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LEXICAL UNITS AND THE LEARNING OF FOREIGN LANGUAGE VOCABULARY

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In this paper the concept of "lexical unit" as proposed by Cruse (1986) is introduced in the context of L2 vocabulary learning to replace the rather vague notion of "word." In the first part of the paper, this concept is defined in terms of lexical semantics and then applied to the L2 learning task. The second part describes two experimental studies in which the learning of different types of lexical units is examined. In the first study, totally new lexical units are compared with multiword items that are made up of familiar forms. In the second experiment, different types of new senses of familiar forms are compared. Both studies underscore the importance of knowledge of form—but not of previously learned meaning—for the learning of new meanings for familiar forms.

Although researchers and language teachers are becoming more and more convinced that vocabulary knowledge constitutes an essential part of competence in a second or foreign language, no comprehensive theories have been proposed up to now that try to explain foreign language growth in terms of lexical development. Nor is vocabulary explicitly catered to in existing foreign-language learning theories. Henriksen (1999) called for more standardization and clarity in the description of the processes that play a central role in the acquisition of lexical knowledge in a foreign language. Currently, however, what can be found are very interesting and promising (but nevertheless scattered) pieces of research on specific points. It is not easy to find much common ground in work done by Kroll and Sholl (1992) on the development of

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lexical knowledge in beginning learners, by Ijaz (1986) on the semantic equivalence hypothesis, by Giacobbe (1994) on the construction of lexical forms, or by Landauer and Dumais (1997) on the latent semantic analysis of words, to mention only a few recent approaches.

Most researchers in this field take as axiomatic the idea that vocabulary acquisition is essentially a matter of learning new words. In a study on vocabulary learning from different types of oral input, Ellis (1995, p. 413), for instance, selected 18 items out of a list of 65 words that were entirely unknown to his participants. Likewise, Hulstijn, Hollander, and Greidanus (1996) selected 16 low-frequency words from a reading passage that were "estimated to be unfamiliar to most first-year students" (p. 329). In a study on the keyword method, Van Hell and Candia Mahn (1997) used Spanish words with learners who did not know any Spanish, whereas Ellis and He (1999) selected the "10 items least known by the subjects" (p. 289) out of a list of 50. The aim in all of these studies was to investigate the acquisition of lexical elements whose form and meaning were unknown before some form of pedagogical treatment that the researchers hoped would lead learners to learn those elements.

Two remarks may be made about this type of study. First, one should not forget that, although for methodological reasons it may be advisable to use words that are entirely new to the participants, vocabulary acquisition may also include the learning of new meanings for well-known words or for combinations of well-known words—that is, meanings that are not predictable on the basis of the already known meanings. Second, there seem to be contrasting views as to what counts as an unknown word. In the Hulstijn et al. (1996) study, all words were one-word items whose form and meaning were assumed to be unknown, whereas the Ellis (1995) list included a number of compound words like *scouring pad*, *pot holder*, and *dishwashing liquid*, parts of which were probably known to the participants before the experiment.

According to some researchers, on the other hand, many words are assumed to be known without the learner ever having seen them. In the Lexical Frequency Profile (Laufer & Nation, 1995), for instance, a word is defined as "a base form with its inflected and derived forms, i.e., a word family" (p. 312). This means that, at a given level of proficiency, *happy*, *unhappy*, and *happiness* are counted as one item. As far as reading is concerned, Bauer and Nation (1993) felt that all the inflected and derived forms of a given base word "can be understood by a learner without having to learn each form separately" (p. 253). This would imply that L2 readers who know the form *level* would have no problems in interpreting phrases like (1a–h).

(1) a. *a high level of radiation*
b. *on a level with*
c. *a level teaspoon*
d. *have a level head*
e. *to level a part of the town*
f. *death is a leveler*

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g. *a leveling staff*
h. *an unlevel surface*

Unfortunately, no experimental evidence is offered to confirm this idea, and many language teachers will have their doubts as to their learners' understanding of each of these forms. The problem is that it is not sufficiently clear what is meant by a word family or, more specifically, by a base word (Bauer & Nation, 1993) or base form (Laufer & Nation, 1995). Do *graceless* and *gracious* belong to the same family because they both have something in common with the word *grace* (see Bogaards, 2000)? And is there one common ancestor for *sauceboat*, *saucebox*, *saucepan*, and *saucy*? That would mean that all people called Smith belong to one big family. This seems especially to be the case with Laufer and Nation's Lexical Frequency Profile, in which the computer recognized forms but was unable to discriminate between different families having the same name. This criticism does not hold as well for the word family as defined by Nagy and Anderson (1984). These authors tried to take semantic differences into account, not only at the level of the transparency of relationships between base words and their derived or inflected forms, but also in counting more than one sense for polysemous words. But even then, for those who have to learn the language, word families may be less clear-cut than for those who are fluent speakers. Why does *adder* not belong to the *add* family, whereas *add up* does but is only seldom mentioned as such? It seems, then, that once a form is known, this does not necessarily imply knowledge of all of its senses, let alone knowledge of all of its family relationships and members.

As is well known, the notion of "word" is not very clear, and the difference between total ignorance and partial or full knowledge of a word is not always straightforward. Words come in many shapes and can be classified in very different ways; they fulfill quite varied functions and play distinct roles. In the history of linguistics very many definitions have been proposed, and in many cases, especially in applied linguistics, no definition of the concept is given at all.

I argue in this article that (applied) linguistics should assign a far less central place to this whimsical notion of "word" than has been done up to now. In the first part, I follow Cruse (1986), who replaced the notion of "word" with the concept of "lexical unit," and I present arguments for doing the same in the study of lexical acquisition in a second or foreign language. In the second part, I report on two experimental studies in which Dutch learners of French had to learn different types of lexical units. The aim of the experiments is to study in more detail the learning of different meanings for known forms.

THE NOTION OF "LEXICAL UNIT"

Consider the sentences in (2a–e), in which the word *party* takes on very different meanings. If this word is to be considered a unit of any kind, it will be difficult to find its unity on the semantic level.

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(2) a. *Our neighbors are throwing a party tonight.*
b. *They were very grateful to the rescue party.*
c. *The Conservative Party has lost many votes.*
d. *The lawyer refuted the arguments of the other party.*
e. *Your party is on the line.*

Although some of these senses may be viewed as having the same root diachronically, for the modern speaker of English, and even more so for the learner of English as a foreign language, the senses illustrated in the above sentences are quite different. Nevertheless, some semanticists have argued in favor of the essentially monosemic meaning of words. Ruhl (1989), for instance, tried to reduce to one basic meaning all the multiple senses of a verb like *bear*, which, according to Bolinger (1976), "is a veritable jungle of idioms and collocational restrictions with no heart to pump blood through it but with peripheral organs that manage to keep functioning anyway" (p. 9). Ruhl made a good stand against the lexicographic tradition that can be found in many dictionaries, according to which some very frequent words may have up to several dozen different senses. He showed convincingly that many of these senses are nothing more than pragmatic specializations or modulations, though he acknowledged that "the unified sense [of a word] is too abstract, inexpressible, and practically (i.e., consciously) useless" (p. 173). In the same vein, Picoche (1986) tried to find what she called *signifiés de puissance* by reasoning on the different senses of polysemous words, but she also ended up with very wide and vague descriptions of the deeper meaning of words (see also Bogaards, 1994, pp. 14–19).

In contrast to content words like *party*, which have extremely rich meaning potential, there are words that have no or hardly any denotative meaning. To start with, consider function words like articles and pronouns, and words like *to*, *do*, or *take* in (3a–c) that have only grammatical meaning.

(3) a. *I'll be glad to help you.*
b. *Please, do come in.*
c. *He suddenly took a spill.*

Another category of words has only pragmatic meaning, such as *hi!* or *thanks!* (see Nattinger & DeCarrico, 1992). Then there is the well-known problem of *hot dog* or *take off*, where two words have to be taken together to get at the intended meaning. Finally, for other words it is difficult to ascertain any independent meaning component—for example, French *fur* or Dutch *lurven*, which only exist in set phrases like *au fur et à mesure* "as one goes along" or "according to one's needs" and *iemand bij zijn lurven pakken* "grab someone by the scruff of the neck."

The only reason to lump together all these semantically disparate elements in the category of words seems to be the fact that they constitute groups of letters between two blanks. This is the concept of "word" that used to be adopted in lexical frequency studies (see Juilland & Roceric, 1972) and that

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continues to be used in text-processing environments. One can only wonder why this superficial, formal characteristic of word keeps so many linguists under its spell and makes them take many pains to disclose their hidden meanings. At any rate, the adoption of word as a necessary linguistic category seems to entail more disadvantages than benefits. Taking words as having equal status in some particular respect obscures many relevant oppositions and relationships at all linguistic levels (see Bogaards, 1994).

This is also true in a foreign-language learning context, where a more functionally differentiated unit is needed to describe the task of the learner more precisely and evaluate learning progress in more detail. Because words are always used in a particular context and, therefore, in a particular sense or use, learners are confronted with them bit by bit, and they have to acquire them bit by bit as well (see, e.g., Schmitt, 1998). They learn a first sense here, something about its use there, and another sense somewhere else. Learning the five senses of *party* as given in (2a–e) will take several distinct learning steps for nonnative speakers, as it probably does for children learning their mother tongue. Moreover, it stands to reason that if a word like *party* is supposed to have one basic meaning, then learners can only discover this meaning after having understood most, if not all, of the contextual senses. So, knowing a word in the regular sense of this expression, and hence also knowing the abstract and inexpressible meaning of a polysemous word, can only be the result of a process. This process necessarily includes a number of successive steps: The learner will first have to learn several particular contextual uses of a word before there can be any knowledge of the word as a whole. The researcher will have to take these preliminary steps into account, and this process will not be correctly described if "word" is the only notion used.

As a useful candidate for this more functionally differentiated lexical element, I would like to put forward the term "lexical unit," introduced by Cruse (1986, p. 24) (see [4]).

(4) Lexical units are the smallest parts that satisfy the following two criteria:
  a. A lexical unit must be at least one semantic constituent.
  b. A lexical unit must be at least one word.

A semantic constituent is a part of a whole (word, phrase, or sentence) that contributes in an independent way to the overall meaning of that whole. This means that *John* and *sleeps* in *John sleeps* as well as the prefix *dis-* in *disobey* are semantic constituents. However *dis-* is not a lexical unit because it is not a word (see criterion [4b]). In a sentence like *Arthur pulled a fast one*, the verb form *pulled* is not a lexical unit because, although it is a word, it is not a semantic constituent (see criterion [4a]).

A word is defined by Cruse (1986), on the one hand, as "the smallest element of a sentence which has positional mobility—that is, the smallest that can be moved without destroying the grammaticality of the sentence (ignoring any semantic effects)"; on the other hand, he defined words as "the largest

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units which resist 'interruption' by the insertion of new material between their constituent parts" (pp. 35–36). The two principles are illustrated by sentences like *John saw Bill* versus *Bill saw John*, and *His (great) coolness (in the face of the danger) was (quite) unbelievable*, in which new material can be added at various places but not inside the units *coolness* or *unbelievable*. (Cruse adds that this definition may not apply in the same manner to highly agglutinative languages like Turkish.)

Lexical units may be words, but this is only the case with monosemic words like *necessarily*, *hotpot*, or *ruche*. As a quick look in the dictionary will confirm, the number of strictly monosemic words (i.e., lexical elements having the form of one single word and having only one single sense) is rather low. Most words are polysemous and therefore cover more than one lexical unit: *Party* covers at least five lexical units (see [2]). In many cases, a lexical unit is also made up of several words: *Pull a fast one*, *hot dog*, and *flag day* are lexical units; *take off*, because of its polysemy, covers several lexical units.

A lexical unit is "the union of a lexical form and a single sense" (Cruse, 1986, p. 77). As to the form, this means that it is more than just a group of letters. A lexical form is a form that is lexically defined (i.e., a form about which at least some of the syntactic and morphological properties are known). A form like *record* remains only a group of letters as long as nothing more is known about it; we would not even know the correct pronunciation. This form becomes a lexical form as soon as it becomes clear whether it can be combined with pronouns like *you* or *we*, or whether it can be combined with *the* and can have an *-s* at the end to mark plurality. Because of specific syntactic and morphological possibilities and restrictions, (*the*) *bear* and (*to*) *bear*, as well as (*to*) *walk* and (*a*) *walk*, are different lexical forms.

As to the meaning side, there should be a "single sense"; the problem now is to find a way to define this notion. Are the uses of *book* in (5a–c) or *car* in (6a,b) to be considered as single senses and, as a consequence, different lexical units for *book* and *car* distinguished?

(5) a. *This book can be found in all bookstores.*
    b. *This book is well-thumbed.*
    c. *This book is not very exciting.* (see Kleiber, 1989)
(6) a. *The car needs to be serviced.*
    b. *The car needs to be washed.* (see Cruse, 1986)

It is clear that the meaning of *book* refers to a class of objects in (5a) but to one particular copy in (5b), to a concrete object in (5a,b) but to the abstract content in (5c). It is clear that the part of the *car* in (6a) that needs to be serviced is the engine, not the body, which is the case for the part that has to be washed in (6b). However, these uses can be considered as contextual, pragmatic specializations or modulations of one lexical unit, as the examples in (7) demonstrate (see also Nagy, 1997, p. 66–68).

(7) a. *Although this book is not very exciting, it can be found in all bookstores.*
    b. *This book is more exciting than the well-thumbed one.*
    c. *The car needs to be serviced and washed.*

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These types of sentences are impossible when different lexical units are involved, as we find in (8).

(8) a. ?*Our neighbors' party was more fun than the conservative one.*
b. ?*They were grateful to the rescue party as well as to the one on the line.*

In other words, the contextual uses of a given lexical unit can be referred to with pronouns and can be coordinated; for different lexical units this is not possible.

Moreover, lexical units have their own semantic, collocational, syntactic, and morphological relationships. To give only a few examples: *side* is a synonym of a *party* in court, not of a political *party*; rescue *party* is a hyponym of *team*, whereas my neighbors' *party* is not; my neighbors can *throw a party*, conservatives can *found a party*, the police can *form a party*; people who are *impartial* are not those who never go to *parties* but those who do not take sides in a conflict between *parties*.

Although it does not solve all problems in lexicology or in applied linguistics, the lexical unit as discussed by Cruse (1986) emerges as a far less capricious and much clearer linguistic element than word. It has a well-determined form that has its own set of properties and a clear meaning that is part of a specific semantic network. The notion of "lexical unit" can also be better used than "word" to describe the processes of vocabulary learning in a second or foreign language.

The task that the foreign language learner faces at the lexical level is far more complicated than is often supposed. It is not just "learning words" in the sense that new meanings have to be attached to new forms. There is far more to it. Speaking about children acquiring their native language, Aitchison (1994) distinguished three different but related tasks, the first of which—the labeling task—consists of attaching a label to a particular object. Next comes the packaging task, where the child has to learn the exact extension of the meaning relationship (i.e., what category of objects can be named by a particular word). The third task is network building, which means that words have to be fitted together in a semantic network. All these aspects are also relevant for the foreign language learner (Verhallen & Schoonen, 1998).

In a more precise way, and taking into account the concept of "lexical unit," it can be said that the learning of foreign vocabulary always implies one or more of the following:

1. Learning an unknown form and a new meaning; this lexical unit may have a unique form—that is to say, it may be monosemic and have no homophones or homographs (e.g., *ruche*), or it may be the first lexical unit of a group sharing the same form (e.g., one particular sense of *party*); the meaning may correspond to a familiar concept or may need the formation of a new concept or of an unfamiliar combination of concepts.
2. Learning a new meaning for an already known form—that is to say, learning a subsequent lexical unit covered by a form to which one or more meanings have already been attached (e.g., another sense of *party*).

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3. Learning a new meaning for a combination of already known forms—that is to say, learning compounds and idiomatic expressions like *hot dog* or *pull a fast one*.
4. Learning semantic relations between lexical units in terms of synonymy, antonymy, hyponymy, meronymy, and so forth (see Cruse, 1986).
5. Learning morphological relations between lexical units—for example, learning that *gracefulness* is related to the lexical unit *grace* in the sense of *charm*, not in that of *mercy*.
6. Learning correct uses of lexical units at the level of grammar.
7. Learning the usual collocations.
8. Learning the appropriate use at the levels of pragmatics and discourse.

Because one single encounter with a lexical unit will seldom be sufficient to result in full learning (Nation, 1990; Schmitt & Meara, 1997), all of these varied pieces of lexical knowledge have to be consolidated over time, and the knowledge of a particular lexical unit will thus almost always be at various intermediate stages between total ignorance and full knowledge. Moreover, this full knowledge will mean many different things according to the kind of lexical unit involved. From a different point of view, any knowledge there is may be characterized as being more or less easily retrievable for receptive or productive tasks (Henriksen, 1999), in helpful contexts or outside of them. To cope with gaps in knowledge, the learner will also have to develop strategies that can help him or her out in difficult situations.

Because there are so many lexical units in a language, many more than there are words, and because so many aspects have to be learned about each lexical unit, one can only be impressed by the high levels of competence many foreign language learners attain. This tremendous performance deserves more detailed attention than it has been given up to now.

THE LEARNING OF DIFFERENT TYPES OF LEXICAL UNITS

In the list of aspects of vocabulary learning given in 1–8 above, points 2 and 3 are about the learning of new meanings for known forms. As I have argued there, knowledge of different meanings for one single form or for combinations of known forms cannot be taken for granted but will have to be acquired bit by bit. Point 2 relates to polysemous words, whereas point 3 involves compounds and idioms. These two aspects are addressed in the two experiments described in the following sections. In both experiments I set out to study the extent to which knowledge of form could be considered helpful—or indeed a hindrance—in the acquisition of new lexical units. In both experiments I consider the learning of a first meaning for a totally unknown form as the bottom line case of L2 vocabulary learning and then contrast it with cases where a new meaning has to be attached to forms that are already known by the learners.

First Experiment: Learning Idioms Made Up of Known Words

The aim of the first experiment is to compare the learning of two types of lexical units of French as a foreign language by native speakers of Dutch. The

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type of lexical unit I am interested in can be exemplified by expressions like *du jour au lendemain* (literally "from the day to the next") or *faire la tête* (literally "make the head"). In both cases intermediate learners will immediately recognize the forms of these expressions because they are made up of very frequent French words. However, these learners will not be able to figure out what they mean simply by taking the meanings they know as a starting point. Indeed, the first expression can be translated as "unexpectedly," the second one as "to sulk." These multiword expressions were paired with single-word expressions whose forms were unknown to the learners, such as *inopinément* and *bouder*, which have the same meanings as the multiword expressions *du jour au lendemain* and *faire la tête*, respectively.

The question I want to investigate is: Does knowledge of the form help, or possibly hinder, the learning of multiword lexical units? Or will there be no difference between the learning of a totally new lexical unit (i.e., a unit whose meaning and form are both unknown to the learner) and the learning of a unit that has a familiar form but an unknown meaning? Both positions can be argued for. If learners are confronted with a totally new lexical unit like *inopinément*, they have to learn the form and the meaning. If they come across a multiword lexical unit like *du jour au lendemain*, which is made up of well-known elements, they have to learn the meaning in the first place, but they have to pay attention to aspects of form as well: the order of the words used, the use of prepositions, and so on. Additionally, the fact that a meaning has already been attached to each of the forms used may interfere with the learning of the meaning of the expression as a whole. In this experiment I investigate this question, taking the null hypothesis as my starting point.

Participants. The participants were 44 students from two fourth-year classes of the preuniversity section (vwo) of a Dutch secondary school. They had had French classes from the first year onward. All were native speakers of Dutch and were approximately 15 years old.

Materials. A selection was made of 28 French pairs of single words and multiword expressions with the same meaning—for example, *infailliblement/à coup sûr* "inevitably," *tabasser/casser la figure* "to beat up," and *dragueur/homme à femmes* "womanizer." Six pairs had adverbial status, 14 were verbs or verb phrases, and 8 were nouns or noun phrases (see Appendix A). The form and meaning of all single words were unknown to the participants; all words making up the multiword expressions were known to them, but they were not familiar with the complete expressions. To make sure that none of the unknown elements was known and none of the supposedly known elements was unknown to the participants, we analyzed the manuals that were used in the school. In case of any doubt, we asked their teachers. Thus, in all cases the items to be learned were semantically new lexical units; in the case of the single words both the meaning and form were new, whereas in the case of the multiword expressions only the forms were familiar.

The words making up the expressions are among the 1,000 most frequently

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used in French (Gougenheim, Michéa, Rivenc, & Sauvageot, 1967) and figure in many expressions. For the word *jour*, for instance, there are some 20 expressions with quite different and unexpected meanings. That is why several expressions were selected for some of these words. For instance, the materials included three expressions containing the word *coup*, four containing the word *casser*, and so forth. The single words, which had to have completely unfamiliar forms, were rather infrequent elements of the language that sometimes belonged to a more informal register. All items corresponded to concepts that were well known to the participants. All cognates were excluded from the materials selected.

All lexical units were inserted in contexts that were one sentence long (see examples in Appendix B). These contexts were the same for a given single word and for the corresponding multiword expression. Two parallel versions (A and B) of the materials were prepared. The items were in the same random order in both versions. Full Dutch translations of the French sentences were prepared and placed to the right of the French sentences.

The materials to be used were checked for their potential transparency. I wanted to know to what extent the words that made up the expressions could give hints about their meanings, or to what extent the single words were recognizable because of known morphological elements. To establish the transparency of both the multiword expressions and the single words, I presented 75 learners from the same type of school and level as those participating in the current experiment with the French sentences and partial translations in Dutch. These learners were asked to complete the partial translations by giving what they considered to be suitable Dutch equivalents of the 28 target items. The results indicated that no items were correctly translated by more than 5% of the participants. In a *t*-test comparing the scores for the single words and the multiword expressions, a nonsignificant value of .336 ($df = 54$, $t = .37$) obtained. This means that even if some single words and some multiword expressions may have been transparent to some participants, there seems to be no clear difference in favor of one of the two categories. It should be noted that the correct translations given by the participants during this pretest were not necessarily based on what was understood of the French target items; the participants might have profited from information in the partial Dutch translations as well.

Tests. Two tests were prepared to measure the vocabulary learning outcomes. The first one was a multiple-choice test where the participants had to choose the right French translation for each Dutch item (see examples in Appendix C). In addition to the target item, two related French words or expressions served as distracters. All distracters were words or expressions that had been studied during the experiment. The second test was an open test where the participants had to provide the Dutch translations of the French target words and expressions, which were presented without any context. For this test, the only translations accepted as good answers were those given in the

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materials that the participants had studied in the context of the experiment, or perfect synonyms thereof. All 28 items were tested in both tests. To avoid a test-retest effect, I decided that two different tests should be used for the immediate and the delayed postmeasurement.

Procedure. Each subject had to learn 28 items, half of which were single words and the other half multiword expressions. One participant group (n = 25) worked with the A version, the other one (n = 19) with the B version. To make the participants learn the correspondences between the French items and their Dutch equivalents without asking them to study these in a traditional way, I devised a procedure wherein they had to go over the materials several times in an active way. During a normal class, the participants were presented with a sheet containing the 28 French words within contextualized sentences, along with the Dutch translation of those sentences (see Appendix B), and a sheet containing the Dutch equivalents of the 28 target items, which were in the same order as on the first sheet. They were asked to read the French sentences and translations and then write down the French translations of the Dutch words on the second sheet. This part of the experiment took approximately 15 minutes.

Next, the participants were given a third sheet containing the 28 French target items in alphabetical order. They were asked to write down the Dutch translations of these items. They were allowed to go back to the two pages they had already been working on. After about 10 minutes, the teacher announced that there was going to be a test. The list of Dutch translations was read aloud before the test to make sure that all participants had the right answers.

After a few minutes, all papers were collected and copies of the multiple-choice test as described above were distributed. The administration of the test took about 15 minutes. Three weeks later, without any announcement, the open test was administered. The students had not been able to go over the items because they had no materials to do so. Moreover, in the meantime, they had had a two-week vacation. The main purpose of the immediate posttest was to examine whether sufficient learning had taken place. The delayed posttest was given to measure long-term retention.

Results. The results of the immediate and delayed posttests are shown in Table 1. As can be seen, the differences between the scores for one-word items and multiword items are statistically significant, the scores for the multiword items being higher. Immediately after the learning session, 83.6% of the multiword expressions and 73.6% of the one-word items had been retained. In other words, in a procedure lasting about half an hour, the participants had retained about 22 of the 28 lexical items, some 12 of the multiword expressions and about 10 single word items. Three weeks later, 30.7% of the multiword expressions and 18.6% of the one-word items were still known. The differences between the results of the immediate posttest and the delayed

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Table 1. Results of the first experiment

	Category					
	Multiword expressions			Single words		
Test	*M*	*SD*	%	*M*	*SD*	%
Test 1 (immediate posttest)	11.7	1.6	83.6	10.3	2.8	73.6
Test 2 (delayed posttest)	4.3	2.1	30.7	2.6	1.2	18.6

Note. $n = 44$; difference in means between word categories is significant at $p < .01$ for both tests.

posttest should be interpreted as a combined effect of time of testing and of test format.

The results of the immediate posttest indicate that the learning task resulted in substantial gains in vocabulary knowledge. After having read the target items in a context and copied them, and after having taken note of their translation in the mother tongue, the participants were able to recognize about 79% of the correct answers in the first test. This may give an idea of the effectiveness of the procedure that was followed for the learning of the new vocabulary.

In view of the results of the immediate as well as of the delayed posttest, the null hypothesis has to be rejected. This means that multiword expressions containing known words are easier to learn than completely new words and that they are better retained after a delay of three weeks. It seems clear, then, that knowledge of form helps the learning of new vocabulary. The presence of already established meanings does not hinder the learning of new meanings, and there are no signs of confusion when up to four new meanings are added to known forms. What the results also make clear is that not all new meanings that can be associated with the known forms are learned and retained. About 20% of the multiword expressions had not been learned immediately after the learning session; after three weeks the learners were unable to give a translation in about 70% of the cases. This means that lexical units whose form is already known need to be acquired; even if their acquisition proves to be easier than that of totally new items, knowledge of their meaning cannot be taken for granted.

Second Experiment: Learning New Senses of Polysemous Words

Knowledge of form turned out to play a positive role in the learning of lexical units in the first experiment: Learning multiword items made up of well-known words gave significantly better results than learning items whose meaning and form were unknown to the learners. In the second experiment, I wanted to know whether only knowledge of form can play such a role or whether resemblance of meaning may be helpful as well.

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To investigate this question, I made a distinction between two types of senses of polysemous words. As was shown with *party* in the section entitled "The Notion of 'Lexical Unit'," a given sense of a polysemous word may show no semantic relationship whatsoever with another sense, at least for the L2 learner. It is difficult to see, for instance, what common ground could exist between my neighbor's *party* and a *party* in court. This is not always the case, however. Thanks to dynamic elements of the lexicon like metonymy and metaphor, many senses of polysemous words have some kind of relationship. This is the case, for instance, with *painting* in (9a) and (9b), as well as with *ball* in (10a) and (10b):

(9) a. *I like his style of painting.*
b. *A huge painting hung on the wall.*
(10) a. *She managed to catch the ball.*
b. *The ball of my left foot hurts.*

The two senses of *painting* in (9) present a metonymic relationship of action and result of the action. The semantic relationship in (10) is based on a metaphor: The round form of a certain part of the foot looks like a ball and it is easy to understand why this part is called a ball. Metonymy and metaphors are pervasive in all languages (Lakoff & Johnson, 1980). The results of these devices, however, may vary widely among different languages. In English, one part of the foot happens to be called a ball; this is not the case in French, for instance, which does not seem to have a particular name for this kind of bulge. According to the criteria of Cruse (1986), the two senses of *painting* and *ball* correspond to two different lexical units for each form. We may therefore hypothesize that, in both cases, L2 learners have to acquire these different senses one by one, probably for productive as well as for receptive purposes.

One could argue that in L2 learning the different senses of *painting* and *ball* are easier to learn than those of *party*. As was demonstrated in the first experiment, once the form is known and one meaning is attached to that form, the learning of new senses of that same form is easier than the learning of a totally new lexical unit. However, when the new sense can be explained on the basis of the one that has already been established, this fact could be of help in learning the new sense. So I put forward the hypothesis that, at least in L2 learning, new but meaning-related senses of a polysemous word are easier to acquire than new senses that do not have semantic relationships with already known senses. I tested this hypothesis in the following experiment.

Participants. The participants were 40 students learning French as a foreign language. As in the first experiment, they were all native speakers of Dutch who had had four years of French classes in the preuniversity section of a secondary school.

Materials. Three types of words were taken into account. First, I selected high-frequency French words whose metaphoric or metonymic senses related

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to those the participants had already acquired. An example is *crayon*, which is known as "pencil" but which can also have the meaning "drawing" (instrument-to-result metonymy). Second, well-known French words of the same frequency range were selected that also had other senses, but ones that had no semantic relationship with the already known senses, as in *blé*, which is familiar in the sense of "wheat" but which is also used to mean "money" or "dough." Finally, words were selected that were synonymous in one of their meanings with the new senses of the words of the first two categories, but with forms that were unknown to the participants. As a synonym of *crayon* "drawing," for example, *fusain* was selected, which can also be used for a particular type of drawing; for *blé* "money" I selected *flouse*, which is also used in an informal way to mean "dough." Thus *crayon* "drawing" as a meaning-related sense of the well-known *crayon* "pencil" is compared with the totally unknown lexical unit *fusain* "drawing;" *blé* "dough," where there is no meaning relationship with the well-known *blé* "wheat", is compared to the totally unknown lexical unit *flouse* "dough." In what follows, I refer to *crayon* "drawing" as a type 1 item, *blé* "dough" as a type 2 item, and *fusain* "drawing" as well as *flouse* "dough" as type 3 items. Participants were presented with either a type 1 or 2 item, or a type 3 item, for each concept; in other words, each subject had to learn one new form for a given meaning.

There were 28 words, 14 of which were totally new to the participants. The forms and one meaning of each of the 14 other words were known. The new sense had a meaning relationship with the known sense in 7 cases; there was no such relationship in the other 7 cases. Half of the words were nouns, the other half verbs. No distinction was made between metonymical and metaphorical relationships. All of the materials were checked with manuals and teachers. (For an overview of the materials, see Appendix D.) The selected words were inserted in sentences that were not interpretable with the already known senses but that were neutral enough not to aid the learners in guessing. The sentences were translated into Dutch, and two parallel versions were prepared (see Appendix E).

Tests. Again two tests were prepared. The first was a multiple choice test in which Dutch words had to be translated into French and the participants had to choose the right translation out of three alternatives; the distracters were other words used in the experiment. In the second test, the participants had to translate French words into Dutch. The French words appeared in the same sentences as were used during the learning phase of the experiment.

Procedure. The same procedure was followed as in the first experiment. To make the participants learn the new senses and words, they read the French sentences and the Dutch translations and they noted on a separate sheet the French words corresponding to the Dutch words listed in the same order as the target words. After that they noted the Dutch translations of the French target words, which were presented in alphabetical order. After a short supplementary learning phase, they were presented with the multiple-

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Table 2. Results of the second experiment, immediate posttest

Lexical unit type	*M*	*SD*	%
Type 1 (+meaning relationship)	6.30	.94	90.0
Type 2 (–meaning relationship)	5.80	1.29	82.9
Type 3 (totally new)	5.80	1.10	82.9

Note. $n = 40$; type 1 > type 2, $t = 2.36$ (*ns*); type 1 > type 3, $t = 2.96$ ($p = .005$); type 2 = type 3, $t = 1.00$ (*ns*).

Table 3. Results of the second experiment, delayed posttest

Lexical unit type	*M*	*SD*	%
Type 1 (+meaning relationship)	1.21	.93	17.3
Type 2 (–meaning relationship)	1.13	1.00	16.1
Type 3 (totally new)	.61	.50	8.7

Note. $n = 39$; type 1 > type 2, $t = .34$ (*ns*); type 1 > type 3, $t = 4.00$ ($p < .0001$); type 2 > type 3, $t = 3.23$ ($p = .003$).

choice test as an immediate posttest. Three weeks later the participants were presented with the second test without warning and without having been able to go over the materials, which had been collected before the immediate posttest. The whole procedure took about 40 minutes the first time and less than 15 minutes for the delayed posttest three weeks later. Again, during the three weeks separating the two tests there had been a two-week vacation period.

Results. The results of the immediate posttest are presented in Table 2. Note first that the same procedure resulted in effective learning: 83–90% of the newly learned senses were recognized at the end of the first session. A *t*-test for paired samples was performed; this analysis was preferred to an analysis of variance because it not only indicates whether there are significant differences, but also locates these in a direct way. This analysis showed that there is a significant difference ($p < .005$) between the cases in which there is a meaning relationship (type 1) and a totally new lexical units (type 3) for the immediate posttest. The other differences were not statistically significant.

The results of the delayed posttest (see Table 3), which was administered after a delay of three weeks, show significant differences between the new senses of well-known words (type 1 and type 2), on the one hand, and totally new lexical units (type 3) on the other. This may be taken to mean that knowledge of form does make a difference but that meaning relationships do not: Both type 1 and type 2 items (where the form was known) are better retained than type 3 items (where both form and meaning were new). There is no significant difference between meaning-related (type 1) and non-meaning-related (type 2) new senses of known forms.

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Both for the immediate and delayed posttests, the hypothesis that predicts better results for meaning-related senses than for non-meaning-related senses must be rejected. When known forms have meaning-related senses, it seems that this may help in learning these senses when first encountering them, at least as compared to the learning of totally new lexical units. Three weeks later, when long-term learning is measured, however, the advantage of the meaning relationship has disappeared. What remains is the advantage of knowledge of form: Meaning-related as well as non-meaning-related senses of well-known forms are significantly better retained than totally new lexical units.

As in the first experiment, part of the materials given to the participants was not learned, even if, on the whole, the results of the immediate posttest were relatively high. However, the results after three weeks were quite low.

DISCUSSION AND CONCLUSIONS

The linguistically founded concept of "lexical unit" seems to be useful in applied linguistics in that it makes it possible to describe in more detail the many steps that learners have to take in acquiring vocabulary in an L2. Different types of lexical units do not seem to be acquired in exactly the same way, however. The results of the first experiment lead to the conclusion that totally new single-word units are harder to learn and retain than multiword units of the same meaning but with a form that is made up of familiar words. As the words and expressions used in the first experiment did not have different degrees of transparency, it seems that it is the familiarity with the forms making up the multiword items that made them easier to learn and retain than the one-word items whose forms were all new.

This conclusion was confirmed by the results of the second experiment. The new senses of already known forms were significantly better retained than those of totally new lexical items, whereas the results of meaning-related and non-meaning-related senses of familiar forms were not significantly different, neither at the end of the learning session nor three weeks later. The only significant difference as far as the immediate posttest is concerned was the one between meaning-related senses of familiar forms and totally new lexical units.

Both experiments involved the same learning procedure: Participants were engaged in a reading and translating task that could lead to incidental vocabulary acquisition. Only during the last minutes did participants know that a vocabulary test was to follow. In this situation, an average of 22 (first experiment) or 24 (second experiment) out of 28 new lexical items were learned in about half an hour. Three weeks later, however, only an average of 1.2 (totally new items in experiment 2) to 4.3 (multiword expressions in experiment 1) out of 14 items were retained. What this makes clear is that many lexical items

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that one may consider to have been learned at one moment are not available later on. One explanation for the differences between the scores for the immediate and delayed posttests can be found in the different formats of the tests used. In both experiments the immediate posttest was a multiple-choice format in which the participants had to select the equivalent of a native Dutch lexical item given a choice of three French words. The delayed posttest was, on both occasions, an open test in which the participants had to write down the translation of the French words in their L1 (Dutch). One could argue that the open test is more difficult than the multiple-choice format and that this explains part of the disparity between the scores of the immediate and delayed posttests. On the other hand, one could say that translating from the L1 into the L2, as in the immediate posttest, is more difficult than the other way around, as in the delayed posttest. However this may be, if the materials are not repeated over time, little long-term learning takes place.

In the second experiment, participants seem to have learned more lexical units during the learning session but three weeks later they had retained fewer items than the participants of the first experiment. It is not clear what factors could explain this difference.

Both experiments show that knowledge of new senses for forms that have already been acquired cannot be taken for granted. This is not only true for compounds and idioms like those used in the first experiment, but also for new senses of well-known forms, as demonstrated in the second experiment. Not only do semantically unrelated senses have to be learned separately, but senses that are close to already known meanings need to be learned as well. This does not seem to be in line with the concept of "word family" as used by Nation and his associates. Bauer and Nation (1993) stated that "the meaning of the base in the derived word must be closely related to the meaning of the base when it stands alone or occurs in other derived forms" (p. 253), but they did not show how different families sharing the same base form should be distinguished, nor did they mention learning problems L2 learners may face in these cases. In the application of the concept of "word family" in the Lexical Frequency Profile (Laufer & Nation, 1995) there seems to exist one central meaning for every base word, a meaning that is not only to be found in all of the uses and senses of this word but also in all of its inflected and derived forms. Once this basic meaning has been acquired, little or no further learning is apparently needed. As mentioned in the introduction to this study, no experimental research has been done up to now to support this claim. The experiments reported here do not totally disconfirm the claim, but by shedding some light on the difficulties that foreign language learners may have—even when they have acquired the core meanings of a fair number of frequent vocabulary items—these experiments remind us that we should not underestimate the magnitude of the task these learners have to face at the lexical level.

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APPENDIX A

Table A1. Single words and multiword expressions used in the first experiment

Version A	Version B	English Translation
Adverbs		
du jour au lendemain	*inopinément*	"unexpectedly"
de jour en jour	*quotidiennement*	"daily"
l'autre jour	*naguère*	"recently, some time ago"
infailliblement	*à coup sûr*	"inevitably"
séparément	*au coup par coup*	"separately"
successivement	*coup sur coup*	"successively"
Verbs		
casser la figure à quelqu'un	*tabasser*	"to beat up"
casser les pieds à quelqu'un	*importuner*	"to bother"
casser bras et jambes	*déconcerter*	"to confound"
casser le morceau	*admettre*	"to spill the beans"
faire des pieds et des mains	*se démener*	"to struggle"
donner ses huit jours à	*congédier*	"to dismiss"
faire la tête	*bouder*	"to sulk"
déguerpir	*mettre les bâtons*	"to clear off"
clôturer	*mettre un terme à*	"to close"
démolir	*mettre à bas*	"to pull down"
expulser	*mettre dehors*	"to expel"
épier	*tenir quelqu'un à l'oeil*	"to spy on"
veiller à	*avoir l'oeil à*	"to attend to"
s'évanouir	*tourner de l'oeil*	"to faint"
Nouns		
chapeau de roue	*enjoliveur*	"hub cap"
homme à femmes	*dragueur*	"womanizer"
mise à sac	*pillage*	"plundering"
fait d'armes	*exploit*	"exploit"
guêpier	*pot au noir*	"trap"
suie	*noir de fumée*	"soot"
séquestration	*prise de corps*	"sequestration"
enregistrement	*prise de son*	"recording"

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APPENDIX B

SOME EXAMPLES OF LEXICAL ITEMS IN CONTEXT (FIRST EXPERIMENT)

Version A

1. *Ce changement s'est produit du jour au lendemain.*	*Die verandering heeft onverwachts plaats gehad.*
2. *L'enregistrement de ce concert a posé pas mal de problèmes.*	*De opname van dat concert heeft heel wat problemen gegeven.*
3. *De jour en jour, le nombre d'accidents augmente.*	*Dagelijks neemt het aantal ongelukken toe.*
4. *Alors, vous arrêtez de me casser les pieds!*	*Zo, hou nou eens op me lastig te vallen.*

Version B

1. *Ce changement s'est produit inopinément.*	*Die verandering heeft onverwachts plaats gehad.*
2. *La prise de son de ce concert a posé pas mal de problèmes.*	*De opname van dat concert heeft heel wat problemen gegeven.*
3. *Quotidiennement, le nombre d'accidents augmente.*	*Dagelijks neemt het aantal ongelukken toe.*
4. *Alors, vous arrêtez de m'importuner!*	*Zo, hou nou eens op me lastig te vallen.*

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APPENDIX C

SOME EXAMPLES OF TEST ITEMS IN THE TWO VERSIONS (FIRST EXPERIMENT)

Version A

1. *onverwachts* "unexpectedly"	a. *du jour au lendemain*
	b. *de jour en jour*
	c. *l'autre jour*
2. *flauwvallen* "to faint"	a. *expulser*
	b. *épier*
	c. *s'évanouir*
3. *afbreken* "to pull down"	a. *clôturer*
	b. *démolir*
	c. *veiller*

Version B

1. *onverwachts* "unexpectedly"	a. *inopinément*
	b. *naguère*
	c. *quotidiennement*
2. *flauwvallen* "to faint"	a. *avoir l'oeil à*
	b. *tenir à l'oeil*
	c. *tourner de l'oeil*
3. *afbreken* "to pull down"	a. *mettre un terme*
	b. *mettre à bas*
	c. *mettre les bâtons*

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APPENDIX D

Table D1. Materials selected for the second experiment

Known lexical units	Unknown lexical units (Type 1: + meaning relationship)	Totally new lexical units (Type 3)
boîte "box"	*boîte* "clink"	*taule* "clink"
chaise "chair"	*chaise* "skeleton"	*charpente* "skeleton"
chemise "shirt"	*chemise* "folder"	*farde* "folder"
corde "rope"	*corde* "execution post"	*poteau* "execution post"
crayon "pencil"	*crayon* "drawing"	*fusain* "drawing"
dommage "pity"	*dommage* "harm"	*préjudice* "harm"
planche "plank"	*planche* "plate"	*estampe* "plate"
attaquer "to attack"	*attaquer* "to tackle"	*entamer* "to tackle"
descendre "to go down"	*descendre* "to do in"	*zigouiller* "to do in"
employer "to use"	*employer* "to employ"	*embaucher* "to employ"
habiller "to dress"	*habiller* "to embellish"	*orner* "to embellish"
monter "to go up"	*monter* "to go further"	*renchérir* "to go further"
passer "to pass"	*passer* "to put on"	*enfiler* "to put on"
rentrer "to enter"	*rentrer* "to hold back"	*ravaler* "to hold back"

Known lexical units	Unknown lexical units (Type 2:–meaning relationship)	Totally new lexical units (Type 3)
bâtiment "building"	*bâtiment* "ship"	*vaisseau* "ship"
blé "wheat"	*blé* "dough"	*flouse* "dough"
cloche "bell"	*cloche* "idiot"	*nouille* "idiot"
clou "nail"	*clou* "rattletrap"	*guimbarde* "rattletrap"
mouton "sheep"	*mouton* "stool pigeon"	*délateur* "stool pigeon"
peau "skin"	*peau* "peel"	*zeste* "peel"
pêche "peach"	*pêche* "slap"	*beigne* "slap"
causer "to cause"	*causer* "to chat away"	*jaser* "to chat away"
chauffer "to heat"	*chauffer* "to pinch"	*choper* "to pinch"
coller "to paste"	*coller* "to fail"	*recaler* "to fail"
couper "to cut"	*couper* "to dilute"	*diluer* "to dilute"
étonner "to surprise"	*étonner* "to crack"	*lézarder* "to crack"
fatiguer "to tire"	*fatiguer* "to toss"	*remuer* "to toss"
rouler "to drive"	*rouler* "to diddle"	*filouter* "to diddle"

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APPENDIX E

SOME EXAMPLES OF LEXICAL ITEMS IN CONTEXT (SECOND EXPERIMENT)

Version 1A

1. *C'est incroyable! Son père a été mis en taule.*	*Het is ongelofelijk. Zijn vader is in de gevangenis gezet.*
2. *La machine était mal fixée sur la chaise.*	*De machine was verkeerd op het onderstel bevestigd.*
3. *Maman avait mis un zeste d'orange dans la crème.*	*Moeder had een sinaasappelschilletje in de pudding gedaan.*
4. *Mais alors! Tu ne vois pas? Tu t'es fait filouter.*	*Nou! Zie je dat niet? Je hebt je laten afzetten.*

Version 1B

1. *C'est incroyable! Son père a été mis en boîte.*	*Het is ongelofelijk. Zijn vader is in de gevangenis gezet.*
2. *La machine était mal fixée sur la charpente.*	*De machine was verkeerd op het onderstel bevestigd.*
3. *Maman avait mis une peau d'orange dans la crème.*	*Moeder had een sinaasappelschilletje in de pudding gedaan.*
4. *Mais alors! Tu ne vois pas? Tu t'es fait rouler.*	*Nou! Zie je dat niet? Je hebt je laten afzetten.*

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