were proven to be the most difficult stimuli. It was suggested that this phenomenon is also evident in the L1 when native speakers are confronted with unfamiliar words (S+derman 1993). Consequently, one may reach the conclusion that whereas formal processing seems to be important in the early stages of the
integration of a word either in the L1 or L2, it is semantic processing that seems to take over and to play a decisive role as the integration of a word progresses in the L1 or L2 mental lexicon.

The findings from the C-tests lend support to this view of lexical development. The great majority of the subjects’ responses were correct and semantically related to the stimulus context and even most of the incorrect responses were in some way semantically related to it as well. The fact that there was some divergence (many different responses) in the responses of some subjects in relation to a few C-test slots which were proven to be the most difficult items in the tests, is an indication that problematic items yield divergent solutions; still, in our case the great majority of these responses are semantically motivated errors, which is a further argument for the importance of meaning in L2 operations. Finally, in respect to lexical creativity, it was shown that the few lexical creations produced by the subjects were related to the most difficult items in the C-tests. Therefore, it seems that lexical creativity is a lexical strategy used for solving lexical problems and it does not seem to be an indication of the ‘looseness’ or randomness of the L2 mental lexicon. Moreover, it was pointed out that lexical creativity in the Chomskyan perspective is evident in L1 and L2 situations. These findings tend to corroborate the view that the level of familiarity of a learner with an item will provoke different types of responses in the L2.

In relation to the claims of the separateness or integration of the L1 and L2 lexicon no findings were yielded from this study which could provide
evidence for or against such claims. It was pointed out that the fact that no
great numbers of cross-linguistic findings emerged from the analysis
cannot be taken as an indication that the two lexicons are completely
separate because this absence could be attributed to psychotypological
factors.
CHAPTER IV

Conclusion: some implications of the research and some unresolved issues

This section includes a concluding summary of all the main points that have been dealt with in this study together with some implications for further research and teaching.

In Chapter I, the issue of word meaning was explored and the difficulty of arriving at an accurate and complete definition of the word was pointed out. The domain of the lexicon was, then, introduced and it was shown that it interrelates with other aspects of language in such a way that the boundaries between them are not always clear. It was, subsequently, suggested that until it becomes clear precisely which aspects of a particular language are to be considered as lexicon-specific it would be wise to allocate those areas of a language to the lexicon which have been generally agreed on as language-particular (e.g. meanings and forms of lexical items, collocational patterns, attribution of grammatical category, complementation of verbs).

In Chapter II, we examined L1 lexical acquisition after the onset of word production arguing that most of the processes in relation to the formation of the L1 lexicon are semantic in nature. In respect to L2 lexical development it was acknowledged that it takes place based on an already formed L1 lexicon but it was suggested that there are similarities in the ways L2
learners and native speakers behave in difficulties that have to do with both the formal and semantic aspects of language. More specifically, the nature of the paradigmatic-syntagmatic shift was examined in the L1 and L2 and it was suggested that, contrary to earlier research, both types of links appear to be prevalent in the lexicon of native speakers and learners. Moreover, the shift does not seem to be related to age (in respect to L1) or overall proficiency (in respect to L2) but rather to the level of familiarity of native speaker or learner (child or adult) with particular words; the more unfamiliar a word is to a person the more likely phonological processing is to be triggered. Phonological processing, then, seems to be related with the early stages of the internalization of a word in the L1 or L2 mental lexicon, followed by semantic processing as the word becomes well integrated in the mental store. More evidence for this approach to lexical development is derived from the two issues that were subsequently dealt with in Chapter II in relation to the L2 mental lexicon: first, the issue of whether the L2 mental lexicon is primarily more form-based than the L1 mental lexicon and secondly the issue of the separateness or not of the L1 and the L2 lexicons. In respect to the first issue, a variety of research coming from a range of fields was presented in favour of the above mentioned approach to word development. In relation to the second issue a range of findings was reviewed that appear to exclude the possibility of a complete separation of the L1 and L2 lexicons but also of a total integration. These findings seem to suggest that the L1 and the L2 lexicon items may be stored separately but there is communication between them; this relationship between an L1 and an L2 item may vary according to the
degree to which the items are perceived to be similar or different from each other. Other factors that would seem to influence such a relationship are the way the L1 and L2 lexical items were acquired and the level of familiarity of a person with the particular items.

Chapter III reported on the layout of the present study by making reference to the subjects and the methodology used. The validity of the experimental instruments employed was discussed and the usefulness of using word association tests and C-tests for gathering lexical data was demonstrated. In respect to the experimental section which tried to shed light on the relative importance of form and meaning in the L2 mental lexicon the findings point to a strong semantic factor in the connections between words in the subjects’ responses. Moreover, it was shown that phonological (clang) responses in the word association tests were produced in relation to difficult items, an indication that formal processing is prominent in the early stages of the integration of a word in the L1 or L2 mental lexicon. Moreover, the heterogeneity of responses in relation to difficult items in the C-tests can be an indication of problematicity rather than of randomness in the L2 mental lexicon. Finally, lexical creativity can be seen as the result of a lexical strategy employed to solve lexical problems.

The above main points that have arisen from the discussion in the previous chapters have certain implications for teaching and research. To begin with, it was stressed in Chapter I that it is becoming increasingly more difficult to establish the boundaries of the lexicon. The importance assigned to the lexical aspects of the language can be attested by the interest of
language teaching in this area and the subsequent rash of relevant publications during the last decade. However, since it is increasingly difficult to delimit those areas of the language which are lexicon-specific it would probably be more appropriate to visualize the teaching of vocabulary as moving away from the teaching of individual and out of context items. For example, the learning of word lists may be thought of as a traditional technique which has long vanished from the teaching agenda, but it is not so as I have seen it practiced recently in primary school classrooms. More contemporary approaches such as the well-known grids also tend to focus on individual lexical items. However, one should not readily diminish the role of lexical grids; my point here is, simply, that such techniques should be used alongside with other activities that take account of all the aspects of the lexicon (e.g. grammatical, collocational).

In respect to research we should probably be a little sceptical at methodologies which use only discrete and decontextualized lexical items in an effort to gain insight into the nature of the lexicon. This does not imply that achievements of projects that use such instruments of research are to be discredited. My point here is that there are many complexities as far as work on the mental lexicon is concerned and that methodologies which use only such instruments provide a rather limited image of the workings of the lexicon. However, findings from word-association tests can complement and lend credit to findings that have resulted from research in other types of lexical data.
In respect to the main issue of this study it has been shown that L2 lexical operations are very similar to L1 operations. This would imply that the teaching of L2 lexis should not be entirely different from the teaching of L1 lexis. More specifically, the analysis of the data in this study and the discussion of relevant research point to a similarity in the roles of form and meaning in the acquisition and processing of L1 and L2 lexis. In respect to form it was suggested that formal processing seems to be important at the early stages of internalization of words. This would point to a need to assess lexical production on the basis of the learners’ capacity to reproduce form. In relation to teaching this would mean that teachers should encourage learners to faithfully repeat new lexis aided by the use of material especially designed to help learners replicate these items. Teachers should also advocate the practice of repetition of novel material not only inside the classroom but whenever such situations emerge.

Moving on to meaning, it was established that semantic links between lexical items are important both in the L1 and the L2 in that they seem to be the key organizing factor in the mental lexicon and also play a significant role in the accessing of lexical items. Lexical research on acquisition and processing, then, should not concentrate only on formal associations in the analysis of data; the role of semantic associations should not be undermined or downplayed. After all, learners are encouraged to exploit semantic links for the purpose of accessing new lexical items. For example, richness activities (e.g. collocational activities, semantic mapping),

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63 Semantic mapping involves the making of a diagram that outlines the relationships between words according to their use in a particular text.
matching) can increase the syntagmatic and paradigmatic networks between words, thus offering many points of access to an item. More specifically, semantic mapping may be used to bring to light the relationships between words in a text with the aim of a deeper understanding of the text and of the creation of associative networks for words. Alternatively, paradigmatic relationships between words may be strengthened with the use of matching and classification activities.

Another interesting point in relation to the role of meaning has to do with the role of image and mnemonic devices in L1 and L2 lexical operations. It seems that the use of visualization has been successful in the learning and retention of new vocabulary and especially of concrete words. Further research would be needed in order to corroborate the importance of visualization in lexical learning but it seems that the findings so far point to a promoting of visualization in the classroom.

In respect to the suggestion that formal processing may be more prominent in the initial stages of the learning of an L1 or L2 word, the use of other mnemonic devices, such as the keyword method, were proven to facilitate the linking of a word’s form with its meaning in those early stages. Such a technique appears to be effective in the early stages of L1 and L2 vocabulary learning as it helps memorization. As was pointed in Chapter II, the keyword method requires a conscious effort on the part of the learner to establish a link between a new lexical item in the L2 and an L1 or L2 word which resembles formally the word to be learnt. This link between these
two words is a strong association which takes place with the help of a visual image that combines the two words in an odd or bizarre way in order to increase the memorability of the new lexical item. It is to be noted here that the power of this odd association is most probably only temporary and it may decrease after a direct and straight-forward association is built between the target word’s form and its meaning. I suppose that the kind of lexicon that could host such connections (formal and semantic, within and beyond languages, with different degrees of stability) is a flexible mental lexicon which allows for temporary mediators. After all, the keyword technique is not unfamiliar to L1 users in situations where they try to retain in their memory the difficult name of a person just presented to them. However, learning novel L2 items is a much more complex process. Still, the keyword method is not to be considered as covering the entire process of ‘equipping’ the lexical node with all the appropriate semantic and formal characteristics but it is to be regarded as a help towards the establishment of one of the necessary associations in the early stages of the internalization of a word in the L1 or L2 mental lexicon.

Whereas the keyword technique constitutes a conscious effort to learn a new lexical item it has been known that learners acquire new words ‘incidentally’ without receiving any instruction. Incidental vocabulary acquisition provides further evidence for the existence of formal and semantic processes in lexical acquisition as was pointed out in Chapter II. However, there is a need to clarify what exactly should be included under the term ‘incidental’. Do learners pay attention to the forms and meanings
of the novel items which they encounter in discourse as some researchers
suggest or not? Whatever the approach taken it seems logical to suggest
that when conscious learning is not involved lexical acquisition can be
broadened when a learner takes into account anything that could be useful
in the retention of unfamiliar words. Precisely what is useful to the learner
needs further research but one thing that learners seem to exploit is
context. Consequently, the exploitation of context in lexical acquisition
would need to be further investigated.

In respect to teaching, incidental vocabulary learning seems to be of no use
in the classroom since no direct teaching is involved in this process. Still,
teachers could give instructions to learners in relation to dealing with
unfamiliar words (e.g. making use of context and existing knowledge of
similar forms), thus helping them at a metacognitive level.

Moving on from the issue of similarities and differences between the L1 and
the L2 mental lexicon let us turn our attention to the question of the
connectedness or not of the lexicons. As I have already pointed out in
previous chapters this latter issue is not the main issue of this study and,
thus it was not fully investigated in the empirical part, the focus being on
the respective roles of form and meaning in the L1 and L2 mental lexicons.
Still, I feel that the two issues are somewhat related and I will try to
consider some of the implications that arise from the previous discussion in
Chapter II.
First of all, it seems that words in the mental lexicon are not clear-cut entities. There are cases where word knowledge is not fully available as in the tip-of-the-tongue phenomena. Sometimes, it is possible that one knows a word form without knowing its meaning; one may even have formed a concept without having at his disposal a word form. Certain factors such as the way words are acquired and the level of familiarity of the individual with particular words in either the L1 or the L2 indicate that language users store information in different levels of completeness.

It appears that the L1 and the L2 mental lexicons are not totally separated from each other nor completely integrated with each other. Obviously, when an L2 is acquired in most of the cases it is acquired with the L1 knowledge in the background, thus the L1 lexicon will have to be consulted during the learning of L2 words (evidence from cross-linguistic influence would verify this assumption). Indeed, it has been shown that learners try to make connections between new vocabulary in their target language and words in languages that they know and that the connections between L1 and L2 words can be both of a semantic and of a formal nature. Consequently, it would not be wise to investigate separately L2 acquisition and processing from L1 lexical operations as it seems that the two lexicons communicate with each other, possibly with direct links between individual L1 and L2 lexical items. It may even be the case that all L1 and L2 words are located in a single store with the subset of L1 words being more strongly associated with each other than with those in the L2 subset; if this is the case, the L1 and the L2 words would constitute two rather separate
groups within the entire ‘community’ of words and there would be links between individual L1 and L2 items. Once again the mental lexicon is conceived as a dynamic system. It would appear that the relationship between an L1 and an L2 lexical item will not be the same for all individuals, that different factors seem to influence such relationship, as, for example, the way the words were acquired, the level of familiarity of the individual with the words in question, and finally the extent to which the individual perceives formal and/or semantic resemblances between the L1 and the L2 lexical item. For instance, an L1 and an L2 word may be first stored with no associative links between them. Later they may be linked with a formal or semantic characteristic and later still more characteristics may be added. In addition, there may be different levels of strength between these links with some increasing and others even decreasing over time.

This implication about different levels of strength between L1 and L2 words can be related to Weinreich’s work on bilingualism, that is, on whether the relationship between L1 and L2 words is to be conceived as coordinate, compound or subordinative. For example, a Greek native speaker who has just started learning English as a foreign language, wanting to express the English word for the concept peace, can have access to the English word peace only via the native ειρήνη. As the proficiency of the learner in respect to this word increases he may be able to access peace directly from the concept peace. In addition, in a stage of further fluency, the meaning of peace may acquire conceptual features not available by the meaning of L1
εἰρήνη. Each word being acquired will have to pass through different stages of lexical knowledge, thus it is possible that some words in a learner’s lexicon will be related to L1 words in a subordinative way while others in a compound or even a coordinate manner. Indeed, Weinreich recognises that it is not necessary for a person’s bilingualism to be of a single type.

The relevance of this suggestion for vocabulary teaching is that since lexical development seems to be characteristic of language learning at all proficiency levels, it goes without saying that vocabulary should be worked on through all stages of language instruction in both quantitative and qualitative terms. In relation to the fact that learners seem to consult their L1 when they learn new vocabulary in the L2 I would like to point out here that this is not necessarily so tragic. After all, where related languages are involved cross-lexical consultation could facilitate the reception of L2 vocabulary (in facilitating comprehension and subsequent acquisition) and also the production of L2 vocabulary so long as borrowing strategies are carefully used.

So far a number of implications for research and teaching have been offered in respect to the main conclusions that have arisen from the discussion in the previous chapters. More research is obviously needed to shed light on the questions raised in this study. One conclusion that naturally flows from what has been discussed so far is that research in the area of the mental lexicon needs to make use of the findings of many source disciplines. If the domain of the lexicon and the way it relates to other aspects of language are to be clarified, then the findings from
linguistic theory, psycholinguistics and cognitive linguistics have to be taken into account as well. In respect to the implementation of methodologies and research instruments relevant research in the area of L1 acquisition could be used to complement the work carried out in L2 acquisition. Finally, the area of language teaching might offer insights and feedback from the actual use of lexical projects in the language classroom.

Overall, the area of the mental lexicon is quite complex and deserves special attention as many issues remain still unanswered. The only obvious suggestion in respect to the difficulties related to the complicated issues involved would be a plea for longitudinal research. After all, the learning of L2 and even of L1 vocabulary stretches out in long periods of time and therefore longitudinal studies may well be justified and might be the solution to dealing with longstanding difficulties in the area of the mental lexicon.
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List of the stimulus words used in the word association experiments

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Appendix B: Table 22

The following table shows the overall numbers of correct, incorrect and non-responses that the students gave in respect to each of the 50 slots in C-test 1 and C-test 2. The numbers from 1-8 in the first vertical column are arbitrary numbers which were assigned to each category for statistical purposes and are of no consequence to the interpretation of the tables (e.g. all the semantically motivated incorrect responses, and more specifically the well-formed items were assigned the number 2). The second vertical column shows the breakdown of the three categories in smaller subcategories (e.g. the correct responses category is comprised of all the responses that coincided with the items in the original texts (assigned the number 1) and also all the acceptable substitutes (assigned the number 4)). Thus, the correct responses category is comprised of all the items which were assigned the numbers 1 and 4 (1 + 4). The next vertical columns offer a detailed breakdown of responses for every slot (1-50). For example, the correct responses of all the students in the first slot of C-test 1 were 25 and the percentage range was 92,6%. In addition, there were 2 incorrect responses for the same slot which are included in the subcategory of semantically motivated errors.
# Appendix I: C-test Life and Death

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## Appendix I: C-test Life and Death [2/5]

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