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The Relationships between Word-Association and Learners' Lexical Development
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Mohammad Umar Farooq

Aichi Women's Junior College

1 INTRODUCTION

1.1 Description and significance of the problem

How can classroom research possibly help EFL learners acquire vocabulary? (see, for instance, Taylor 1986, cited in Carter and McCarthy 1997: 52). 'Acquire' refers here to the definition adopted by Channel:

> I regard an L2 word as having been acquired by a learner when a) its meaning
> can be recognized and understood (rather than guessed at), both in and out of context
> and b) it can be used naturally and appropriately to situation (1996: 84).

A response to the question would be crucial if the EFL learners believe that the most important part of learning a foreign language is learning vocabulary (Horwitz <u>1998</u>); and "the development of a rich vocabulary is an important element in acquisition of second language" (Nunan 1991: 118). For EFL learners, because of an entirely different learning environment from those of ESL learners (see Holliday 1994: 4-5; Bisong 1995; Hopkins and Nettle 1994: 158-159; and Farooq 1993: 88-89), the choice left is to rely heavily on widely used traditional strategies such as 'flash cards', 'word lists' and 'bilingual dictionaries'. The situation seems even more common among Japanese learners as is pointed out by Thompson:

> The traditional Japanese regard for authority and formality is in tune with teacher-
> dominated lessons where much heed is paid to the 'correct' answer, learning of
> grammar rules and <u>item-by item</u> (rather than contextualised) vocabulary
> (1995: 223).

In an extensive study based on a general survey relating to vocabulary learning strategies of Japanese learners, Schmitt (1997: 220, and 224) reports that Japanese learners make use of bilingual dictionaries and feel that they are helpful (95 %); they also use word lists (57-82%), and flash card (59-79%). However, whatever strategies students employ learning words is not a waste of time. With several years' efforts these students have stored words in their long-term memories. These are likely to be utilized as a strong foundation to help them acquire new words; this can be accomplished by first, exploring how and how strongly they are organized and connected with each other in

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their minds; and then, on the basis of the information obtained, designing or selecting appropriate teaching materials for vocabulary building (see Richards 1976).

1.2 Objectives of the paper

The main objective of this paper is to explore the relationships between word-association and learners' lexical development employing the word-association test and report on the outcomes of the study (Deignan et. al. 1998: 152).

The study will use two different levels of EFL Japanese learners as subjects: lower-level learners (students), and advanced-level learners (English teachers). The specific research questions addressed are as follows:

[1]   Does such a word-association test tell us anything about how these learners are making mental links between words they have learnt?

[2]   At lower levels, are phonological similarities playing an important role?

[3]   Do the results bear out the prevailing characteristic types of response as follows?
    (i)   co-ordination,
    (ii)   collocation,
    (iii)   superordination,
    (iv)   synonymy, and
    (v)   word knowledge.
(see McCarthy 1996: 34-45)

[4]   Do the results of the lower-level learners differ from those of the advanced-level learners?

The report will first, provide brief information on the background of the problem through a literature review; next, describe the steps and procedures involved in collecting and analyzing the data; and last, respond to the above questions 1-4.

2 LITERATURE REVIEW

2.1 Sources of data to investigate mental lexicon

For research into mental lexicon the literature offers four means of data collection from the way speakers behave: (i) word searches and 'slips of the tongue' of normal speakers; (ii) the word-finding problems of aphasics; (iii) psycholinguistic experiments; and (iv) the work of theoretical linguistics (Aitchison 1996: 16-27; and Deignan et. al 1998: 80).

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Data in the form of a prompt and its target response from the resources (i)-(iii) is interpreted within the framework of theories of lexical relationships (Deignan et. al 1998: 80).

2.2 Semantic, phonological relations and world knowledge

The theories in general seem to categorize the semantic aspects of the data into the syntagmatic and the paradigmatic relations (see Meara 1980: 234); whereas the phonological aspects attribute the data to refer "bathtub phenomenon" (i.e. the importance of beginnings and endings of prompt and response words), general stress pattern and the word length.

The syntagmatic relation between the prompt and the response refers to as chain or the left to right relationship in a text, whereas the paradigmatic one is known as choice or the relationships between lexical items that could have been chosen to fill the slots in a piece of text (Deignan et. al 1998: 17, 41; also see Richards et. al 1993: 369).

Another relation which cannot be explained on the basis of current lexical theory, is regarded as that which relates the stimulus word to the world or encyclopedic knowledge of the speaker (Schmitt 1997: 212; and Ann, R. 1998). Moreover, it seems that "speakers store some world knowledge with each word" (Deignan et. al 1998: 83) as exemplified by McCarthy in a discussion of his associations of 'war' (1996: 41).

2.3 Collocation and paradigmatic relations

The syntagmatic relationship (see Deignan et. al 1998: 17, 40; Yule 1996: 122-123; McCarthy 1996: 12-15; Aitchison 1996: 89-90; Sinclair 1997: 115-121; Carter 1996: 36-38; Nattinger and Decarrico 1992: 36, 177-179; Hoey 1996: 69; and Bauer 1998: 34) "is left undivided as a general relation [termed as 'collocation'] of likely co-occurance" (Carter and McCarthy 1997: 202). Paradigmatic or sense relations, on the other hand, are comprised of different types (see Carter 1996: 18-22; Yule 1996: 118-120; Deignan et. al 1998: 18-23; McCarthy 1996: 15-20; Aitchison 1996: 84-85; Nattinger 1997: 72; Hoey 1996: 69-75; Bauer 1998: 30-33; and Carter and McCarthy 1997: 19-27; 202 and 210). However, in terms of pedagogy, McCarthy (1996: 16) points out "The relations which most language teachers encounter with the greatest frequency in day-to-day teaching are synonymy, antonymy, and hyponymy " and their correspondence respectively as equivalence, opposition and inclusion (See McCarthy 1997).

Other terminology and concepts frequently found in the literature that will be employed grossly in the current study are (i) superordination (e.g. color), subordination (e.g. green) as parts of hyponymy; (ii) co-ordination (e.g. green, white) including antonymy (see

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Aitchison 1996: 84); and (iii) the quasi-hyponymy which is reported as " These other, more lax types hyponymy ('pseudo-hyponymy'), [that nevertheless], are important in language." Examples are part-whole or source-result relations (see Carter and McCarthy 1997: 26).

2.4   Word-association based research

Based on the data from the above resources, considerable research has been carried out to explore the organization of the L1 mental lexicon, and the process of how words are stored and retrieved for comprehension and production (see McCarthy 1996: 35-45; Aitchison 1996; Yule 1996; and Scovel 1998).

Among the reported studies, the data from psycholinguistic experiments (Aitchison 1996: 24-25) is of interest for the present study. The most well known experiment is word-association, in which a word produced spontaneously in response to a prompt may have strong link with that prompt word in the mental lexicon (Deignan et. al 1998: 80). Likewise, "an analysis of these responses [to a prompt word/s] may give useful information about how words might be linked together in a person's mind" (Aitchison 1996: 24). Considerable work has been done using the word-association test. For instance, see Jenkins (1970: 9-37), Rosch (1975: 229-233), and Armstrong et. al. (1983: 276, 278, and 288).

The preceding literature, however, primarily either deals with learners whose native language is English or relates to ESL learners (see Channell 1997, Nattinger 1997; and O'Gorman 1996). It seems that comparatively little attention has been given to explore the relationships on the basis of the word-association test concerning learners in an EFL context specifically Japanese learners (but see Sokmen 1993: 138; Schmitt and Meara 1997: 22; and Yoneoka 1987-2-3).

3   METHOD
3.1   Subjects

Two different levels of EFL Japanese learners were selected as subjects for this study: lower-level students, and advanced-level English teachers. These particular groups were selected to maintain a clear distinction between groups' ages, language proficiency levels, and learning habits and environments.

3.1.1   Lower-level learners

Total subjects in this group were 64 females of 19-20 years old. They were junior college students (see Okugawa 1993: 231; and O'Sullivan 1994: 105) who belonged to

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two different courses of study: the International Secretarial Studies course and the Nurse-training course. The students in general were relatively well motivated (ibid: 107-108). The students from a former course had attended a 3-month overseas program in Australia. Moreover, all the subjects have had studied English for at least 6 years prior to entering this college (see Thompson 1995: 222-223).

3.1.2 Advanced-level learners

Subjects in this group were 15 females and 5 males. All of the subjects were EFL teachers, including professors and heads of English departments, and were fluent in English in that they had either received a Masters degree including TESOL from an English speaking country, lived overseas for several years, had TOEFL scores of over 600 or were currently engaged in the MA TEFL/TESL Open Distance learning program through the University of Birmingham.

3.2 Stimuli

After conducting a pilot study of 36 words as stimuli, and following the suggestions "A pilot study indicated that nine categories [= stimuli] was the largest number that could be tested" (Rosch 1975: 199), 8 words were selected for testing from the pre-determined categories (Deignan et. al. 1998: 152). The stimulus words were "she, pencil, house, grass, hungry, come, internet, red".

3.3 Procedure

3.3.1 Lower-level learners

In a regular class setting, subjects were instructed to write down the response in English that first come into their minds after listening to a stimulus word. Each word, since it was not always clearly caught, had to be repeated 3 or 4 times, and words were occasionally written on the board, in particular the grammar, and the low-frequency words.

3.3.2 Advanced-level learners

The same test was used for the advanced group. In a face-to-face meeting or by telephone, each subject responded to the stimuli. Each word was spoken only once with the exception of grammar and low-frequency words 'she' and 'grass' because of sound similarities with the words 'sea' and 'glass'. For the purpose of comparison, data of native speakers of English was also collected (see Grott 1998).

4 DATA ANALYSIS

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The frequency of a response in a word-association test accounts for the strength of that particular response (see Jenkins 1970: 1). Likewise, the strength of an existing link that is a relation between a stimulus word and its response maybe defined in terms of the frequency of that response. The higher the frequency, the stronger the link can be assumed to be. For the purpose of reliability and applicability of results as pointed out by Seliger and Shohamy (1995: 208), and Griffee (1997: 177), two different approaches were employed to explore the strength of relations. Furthermore, for simplicity, all the results were presented in whole numbers (by counting fractions of 0.5 and over as a whole number and disregarding the rest).

4.1   Three commonest responses based approach (I)

The first approach, taking into consideration mainly the first three commonest responses to each stimulus word (see Sokmen 1993: 142-144; and Jenkins 1970: 4), attempted to find the order of the strength of the existing relations. For example, the strength of 'she' with its associated responses 'girl' (48%) was regarded as the strongest, 'he' (38%) the second strongest, and 'woman' (13%) the least strong; and the relations were decided, respectively as synonymy, co-ordination and synonymy (see Appendix C).

4.2   All responses based approach (II)

In the second approach, however, the strength in a particular relation was seen on the basis of all responses; by first exploring the existing relations between a stimulus word and its associated responses, and then adding all responses that belong to a particular relation to find its strength. For instance, in the case of 'she' the relations and their strengths are regarded (and will be explained below) as synonymy (55%), co-ordination (31%), collocation (12%), and world knowledge (4%) (see Appendix A: lines 01-04). The strength of relations for each stimulus word in the descending order is shown in Appendices A and B. The values of each type of relation was then added to calculate its average strength (see Table 1: p. 10, and Table 2: p. 11). The following analysis refers to the approach II based on the data presented in Appendices A and B, since the approach I with minor analysis represents a subset of II.

4.3   Semantic relationships

The raw data after discarding responses produced in L1 and null responses, and categorizing in the forms of most to least common occurrences was utilized to look at the existing relations in the order of syntagmatic (defined as collocation in this study), paradigmatic, and/or world knowledge.

4.3.1   Syntagmatic/collocational relation

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The 'collocations sampler' (see Collins Cobuild) was employed to obtain the number of instances of collocational relations in a concordance with a maximum two words (see Carter 1996: 49) apart between a stimulus word and its response and the information was used as an evidence (ibid: 73) to decide the strength of collocational relations in the present study. The higher the frequency of instances (up to 40), the stronger the relation was regarded. No attempt was made to use self-created examples for the justification of a collocational relation, since it might affect the reliability of the analysis. A collocational relation is reported to exist with 4 words on either side of a target word (Sinclair 1997; and Carter 1996: 74), however with this definition most of the responses to each stimulus word seemed to have collocational links . On the other hand, cases with two apparently equally strong relations posed difficulties in deciding the stronger relation. For example, let us consider the following examples of synonymy, as in

she: girl; woman; her, daughter . . . [Appendix A: 01; Appendix B: 01], and

house: home . . . [Appendix A: 08]; or

co-ordination as in

red: blue; black, white . . . [Appendix A: 26, Appendix B: 29].

The links between 'she', 'house' or 'red' respectively with their associated responses can be seen as both collocational and paradigmatic. However, all responses to 'she' are words used only to refer a single entity (see Meara 1980: 234), 'female'. Additionally, all the other associations listed above that are synonymy and co-ordination seem well established as they are widely found in the literature (see Aitchison 1996: 84).

Other examples involve apparently stronger relations such as collocation and subordination, as in

house: family; dog . . . [Appendix A: 07],

'family' or 'dog' can be seen as subordinates of a 'house' in terms of its parts. However, this part-whole relationship seems comparatively weaker since the parts are represented by human nouns as opposed to inanimate objects like rooms and furniture (see Yule 1996: 116).

4.3.2 Paradigmatic relations

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The remaining responses were then used to see whether they relate paradigmatically in terms of co-ordination, hyponymy, or synonymy as analyzed below.

4.3.2.1 Co-ordination

The co-ordination link was found to be relatively straightforward in this study as the link lends itself to analyze two items "on the same level of detail, [and since]. . . opposites come into this category, as they are co-ordinates in a group consisting of only two members. . ." (Aitchison 1996: 84).

4.3.2.2 Hyponymy

Since "hyponymy offers the possibility of clear, diagrammatical representations of meaning, . . it would seem conceivable that the whole of the vocabulary could be hierarchically organized in this way" (Carter and McCarthy 1997: 25). In fact, it was difficult to focus on relations other than the hyponymy. Additionally, " much of what is said about hyponymy applies to nouns only" (ibid: 26). For this reason, the concept of quasi-hyponomy (see section 2.3) was adopted since it shows a way to link a superordinate to its subordinates through grammatical classes different from each other (ibid: 26). Instances of the concept found in this study include

pencil: write; study; picture; blue; black . . . [Appendix A: 05],

pencil: write, study; erasable . . . [Appendix B: 04], and

house: mine . . . [Appendix B: 08].

'pencil' (a noun) may relate to 'write', study' (verbs) in terms of its function or usage; to 'black'(adjective) in terms of physical appearance. Similarly, 'house' may have a link with 'mine' in terms of 'ownership'. Therefore, in these examples quasi-hyponymy relationships are likely to have existed (see other similar examples in Carter and McCarthy 1997: 26)

4.3.2.3 Synonymy

Some of the links found were obvious such as

hungry: starving . . . [Appendix B: 17], while

others had an indirect sense of or near synonymy, as in

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hungry: unhappy; irritating . . . [Appendix B: 17].

4.3.3   World or encyclopedic knowledge

A response which neither had a collocational link (defined in terms of 0-5 instances in Collins Cobuild) nor had a paradigmatic relation was then used to see whether it was related to the subjects' world or encyclopedic knowledge (see McCarthy 1996: 40-41; Deignan et. al. 1998: 83; and Soderman 1989: 116). Although, the decision on a certain relation may require a deep understanding of the learners' culture, there seem to be some other factors that made it difficult to arrive at this relation with confidence especially for cases when the response was the commonest one. For instance in the pair

hungry: food (the commonest response) . . . [see Appendices A: 15; B: 16, and C],

no instance was found in the concordance (see Collins Cobuid) with 2 words intervening 'hungry' and 'food'. However, with 5 words apart, 4 instances were found. Therefore, this particular link (and the ones which were decided on the '2-word-apart' assumption) differ from what was reported previously as collocational (see Deignan et. al. 1998: 82).

4.4   Syntactic relationships

To see whether a direct syntactic relation (Deignan et. al. 1998: 81) existed, for example, a noun elicited a noun (Channell 1997: 92), responses to a stimulus word were calculated by counting the number of responses belonging to the same syntactic category as that of the stimulus word. The response in each syntactic category was averaged to find the strength of syntactic relation (see Table 1 and Table 2).

4.5   Phonological relations

The number of instances with the same (1) beginning and ending sound, (2) general stress pattern, and (3) word length (i.e. the number of syllables) between each stimulus word and its associated response were calculated to see whether there existed any (i) semantically related and (ii) semantically unrelated phonological similarities. Results relating to (i) were then averaged, giving the general strength of phonological relations (see Table 3: p. 13).

5   RESULTS AND DISCUSSION

The main objective of this paper was to explore the relationships between word-association and learners' lexical development employing four research questions
(see section 1.2; and Deignan et. al. 1998: 152)

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On the basis of findings in this study, these questions can be answered affirmative as indicated by the existing mental links, characteristic types of response (see Table 1: p. 10 and Table 2: p. 11), and phonological similarities (see Table 3: p. 13) both for the lower-level (L) and advanced (A) learners. Detailed discussion which includes responses to the questions will be presented, for clarity, in the forms of semantic, collocational, and phonological links (as in the following subsections).

5.1   Semantic and collocational links

As predicted (Aitchison 1996: 83), learners made mental links between each stimulus word and its associated responses.   Strong links in general were in the order of paradigmatic, and syntagmatic or collocational. Similar results were reported previously as

> the word associations of the most proficient learners still contained a surprising amount of syntagmatic and clang responses. . ., the least proficient group gave evidence of an impressive number of paradigmatic responses. (Soderman 1989: 119)

Learners also related words (comparatively less strongly) from their existing world or encyclopedic knowledge (see Table 1 and 2).

Table 1:   Semantic and Syntactic links in terms of frequency of response (in percentage) <u>based on the first three commonest responses</u> (Approach I)
L: Lower-level learners
A: Advanced learners

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Links/ Stimuli	Level	Paradig-matic	Syntag-matic/ Colloca-tion	World Knowl-edge	Co-or-dina-tion	Hypony-my	Synony-my	Syntactic
she	L	99	0	0	38	0	61	38
	A	75	25	0	42	0	33	75
pencil	L	100	0	0	40	60	0	40
	A	100	0	0	100	0	0	100
house	L	21	78	0	0	0	21	100
	A	20	80	0	0	20	0	80

	Level	Paradigmatic	Syntagmatic/Collocation	World Knowledge	Co-ordination	Hyponymy	Synonymy	Syntactic
grass	L	22	78	0	13	9	0	22
	A	20	40	40	0	20	0	60
hungry	L	0	37	63	0	0	0	0
	A	72	0	29	29	0	43	72
come	L	59	41	0	59	0	0	59
	A	85	16	0	85	0	0	85
intrenet	L	68	20	11	0	68	0	88
	A	72	0	29	0	72	0	73
red	L	70	0	30	44	26	0	44
	A	58	0	43	29	29	0	29
Average Strength	L	55	32	13	24	20	10	63 (Nouns) 78 59 (Verbs) 85 44 (Adjectives) 51
	A	63	20	18	36	18	10	

Key to symbols: Paradigmatic: Includes Co-ordination, Hyponymy and Synonymy
Hyponymy: Includes Superordination, Subordination, and quasi-hyponymy

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Table 2: Semantic and Syntactic links in terms of frequency of response (in percentage)
based on all responses (Approach II).
L: Lower-level learners
A: Advanced learners

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Links/ Stimuli	Level	Paradigmatic	Syntagmatic/ Collocation	World Knowledge	Co-or-dination	Hypony-my	Synony-my	Syntactic
she	L	86	12	4	31	0	55	36
	A	80	20	0	30	0	50	45
pencil	L	100	0	0	40	61	0	42
	A	90	0	10	35	55	0	80
house	L	22	76	4	0	6	16	85
	A	35	50	15	0	35	0	70
grass	L	22	78	0	13	9	0	22
	A	30	24	48	6	24	0	78

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hungry	L	2	30	69	2	0	0	2
	A	40	10	50	15	0	25	40
come	L	32	50	18	32	0	0	32
	A	55	15	25	55	0	0	65
intrenet	L	64	16	22	0	64	0	85
	A	40	5	55	0	40	0	60
red	L	40	32	28	27	13	0	27
	A	25	30	40	15	10	0	15
Average Strength	L	46	37	18	18	19	9	59 (Nouns)
	A	49	19	30	20	21	9	72
								32 (Verbs)
								65
								15 (Adjectives)
								28

5.1.1 Characteristic types of response

In terms of specific links, learners verified prevailing characteristic types of response as reported in the studies of McCarthy (1996: 39-41) and Aitchison (1996: 84-85). Lower-level group made strong (average) collocational associations (see Table 1), as predicted because "non-native speakers,. . . have a stronger tendency to produce collocates than native speakers" (see Coulthard 1994, cited in Deignan: 1998: 83). However, it is not clear at this point what language proficiency level of non-native speakers has this particular tendency. Comparing the results of the two groups concerning collocation (see Table 1 and 2), not only was the average value in the lower-level group much higher (32, 37) than that of the advanced group (20, 19), but also in almost each stimulus word the tendency was consistent (see Table 2). This indicates that the collocation relation was strongest among lower-level learners (also see Yoneoka: 1987: 3).

For advanced learners, however, the strength of links was in the order of co-ordination (36%), collocation (20%), hyponymy (18%), and synonymy (10%) with the major difference merely in collocation (strong in lower-level learners) and co-ordination (strong in advanced learners) (see Table 1). The results from the approach I of advanced learners are in close agreement with the reports of Jenkins (1970: 7) and Aitchison (1996: 84-85).

Furthermore, based on the results obtained through the approach I (Table 1), the co-ordination link seemed to be the strongest (in advanced learners). Approach II, however, indicates that the learners linked the stimuli with their world knowledge most (Table 2). If one assumes that the links based on approach I are stronger than those on II, then the co-ordination link showing some similarities between EFL advanced learners (i.e. Japanese fluent English speakers) and L1 English speakers, is not in agreement with the

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prevailing reports that "in advance learners, collocation is a stronger factor in word association tests than for native speakers (see Deignan: 1998: 87); and that non-native teachers with native-like competence also have a strong tendency to produce collocates (ibid.: 83). On the other hand, Sokmen, in an attempt to explore whether native speaker responses are similar to ESL students of 5 different L1 backgrounds with Japanese students as the largest group (108), reported a high percentage of similarities (1993: 143). Furthermore, similarities in responses of native speakers of English and EFL learners obtained in this study were also found (see Appendix C).

5.1.2 Syntactic links

For further evidence of similarities, the results of the syntactic links showed that for each stimulus word, advanced learners' responses were in the same syntactic category as that of stimuli. For instance, nouns elicited nouns (78%), verbs produced verbs (85%), and adjectives gave adjectives (51 %) (see Table 1). Similar results were obtained through the approach II (see Table 2). Syntactic behavior similar to the one reported here is also prevalent in the relevant literature. For instance, commenting on results from word association experiments of native English speakers, Aitchison reported that "the commonest adult response is a word from the same class. Nouns elicit nouns 80 per cent of the time, whereas verbs and adjectives do so somewhat less strongly, with a figure of just 50 per cent." (1996: 102, also see Sokmen 1993:140; and Yoneoka 1987: 6). Similar results were reported for word association studies of bilinguals (Channell 1997 : 92).

Furthermore, referring to studies relating to malapropism errors, Channell states that "at some level in processing, syntax is a powerful and reliable organization of the mental lexicon (1997: 92). In each category of stimuli, the results from the two approaches I and II (see Table 1 and 2), although slightly different, were consistent in that to a stimulus word elicited responses were in the range of values of what are reported previously.

Concerning the results of lower-level learners, on the other hand, both verbs and adjectives elicited fewer similar syntax responses (see Table 1 and 2). A careful analysis showed that to each stimulus word, lower-level learners' responses were largely nouns (see Appendix A). The situation seems to be the result of "when the word class is disturbed, learners mostly produce nouns" (Aitchison 1996: 102). Therefore in strict sense, on the basis of syntactic consideration, it is safe to state that only those relations which involve nouns as stimuli such as 'pencil', 'house', 'grass' and 'internet' are likely to be regarded as stable in the group of lower-level learners.

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Table 3: Phonological links in terms of frequency of response (in percentage)
       based on all responses.
        L: Lower-level learners
        A: Advanced learners

Phonolog-ical Links / Stimuli	Level	Same Beginning Sound	Same Ending Sound	Same Stress Pattern	Same Word Length
she	L A	2 0	31 25	100 100	64 60
pencil	L A	26 30	0 0	100 83	50 58
house	L A	20 0	0 0	92 100	69 33
grass	L A	85 47	0 0	100 100	25 79
hungry	L A	4 0	0 15	100 100	13 33
come	L A	0 10	0 5	100 100	82 22
internet	L A	9 10	13 15	75 67	38 33
red	L A	4 5	12 5	100 100	70 69
Average Strength	L A	19 13	7 8	96 94	51 47

5.2 Phonological links

5.2.1 Similarities in the words' beginning and ending sounds

  For responses that were only phonologically related, without any clear semantic connection with the stimuli; 'glass' as a response to 'grass' was the only response elicited

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in the study (see Appendix B: 15). Therefore, in the present study at lower levels, semantically unrelated phonological similarities did not play an important role. One of the possible reasons, which was also confirmed after interviewing the lower-level learners and observing them (Deignan: 1998: 87) during the test, would be that the learners made links between their L1 and L2 lexicons through translation equivalents which could be the result of teaching and learning practices (see Deignan: 1998: 87; Gorsuch 1998: 7; and Susser 1998: 55). On the other hand, in most of the semantically related instances, responses with the same beginning (19%) had higher frequency than those with the same endings (7%) (see Table 3). These results are in line with the 'bathtub effect' phenomenon (see section 2.2) "which suggests that particularly the beginning of the words and to a lesser extent the ends, are prominent in [mental] storage" (Aitchison 1996: 135; and McCarthy 1996: 35).

5.2.2 Similarities in the stress pattern and word lengths

Similarities in both groups of learners were also found in the general stress pattern of the stimuli and their responses (over 90%) , and (about 50%) in word length (see Table 3). Channell, citing the examples from Fay and Cutler's corpus, reported that "87 per cent of malapropisms had the same number of syllables as their targets, and 98 per cent had the same stress pattern" (1997: 88). Most of the elicited responses in the present study were short words (70 % and 49% respectively by lower- and advanced-learners) comprising merely one syllable's length and were easily and promptly produced (see Appendices A and B). According to Aitchison (1996: 136), "stressed vowels are moderately well recalled in short words". In comparing native speaker data with the results obtained in this study, it is probable that in the L2 mental lexicon (of learners of any language proficiency level), like in the L1 lexicon, "words are organized first by syllable structure and/or stress, and only then into exact sounds" (Channell 1997: 88).

6 CONCLUSIONS
6.1 Outcomes of the study

Lower-level learners seemed to make strong collocational links between the words they have learned; however, only those links which involve nouns as stimuli are likely to be regarded as stable. On the other hand, advanced learners made strong links through co-ordination, and the strength of mental links of co-ordination, collocation, hyponymy and synonymy appeared in the same order as that of native speakers.

Literature suggests that in the L1 lexicon, words are organized first by syllable structure and/or stress, and only then into exact sounds. This study suggests that the similar organization accounts for in the L2 mental lexicon of EFL learners of any language proficiency level.

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6.2   Pedagogical implications and further research

Outcome of this study suggests adopting pedagogical approaches which involve both collocational and paradigmatic associations which seemed to be mentally strong in terms of making links for the learners. One of such approaches is likely to be 'semantic maps' (see Stahl and Vancil 1986: 62-63; McCarthy 1996: 95; Schmitt 1997: 212; and Nattinger 1997: 72) to adopt for learners (specially advanced learners) in the classroom. For outside the class, however, learners should be encouraged to replace the traditional flash card containing a single word and its translation equivalent (see Schmitt 1997; and Thompson 1995) with one created by the learners with semantic (McCarthy 1984) , and phonological associations (see Channel 1997: 95) along with collocations of an unfamiliar word in conjunction with approaches that utilize the data of real English (see Sinclair 1997; and Collins Cobulid).

A recommendation for further research in this direction would be towards focusing on a large number of fluent EFL speakers to explore the relationships between word-association and learners' lexical development (see Channel 1997: 93).

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Appendix A: Lower-level learners' response

Key to symbols

S: Syntagmatic (= Collocation) relation
Col: Collocation
P: Paradigmatic (= Sense) relation includes (i) Co-ordination, (ii) Hyponymy, and
          (iii) Synonymy
W: World (Encyclopedic) knowledge
Co: Co-ordination including Antonymy
Antyn: Antonymy

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Hyp: Hyponymy includes Superordination , Subordination, and Quasi-hyponymy
Sup: Superordination
Sub: Subordination
Qhyp   Quasi-hyponymy
Syn: Synonymy
N: Noun
V: Verb
A: Adjective
PR: Pronoun
PP: Preposition
AP: Adverbial Phrase
*:   Different stress pattern between the stimulus word and its associated response. Same stress
          pattern is left unmarked.
(I/II) : 'I', the first figure in brackets next to a stimulus word represents the frequency or the number
          of occurrences of a particular response (in percentage); whereas 'II' represents the frequency
          of that response.
 [ ]:   Includes self-created examples and/or comments
{ }   Include number of instances found in the Collins Cobuild Concordance with two words
          apart between the stimulus word and the response.
a: The first of the two relations which is regarded as strong in terms of high frequency of
          response.
b: The second of two relations which is regarded as weak in terms of low frequency of response
TNR: Total Number of Responses in a particular relation: P, S and W (in percentage)
L: Lower-level Learners
A: Advanced-level Learners

Appendix A1:   Grammar/Function Word

Total number of responses: 64

1. she (PR)   Links (strong-weak)   Phonological Similarities

01   girl (N; 39%/25)   a. P: Syn [he: (boy, man) :: she: (girl, woman)]
                             b. S: {40}
     wom-an (N; 11/7)   b. S: {40}
     her (PR; 5/3)   a. P: Syn [he: him :: she: her]
                             b. S: {40}
TNR: 55
----

02   he (PR; 31/ 20)   P: Co [Antyn]   Same ending sound (31%)
----

03   is (V; 3/2)   S: {40 }
     friend (N; 3/2)   S: {40}
     pret-ty (A; 2/1)   S: {40}
     beau-ti-ful (A; 2/1)   S: {40}
     dar-ling (N; 2/1)   S: {6}

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TNR: 12
----

04 skirt (N; 2/1)   a. W   <u>Same beginning sound (2)</u>
                              ['skirt' and 'ribbon' indicate belongings particular to females]
                            b. S: {5; 25 for 5 words are apart}
     rib-bon (N; 2/1)   b. S: {0; 8 for 5 words are apart}
TNR: 4

Appendix A2:   Physical Environment Words

Total number of responses: 63

2. <u>pen-cil</u> (N)   <u>Links</u> (strong-weak)   <u>Phonological Similarities</u>

05 write (V; 41%/26)   a. P: Sub--Qhyp [write, use, study, picture] in terms of function
                            b. S: { 2; 5 when 5 words are apart }
     study (V; 5/3)   b. S: { 0 when 5 words are apart }
     pic-ture (V; 3/2)   b. S: { 0 }   <u>Same beginning sound (3%)</u>
     blue (A; 5/3)   a. P: Sub--Qhyp [blue, black, red] in terms of physical appearance
                            b. S: { 1 }
     black (A; 5/3)   b. S: { 2 }
     pen case (N; 2/1)   P: Sup   <u>Same beginning and following sound (2)</u>
TNR: 61
----

06 eras-er (N; 14/9)   P: Co
     pen (N; 13/8)   <u>Same beginning and following sound (13)</u>
     pa-per (N; 8/5)   <u>Same beginning sound (8)</u>
     note-book (N; 5/3)
TNR: 40

Total number of responses: 57

3. <u>house</u> (N)   <u>Links</u> (strong-weak)   <u>Phonological Similarities</u>

07 fam-i-ly (N; 39/22)   a. S: {40}
                            b. P: Sub [a part of a house]
     dog (N; 19/11)   a. S: {4}
                            b. P: Sub [a part of a house]
     big (A; 7/4)   S: {40}
     moth-er (N; 5/3)   S: {16}
     warm (A; 2/1)   S: {11}
     hot (A; 2/1)   S: {11}   <u>Same beginning and following sound (2%)</u>

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    life (N; 2/1)          S: {13}
TNR: 76
---------

08  home (N; 16/9)        a. P: Syn               Same beginning and following sound (16)
                          b.  S: {40}
---------

09  room (N; 4/2)         P: Sub
    yard (N; 2/1)
TNR: 6
---------

10  hap-py (A; 2/1)       a.  W                   Same beginning sound (2)
                             [ a place regarded to relax after work and feel happy in Japan]
                          b.  S: {2}
    *re-'lax (A; 2/1)     b.  S: {0}
TNR: 4
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Appendix A3:   Uncommon/Low-frequency Words

Total number of responses: 45

4. grass (N)	Links (strong-weak)	Phonological Similarities
11 green (A; 78%/35)	S: { 11 }	Same beginning and following sound (78%)

```
12 flow-er (N; 13/6)     P: Co
---------

13 gar-den (N; 9/4)      P: Sup                   Same beginning sound (9)
---------
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14   wa-ter (N; 17/9)   [the stimulus word 'grass' maybe mistakenly taken as 'glass' and therefore responded 'water', and is disregarded from the data]
P: Sub

Total number of responses: 56

5. hun-gry (A)	Links (strong-weak)	Phonological Similarities

. .

15 food (N; 36%/20)   a. W [may indicate a subconscious desire for food: bread, hamburger,
                            lunch and dinner when one feels hungry. Note that the test was
                            conducted before and just after the usual lunch time-12 o' clock]
                         b. S: {0; 4 when 5 words are apart}
     bread (N; 5/3)   b. S: {0}
     ham-burg-er   b. S: {0}   Same beginning sound (4%)
     (N (4/2)
     lunch (N; 16/9)   b. S: {0}
     din-ner (N; 4/2)   b. S: {1, when 2-5 words are apart}
     12 o' clock   W [usual time to take lunch in Japan]
     (AP; 4/2)
TNR: 69
----

16 eat (V; 30/17)   S: {5}
----

17 full (A; 2/1)   P: Co [near-Antyn]

Appendix A 4:   Mixed Words

Total number of responses: 50

6. come (V)   Links (strong-weak)   Phonological Similarities

18 home (N; 12/6)   S: {40}
     on (PP; 6/3)   S: {40}
     in (PP; 10/5)
     house (N; 6/3)   S: {40}
     back (A; 8/4)
     door (N; 4/2)
     par-ty (N; 4/2)   S: {12 }
TNR: 50
----

19 go (V; 32/16)   P: Co [Antyn]
----

20 hap-py (A; 4/2)   a. W [feeling of happiness when someone is expected to come or visit]
                          b. S: {3}
     friend (N; 8/4)   a. W: [Expectation of a friend or a guest to visit]
                          b. S: {5 }
     guest (N; 6//3)   b. S: {1}
TNR: 18

Total number of responses: 57

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7. inter-net (N)   Links (strong-weak)   Phonological Similarities

21   *com-'pu-ter   a. P: Sub [internet is regarded as a network of computers]
      (N; 53%/30)   b. S: {7}
      e-mail (N; 7/4)   a. P: Sub
                        b. S: { 4 }

      home-page   b. S: { 2 }
      (N; 4/2)
TNR: 64
 ----

22 *in-for-'ma-tion   a. W   Same beginning and following sound (5%)
      (N; 5/3)   [as is generally regarded, 'internet' may indicate a source of
information]
                        b. S: { 5 }
      want (V; 9/5)   a. W   Same ending sound (9)
                          [a personal desire to buy or use the internet]
                        b. S: [1]
      in-ter-est-ing   a. W   Same beginning sound following sound (4)
      (A; 4/2)   [a personal positive thought towards the internet system]
                        b. S: { 0 }
      dif-fi-cult   a. W   Same ending sound (4)
      (A; 4/2)   [a personal negative thought towards the internet system]
                        b. S: {0}
TNR: 22
----

23 world (N; 16/9)   S: {13}

Total number of responses: 52

8. red (A)   Links (strong-weak)   Phonological Similarities

24   blood (N; 12/6)   S: {40}   Same ending sound (12%)
      fire (N; 8/4)   S: {10}
      hot (N; 6/3)   S: {40}
      rose (N; 4/2)   S: {40}   Same beginning sound (4)
      flow-er (N; 2/1)   S: {15}
TNR: 32
----
25   ap-ple (N; 15/8)   a. W: [The color of 'apple' as well as of 'Sun' is culturally regarded as
                              red, specially when Japanese color these objects in sketch work]
                        b. S: {4}
      Sun (N; 13/7)   a. W [Sun is regarded red as opposed to yellow]
                        b. S: {0}
TNR: 28

24

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26  blue (A; 23%/12)      a. P: Co
                          b. S: {40}
     black (A; 4/2)        b. S: {40}
TNR: 27
---------
27  col-or (N; 13/7)      a. P: Sup
                          b. S: {4}
--------
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Appendix B: Advanced learners' response

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Appendix B1:   Grammar / function word
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Total number of responses: 20

1.   <u>she</u> (PR)   <u>Links</u> (strong-weak)   <u>Phonological Similarities</u>

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01   her (PR; 20/4)       a. P:  Near Syn [ he: him :: she: her}
                          b. S: {40}
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girl (N; 10/2)	a. P: Near Syn [he: boy :: she: girl] b. S: {40}
daugh-ter (N; 5/1)	a. P: Near Syn [he: son : : She: daughter] b. S: {40}
fem-i-nine (A; 5/1)	a. P: Near Syn [he: masculine:: she: feminine] b. S: {4}
mad-am (N; 5/1)	a. P: Near Syn [he: sir :: she: madam] b. S: {3}
Mary (N; 5/1)	a. P: Near Syn [he: John : : She: Mary] b. S: {0}

TNR: 50

----

02 he (PR; 25%/5)   P: Co   <u>Same ending and preceding sound (25%)</u>

     male (A; 5/1)   P: Co [she: female :: he: male]

TNR: 30

----

03 friend (N; 15/3)   S: {40}

     beau-tif-ul (A; 5/1)   S: {40}

TNR: 20

Appendix B2:   Physical Environment Words

Total number of responses: 20

2. <u>pen-cil</u> (N)   <u>Links</u> (strong-weak)   <u>Phonological Similarities</u>

04 pencil-case (N; 15/3)
     class-room (N; 10/2)
     sta-tion-ary (N;5/1)
     case (N: 5/1)
	P: Sup	<u>Same beginning and following sound (15%)</u>

write (V; 10/2) study (V; 5/1)	a. P: Sub--Qhyp [write, use, study] in terms of function b. S: {2}	
*e'ras-able (A: 5/1)	a. P: Sub--Qhyp [with or without an attached eraser] in terms of kinds b. S: {0}	

TNR: 55

----

04   (see above)

05 pen (N; 15%/3)   P: Co   <u>Same beginning and following sound (15)</u>

     *e'ras-er (N; 10/2)

     note-book (N; 10/2)

TNR: 35

----

06 mes-sage (N; 5/1)   a. W [may remind that a pencil is used to produce messages]

                          b. S: {0}

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chil-dren (N; 5/1)	a. W [may remind 'children' as they first begin writing using a pencil]	
	b. S: {0}	

TNR: 10

Total number of responses: 20

3. house (N)	Links (strong-weak)	Phonological Similarities

07 fam-i-ly (N; 30%/6)	S: {40}	
live (V; 10/2)	S: {12}	
com-fort-able (A; 5/1)	S: {10}	
wife (N; 5/1)	S: {14}	

TNR: 50

----

08 kitch-en (N; 10/2)	P: Sub	
gard-en (N; 5/1)		
so-fa (N; 5/1)		
ta-ble (N; 5/1)		
grass (N; 5/1)		
mine (PR; 5/1)	a. P: Sub--Qhyp [mine, his, her] in terms of ownership	
	b. S: {2}	

TNR: 35

----

09 feel-ing (N; 5/1)	a. W [a 'house' may be regarded as a place where one may openly express his/her feelings/opinions as opposed to out of the house where people in general have social bindings that prevents them to do so. This is specifically true in a country like Japan]
	b. S: {5}
ex-pen-sive (A; 5/1)	a. W [a general thought attributes to the high cost of a house or land in Japan]
	b. S: {3}
wide (A; 5/1)	a. W[may indicate a desire to live in a 'wide' house as the houses in general are 'not wide']
	b. S: {4}

TNR: 15

Appendix B3:   Uncommon / Low-frequency Words

Total number of responses: 17

4. grass (N)	Links (strong-weak)	Phonological Similarities

. .

10 field (N; 24%/4)   a. W: [may indicate 'a rice field' that has green color]
                       b. S: {3}
                       c. Sup
    camp-ing (N;6/1)   a. W [grass may remind camping]
                       b. S: {0}
    golf (N; 6/1)   a. W   Same beginning sound (6%)
                          [grass may remind golf]
                       b. S: {0}
    sweat (N; 6/1)   a. W ['grass' (= rice field in Japan) may remind 'sweat' after hard work]
                       b. S: {0}
    dog (N; 6/1)   a. W {may remind taking a walk with a dog in the garden or a park; a
                          common custom specially during a holiday]
                       b. S:{1}
TNR: 48
----
11 park (N; 12/2)   P: Sup
    west-ern style
    house (N; 6/1)
    gard-en (N; 6/1)   Same beginning sound (6)
TNR: 24
----

12 green (A; 24/ 4)   S: {11}   Same beginning and following sound (24)
----

13 leafs (N; 6/1)   a. P: Co   Same beginning sound (6)
                       b. S: {0}
----

14 strong (A; 5/1)   a. Mismatch
                       b. S: {0}
15 *glass* (N; 11/2) a. Mismatch   Same beginning and ending sound (11)
                       b. S: {0}

Total number of responses: 20

5. hun-gry (A)   Links (strong-weak)   Phonological Similarities

16 food (N; 5/1)   a. W [a subconscious desire for food when one feels hungry]
    cup noo-dle (N; 5/1) b. S: {0}
    cake (N; 5/1)
    lunch (N; 10/2)
    break-fast (N; 5/1)
    Af-ri-ca (N; 5/1) a. W { may remind famine]
                       b. S: {0}
    stom-ach (N;10/ 2) a. W [may remind a hungry stomach]
                       b. S: {1}

. .

| class (N; 5/1) | a. W [may remind a class of people who lack food] |
| | b. S: {0} |

TNR: 50

17	starv-ing	a. P: Near Syn	
	(A; 15%/3)	b. S: {0}	
	un-hap-py (A; 5/1A)		Same ending sound (5%)
	ir-ri-tat-ing (A; 5/1)		

TNR: 25

| 18 | thirsty (A; 10/2) | P: Co [Near Antyn] | Same ending sound (10) |
| | full (A; 5/1) | P: Co [Near Antyn] | |

TNR: 15

| 19 | chil-dren (N; 5/1) | S: {19} |
| | eat (V; 5/1) | S: {5} |

TNR: 10

Appendix B4: Mixed Words

Total number of responses: 20

6.   come (V)   Links (strong-weak)   Phonological Similarities

20   go (V; 55 %/11)   P: Co (Antyn)

21	vis-i-tor (N; 5/1)	a. W [may remind someone a friend to come for a visit]	
		b. S: {0}	
	prom-ise (V: 5/1)	a. W [may remind a promise to come/visit]	
		b. S: {0}	
	wel-come (V; 5/1)	a. W	Same ending and preceding sound (5%)
		b. S: {4}	
	friend-ly (A; 5/1)	a. W	
		b. S: {1}	
	Christ-mas (N; 5/1)	a. W	Same beginning sound (5)
		[personal expectations]	
		b. S: {0}	

TNR: 25

22	clos-er (N; 5/1)	S: {40}	Same beginning sound (5)
	school (N; 5/1)	S: {40}	
	some-thing (PR; 5/1)	S: {40}	

. .

TNR: 15

Total number of responses: 20

7. inter-net (N)	Links (strong-weak)	Phonological Similarities
23 *in-'ter-na-tion-al (A; 10/2)	a. W	Same beginning and following sound (10%)
		[a regular internet user may realize from his/her personal experience
		how it relates to the word 'international' in terms
of communication and		its convenience]
	b. S:{2}	
*com-'mu-ni-ca-tion (N; 5/1)	b. S:{0}	
*con-'ve-nience (N; 5/1)		
net surfi-ng (N; 5/1)		
dif-fi-cult (A ; 10/2)	a. W	Same ending sound (10)
	[a personal negative thought towards the internet system]	
	b. S: {0}	
broad-en (V; 5/1)	a. W [a personal positive thought towards the internet system]	
	b. S: {0}	
*en-'coun-ter (V; 5/1)	a. W [a desire of friendship through the internet]	
	b. S: {0}	
fast (A; 5/1)	a. W:	Same ending sound (5)
	[a personal positive thought towards the internet system]	
	b. S: {2}	
friend (N; 5/1)	a. W: [a desire of friendship through the internet]	
	b. S: {0}	

TNR: 55
----

24 e-mail (N; 15 %/3)	a. P: Sub
com-pu-ter (N; 10/2)	b. S: {4}
WWW (N; 5/1)	b. S: {0}
PC (N; 5/1)	
home-page (N; 5/1)	

TNR: 40
----

25 *con-'nec-tion (V; 5/1)	S: {7}

Total number of Responses: 20

8. red (A)	Links (strong-weak)	Phonological Similarities

. .

26 pas-sion (N ; 15/3)   W [one may have some personal memories associated with the color
                               'red']

    Sun (N; 5/1)   W [The color of 'apple' as well as 'Sun' and the 'flame'
    ap-ple (N; 5/1)   is culturally regarded as red, specially
    flame (N; 5/1)   when Japanese color these objects in sketch work}
    lip-stick (N; 5/1)   W [lipstick maybe regarded as basically in red or pink color]
    sig-nal (N; 5/1)   a. W: [a sign of being stop when the signal becomes 'red']
                          b. S: {3}
TNR: 40
----
27 car (N; 5/1)   S: {40}
    dress (N; 5/1)   S: {16}
    rose (N; 5/1)   S: {40}   <u>Same beginning sound (5%)</u>
    blood (N; 5/1)   S: {40}   <u>Same ending sound (5)</u>
    fire (N; 5/1)   S: {10}
    make (V; 5/1)   S: {8}
TNR: 30
----
28 col-or (N; 10%/ 2)   P: Sup
----
29 blue (A; 10/2)   P: Co
    white (5/1A)
TNR: 15
----

30 *coat* (N; 5/1)   a. Mismatch
                          b. S {1}

Appendix C   First three commonest responses (in percentage):
                  (i) Lower-level learners (first line);
                  (ii) Advanced-level learners (second line); and
                  (iii) Native speakers of English (third line) (Grott 1998)
                  (iv) Extracts from prevailing studies (fourth and fifth lines):
                  •• 'house', 'hungry' and 'red' (Jenkins 1970);
                  ••• 'house', and 'hungry' (Sokmen 1993).

Stimuli   -----------------------------Responses-----------------------------

1. She: girl (48%-Syn)   he (38-Co)   woman (13-Syn)
                 he (42-Co)   her (33-Syn)   friend (25, S)
                 •girl   he   woman
----
2. pencil   write (60-Sub)   eraser (21-Co)   pen (19-Co)
                 pen (38, Co)   pencil case (38, Co)   notebook (25, Co)

	•write	pen	eraser
3. house	family (52-S)	dog (26-S)	home (21-Syn)
	family (60- S)	live (20, S)	kitchen (20, Sub)
	•car	live	home
	•• family	dog; live	home; kitchen
	••• family	home	-----------

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4. grass	green (78-S)	flower (13-Co)	garden (9-Sup)
	field (40, W)	green (40, S)	park (20, Sup)
	•green	yellow	grow
5. hungry	food (43-W)	eat (37-S)	lunch (20-W)
	starving (43, Syn)	thirsty (29, Co)	lunch (29, W)
	•food	eat	full
	•• food; starved	eat, thirsty	lunch
	••• food	eat	lunch

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6. come	go (59-Co)	home(22-S)	in (19-S)
	go (85, Co)	something (8, S)	closer (8, S)
	•go	------------	------------
7. internet	computer (68-Sub)	world (20-S)	want (11-W)
	e-mail (43, Sub)	computer (29, Sub)	international (29, W)
	•computer	------------	------------
8. red	blue (44-Co)	apple (30-W)	color (26-Sup)
	passion (43, W)	color (29, Sup)	blue (29, Co)
	•blue	blood	-------------
	•• blue	apple, color	color; blue

• she	girl (frequency= 4), he (2) , person, devil, dog, woman
pencil	write (3), pen (2), writing, eraser, lead, long, yellow
house	car (2),live, home, people, bed, kids, mouse, bricks, living, area
grass	green (5), yard (2), lawnmower, mow, grow
hungry	food (6), wagoner, eat, full
come	go (4), kiss, today , I need you, fly, to , car
internet	computer (4), knowledge, mouse, chat, Kristi (roommate), Deigo (roommate), email
red	blue (3), blood (2), apple, color, pink, hot, hate

Data provided by Grott (1998)

•• house: home (commonest response / frequency: 362); live (12th/16); family (18th/13); dog (32/6); kitchen (63rd/ 2)

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hungry: food (commonest response / frequency 362); eat (2nd/174); thirsty (3rd/69); starved (5th/29); lunch (21st/5)

red: blue (2nd commonest response / frequency 196);color (5th/46); apple (22nd/5)

Extracted from Jenkins (1970: 22 and 27)

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••• house: family (frequency 31); home (21), and big (13)

hungry: food,-s (44), eat, -ing (38), lunch (11)

Extracted from Sokmen (1993: 142)

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