

CHAPTER V  
VOCABULARY LEARNING AND TEACHING

Overview

Three questions need to be addressed in connection with all teaching and learning tasks: (1) What should be taught and learned? (2) What should be the nature of the intended learning outcomes? (3) How should the learning task be carried out? In terms of vocabulary teaching, the first question relates to the selection of vocabulary. The second question is related to nature of vocabulary knowledge and skills. The third question deals with the methodology of teaching and learning vocabulary. We have touched upon the selection problem earlier. It is to the second and third questions that we now turn.

In this chapter we will review literature that deals with some aspects of how vocabulary is learned and what may cause difficulties in such learning, review some experiments that have studied vocabulary teaching and learning, and discuss views that have been expressed about the methods of teaching vocabulary in L2 learning. We will begin with some quantitative estimates of vocabulary size in L1.

Size of Vocabulary in Mother Tongue

There has been a persistent interest in the size of vocabulary that people have in their first language and in any second language they have learned. Estimates of vocabulary size in the first language have varied widely. This applies to the estimates of both children's and adults' vocabulary. Jespersen (1905) reviews several early statements and studies concerning the number of words used by famous authors and by "ordinary beings",

educated and not educated. As Jespersen points out, these statements are problematic, since they are often given and repeated without indicating the manner in which they have been arrived at. Still, a brief review of such early studies will provide a background for a better understanding of the current situation in the estimation of average vocabulary sizes.

Muller (quoted in Jespersen, 1905) stated that a farm laborer uses only 300 words. Jespersen cites Wood giving the figure 500 as the average number of words used by "the average man" and quotes him saying that "it is appalling to think how pitiably we have degenerated from the copiousness of our ancestors". Everybody's Cyclopedia estimated that the agricultural laborer uses about 1,500 words and suggested that even that figure might be an overestimate. "Intelligent artizans" were stated to have a vocabulary of 4,000 words, while educated persons might be familiar with 8,000 to 10,000 words, even if they might not use all of them (cited in Ogden, 1934).

Such extremely low estimates of average vocabulary sizes did not pass unchallenged. Jespersen (1905) quotes Wundt's evidence that one two-year-old girl had 489 and another 1121 words. He also refers to a study by Hall, in which she and her assistants noted down every word they heard her boy child use. In his 17th month he used 232 different words and at the age of six his vocabulary was reported to be 2688 words. Jespersen also refers to Sweet, who disputed the estimate of 300 words by farm laborers. According to Sweet, a missionary in Tierra del Fuego compiled a dictionary of the Yaagaan language and needed 30,000 words. Sweet declared that "we cannot give any credence to this statement, especially if we consider the number of names of different parts of a waggon or a plough, and all the words required in connection even with a single agricultural operation, together with names of birds, plants,

and other natural objects". Reference is also made to the Swedish linguist Smedberg and the Danish dialectologist Kristensen who at the end of the 19th century estimated that the average peasants had a rich vocabulary of technical terms and suggested that a figure of 26,000 might be an underestimate. Similarly professor Holden is reported to have estimated his vocabulary at 33,456 words by testing himself on all the words in Webster's Dictionary. Finally, E.H. Babbitt is quoted to have estimated that the majority of his students had a vocabulary of slightly below 60,000 words.

Some more recent estimates of vocabulary sizes in the mother tongue are presented in Table 4.

Table 4

## Estimates of Vocabulary Size in the Mother Tongue at Different Age

Age	No of words	Investigator
5.5	1,528	Terman & Childs (1912)
6.5	2,500	Terman & Childs (1912)
7.5	2,600	Terman & Childs (1912)
8.5	3,960	Terman & Childs (1912)
8.5	4,480	Kirkpatrick (1907)
9.5	5,000	Terman & Childs (1912)
9.6	6,620	Kirkpatrick (1907)
10.5	6,000	Terman & Childs (1912)
10.7	7,020	Kirkpatrick (1907)
11.5	6,100	Terman & Childs (1912)
11.7	7,860	Kirkpatrick (1907)
12.5	7,700	Terman & Childs (1912)
12.8	8,700	Kirkpatrick (1907)
13.0	8,800	Terman & Childs (1912)
13.9	10,660	Kirkpatrick (1907)
15.0	12,000	Kirkpatrick (1907)

According to George Miller (1977), one of the most reliable sources of vocabulary development in childhood is Templin (1957). Her findings are summarized in Table 5. Anderson and Freebody (1981) report on more recent



estimates of vocabulary size in Ll. Their data, shown in Table 6, is based on grade levels, instead of age.

Table 5

Comparison of Median Number of Basic Words and Total Vocabulary (Basic, Derived and Compound Words) According to Age (Source: Templin, 1957)

Age	Basic words	Total vocabulary
6.0	7,800	13,000
7.0	12,400	21,600
8.0	17,600	28,300

As George Miller (1977) has pointed out, the implications of such vocabulary estimates become more concrete if the figures are converted into words learned per day. Miller does not estimate the rate of vocabulary growth during the first six years, but this can easily be done following his method of dividing the number of words by the number of days a year. If we start counting from the date when children are one year old and use Templin's (1957) estimates, they will have had 1,825 days (12,775 hours, if we count 7 waking hours a day) to learn 7,800 basic words and a total of 13,000 words. This makes 2.3 basic words and 7.1 basic, derived and compounded words a day. Between the ages of 6 and 7, the median child learns 8,600 words (4,600 basic or root words), which is 23.5 (12.6) words a day. Between the ages of 7 and age, the median child learns 6,700 words (5,200 root words), which is 18.4 (14.2) words a day. Since words seldom are learned at one try, this means that there must be several hundred different words in various states of incomplete mastery.



Table 6

Some Previous Estimates of Vocabulary Size at Selected Grade Levels (Source: Anderson & Freebody, 1981)

Grade	Source	Estimate
1st	M. E. Smith (1926)	2,562
	Dolch (1936)	2,703
	Ames (1964)	12,400
	M. K. Smith (1941)	17,000
	Shibles (1959)	26,000
3rd	Dupuy (1974)	2,000
	Holley (1919)	3,144
	Brandenburg (1918)	5,429
	Kirkpatrick (1907)	6,620
	Cuff (1930)	7,425
	M. K. Smith (1941)	25,000
7th	Dupuy (1974)	4,760
	Holley (1919)	8,478
	Kirkpatrick (1907)	10,666
	Brandenburg (1918)	11,445
	Cuff (1930)	14,910
	Bonser et al. (1915)	26,520
	M. K. Smith (1941)	51,000
College sophomore	Seashore (1933)	15,000
	Kirkpatrick (1907)	19,000
	Seashore & Eckerson (1940)	60,000
	Gerlach (1917)	85,300
	Gillette (1927)	127,800
	Hartman (1946)	200,000

Diller (1978) claims that the adult native speaker's English vocabulary is more than four times what it is commonly thought to be. Testing 196 subjects using Webster's Third New International Dictionary of the English Language as the basis and taking a sample of 1000 words from the upper-left-hand words on left-hand pages, he presented the list to the subjects and had them judge each word using the following categories: words they were definitely sure of; words that they might guess at but were unsure of; and words

they definitely did not know. The results of the study are summarized in Table 7.

Table 7

Median Estimated Vocabulary Size for Different Age Groups

Source: Diller, 1978)

Age	Median estimated vocabulary	Number of subjects
7	54,000	1
10	112,000	1
12	135,000	1
13	144,000	26
14	166,500	29
15	198,000	30
16	216,000	31
17	216,000	35
18	216,000	23
University students	243,000	13
College professors	247,500	6

Even if Diller's data are subject to limitations due to the small number of subjects, they offer some interesting suggestions about vocabulary growth. If the data are approximately correct, children in grade school appear to learn to recognize some 10,000 words each year. There is a spurt in junior high school, when they seem to be learning 20,000 to 30,000 words a year. Around the age of 16 there appears to be a leveling off, when about half of the words in the dictionary are known (about 216,000 words). Thus approximately 200,000 words seems to be the average vocabulary size of a literate adult. College studies appear to add only a limited number of new words to the vocabulary of young adults. There appears to be a law of diminishing return operating such that it takes about eight years of college and graduate study to learn as many new words as junior high students learn in two years.

School years seem to be very important for vocabulary learning: students' vocabulary on graduating from high school is likely to be at least four times larger than when they started school.

Malir (1972) reports on a study which analyzed the vocabulary of 600 letters by Russian school children (aged 11-14) to their Czech pen friends. The results of the analysis are presented in Table 8.

Table 8

Distribution of the Most Frequent Words (Occurring at Least 9 Times in Russian School Children's Letters ,Broken down by Word Class (Source: Malir, 1972)

Word class	Different words	Total number of words
Nouns	239 (34.6%)	13,910 (21.9%)
Adjectives	84 (12.2%)	3,755 (5.9%)
Pronouns	33 (4.8%)	13,877 (21.8%)
Numerals	37 (5.3%)	1,671 (2.6%)
Verbs	173 (25.0%)	10,785 (17.0%)
Adverbs	67 (9.7%)	4,796 (7.6%)
Particles	21 (3.0%)	1,591 (2.5%)
Prepositions	20 (3.0%)	7,936 (12.5%)
Conjunctions	12 (1.7%)	3,762 (5.9%)
Interjections	5 (0.7%)	1,431 (2.3%)

A total of 68,070 words was found, including 2,743 different words. Of these 1,506 occurred only once or twice (2.9% out of total number of words). Words that occurred at least 9 times were distributed in different word classes as shown in Table 8.

In summary, studies of the vocabulary size in L1 attest that it is very difficult to estimate reliably the size of people's vocabulary in L1. The difference in the estimates can be as large as tenfold. There are some general patterns across the various studies, however. First, the estimates



have fairly consistently grown from the beginning of the century up to the present time. Second, the estimates, whether on the lower or higher side, consistently double between grades 3 and 7. Third, as a methodological generalization it can be said that growing sophistication in test theory, sampling theory, and measurement techniques has made it possible to get more accurate estimates than in the past, when lexicometric work was also hampered by the lack of automated data processing systems.

#### Knowing a Word

This section will discuss the second question: what does it mean to "know a word"? The nature of vocabulary knowledge in second language learning has been the object of scholarly discussion especially in Belgium and Holland (e.g., Bogaards, 1980; Carpay, 1974, 1975; Cornu & Binon, 1983; Cowie, 1978; Schouten-van Parreren & van Parreren, 1979; van Parreren, 1967).

In what ways can a word be known, or perhaps more specifically, in what forms could it be shown that a person either knows or does not know a given word? The first distinction is between receptive and productive knowledge: a person may recognize and understand a word when it is used by somebody else but may not be able to find and use it on his or her own. Another distinction pertains to the ease of access: somebody may have the word easily available while another has to think about it and look for it for some time. There may also be differences in the ability to paraphrase or define a word; in the ability to give a translation equivalent of a word in another language; to indicate a synonym or antonym for a word; and finally, in the ability to know what the referent of the word is like, and what it can be used for.

In discussing the nature of vocabulary knowledge in L2, Bogaards (1980) distinguishes the following kinds of word knowledge (for a similar discussion of word knowledge in L1, see Saville-Troike, 1982):

(1) Know Something About a Word

This category includes several types of word knowledge. A person may come across an unfamiliar word and decide to look it up but forget to do that. It may happen that the same word occurs again quite soon. The person recognizes the word as the one that he or she meant to check but forgot to do so. Another aspect of this kind of word knowledge is when a person comes across a word which he or she has frequently met and knows that he or she always forgets what the word means. Also, a person may know that the word in question is one which he or she absolutely should not mix up with another word, without knowing the meaning of the two words exactly.

(2) Knowledge of Formal Aspects of Words

Knowledge of formal aspects of words includes knowledge of how a word ought to be written or pronounced; how many syllables a word includes; how short or long a word is; what letter a word begins or ends with. It also incorporates knowledge about the morphological characteristics of a word (inflection, derivation and compounding possibilities) and about the word's paradigmatic relations with other words.

(3) Knowledge of Semantic Aspects of a Word

This aspect deals primarily with the precision of knowledge of word meanings. One can know the meaning of a word globally, e.g., that "elm" is a kind of a tree (cf. "natural kind terms" and "division of linguistic labor" in recent philosophical discussion) without knowing exactly its referent. The range can be from a broad knowledge of a word to a highly nuanced knowledge

of its meaning and use. Semantic knowledge also includes knowing the semantic "valence" of a word: with which words does it typically occur (collocational range), in which stereotypic expressions does it occur (e.g., idioms)? Similarly, semantic knowledge includes awareness of the difference between denotation and connotation: thus e.g., terrorist and freedom fighter may refer to the same person but display a different view of the person. Finally, knowledge of the stylistic value of a word is part of the semantic knowledge of a word. "Protest", "grumble", "gripe about", "bellyache" may refer to the same form of behavior but belong to different stylistic levels.

#### (4) Knowledge of Syntactic Aspects of a Word

This aspect relates to knowledge about the syntactic "valence" of a word. This includes e.g., knowledge of the gender of a word and of the construction possibilities of a verb. Bogaards (1980) gives the following example of French. Someone knows the syntactic and semantic aspects of the verb "tenir", if he or she knows its use in sentences like:

il tient la caisse	- il la tient
il tient a sa reputations	- il y tient
il tient de son pere	- il tient de lui
il tient bon	- ( - )

### Sources of Difficulty and Ease in Vocabulary Learning

#### Sources of Difficulty

Several researchers have addressed the question of what causes difficulties and what facilitates vocabulary learning (Bol, 1970; Carpay, 1975; Chapman & Gilbert, 1937; Higa, 1966; Lado, 1955; Pedanova, 1970; van Parreren & Schouten-van Parreren, 1979; Zalevskaya, 1967). Lado (1955) has provided one of the earliest discussions, which is directly relevant for L2



teaching. We will use his article as the main source in this section.

According to Lado (1955), attention needs to be paid to the form, meaning and distribution of words in discussing word difficulty. Word forms can vary quite a lot from language to language. Thus, for instance, English has many constructions like "call up" while such two-part verbs are unusual or unknown in other languages. That languages do not share meanings in any simple one-to-one correspondence is according to Lado shown most clearly by difficulties in translating accurately from one language to another. The distribution of words can also be restricted differently in different languages.

Lado suggests that the vocabulary of the native language is the most powerful factor in acquiring the vocabulary of a foreign language (cf. also Anthony, 1955). He further argues that similarity to and difference from the native language in form, meaning and distribution results in relative ease or difficulty in learning the vocabulary of a foreign language. According to Lado, there are seven distinct patterns in this respect:

1) Similar in Form and in Meaning

Words that are similar in form and meaning in two different languages are usually called "cognates". These words usually cause no special difficulties. Thus the amount of true cognates is an important factor in learning another language. While there are some cognates in most languages (due e.g., to loanwords), obviously there are more between related languages than non-related languages. Finnish students are handicapped in this respect in comparison to many other students, since Finnish belongs to a Finno-Ugric family of languages, which is not related to Indo-European languages. The amount of cognates in English, Spanish, French and German is discussed later in this

section.

2) Similar in Form but Different in Meaning

Words belonging to this category are usually called deceptive cognates (false cognates, false friends, "faux amis"). They cause problems and can create embarrassing situations.

3) Similar in Meaning but Different in Form

Words in two languages can be similar in some of their meanings but not in all. Lado mentions as an example the English word "tree" and Spanish "albol". According to him, these two words are similar in only some four of their twenty or more meanings and uses. Such words are assumed to be of average difficulty.

4) Different in form and Meaning

Words that are different in form and represent "strange" meanings, i.e., give a different perspective of reality, are assumed to be difficult. One example is the way different languages refer to the floors of buildings. What in one language means "first floor" refers to "second floor" in another.

5) Different in Their Type of Construction

Words that are different in their morphological construction are assumed to be difficult. Students from several languages have difficulty in learning the two-word verbs that are frequent in English, e.g., call for, call on, call up. Language-specific idioms are another source of difficulty.

6) Similar in Primary Meaning but Different in Connotation

Words that have different connotations can be difficult and cause embarrassment. This is especially true if a word in one language has harmless connotations but offensive or taboo connotations in another. This also ap-

plies to non-verbal behavior. Many foreigners are baffled when they first notice that the audience may whistle, for instance, at a sports event in the United States. In many countries whistling is the sign of disapproval.

7) Similar in Meaning but with Restrictions in Geographical Distribution

Words that are restricted in terms of the geographic areas in which they are used in the foreign language are assumed to be difficult. Differences between British and American English words is a case in point. Regional differences in terminology is another instance of difficulty.

Lado's treatment of vocabulary learning difficulties emphasizes the comparative perspective (i.e., cross-language and cross-cultural similarities and differences). Other scholars have had a more linguistic and psychological focus. Thus Pedanova (1970), using German as the language to be learned by Russian students, identified four major sources of word difficulty. Word length (measured in syllables) proved an important source of word difficulty. A second important factor was the transparency of word structure, i.e., the possibility for the learners to recognize familiar morphemes in the word. These two factors are obviously not independent of each other: a multisyllable word is particularly difficult to the learners if its structure is opaque. Zalevskaya (1967) makes the same observation. The link with the "Wortbezugsmodelle" (Berman et al., 1968; Denninghaus, 1976) is obvious. The third factor that Pedanova found is the degree of concreteness vs. abstractness of word meaning. Abstract words were harder to retain than concrete ones. The same phenomenon has been found to be true of first language learning as well (e.g., Paivio, 1971). Pedanova's fourth factor has to do with the relative scope of word meaning in the the mother tongue and the second language. If the scope does not coincide there are likely to be learning



difficulties. These four factors have often been identified also in didactic manuals. On the other hand, it is unlikely that pedagogical manuals have pointed out another finding by Pedanova, according to which nouns are easier to learn than adjectives and verbs, and that verbs, in particular, cause difficulties for second language learners (cf. Gentner, 1982).

van Parreren and Schouten-van Parreren (1979) point out that one source of word difficulty is interference due to word forms that are easily mixed up in the second language but which have different meanings. In a study carried out at the University of Utrecht, Bol (1970) has identified another related factor. He uses the term "tolerance" (*verdraagsamheid*, *Vertraglichkeit*) to refer to the situation when the word form in a second language gives rise to incorrect associations in the mother tongue (e.g., Swedish "tryck" is the equivalent of "duwen" (push) in Dutch and not of "trekken" (draw, pull)). Carpay (1975) and van Parreren and Schouten-van Parreren (1979) both mention the pronunciability of the word, which is important especially at the beginning stage. Another factor worth mentioning is the word frequency in the mother tongue. This was established already by Chapman and Gilbert (1937).

Idioms. It is often suggested (e.g., Baugh & Cable, 1978) that English has several assets that make it a serious candidate for an international lingua franca: (1) It has a very cosmopolitan vocabulary. More than half of its vocabulary is derived from Latin. There has been extensive borrowing from French and other languages have also given words to English. (2) English is inflectionally simple. (3) English has discarded grammatical gender and adopted natural gender.

On the other hand, as Baugh and Cable (1978) note, foreigners often complain that while the lack of complex inflectional system is an asset, this means that English has become a very idiomatic language. Baugh and Cable (1978) state that

languages with a minimum of inflection are very likely to depend more than others on stereotyped expressions or idioms. Their mastery depends largely on memory. The distinction between My husband isn't down yet and My husband isn't up yet, or the quite contradictory use of the word fast in go fast and stand fast seems to the foreigner to be without reasonable justification. It is doubtful whether such idiomatic expressions are so much commoner in English than in other languages - for example, French - as those learning our language believe, but they undoubtedly bulk large in the mind of foreigners.

(p. 11)

In his doctoral dissertation, Makkai (1966) has provided a thorough analysis of the concept of idiomatic expressions. Related work on collocations (sometimes called irreversible binomials, paired words, etc) have been done by Scott (1913), Abraham (1950), Malkiel (1959), Halliday (1966), Sinclair (1966), Jones & Sinclair (1973), and Coulmas (1981). Ackerman (1982) has studied how children comprehend idioms in L1.

Wilbur (1983) cites some studies which have shown that figurative language can comprise up to two-thirds of spoken and written materials. Between 107 and 310 idioms have been found in typical reader series for the middle grades. An average of 38 similes have been found in children's fiction books for readers at grades four to six. Coleman (1921) reports on a study of eight French books, which were analyzed in terms of their idiomatic content. A

total of 35,921 running words out of a grand total of some 283,000 words were studied. A total of 793 idioms, recurrent or single occurrence, were found. This is 2.2% out of the total amount of words. Arnold (1932) analyzed 15 literary Spanish texts, a total of 356,000 running words. A total of 9,876 occurrences of idiomatic expressions were found. Thus idioms accounted for 2.8% of all running words.

#### Sources of Ease in Vocabulary Learning

It has been long recognized that at least in learning a second or foreign language in a formal school setting, the first language has both a facilitative and an interfering influence. In the case of vocabulary, the facilitative effect is most obvious for cognate words. Cognates are usually defined to be words that are similar in form and/or meaning in two different languages. In some cases the meaning of a cognate word in a target language differs from the meaning it has in the native language. Such cognates are often called "deceptive cognates" or "false friends" (a translation from the French "faux amis"). They obviously can cause difficulties in communication (e.g., Scatori, 1932; Stevens, 1943).

Miller and Farr (1940) selected 1,323 cognates from A Graded Spanish Word Book by Buchanan (1929), which contains 5,000 words. Two hundred students (77 freshmen, 28 sophomores, 47 juniors, and 48 seniors) in three Kansas high-schools covered the entire list. Of these, 65 had had a semester or more of Latin, 9 a semester or more of German, and 132 had studied no foreign language. The majority of students were between 14 and 18 years of age. All tests were personally administered and students were to write the English equivalents of the Spanish words. Spelling errors were not taken into



account in scoring the answers. Individual scores ranged from 95 to 1,232, with the average being 751. Thus it can be assumed that high-school students, who have not studied Spanish, recognize about 750 Spanish words, which is 15% of the 5000 most frequent Spanish words.

Morgan (1940) estimated that about 700 German words in the first 1000 of a commonly used frequency count of German have cognates in English. A study of the words reveals, however, that most of the words are only partial cognates and quite a few of the English equivalents are archaic words (e.g., Bauer - boor; fahren - fare; Zweig - twig). Steinbugler (1945) lists 645 German words which have close English parallels. His list is more realistic than Morgan's as the following examples indicate: arm - der Arm; blood - das Blut; finger - der Finger; lip - der Lippe; ice - das Eis; fish - der Fisch; shoe - der Schuh; book - das Buch; fever - das Fieber; bed - das Bett; bitter - bitter; middle - mittel; sour - sauer; bind - binden; drink - trinken; hope - hoffen; sing - singen; thirst - dursten. There are a great number of similar technical and learned words derived from Latin and Greek (e.g., barometer - der Barometer; telescope - das Teleskop; botany - die Botanik; physics - die Physik). Many words ending in -ion and -tion have the same form (e.g., position - die Position; provision - die Provision), and the ending -ism is usually -ismus in German (e.g., Catholicism - der Katholizismus; communism - der Kommunismus).

Bovee, Coleman, Eddy, Jameson and Tharp (1934) undertook to produce a basic French vocabulary. All authors were either prominent scholars in vocabulary teaching or well known textbook authors. The authors estimated that 900 out of 3,000 basic words are recognizable in context, and over 300

have identical spelling and meaning. In the final list, which consisted of 2,752 words, 737 words were considered to be recognizable cognates. This is slightly more than one quarter of the total word list (26.8%). The role of cognates was estimated largely on the assumption that the learning materials are to be seen by the learner, since most French cognates are recognizable as such by the eye and comparatively few by the ear.

What Should be the Nature of the Learning Outcome in Vocabulary

Before we will discuss what might be the optimal way of teaching vocabulary, it is useful to determine what kind of learning outcomes have been advocated by some leading scholars in the field of L2 vocabulary research. Referring to a basic principle in Soviet psychology and psycholinguistics, Schouten-van Parreren and van Parreren (1979) emphasize that the starting point should be the analysis of the structure of the activity to be learned. Objectives should be clarified first before means are planned and selected.

Schouten-van Parreren and van Parreren (1979) suggest that we should make a clear distinction between the final, intermediate and beginning aims of vocabulary learning. One of the aspects of final learning outcomes should be the ability to master the target language relatively effortlessly, without too much reliance on the mother tongue. It is unlikely that such a command of the target language requires that people know the words out of context. This applies especially to listening and reading comprehension but, according to the authors, possibly also to the productive language use (speaking and writing). On the other hand, it does appear to be a necessary part of vocabulary knowledge that people usually can indicate what the mother tongue equivalents of target language words are, and that that they can carry out a

semantic analysis of the word forms. It is to be noted, however, that target language words do not always have easily definable meanings, and thus a mother tongue equivalent cannot always be given without the support of the context. Also, it is not always easy to give a mother tongue equivalent even with the help of context (cf. the problems that face translators).

Yet, even if it is not necessary as the final learning outcome to know the words out of context nor to be able to give their mother tongue equivalents nor analyze them semantically, this does not mean that those three forms of word knowledge would not be useful. Schouten-van Parreren and van Parreren (1979) suggest, however, that their proper place is not at the beginning or end of vocabulary learning but as intermediate objectives. Carpay (1975) recommends that students should know the meanings of content words without contextual help as far as the passive language use is concerned. He argues that in reading texts, the inference of new words would then get more support since the old words would be known solidly, even without the help of context. If old words are not known without contextual support, their meanings might be distorted towards the direction of new meanings. Schouten-van Parreren and van Parreren (1979) claim that this viewpoint is debatable, since they think that the meaning of a word is, nevertheless, dependent on the context in which it appears. Knowing words independently of context can also be detrimental, in their opinion, since there is a chance that students might distort the context in the direction of the known old word meanings. This applies particularly to words with several meaning nuances and those whose referents in the target language and the mother tongue do not coincide. Thus, on balance, it seems that in comprehending new text it is of use to know a number of words without the help of the



context, and especially such words that have few meaning nuances and whose referents coincide in the mother tongue and the target language. Even in such cases students should be aware of the fact that such a meaning can never be simply substituted in a new context by the foreign word.

Since vocabulary learning is important and requires both time and perseverance, it is important that students learn ways to optimize their vocabulary acquisition and utilization. They need to learn to expand their "potential vocabulary" and to learn to put it to maximum use. The latter is important from the point of view of motivation.

Schouten-van Parreren and van Parreren (1979) claim that after learning about 1,000 words, a point is reached after which learning new words becomes harder. Based on the frequency word book of German, which was constructed on the basis of 11 million words of running text, Kondratyeva (1974) has shown that when the relationship between rank and word frequency is plotted, a hyperbola emerges with one branch close to the horizontal axis and the other close to the vertical axis. The point of symmetry (word with rank number 1,000 and with the frequency of 1.023) is close to zero on both axes. This hyperbolic relationship between word frequency and rank is found also in other languages. Schouten-van Parreren and van Parreren (1979) suggest that this makes it understandable that a student who has learned the first 1,000 most frequent words without too much difficulty needs much more time to learn the next 1,000 words. He meets the asymptote of the horizontal branch: there is an incredibly large amount of low frequency words, which - to make matters worse - are repeated relatively seldom. They suggest that it is important to give students weapons to tackle this vast amount of vocabulary effectively so

that their motivation can be kept up.

Schouten-van Parreren and van Parreren (1979) suggest that there are two main approaches that help students tackle successfully the great number of words to be mastered in foreign language learning. These are mastery of the "word relation" model (Wortbezugsmodelle) and the ability to infer the meanings of unfamiliar words from the context (cf. also Nagy & Anderson, 1982).

The word relation model is closely connected with the concept of "potential vocabulary". It seems likely that the concept was first clearly defined in Russian literature on language teaching. Berman, Buchbinder and Bezdeneznych (1968) in an article "Building a Potential Reserve Vocabulary in Learning Russian as a Foreign Language", drew a distinction between the "actual" or "real" vocabulary and "potential" vocabulary. The real vocabulary includes those words that the students have learned at a given stage of the learning process, i.e., those words whose forms and meanings are known. Within the real vocabulary there is an active real vocabulary and a passive real vocabulary. The former can be used by the students while the latter can only be understood. The potential vocabulary refers to those words that the students have never read or heard but which they can understand on first encounter.

Denninghaus (1976) adopted the concept and developed it into his word relation model (Wortbezugsmodelle). He noted that it is a common assumption in L2 pedagogy that some words can be taken to be known even if they have never been taught. Thus, for instance, if students have learned the meanings of several word pairs like "fair - unfair", "happy - unhappy", they can be assumed to know what "uncertain" means if they first learn the meaning of "certain", or vice versa. Denninghaus states, however, that in spite of this common observation, textbook writers and teachers hesitate to take full

advantage of this phenomenon. Potential vocabulary remains an accidental by-product of teaching rather than becoming an important part of teaching efforts. He suggests that it is not generally realized how much larger the potential vocabulary is than the real vocabulary in any language competence that is beyond the most elementary stage. Similarly, it is not commonly appreciated how decisive potential vocabulary is for reading and listening comprehension.

According to Denninghaus (1976), potential vocabulary is partly based on the real (learned) vocabulary and on the ability to analyze it into its meaning-bearing elements (morphemes), and partly on the knowledge of the mother tongue and the ability to recognize relationships between the words in the source language and the target language. For languages like English, German and Russian, which all have a large and related vocabulary and which have a substantial native vocabulary consisting of polymorphemic words, the potential vocabulary is quite large already at the end of a basic course. Berman et al. (1968) have estimated that in Russian the potential vocabulary is tenfold on the basis of 2,200 - 2,500 words (without taking into account possible cognate words). They also report other estimates according to which 1,350 Russian words, selected on the basis of frequency and excluding cognates and loan words, leads to a potential vocabulary of 7,700 words. Denninghaus claims that the figures can be doubled for an English and German speaker thanks to a number of cognates and loan words.

The size of the potential vocabulary is related to the type of language. In an amorphological language like Chinese, in which word and morpheme boundaries largely coincide, and in languages which are not linked by related



words and commonly shared loan words, the situation is not equally favorable. This applies to a language like Finnish, which is not related to any language of wide use and which is puristic and does not have a large stock of loan words (most new concepts have become loan translations).

Denninghaus (1976) points out that there needs to be a decision of which word relation models to select for language teaching purposes. According to him, there are some 400 word-building models in Russian. Some 100 models should be taught in teaching Russian, French, German or English as a foreign language.

#### How Should Words Be Learned?

The question of how new words should be learned so that the results would be maximized in second language learning can be divided into two more specific questions: (1) What is the optimal way of semanticizing words, i.e., to learn what the new L2 words mean?, and (2) What is the optimal way of ensuring retention, i.e. to make sure that words whose meanings are now known are not forgotten? Schouten-van Parreren and van Parreren (1979) provide a useful review of these two questions. The following discussion is largely based on their article. The question of learning word meanings will be taken up first and followed by the problem of word retention.

Schouten-van Parreren and van Parreren (1979) argue very strongly that new words should never be presented in isolation but always in context. They further suggest that words should preferably be presented within a text rather than within isolated example sentences. The authors build on earlier arguments against the learning of isolated sentences by van Parreren (1967) and van Parreren and Eikeboom (1969). Briefly stated, it is argued that

(1) Words that are learned from a list are easily mixed up with each other; they tend to be lumped together ("klonteren"). This tendency is particularly prominent in alphabetical and thematically arranged word lists. On the other hand, in lists arranged in other types of order there is, however, no cognitive hold on the material and thus such words are quickly forgotten.

(2) Words that are well recognized within a list need not be known outside of it. This is the result of something that van Parreren in his writings on learning has called "systeemscheiding". The term means "systems distinction" in literal translation.

(3) The meanings that are given in word lists do not often match the ones words have in the contexts that learners meet.

(4) In a word list learning situation, there is little or no spontaneous need for learners to learn the word meanings. Thus, learning requires a lot of effort without pre-existing strong motivation.

There remain at least two important questions that need to be addressed in discussing methods of learning word meanings. These have to do with the degree and nature of help given to students.

#### Approaches to Vocabulary Teaching

In systematic vocabulary teaching attention has to be given to the initial presentation, and the subsequent consolidation of new vocabulary. Methods should be found by which words can be presented optimally for the first time and through further work made easily and permanently accessible to the students. These two stages will be taken up for discussion separately in the following.

There is a high degree of agreement among the experts of second language teaching that vocabulary should be introduced within the framework of meaningful contexts. Among others, van Parreren (1967) cites several drawbacks that are inherent in decontextualized vocabulary teaching. On the other hand, there has been less agreement on the role and kind of help that students should be given in vocabulary learning.

It is possible, in principle, to give students no or little explicit help in learning vocabulary. They could be required to learn the meanings of words on the basis of the extralinguistic situation, the linguistic context, and the ability to analyze the morphological structure of words. It has, in fact, been shown (Sinica, 1955) that the inference (guessing) of new word meanings created good conditions for their subsequent recall.

There are, of course, a number of ways that are used to help students to learn the meanings of new words. There are two main approaches: monolingual and bilingual. If the monolingual approach is selected, several means are available: meanings can be clarified through objects, pictures, and actions; they can be conveyed through other related words (synonyms, antonyms) or through definitions (cf. e.g., Anderson & Kulhavy, 1972). In the case of the bilingual approach, there are also several options available: translation equivalents on the margins, at the bottom of the page, in a separate word list (e.g., at the end of the extract or at the end of the book); oral translation; use of bilingual dictionaries.

As a reaction to the prevalent grammar-translation method, the monolingual method gained almost the status of dogma in the heyday of the audio-lingual method. Empirical studies have shown, however, that the advantage of no translation into the mother tongue is less than was often assumed, since



students tend to refer to the mother tongue equivalents in their minds anyway (e.g., Bol & Carpay, 1972). Oskarsson (1974) has also shown that the "treatment" with the bilingual word lists produced better results with adult ESL learners than monolingual word lists. Studies by Heuer and Heyder (1971) and by Preibusch and Zander (1971) did not show any clearcut advantage to either method, but pointed out that the age of learners and the number of words presented at one time might be important factors.

As van Parreren and Schouten-van Parreren (1979) point out, the pros and cons of giving help to students in the learning of word meanings is related to a broader question of the relative benefits of discovery vs. expository teaching. There is no clearcut agreement on this point, either. It has, however, been pointed out that teaching that encourages students to discover meanings and solutions to problems tends to promote and maintain study motivation, and to lead to better retention and a more creative approach to learning tasks. In recent years, cognitive psychologists have emphasized the importance of the so-called metacognitive strategies and processes for learning. On the other hand, expository teaching (van Parreren and Schouten-van Parreren (1979) refer to this type of teaching as "linking teaching" or "guiding teaching") may have the advantages of leading to more certain and firmer knowledge (i.e., no or fewer partially learned meanings or ideas), more structured knowledge, while requiring less time. On the other hand, if retention is better in discovery learning, the overall time expenditure may be in favor of the discovery approach.

In learning vocabulary in second language learning, the use of context to infer word meanings can lead to a more creative and active attitude to

language learning, but it may also involve some problematic aspects. The most serious one has to do with learning only limited meanings or even wrong meanings. In second language pedagogy, the difficulty of unlearning wrong speech habits has always been recognized (e.g., Dodson, 1967; Butzkamm, 1971), even by those who emphasize the hypothesis-testing nature of language learning and consider errors as normal and even necessary phenomena in language learning. On the other hand, students may pay too little attention to new words if they can always easily get the mother tongue equivalent. Such superficial cognitive work on new words may lead to the fact that they are not recognized on a second encounter. This effect has been shown by Anderson and Faust (1967) for programmed learning.

The hypothesis that inference of word meanings from context, i.e., active work on the structure of the L2 words and on the contextual clues, may lead to better word retention is supported by several empirical studies. Sinica (1955) showed that letting students infer word meanings from context led to a better performance on a composition test (where the words had to be used actively) than the two other conditions in which the words were semantized by means of pictures or through synonyms. In a doctoral dissertation at the University of Utrecht, Uhlenbeck cited in Schouten-van Parreren & van Parreren, (1979) corroborated Sinica's findings. In a Master's thesis at the Free University in Amsterdam, Hemels (also cited in Schouten-van Parreren and van Parreren, 1979) built on the earlier Dutch experimental work on discovery vs. expository teaching. The experiment included about 60 students in the 6th grade of the elementary school. They read three relatively short texts which contained 16 unfamiliar words. Half of the students got three synonyms for each of the unfamiliar words and a sentence in which the word was used, while

the other half had to guess the meanings of words from context. The latter were asked to note down the guessed meanings, which were then confirmed in a class discussion. Word knowledge was tested in three ways: (1) a free recall test, in which the students had to pick out the 16 words from one text; (2) students were given the 16 words and asked to use them in a sentence so that the meanings could be inferred from the sentences (these two tests were given immediately after and again after three days), and (3) two weeks later, the students were asked to write a composition using the target words. The inference group did considerably better on all tests than the synonymy group.

If inference (guessing) from context is opted for as the principal method in mediating new word meanings, it is important to guarantee that word meanings are inferred as correctly as possible. This can be achieved partly by teaching students the skills of contextual inference but also by careful manipulation of the stimulus (input) material. van Parreren and Schouten-van Parreren (1979) suggest the following factors as favorable to the correct inference of meaning from context:

1. The skill of being able to infer word meanings from context should be developed as effectively as possible.
2. The nature of the input material (in this instance, mainly written text) should be optimal. Following viewpoints can be presented to discuss this second requirement:
  - a. There are different degrees of "pregnancy" in context. The introduction of new words should always take place within maximally pregnant contexts, i.e., the context should give information for the inferring of the sought word meaning.



b. In many cases the students need more than one context. Such contexts should not be placed too far from each other.

c. The density of new vocabulary is usually an important consideration. If the density is too low, the students may not be motivated to try to infer the meanings of new words. The gist of the text can be understood without such words (cf. the concept of "fossilization"). If the density is too high, the text is too difficult to understand. (cf. e.g., Frumkina, 1967). Kondratyeva (1974) has pointed out that too dense vocabulary slows down the tempo of learning and is thus detrimental to learning.

d. The importance of the word for the total meaning of the text is also a significant factor (cf. also Freebody & Anderson, 1981a). The more important the contribution of the word is to the overall meaning of the text the more it requires attention from the students. In a doctoral dissertation van Keulen (cited in Schouten-van Parreren & van Parreren, 1979) showed that unfamiliar L2 words that were important for the comprehension of a text were remembered better than unfamiliar words that were less important. This, of course, presupposes that students, in fact, do make an effort to get the meaning of texts.

e. Finally, it should be emphasized that inferred word meanings must be consolidated. An experiment by Carpay (1975), which has been referred to earlier, showed that explicit consolidation work led to improved results.

van Parreren and Schouten-van Parreren (1979) emphasize that even if the above factors are favorable for inferring the meanings of new words from context, it is important to confirm their correctness, e.g., by means of a

monolingual or bilingual word checking or explanation at the end of the lesson. It should be kept in mind, however, that if students come to expect such word clarification, they might not engage in inference during the lesson itself. Berlyne et al. (1968) has shown that a positive effect occurs only if students actually build hypotheses, i.e., are actively engaged with the words (possess a cognitive set).

In a recent discussion on the role of context in vocabulary development Beck, McKeown and McCaslin (1983) suggest that although it may be true that the learning of new words is facilitated by context, it is questionable to assume that any situation that presents a context is an appropriate or effective vehicle for vocabulary development. This is the point made by the subtitle of the article: All contexts are not created equal. The authors distinguish two kinds of context: pedagogical and natural. Pedagogical contexts are specifically designed for teaching certain unfamiliar words. Natural contexts are the contexts containing the target unfamiliar words that could be found in the universe of print. The limitation by the authors of the article to print is unnecessary: natural contexts could also be taken to include any non-pedagogical oral discourse.

Beck, McKeown and McCaslin (1983) suggest that there is a continuum on which contexts can be classified in terms of their effectiveness to guide the inference of the meanings of unfamiliar words. They distinguish four categories. From least to most effective they are: misdirective contexts, non-directive contexts, general contexts, and directive contexts. Using a small group of adults as subjects, the authors showed that the proportions of correctly identified word meanings increased consistently from .03 through .27 and .49 to .86 for the four types of context categories respectively. The

conclusion reached is that it is precarious to believe that naturally occurring contexts are sufficient or even generally helpful in providing clues to promote initial acquisition of a word's meaning (Beck, McKeown & McCaslin, 1983).

#### Consolidation of Learned Word Meanings

The foregoing discussion has dealt with various aspects of learning word meanings on the initial presentation. The focus of the following discussion is on the consolidation of vocabulary. Two different approaches are usually distinguished in vocabulary consolidation work: incidental learning and intentional learning.

In the case of vocabulary learning, incidental learning refers to word learning that takes place without conscious attempt to fix words in memory. Intentional vocabulary learning has as its object the conscious learning of words. Recently Krashen (1981, 1982) has drawn attention to these two approaches to language learning and labelled the incidental language learning the "natural" way. It is likely that incidental learning plays an important part in the early learning of the native language and in daily life in general. It is also obvious that it is useful to maximize incidental learning in all domains, including language learning. This also applies to vocabulary learning: acquiring an adequate vocabulary is not an end itself. It is important as a means for adequate language comprehension and production. Thus the question arises how incidental learning could be maximized in vocabulary learning. van Parreren and Schouten-van Parreren (1979) suggest that both qualitative and quantitative aspects of learning situations are important.



The qualitative aspect of vocabulary learning has to do with the structure of activity on vocabulary. van Parreren and Schouten-van Parreren (1979) suggest that effective incidental learning can only be expected if the activity on vocabulary is meaningful, i.e., word meanings play a central role in the activity. A study by Gumenik (1976) lends support to this hypothesis. Three groups of subjects were presented 24 words, each after an interval of 30 seconds. One group was required to draw pictures representing the stimulus words. Another group was asked to write down verbal associations elicited by the stimulus words. The third group had to form new words using as many letters of the stimulus words as possible. In an unexpected recall test all subjects were asked to recall the stimulus words. The last ("anagram") group did clearly poorest, while the first group had a slight edge over the second one. van Parreren and Schouten-van Parreren (1979) suggest that the poor performance of the third group is not surprising: in building new words the subjects could use neither the form nor the meaning of stimulus words as points of reference. Thus in their activity the words did not function as meaningful units. Studies by Smirnov and his colleagues (Smirnov, 1973) have also demonstrated the superiority of incidental learning. Incidental learners had to categorize pairs of adjectives as synonyms, antonyms, or as neutral pairs, whereas intentional learners had to try to memorize the pairs as well as possible in the same amount of time.

The other important aspect of the activity on vocabulary has to do with quantitative characteristics of stimulus (input) materials. It is evident that whether words are acquired permanently in the incidental manner is

dependent on the number of times words are encountered and on the circumstances in which repetition takes place. In an experiment at the University of Utrecht, Carpay (1975) developed a 20-lesson program which taught elementary Russian to psychology students. A total of 236 words was covered, about 12 new words per lesson. Carpay found that the optimal repetition formula was 4-1-1-1. In other words, learning was best if the new words were repeated four times during the first presentation and repeated once during successive three lessons.

One may ask about the implications of the foregoing facts about incidental learning for intentional learning. Obviously intentional learning may have to be resorted to if incidental repetition is not present in the input or cannot be arranged. In a set of studies on incidental learning Zinchenko has established that it is optimal for learning to have an incidental learning period followed by an intentional learning period. This suggests that it might be optimal for vocabulary learning to have the incidental learning period followed, after some time interval - not immediately - by an intentional learning period. That this may be so is confirmed by the findings that Carpay (1975) obtained in his set of experiments. Words had to be inferred mainly from context. Through contextualized vocabulary tests and through the above-mentioned word repetition formula the students were found to have learned an average of 83% of the 236 words at the end of the course. The result indicates that at least motivated college students can learn vocabulary effectively when vocabulary is acquired incidentally, without conscious memorizing work.

Kondratyeva (1974) has shown that it is also possible to learn vocabulary incidentally from material not specially prepared for language learning. A university student, a non-language major, who only knew a few words of German, read a German novel with the help of a dictionary and wrote down all words on each page that he did not know. He was not asked to try to memorize the words. The number of known words varied to some extent but showed a consistent pattern over time. At the beginning he usually noted down more than 90 words per page but the number had sunk to five at the end of the 600-page book. It is remarkable that most of the words (80%, 2,400 words) were written down only once. Only seven words were written five times. Kondratyeva established that the result was not due to lack of motivation or understanding from context, etc. In the final test, the student showed that he knew the meanings of more than 1,000 words marked down. How is it possible that the student could remember the meanings of words that he had marked down only once and many of which appeared also only once in the book? Kondratyeva found that the "word family" principle was in operation: the student could remember words like fahren, Fahrer, Fahrkarte, Erfahrung, which obviously are not independent from each other. The student had learned to "see through" the structure of several German words and recognize familiar stems in new words. Kondratyeva recommends that the word family principle be applied in preparing language teaching texts (cf. Wortbezugsmodelle by Berman et al, 1968; Denninghaus, 1976). Schouten-van Parreren and van Parreren (1979) suggest caution, since there is a possibility of interference here (cf. the "lumping tendency" -klonteringstendentie).



van Parreren and Schouten-van Parreren (1979) also refer to their own experiment with intentional vocabulary learning. They suggest that the demand for contextualization does not apply with equal force in the case of word meaning consolidation as in the case of word presentation. They developed a method, in which target language words are presented on one side of cards. The translation is on the reverse side. On top of the reverse side, there is a reduced context for the word. The minicontext might help to remind the students of the larger context in which they had earlier encountered the word. Using a mechanism that first made the minicontext visible without the mother tongue equivalent they had students successfully review their vocabulary by self-administration and self-checking. Atkinson (1972) has applied a similar method but used the possibilities offered by the computer.

van Parreren and Schouten-van Parreren (1979) note that such intentional vocabulary consolidation is appropriate only during the intermediate and later stages of instruction. Incidental learning is to be preferred during the initial stages, which usually deals with high-frequency words anyway and so they are repeated often in the teaching materials. The authors also recommend a cautious contrast with mother tongue words, especially in the case of words that typically cause a lot of problems for students. Contrasting should always be very limited in scope.

Ability to Infer Word Meanings

It has been suggested that the ability to infer (guess) word meanings on the basis of context is important for comprehending spoken and written text both in the native language (e.g., Nagy and Anderson, 1982) and in foreign languages (e.g., Schouten-van Parreren and van Parreren, 1979; Schouten-van Parreren and Hoogendoorn, 1983).

Why should context-based inference of word meanings be important in learning foreign languages? The school can teach only a relatively limited amount of vocabulary owing to the limited amount of time available for foreign language learning. It is obvious that even at very advanced levels of knowing foreign languages people will come across new words every now and then. Outside of school there will be no teacher to help with unfamiliar words and there will be no word lists on the margin, at the bottom of the page or in a separate section at the end of the book. In some situations there will be enough time to consult a dictionary but since many words have several meanings it will be necessary to use context to decide which one of the given meanings is the most appropriate one.

Granting that context-based inference (guessing) is an important skill in comprehending language both in L1 and L2, the question arises to what extent it is a learnable and, especially, teachable skill. There is a lot of indirect evidence about the learnability of contextual inference and context-based word learning in L1. Thus, e.g., Nagy and Anderson (1982) conclude that the size of people's vocabularies makes it extremely unlikely that they could have learned it in any other way than through a massive exposure to words in context. But the matter is not equally obvious in second or foreign language

learning. Thus it merits a closer look.

Schouten-van Parreren and van Parreren (1979) provide a useful discussion of learning to infer word meaning on the basis of context. They suggest that it is possible due to the redundancy of language. The successful inference of word meaning from context is dependent on several factors:

(1) The nature of context. The more pregnant (compelling) the context, the easier it is to infer the meaning of a word. There is no simple way of determining the "pregnancy" of the context, however.

(2) The nature of the word to be inferred. Several factors play a role here: the length of the word; the transparency of the word structure (e.g., does it contain familiar elements?); word class; the degree of abstractness vs. concreteness of word; the likelihood of interference; the lack or only partial agreement of the reference of the word in L1 and L2; the compatibility between the sound and meaning patterns of the word (cf. also Carpay, 1975; van Parreren and Schouten-van Parreren, 1979).

(3) The experience and knowledge of the learner. In order to be able to infer a word meaning, the learner has to be able

(a) to analyze the word structure,

(b) to make use of the syntactic context, i.e., the form of the utterance,

(c) to make use of the semantic context, i.e., the content of the utterance, and

(d) to possess world knowledge that is necessary to understand the text in question.



There is not very much empirical data on the question to what extent the contextual inference of word meanings can be taught. Schouten-van Parreren and van Parreren (1979) refer to an experiment carried out at the Free University of Amsterdam. About 100 students in the 2nd and 3rd grades in one school in Amstelveen participated in the study. During four successive lessons they read a simulated foreign language text. This was a Dutch text in which words had been systematically replaced by quasi-words (cf. Frumkina, 1967). Quasi-words are words that resemble Dutch words in structure and can be inflected/ conjugated like ordinary Dutch words. Half of the students got "Dutch equivalents" in the margins, while the other half had to try to guess the meanings of quasi-words. Two tests, one immediate and one after three weeks, showed that the "inferers" in the 3rd grade did significantly better than their 2nd grade counterparts. The results of the "margin-readers" did not differ from grade to grade.

The above experiment showed that word meaning inference on the basis of context can be taught and that it is subject to developmental differences. It did not, however, indicate very clearly what the role of teaching was. A set of experiments by Carpay (1975) is relevant on this point. He developed a beginners' program in Russian, whose purpose was to teach basic Russian structure and about 200 Russian words to university students (psychology students). The program consisted of about 20 lessons and a few revision lessons and it took about a year to complete. The instruction was transmitted by a computer, thus controlling for teacher effect. The program was set up so that students usually had to infer word meanings from the context. Thus they can be assumed to have had considerable experience in inference. Carpay used

a Dutch story in which a number of words had been replaced by quasi-words. Eight students from the experimental group and 45 control students took a test measuring the ability to infer the meanings of the quasi-words. The experimental group scored significantly higher on the text than did the control group.

There are a few other studies that bear on this question. The experimental method has usually been the cloze procedure. This is a variant of the fill-in test, which goes back to Ebbinghaus, and was rediscovered by Taylor. The cloze procedure has been extensively used to measure the difficulty level of texts and the level of reading competence. A few studies can be cited that are relevant in terms of the present study. Jongasma (1971, 1980) reviews cloze studies in which the method was used as a teaching tool. He concluded that practice with guessing word meanings did not lead to any appreciable improvement in inference ability. When there was discussion of how the gaps might have been filled in, there was some indication that inference ability was improved. A study carried out in Belgium (Henry and Hinq, 1975) with about 50 students in the last grade of the compulsory school and lasting three weeks had students practise the filling-in of cloze passages. A few of the passages were filled in together and accompanied by class discussion. A control group had silent reading during this period. A post-test showed that the experimental group did significantly better on a cloze test than the control group, and it did also significantly better on another type of test of reading with comprehension (test of anaphoric relations). This is perhaps the most concrete evidence that inference of word meaning from context is not only learnable but also teachable.

Miroschina (1969) has suggested that the best strategy in inferring word meaning from context is to make a general guess about the approximate meaning of the word ("macrohypothesis") followed by an attempt to nail down the exact meaning ("microhypothesis"). There might also be other heuristic methods, but very little is known about them.

Sternberg and Powell (1983) provide an excellent discussion of cognitive bases of verbal comprehension. Only some aspects that are of special relevance to the present study are briefly summarized below. The authors review three main approaches to cognitive accounts of verbal comprehension (bottom-up, top-down, and knowledge-based) and conclude that the three are really complementary. Thus, lexical access seems to play some role in verbal comprehension (bottom-up process), reasoning and inferencing have been found to be related to being able to extract word meanings from context (e.g., Marshalek, 1981) lending support to the top-down hypothesis, and earlier knowledge influences the acquisition of new knowledge. They present a theory of their own, which they call a "theory of learning from context".

The theory accords a prominent place to the ability to infer the meanings of unfamiliar words from context. Three reasons are given for this emphasis. First, a theory that describes how people use context to infer word meanings could tell us much about vocabulary building skills and thus give hints about effective ways of training vocabulary acquisition skills. Second, a theory of learning from context can help explain why vocabulary consistently turns out to be one of the best, if not the single best, predictor of verbal intelligence overall. The authors hypothesize that learning from context reflects important vocabulary acquisition skills, and the end pro-



ducts of such skills are indicated by the vocabulary size. On this view, vocabulary tests are such good predictors of people's overall verbal intelligence because they reflect the ability to acquire new knowledge. Third, a theory of learning from context helps clarify the relationship between the more fluid, inferential aspects of verbal intelligence (usually measured by tests of verbal analogies) and the more crystallized, knowledge-based aspects of verbal intelligence (usually measured by vocabulary tests). The authors suggest that a theory of learning from context provides a useful way of integrating the two salient aspects of verbal ability - vocabulary and comprehension - and of placing vocabulary acquisition within the context of general cognitive theories of language comprehension.

There are two basic ideas underlying the proposed theory of learning from context. The first has to do with the fact that some verbal concepts are easier to learn than others. Contextual factors that either facilitate or inhibit the learning of new verbal concepts are assumed to have a similar effect also in their retrieval and transfer to new situations. The second has to do with the fact that some individuals are better at learning verbal concepts than others. It is assumed that such differences can be traced largely to individual differences in the ability to utilize contextual supports and avoid contextual pitfalls. Similarly, it is assumed that these differences are also involved in the retrieval and appropriate transfer of these concepts to novel situations.

The theory makes a further distinction between decoding of external context and decoding of internal context. The former pertains to the contextual cues available in the external context itself which convey different kinds of information about words. The latter refers to those aspects of

vocabulary acquisition that lie, at least in part, within individuals. They are factors that mediate the utilization of external cues. These two key concepts are briefly discussed below.

Sternberg and Powell (1983) distinguish eight different types of external contextual cues, which are briefly listed below:

1. Temporal cues. These cues relate to the duration or frequency of the phenomenon that the unknown word refers to or to the time that it can occur.
2. Spatial cues. These cues relate to the general or specific location of the object or phenomenon denoted by the unknown word.
3. Value cues. Cues relating to the worth or desirability of what the unknown word refers to, or regarding the kinds of affect that it arouses.
4. Stative, descriptive cues. Cues regarding the physical properties of what the unknown word refers to (e.g., size, shape, color, odor, feel).
5. Functional descriptive cues. Cues relating to the possible purposes of what the unknown word refers to, what actions it can perform or what it can be used for.
6. Causal/enablement cues. Cues regarding possible causes or enabling conditions for what the unknown word refers to.
7. Class membership cues. These cues relate to one or more classes to which the unknown word belongs.
8. Equivalence cues. These cues relate to the meaning of the unknown word or contrasts to its meaning.

The authors illustrate the use of cues with the following passage, which contains the unfamiliar word trok:

Ann wiped the morning sleep from her eyes, leaned against the sink and lifted her trok from its holder. She squeezed some paste onto its bristles and wet it, but just as she put the trok in her mouth, the phone rang.

Temporal, spacial, stative and functional descriptive cues are given that help to educe the meaning of the unfamiliar word.

The presence of external contextual cues is probably a necessary but not sufficient condition for inference of the meaning of unknown words. The authors acknowledge this by proposing a second category of mediating variables which affect whether and in what way a reader will apply contextual cues to infer the meanings of unfamiliar words. Seven mediating variables are proposed. They are:

1. Number of occurrences of the unknown words
2. Variability of contexts in which the unknown words appear
3. Density of unknown words
4. Importance of the unknown word to understanding the context in which it is embedded (both at the sentence and the overall passage level)
5. Perceived helpfulness of surrounding context in understanding the meanings of unknown words
6. Concreteness of the unknown word and the surrounding context
7. Usefulness of prior knowledge in cue utilization.



Jenkins and Dixon (1983) suggest three additional conditions which may affect learning from context. The first expands the seventh category. Four different cases are distinguished: (1) The unknown word has a simpler synonym, and the student knows the concept referred to by it. (2) The unknown word has a simpler synonym, but the student does not know the concept referred to by it. (3) The unknown word does not have a simpler synonym, but the student reliably recognizes instances of the concept. (4) The unknown word does not have a simpler synonym, and the student shows no knowledge of the concept referred to by the word. (Note that the first case, requiring only that a new label, name, be assigned to an already known concept is very common in the case of learning vocabulary in a second language, and involves only one stage).

The second condition is the proximity of recurrence of the unknown word. Multiple occurrences that are not spaced too far apart provide different contextual cues and enhance their integration. The third additional mediating variable refers to the number of meanings of the unknown words. The more meanings the unknown words have the more encounters in different contexts are needed for learning all the meanings.

In the case of internal contextual cues, Sternberg and Powell (1983) distinguish four contextual cues and five mediating variables. The former contains prefix cues, stem cues, suffix cues, and interactive cues. Mediating variables have to do with the following factors:

1. Number of occurrences of the unknown words
2. Density of unknown words
3. Density of decomposable unknown words

4. Importance of the unknown words to understanding the context in which it is embedded
5. Usefulness of previously known information in cue utilization

We conclude, then that the ability to infer word meanings from context is a important skill for discourse comprehension. Recently, Nagy, Herman and Anderson (in press) have also shown that context can lead to reliably established word learning. The authors estimated that the probability that a child in middle grades will acquire full adult understanding of an unfamiliar word as a result of one exposure in a natural context is between 5 and 10%. They also calculated that the rate of unknown words that such children meet is about 20 to 60 words in a 1,000 word text. When it is further estimated that such children meet 500,000 to 1,000,000 words a year in independent reading outside of school, it can be seen that middle grade children learn from 500 to 6,600 words a year, with the mean being 3,550 words. Since this is obtained with an average of 10 minutes' independent reading outside of school, the amount of word learning from context during school reading might be much higher, provided that children are allowed to read extensively at school, and not interrupted too often.

#### Mnemonic Techniques in Second-Language Learning

The necessity to memorize large amounts of separate items has led to the search and application of different methods in different school subjects. Language teachers, like most other teachers, have stressed the need for repetition and rehearsal. This is reflected in familiar proverbs: Repetitio est mater studiorum (Repetition is the mother of studies), Practice makes perfect. Language teachers, more frequently earlier than at present, had

students study word lists and held vocabulary quizzes on a regular basis. Repetition/rehearsal is based on the notion that the link between word form (stem, root) and meaning is arbitrary in all languages and the same applies across languages: there is no reason why the equivalents of the English word "table" should be "der Tisch" in German, "ett bord" in Swedish, "poyta" in Finnish, "stol" in Russian. The associations have to be established essentially on an arbitrary basis, like in many traditional list-learning experiments of the paired associate research paradigm in the study of verbal learning. On the other hand, the link with the Dutch equivalent "tafel" and the French equivalent "la table" is obviously not arbitrary, since the words are cognates.

Over the centuries, language teachers have looked for ways of improving the memorization of both content words and structural words (e.g., which German or Latin prepositions require the accusative case in the headword). Paivio and Desrochers (1981) cite several early references to attempts to use mnemonic techniques in second language learning (the earliest reference is to an article published in 1813). Typically verbal mediators were created to establish an acoustic or orthographic link between a native and second-language word, sometimes complemented by a semantic link. A quotation from Sayer (quoted in Paivio & Desrochers, 1981, p. 780) is given below:

It [rana] is an unfamiliar idea. We know nothing about it and it makes no impression save that of sound. That impression must, however, be connected with the word frog. So we assimilate it to an English word of identical sound which will readily blend with frog. The first three sounds of the word are found in the same order as in

our word rain. Nothing is now easier than to associate on the principle of [an earlier specified] exercise. "A frog caught in the rain" is the idea pictured, and whenever we meet with the word "rana", we immediately know its signification. (p. 9)

Willson (1917) called the method "catenation". He suggested that the method emphatically "has no part in the elementary stages of instruction" but is suitable only for pupils who have done at least three or four years of French and who have already acquired a fair working vocabulary of a foreign language. He gives several examples, including the following: French "palisandre" - palace gardens - roses - "rosewood". Willson suggests that the method can be used to learn a few hundred vocabulary items.

Atkinson (1975) "rediscovered" the mnemonic technique after working on optimizing the learning of second language vocabulary (Atkinson, 1972) using computer as a tool for an experimental study of four optimization strategies. Since his first study, a number of studies have been carried out. The method developed by Atkinson is called the keyword method. In the case of foreign language vocabulary learning, the students must first acquire a stable association between the unfamiliar foreign word and a familiar native language word that sounds like a salient part of the foreign word. For instance, a possible English keyword for the Spanish word "carta" might be "cart". The second stage consists in encoding a meaningful interaction between the keyword and the meaning (definition) of the foreign word. Since "carta" means "letter", a possible vivid image might be to think of a huge letter (envelope) in a shopping cart. If a meaningful sentence method is chosen instead of the image method, a possible sentence frame might be "The cart transported the letter" (Pressley, Levin & Delaney, 1982).



A review of a, by now, great number of studies (Atkinson, 1975; Atkinson & Raugh, 1975; Levin, Pressley, McGormick, Miller, Shriberg, 1979; Levin, Shriberg, & Berry, 1983; Ott, Butler, Blake & Ball, 1973; Ott, Rowland & Butler, 1976; Paivio & Desrochers, 1979; Pressley, 1977; Pressley & Dennis-Rounds, 1980; Pressley & Levin, 1978; Pressley & Levin, 1981; Pressley, Levin, Hall, Miller & Berry, 1980; Pressley, Levin & McGormick, 1980; Pressley, Levin & Miller, 1981; Pressley, Levin & Miller, 1982; Pressley, Levin, Nakamura, Hope, Bispo & Toye, 1980; Pressley & Mullally, 1984; Pressley, Samuel, Hershey, Bishop & Dickinson, 1981; Raugh & Atkinson, 1975; Raugh, Schupbach & Atkinson, 1977) leads to a conclusion that the keyword method is clearly superior to rote repetition in a variety of tasks and circumstances and with different age groups. Paivio and Desrochers (1981) have also shown that another mnemonic technique called the "hook method" can be up to three times more effective in learning foreign language vocabulary than rote memorization. The "hook method" uses a standard list of peg words each of which can be translated into a number.

In a review of vocabulary acquisition Meara (1980) suggests that while the evidence is impressive at first sight, the work on mnemonics is problematic at a deeper level, and should be treated with some caution. Meara offers some critical comments on the mnemonic methods. First, the greatest objection is that mnemonic studies treat vocabulary items as discrete pairs of translation equivalents and ignore the complex patterns of meaning relationships that characterize a full-fledged lexicon, as opposed to a mere word list. Meara (1980) states that

Learning vocabulary is not just a matter of acquiring translation equivalents, as it is well known that languages rarely map their lexical items onto each other in a one-to-one fashion. Some lexical structuring must go on when even the shortest word list is learned, and any view of vocabulary acquisition which treats the problem as a simple matter of pairing words with their translation equivalents is an oversimplified one, which cannot adequately account for how these semantic relationships are built up in a foreign-language vocabulary. (p. 225)

A second problem, according to Meara, is the rather artificial nature of most experiments. They do not resemble ordinary classroom situation and instruction very much. He suggests that such laboratory-like experiments should be complemented by adequately controlled longitudinal classroom tests, before their findings can be widely accepted.

Third, the fact that the target-language link is required to evoke a native-language equivalent may work reasonably well in the case of recognition vocabulary but might lead to detrimental effect on the pronunciation of target-language words. However, some of the studies referred to in the above seem to indicate that this objection may not be as serious as Meara suggests.

The present writer came to similar conclusions after reading the original articles and before reading Meara's comments. After spending quite some time in trying to think of how the method would work when Finnish students try to learn English vocabulary, he failed to come up with more than a couple of words that sounded roughly similar. It should be remembered that Finnish and English are not related languages and the sound patterns are quite dif-

ferent. Thus it seems that it takes more time to try to find the keywords than learn the link in what is essentially a paired-associate way with whatever meaningfulness can be imposed on the task.

Thus it remains to be seen to what extent and how soon the keyword method and the hook method will be adopted in foreign language teaching and other areas(cf. also Hall, Wilson & Patterson, 1981). The present author would like to see long-term studies carried out in normal classrooms in order to be convinced that the method is transferrable from psychological experiments to workable pedagogical practice, which works over time once the novelty effect is over. The evidence amassed by the researchers for the effectiveness of the mnemonic techniques is such that foreign language educators should seriously and thoroughly try them out in their teaching. It is time to test the methods in the crucible of normal classroom circumstances.

#### Summary

In discussing some central questions of vocabulary learning and teaching, we found that estimates of vocabulary size in L1 have climbed from the extremely low estimates, in the range of a few hundred words at the beginning of the century, to current estimates in the ten and hundred thousand range. We have also found that there are several factors that may cause difficulty in vocabulary learning, and by the same token, may facilitate it. We discussed the question of what kind of vocabulary knowledge students should have at different stages in a language learning course. We further dealt with various approaches to vocabulary teaching and learning and discussed in detail the role of context and the ability to infer and learn word meanings from context. Finally, we gave an account of the use of various



mnemonic techniques in learning L2 vocabulary.

Due to the delimitation of the problem and due to limitations of space, we did not discuss the possibility of using the principles of semantic theory in vocabulary teaching (e.g., Aid, 1974; Eoff & Bull, 1948; Nilsen & Nilsen, 1975; Nilsen, 1976). The interesting possibilities of the semantic field approach (e.g., Cutler, 1972; Hartmann, 1975; Holec, 1974; Jones, 1966; Kuhlwein, 1972) were not explored, either. Similarly, while articles by Bol (1970, 1978), Bunting (1969), Clough (1953), Cohen and Apek (1980), Cohen and Mauffrey (1978), Cornu (1979), Cowan (1974), Daams-Moussault and Blaauw-Holtzappel (1978), Friederici (1983), Gammon (1969), Gray (1940), Greiner (1946), Guilbert (1963), Herbershoff (1975), Holley (1972), Judd (1978), Martin (1976), Melchuk and Zolkovsky (1974), Olhstain (1982), Pearson and Studt (1975), Raasch (1972), Richards (1980), Rosengren (1971), Twaddell (1980), and by Werner and Kaplan (1952) were consulted and found to contain important facts on vocabulary learning and teaching, they were not directly reviewed. Researchers working on vocabulary problems will benefit from consulting them.

We did not, either, touch on the role of dictionaries in vocabulary learning. However, we agree with the views by Gentilhomme (1983), Hill (1948), and Marckwardt (1973) on the potential of dictionaries in vocabulary work.

Finally, although the above review of research on vocabulary learning and teaching has been fairly extensive, the literature on this area is much wider as bibliographies by Dale, Razik and Petty (1973), Meara (1983), Petty, Herold and Stoll (1968), and Takala (1982d) testify. These bibliographies as well as the symposium edited by Hartmann (1983) will be



useful sources for anyone who wishes to start work on the multifaceted domain of vocabulary learning and teaching.

## CHAPTER VI

## VOCABULARY SIZE IN A SECOND/FOREIGN LANGUAGE

Overview

In this chapter we will review earlier studies that have specifically addressed the same research question as is pursued in this investigation: the estimation of students' vocabulary size in a second or foreign language. Review of literature indicated that while there have been quite a number of studies on vocabulary selection and on vocabulary input in textbooks, there have been few studies on what students have actually learned. We will begin with a discussion of how many words students are taught when they learn foreign languages. After that, we will review some psychological studies of vocabulary learning. Finally, we will turn to the more evaluation type of studies, which most closely resemble the present investigation.

Size of Taught Vocabulary in L2 Study

There is no handy reference book that would give statistical information about how many words are taught in different countries. Thus, this review is by necessity limited in scope. It can only claim to be able to illustrate how some countries have solved the question of the size of taught vocabulary.

The Threshold system developed by the Council of Europe (van Ek, 1976) includes 1,200 words, but the Niveau Seuil for the teaching of French contains 6,000 words. Francais Fondamental (1er degre) offers 1,475 words. Mackey (1965) states that foreign language methods in many European countries teach 500 to 1,500 words a year over a period of six years. He further says that of these, a maximum of only one third is typically remembered.

In Finland, before the introduction of the comprehensive school, the commonly used textbooks taught 1,000 - 2,150 words (Black, 1971) during a 4-5-year course in the junior secondary school (age 11-16). In the Netherlands, frequently used introductory textbooks contain about 900 words, more extensive coursebooks about 2,100 - 2,350 words (Sciarone, 1979). In Poland, the number of words taught in a four-year course of English in a secondary school was 2,000 words around 1970 (3-4 lessons a week). In the German Democratic Republic the number of words taught during the first year of Russian was 350 around 1970. Hammerly (1982) recommends that the vocabulary load of the first semester should not be more than 450 words, and can increase to, respectively, about 550, 650, 800, 950, and 1,100 words for a total of about 4,500 words in six semesters.

The Finnish comprehensive school curriculum (1970) recommended that the slowest learners (Set C) should know about 1,000 - 1,500 words after a seven-year course, students of middle verbal ability (Set B) 2,000 - 2,500 words, and the most verbally gifted students (Set A) 2,500 - 3,000 words. Since the targets were not reached, the common core curriculum draft (1976) recommended that all students should know actively at least 1,000 - 1,100 words.

#### Size of Learned Vocabulary in L2

##### Psychological Studies

In an early study, Thorndike (1908) had 22 college seniors and graduate students learn the meanings of 1,200 German words. The students could take their time in learning the word lists, and were tested after they felt that they knew the meanings. Retention was also tested about one month later. Thorndike found that 30 hours of study (plus 8 hours of testing) led to the

command of an average of 1,030 words for three days and to 620 words for 42 days. The loss in a month and a third was less than expected, 40%. The loss seemed to be a twentieth in an hour, a tenth in three days, and between four and five tenths in 40 days. Thus Thorndike concluded that the common inference from Ebbinghaus' figures, that half the effect of memorizing is lost less than an hour and two thirds in a day, does not apply to the memory for paired associates. Thorndike found great variability even within this relatively homogeneous subject sample: 3 to 1 in the amount learned in a hour for short retention; 5 to 1 learned in 30 hours for moderate retention; 4 to 1 learned in 30 hours for long retention, and 5 to 4 in proportion retained from the moderate to the long interval.

Almost 60 years later, Carroll and Burke (1965) carried out a more detailed and controlled study of paired associates learning. They found that high-meaningful materials were learned more efficiently with a faster pace (less than 8 second interval). For medium-meaningful materials, a curvilinear trend was found. Thorndike's earlier estimates were corroborated. Carroll and Burke estimated that if Thorndike's task corresponded to their medium-meaningful tasks, it would have taken their subjects some 60 hours to learn 1,030 words. While this is twice the figure that Thorndike arrived at, it is still considered to be in the same decimal order of magnitude.

If we compute how many words were learned per hour relatively permanently, the figures are 20 for Thorndike's subjects and 10 for Carroll and Burke's subjects.

Crothers and Suppes (1967) carried out sixteen experiments on the learning of Russian as a second language. In each experiment, they investigated one or two variables that they felt might influence the



learning of certain language skills. The aim was to formulate and apply mathematical learning models that would help them to understand the learning processes involved. Vocabulary learning was of the list-learning type, and the authors studied, among other items, the optimal block size. Block sizes of 18, 36, 108, and 216 were used with college students. The proportion correct increased monotonically over the block size. On a 108-item test for the first three groups, the means were, respectively, 100.3, 100.5, and 106.2. The means on a 216-item test for the last two groups were, respectively, 192.1 and 204.2. It was also found that the larger block size was more efficient than the smaller block size on easy items and vice versa on difficult items.

Harlov (1974) studied the possibility of memorizing relatively large doses of vocabulary during foreign language lessons. He studied 6 groups of first-year university students. Each group consisted of 8 students and half of the groups were majoring in a foreign language (German or French), and the other students were non-language majors. The experimental task consisted of memorizing 10, 20, 30, 48, and 60 English words during one lesson. The experimenter read aloud the words, and they were repeated in chorus by the subjects and copied in their own word lists from cards provided to them. The word list was read aloud a second time, and the subjects rehearsed the words on their own.

The learning stage was followed by three control tasks: (1) In the recognition task the subjects were given the studied words which were mixed up with new words (first 10 studied words plus 10 new words, then 20 studied words and 20 new words, etc). The subjects marked those words on the list

that were familiar to them. (2) Russian sentences with embedded target English words were translated into Russian. The meanings of the embedded English words were such that they had not been taught to the subjects. (3) In a recall task the subjects were required to give English translation equivalents to Russian words. Tasks 1 and 3 were repeated after 6 days. The students' capacity for work was also tested by means of the Burdon tables test.

The results indicated that the language majors learned about 55 new words during a lesson, while the non-language majors learned and retained about 35 words. The capacity for vocabulary work did not decrease among language majors in this range of 10 to 60 words, whereas among non-language majors the capacity was clearly deteriorated, if the number of words to be learned during one lesson was around 48 words.

Mikaeljan (1973) conducted a study with 1,469 students in grades 5 through 10 in three Armenian schools. The purpose was to study the effect of instruction in Russian word formation on the growth of students' vocabulary. The percentage of known word meanings was 56% before instruction and 70% after instruction. The percentage of correct word translations rose from 35% to 95% among "good" students, from 25% to 75% among "average" students, and from 10% to 65% among "poor" students. The author concluded that teaching word formation skills for students who have to learn a relatively highly inflected language like Russian helps students to utilize the morphemic clues in words.

Zalevskaya (1967) studied how students perceive new foreign language words with different informational loads. Students' span of immediate memory for words with different informational loads was used as an index of perception of new foreign words. Zalevskaya classified English words into five

groups on the basis of their structural composition and the presence of elements known to students at a given stage of learning. For the purpose of a quantitative representation of the degree of difficulty of words, the informational load of each word was expressed as the sum of the informational loads of word components and of their combination, and calculated in conditional units of information. Zalevskaya (1967) found a clear decline in the percentage of immediate recall for new English words in relation to increased informational load. The differences were statistically significant at the level of  $p < 0.01$ . Thus the hypothesis was confirmed that the degree of difficulty of new vocabulary material for students is determined to a significant extent by their previous knowledge and must be defined with reference to known word elements. It is on the basis of known elements that the logical processing of material takes place and increase in known elements leads to reduction in informational load and to an increase in memory span. An order effect was also observed in that students remembered better the words at the beginning and end of word lists than those that occurred in the middle of the lists. It was also found that when two lists belonging to the same informational load category were presented, students understood faster the words in the list where words were thematically related than the words in the other list where they were not semantically related. However, the results were reversed when meanings had to be related to English words (cf. van Parren's concept of "klontering").

Trusina (1975) demonstrated for foreign college students, and Adjarova and Savelyeva (1972) for early graders that it is possible to teach even young school children means that are characteristic of linguistic analysis.



This was shown by the fact that children were able to find independently some linguistic characteristics in new linguistic material. It was also shown that young children can develop new cognitive skills that were often considered to be feasible only in later grades. It was further observed that such theoretical knowledge about language had a positive effect on students composition writing and communicative tasks.

Holley and King (1971) studied the effect of various types of vocabulary glosses on vocabulary learning and reading comprehension. A total of 110 third-semester students of German participated in the study. The results did not indicate any superiority by any type of gloss, but the main interest for the present purposes is in the authors' subsidiary finding: when students were presented with a text containing 50 new words, their performance on a vocabulary test was on the order of 30, while students who had read a text containing only 25 new words had learned only about 19 words. The difference is statistically significant ( $F, 1/104 = 192,5, p < .001$ ). Thus, clearly providing 25 new words in a text was not optimal for this group of students, who had 20 minutes to read the texts.

The most amazing results concerning vocabulary learning have been obtained by the Bulgarian psychiatrist Lozanov. He (Lozanov, 1978) has developed a theory of suggestology and worked out a pedagogical application of it called suggestopedy or suggestopedia. Lozanov claims that human beings resist external influences (including instruction) through three kinds of barriers: (1) the critical logical barrier rejects everything that does not give the impression of well-intended logical motivation, (2) the intuitive-affective antisuggestive barrier rejects everything that does not create a sense of self-confidence and security, (3) the ethical barrier contravenes



suggestions which are contrary to a person's ethical principles. By a process of suggestion and de-suggestion, Lozanov has demonstrated surprising memory feats (hypermnnesia) in FL learning. Adult students were able to remember about 92% of 100 words presented on one session, and similarly 97% of 100-200 words, 93% of 200-400 words, 90% of 400-600 words, and about 96% of 1000-2000 words. The data are based on 896 suggestopedic sessions.

While the figures are mind-boggling and invite scepticism, the present author has personally heard and seen Dr Lozanov lecture and demonstrate his method, and the contrast to regular classroom atmosphere was dramatic. Perhaps, in an area like vocabulary learning, the most efficient way is through a relaxed and pleasurable incidental activity rather than conscious vocabulary work.

#### Evaluation Studies

Netherlands. Bongers (1947) used Palmer's 3000-word list to estimate the size of students' English vocabulary at the time of their matriculation. During 1941 through 1943, he tested students in the upper grades of three secondary schools. Each student was given the whole list and their knowledge for each word was noted. The results indicated that students knew about 2,500 to 2,800 words. Bongers suggests that 3,000 words could be taken as a suitable number for a secondary school vocabulary.

Finland. The most detailed Finnish study on vocabulary learning in foreign languages was conducted by Pesonen (1968) in 1966-1967 while he was school psychologist in an urban secondary school in Rovaniemi (capital of the province of Lapland). The school had become a full-fledged senior secondary school in 1965. This means that it had grades from 1 through 8 (ages 11-19)

and the first age group participated in the external matriculation examination in the spring of 1965. At the beginning of the school year 1965-1966 the number of students was 807. There were 22 classes and 37 teachers. Thus there were 2-3 parallel classes in each grade level. The frequency of grade repetition was close to national average: 12.7% of all students in spring 1965, 6.4% in 1966, and 8.5% in 1967. Of the nine foreign language teachers seven were formally qualified. They were relatively new to the profession: the number of their in-service years was 0-6 years.

Pesonen first tried to establish what was the greatest cause for failure in L2 tests. Since the grading system was based on the computing of errors in translation tests, he first classified errors. The results of error classification are presented in Table 9.

The results of the experiment showed that vocabulary errors made the greatest contribution to the total number of error points in all foreign languages and in all classes: 78% in English, 75% in Swedish, and 54% in German. The proportion of vocabulary error points varied between 54% and 85% in seven studied classes in English, between 43 and 91% in four Swedish classes studied, and between 41 and 64% in four German classes studied. The number of analyzed papers was about 40 for each class and they were randomly chosen from among three last test sessions. The greatest relative source of vocabulary errors was wrong or missing word (39% of all error points in Swedish, 47% in English, and 48% in German).

Table 9

Proportion of Different Error Types in Three Foreign Languages,  
Spring 1965 (Source: Pesonen, 1968)

Error category	Language	Grade level								Md	Md%
		2	3	4	5	6	7	8			
Word	Swe	91			43	56	85			71	75
	Eng	85	69	54	77	77	77	77		77	78
	Ger		41		46			64	62	54	54
Verb (mood, infinitive, voice, person)	Swe	0			4	7	0			2	2
	Eng	0	0	13	16	5	6	1		5	5
	Ger		9		6			7	3	7	7
Verb (number)	Swe	0			0	1	0			0	0
	Eng	7	19	9	3	4	2	2		4	4
	Ger		0		0			0	0	0	0
Verb (participial)	Swe	0			0	7	2			1	1
Nominals (inflections)	Swe	9			20	14	4			11	12
	Eng	0	0	0	1	1	7	4		1	1
	Ger		16		19			12	16	16	16
Word order	Swe	0			32	12	3			8	8
	Eng	4	2	16	2	3	1	4		3	3
	Ger		17		9			4	7	8	8
Article	Eng	4	8	6	1	5	3	7		5	5
	Ger		5		6			3	0	4	4
Other	Swe	0			1	3	4			2	2
	Eng	0	3	2	0	5	4	4		3	3
	Ger		12		14			10	12	12	12
Total	Swe	100			100	100	98			(95)	100
	Eng	100	101	100	100	100	100	99		(98)	99
	Ger		100					100	100	(101)	101

The average proportion of learned words out of all taught words was 54% in English, which was also very close to the average proportion of words known of day-to-day vocabulary assignments. The average mastery of basic German vocabulary in grades 3-9 was 55%. The mastery of vocabulary had a

significant correlation with the mark in the school report ( about .65 on the average).

After establishing that vocabulary errors had by far the greatest influence on students' success in foreign languages (as they were currently taught and as the success in them was evaluated), Pesonen (1968) - in many ways antedating both the rationale and methodology of mastery learning - proceeded to study (1) the ratio of learned vocabulary to taught vocabulary, by grade level, (2) to try to reduce failure through massive review work in vocabulary and to evaluate the outcome of the "treatment", (3) to study the relationship between the level of vocabulary knowledge and the school report marks (i.e., institutionally important consequences of the treatment), and (4) to map the curricular and methodological reasons for the great share of foreign languages in grade repetition and school drop out rates. Most of the studies were done using English as the target language.

Using school records, the vocabulary taught in different grade levels (sometimes going back as long as 6 years) was identified. Using systematic sampling, a sample of 50 words was drawn from the total vocabulary population of the respective grade level. These words were presented to students such that they had to give the English equivalents of Finnish stimulus words. It usually took 12-15 minutes to complete a 50 item test. The pretests were carried out without notifying students of them in advance.

After the pretesting was over, an intensive program of vocabulary teaching and review was initiated. Creating and maintaining a motivational basis for the activity was considered very important. Support for it was solicited from students, teachers, and parents. The purpose was to increase the motiva-



tional level so high that students would voluntarily consent to actively participate in vocabulary review. The program is briefly described below.

Students, their parents, etc. were informed of the project and their cooperation was enlisted. Motivation was enhanced through competitions, announcement of the names of those students who had made the perfect score, etc. Written quizzes acted as concrete intermediate goals. The time and objective of each quiz was determined about 2-3 weeks before it was held. Both students and parents were informed of the date and of the results of the quizzes. Those who scored 80% or lower were given a chance and motivated to participate in a make-up quizz.

The scope of vocabulary review varied from one to two grade levels at one time, i.e., the total vocabulary of one or two previous grades was reviewed and tested at one time. This means that the number of words covered at one time was 700-1,500 words, and 10 - 20 days was reserved for doing this at home. Usually the teachers and classes easily reached an agreement on the date of quizzes and students' motivation remained high. The vocabulary was tested in the chronological order from grade 2 to grade 5.

Intensive vocabulary review in English raised the average proportion of learned vocabulary from 54% to 71%. This 17 percentage point increase means a dramatic 31% improvement in the level of learned vocabulary. The effect of increased emphasis on vocabulary learning was also seen in school grades. In a 7-point grading system, the average grade rose by about one grade point, and the modal grade changed from a failing grade to a middle grade.

The match between taught and learned vocabulary is shown in Table 10. It shows that the amount of taught vocabulary rose almost linearly as the function of the grade level.

Table 10

Number of Taught and Learned Vocabulary and their Mutual Relationship  
in Different Grade Levels

Object of measurement	Grade level			
	2	3	4	5
Taught vocabulary	686	800	798	876
Cumulative taught vocabulary	686	1,486	2,284	3,160
Learned vocabulary	394	440	416	351
Cumulative learned vocabulary	394	834	1,250	1,601
Ratio of learned to taught vocabulary (%) per grade	57.5	55.0	52.1	40,0
Ratio of learned to taught vocabulary (%), cumulative	57.5	56.1	54.7	50.7

The author concluded that the level of requirements in vocabulary learning in the junior secondary grades was clearly out of gear with the level of actual learning: the former increased by 113% from grade 2 to 5 while the latter increased only by 31% in spite of student selection due to grade repetition.

A colleague of the present author, Kärkkäinen (1983) has recently reported her findings on students' knowledge of Swedish vocabulary (L2) in the Finnish comprehensive school. Her study was planned and executed parallel to the present investigation as part of the First National Assessment of Teaching in the Comprehensive School.

Kärkkäinen (1983) took a representative sample of 1861 students (aged 13-16, grades 7 through 9) and rotated 310 multiple choice items among the students. She found that the average size of students' passive vocabulary was

1,380 words, with girls doing better than boys (1,508 vs. 1,205 words, respectively). Students in the advanced set (stream) had learned almost twice the number of words than students in the basic set (1,589 vs. 867, respectively). These results were obtained after three years of studying Swedish with a total of some 225 clock contact hours. Students also had four years of experience in learning another Indo-European language, English, before they started learning Swedish, and the two languages were studied side by side during the last three grades of the comprehensive school.

Sweden. A study which is related to the present investigation and which served as one main source of interest in carrying it out was conducted by von Mentzer (1968) in Sweden. He carried out a set of studies in an effort to operationalize the Swedish national curriculum for English into a system that would make it possible to produce teaching materials and methods based on empirical studies and on best subject matter expertise. Thus the study was an example of a project that followed procedures developed within the instructional technology movement. It was carried out at the Teachers College in Stockholm during the latter half of the 1960's. The project was called UME (Undervisningsmetodik i engelska; "Teaching methodology for English").

The Swedish comprehensive school curriculum (Lgr 1969) stated that students are to be taught "a limited amount of essential vocabulary". von Mentzer inferred that the term "limited" was meant to convey that the amount of taught vocabulary should be sensibly related to students' capacity for vocabulary learning. von Mentzer concluded that the only feasible way to estimate the capacity to learn vocabulary is to measure the size of actually acquired vocabulary. It can be argued that students may not have been learn-



ing vocabulary under optimal conditions. This is logically true but the method does provide an estimate of what can typically be learned under current, admittedly less than optimal, circumstances. The method also provides an estimate of typical variation in the ability to learn foreign language vocabulary. This is based on the assumption that the circumstances are equally favorable for all students. Even this assumption may be partly unwarranted, but in the absence of better criteria, von Mentzer concluded that the use of actual performance is the best estimate of potential performance.

von Mentzer defined the word population, not on the basis of dictionaries or word lists, but based on the following considerations:

1. Students can know only those words that they have encountered some time.
2. Students meet English words mainly during English lessons in school.
3. The vocabulary of the English lessons in schools is largely identical with that of English textbooks.

As von Mentzer points out, the first assumption does not apply to real cognate words but he also mentions that it takes account of false (deceptive) cognates. As regards the second assumption, von Mentzer notes that students may meet some English words through pop culture and TV. He regards the third assumption as less daring than it may sound. There is said to be a considerable amount of independent evidence that suggests that teachers do not utilize material other than textbooks to teach students central English vocabulary.

The definition of the central, limited stock of English vocabulary was based on the interpretation by the authors of current English textbooks for



grade 7, and this was checked against the Faucett & Maki frequency list (1934) and the word list prepared by the distinguished Swedish expert on foreign language teaching, Mr. Birger Thoren ("8000 Words for Eight Years of English"). A modified lexical principle was employed in the definition and counting of words:

- 1) As a word were counted uninflected basic forms of nouns, verbs, adjectives, and adverbs, as well as prepositions, pronouns, and numerals.
- 2) Proper names were not counted as words. Geographical names were, however, entered in a separate list.
- 3) Homonyms were registered as separate entries only if the basic meanings were radically different.
- 4) Compound words were counted as separate words (e.g., apple-pie), except in the case of strongly established combinations.

Through careful estimation procedures, von Mentzer arrived at a pool of 3,303 words to represent the vocabulary taught to students in the Swedish comprehensive school by the end of grade 7 (after 5 years of English with a total of some 350 lessons). Two random samples, each consisting of 33 words (1% sample), were taken. One sample was designed to test students' active English vocabulary using a contextualized fill-in type task: e.g.,

" You and I are happy, aren't we?"

" He and she are happy, aren't \_\_\_\_\_?"

The passive vocabulary was tested with a multiple-choice test format with the alternatives in Swedish: e.g.,

The capital of Sweden is

- Stockholm
- 7,5 millioner
- Gustav VI Adolf
- Skane
- I genomsnitt 8000 kronor (8000 crowns on average)

Random samples of students were tested both at the beginning and end of grade 7. The results are summarized in Table 11.

Table 11

Average Size of Students' Active and Passive Vocabulary in English in Grade 7 in the Swedish Comprehensive School (Source: von Menzer, 1968)

Type of vocabulary	Fall 1967			Spring 1967		
	Mean	SD	N	Mean	SD	N
Active vocabulary	455	326	637	641	374	592
Passive vocabulary	1,596	553	606	1,957	598	576

There was a clear increase in students' vocabulary knowledge during the school year from 455 to 641 active words, and from 1,596 to 1,957 passive words. Another conclusion is that there was great variability in students' vocabulary knowledge. The large student sample and the 1% random sample (with 35 items) resulted in rather accurate estimations of the passive and active vocabulary sizes. The 95% confidence interval for the means varied between 50 and 100 words. The passive vocabulary was 3.5 times larger in the fall measurement and 3 times larger in the following spring measurement.

To summarize, we have established that in learning a second language in a school setting, students are usually taught a few hundred words a year, and the number of weekly lessons varies from 2 to 5-6. This means that only a few

hundred contact hours are available for learning a second language.

We found that there have been both psychological and educational studies of vocabulary learning. Psychological studies showed that it is possible to enhance students' vocabulary learning beyond the typical 5 to 10 words learned during a lesson. This was possible through conscious learning and through metalinguistic knowlegde, but there are some indications that a relaxed suggestopedic environment may lead to even better vocabulary learning.