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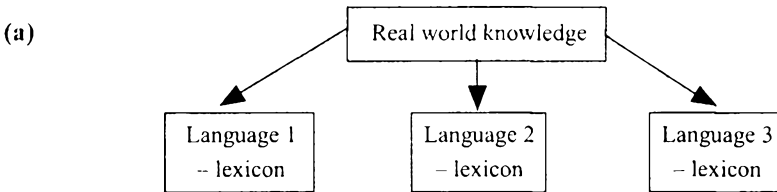
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# Association network(s) in a multilingual mind

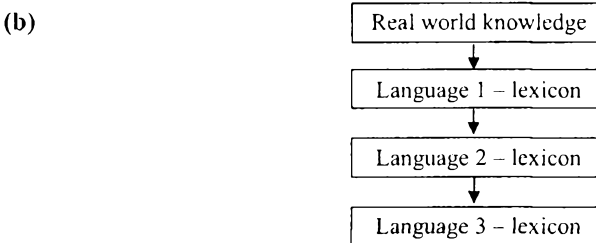
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## 1. Mental lexicon of a multilingual learner

Probably no other phenomenon in second language acquisition raised so many questions and controversies as the problems connected with word storage and retrieval. Of course, in the case of multilingual learners, it can be predicted that the situation becomes even more complex. Adapting O b l e r and G j e r l o w ' s model representations of bilingual lexicon(s) (1999: 129), we can think of:

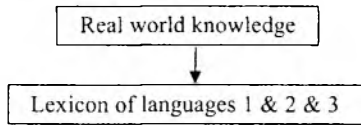


The model assumes the independency of each lexicon: "Each language has a separate relation to concepts; no overlap in the association of words and ideas".



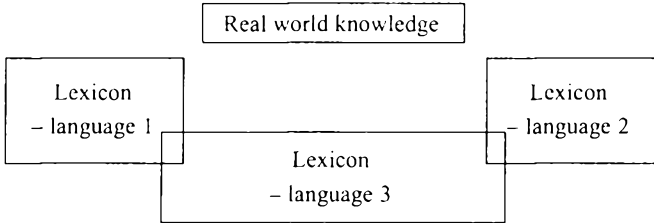
The meanings in lexicon of L2 are translation equivalents of L1 concepts; in the case of L3 lexicon it can be hypothesised that the equivalence is searched indirectly: through L2 lexicon to L1.

(c)



Here, the concepts are the same for all the languages, only the language labels are different.

(d)



It is assumed that: "The (...) lexicons overlap in their relationship to the conceptual store. Some items share many associations, some none".

The above models are only simplified hypotheses concerning mutual relations between lexical stores of a multilingual learner. On the basis of research on mental lexicon an independence model has long been rejected. Whichever of the other models is being considered as a true model, it can be observed that multilingual memory representations are based on two different types of connections a language user makes when activating his lexical store (Gabryś, 1999: 3):

(...) conceptual links: within the same language and across languages manifested as a semantic field search, e.g. coordination, superordination; lexical links: within the same language referring to the form and across languages, using translation equivalences (Fig.1).

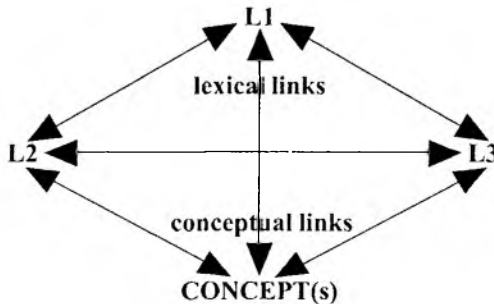


Fig. 1. A model of multilingual memory representations (Gabryś, 1999: 3)

Gabryś (1999: 3) in her study on the content words and their activation in the mental lexicons of trilingual learners observed that their accessibility either via conceptual or lexical links was clearly determined by a variety of variables:

1. language dominance in a multilingual competence and performance of a learner/user,
2. language proficiency in all three languages (L1, L2, L3),
3. form of a linguistic task (e.g. degree of automaticity),
4. type of a stimulus word (e.g. concrete versus abstract nouns, culturally loaded words versus neutral ones).

The present study focuses on the storage and retrieval of the grammatical words. It could be hypothesised that in the case of the function (or grammatical words) a variable that will affect the storage and retrieval will be the learners' linguistic and metalinguistic awareness and grammatical and semantic complexity of a word.

## 2. Grammatical words and their characteristics

The words of any language are usually classified into certain functional categories (though not all languages represent all of them in the same linguistic form):

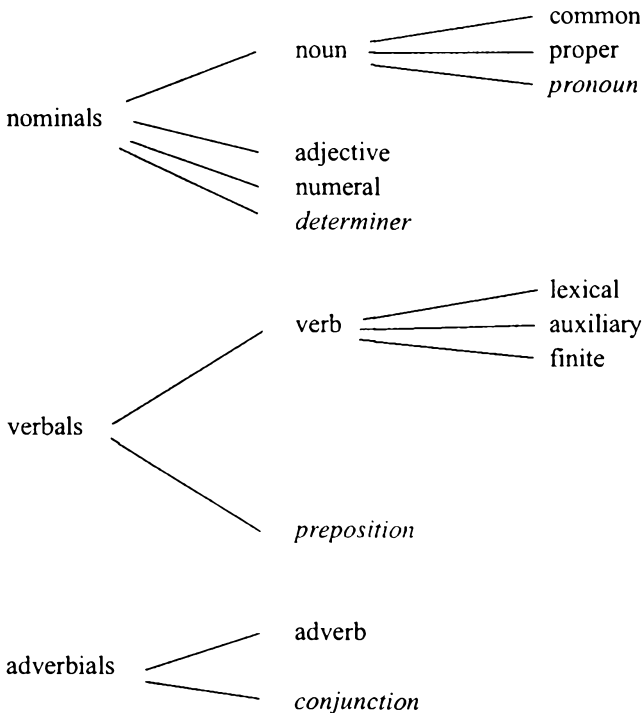


Fig. 2. Word classes (after Halliday, 1985: 91)

Traditionally the above categories are being described in terms of: content versus function words, or lexical versus grammatical words, i.e. nouns, verbs, adjectives versus pronouns, prepositions, determiners, etc. Words labelled as content words are often viewed as these lexical units that carry substantial meaning even when decontextualised, whereas grammatical words seem to have very little or no independent of the context, meaning and seem to perform only a certain grammatical role when combined with the content words. Such an explanation is of course too simplistic. If we consider grammatical words such as *although* or any pronoun, we cannot fail to observe that they carry meanings. When comparing the class of grammatical words it can be clearly seen that they represent different degrees of complexity:

- (a) semantic complexity: transparency of meaning (e.g. out of context, pronouns are much more meaningful than e.g. articles or some conjunctions)
- (b) grammatical complexity: a load of grammatical information carried by an item and a number of specific restrictions on its use (e.g. in conditionals, clauses or determiners).

The conjunctions and connectors are good examples of complex function words because:

[they] cannot be assigned in a one to one correspondence to the logical or semantic goals readers or speakers have in mind

(Hatch & Brown, 1995: 239)

Another variable involved in the acquisition of function words is their “unequal status” in different languages, e.g. in German connectives are far more common in speech than in a written discourse. Different languages have different number of pronouns, genders of those differ, as well as certain pragmatic constraints on their use. Certain perceptions beyond language, such as perception of space is only to some degree universal which may influence for example the acquisition of prepositions (Hatch & Brown, 1995: 245). It can be observed that function words are more commonly observed in the case of code switching (language mixing): we tend to insert “little words” from another language (not necessarily our L1) more than “big words” (content words).

These different degrees of complexities (semantic and grammatical) and the factors described above undoubtedly affect language acquisition and learning processes as well as storage and retrieval of function words. Besides, the learners’ perception of the function words has to be considered as well, i.e. the perceived importance of meaning being carried out by the major category of words, i.e. content words may make the learners neglect the grammatical words (especially in case of focus being put on fluency practice in communicative language teaching):

Rina: Yeah, but people talk with these words.

Zoila: Yeah, pero /es, eh/ I’m hear and put more attention the big words. You know and (...) something house. I know house is the casa for me. And /es es/ and little words is no too important for me

(Hatch & Brown, 1995: 247)

The learning process of function words may become either incidental or on the contrary, heavily determined by the method of formal instruction the learner is exposed to in the classroom (i.e. explicit deductive metalinguistic explanation). Developing learners' conscious linguistic and metalinguistic awareness may facilitate the processes of acquisition of the grammatical words.

### 3. Description of the study

The present study focuses on the phenomenon of **storage and retrieval of grammatical words** by multilingual (trilingual) language users. The research questions put forward are as follows:

- (a) What links do the retrieval through automatic association activate in the case of grammatical words?
- (b) Are the associations of the same type for all the languages involved?
- (c) What are the factors that might be hypothesised to influence the activation?

As already mentioned the research method used is that of a simple stimulus-response association; a battery of tests administered to the subjects under a time limit. The tests used in the study were both single language tests (stimulus and response in the same language, Table 1) and mixed language tests (Table 2 & 3).

The lexical material of the test consisted of both content and grammatical words of high frequency, mixed together. For the purposes of the analyses, only grammatical words were selected. They represented various word categories: pronouns (*she, they, hers*), conjunctions and connectors (*and, although, if*), demonstratives (*these*) and prepositions (*outside*).

The typology of associations adapted for the purposes of the study consisted in the following categories (G a b r y ś, 1998):

#### **Content focus:**

- semantic associations (paradigmatic): coordination, superordination, synonym, antonym, translation
- syntactic associations (syntagmatic): collocation

#### **Form focus:**

- phonetic similarity, graphic similarity, clang (rhymes).

The seventy five subjects used in the test were all Polish students of English (L2) at the advanced level and German (L3) at the intermediate level. Both English and German were learnt by means of formal instruction in a classroom setting.

## 4. Grammatical words in the mental lexicon: Data presentation (observations and comments)

The data are presented here according to different types of association tests performed:

- single language tests
- mixed language tests (L1 as stimulus or response)
- mixed language tests (only L2 and L3 items).

### 4.1. Single language tests

Stimulus word	Test: L1 → L1	Test: L2 → L2	Test: L3 → L3
<i>she</i>	<i>he</i> (55%) <i>woman</i> (30%) <i>girl</i> (10%)	<i>he</i> (25%) <i>girl</i> (10%) <i>her</i> (8%) *PRONOUN	<i>he</i> (15%) <i>woman</i> (12%) <i>we</i> (10%)
<i>although</i>	<i>0</i> (40%) <i>T</i> (5%)	<i>T</i> (25%) <i>0</i> (15%) <i>but</i> (10%) <i>however</i> (10%)	<i>0</i> (80%)
<i>and</i>	<i>as well</i> (40%) <i>T</i> (35%) <i>0</i> (5%) *CONJUNCTION	<i>0</i> (15%) <i>but</i> (10%) <i>or</i> (8%) <i>also</i> (8%) *CONJUNCTION	<i>0</i> (75%)
<i>if</i>	<i>0</i> (30%) <i>T</i> (30%) *CONDIT. (10%)	<i>whether</i> (15%) <i>0</i> (15%) <i>not</i> (8%) <i>unless</i> (8%)	<i>0</i> (20%) <i>therefore</i> (20%) <i>because</i> (15%)
<i>into</i>	<i>0</i> (15%) <i>out of</i> (10%) <i>in direction</i> (5%)	<i>0</i> (15%) <i>out of</i> (15%) <i>T</i> (8%) <i>inside</i> (6%)	<i>0</i> (45%) <i>out of</i> (25%)
<i>they</i>	<i>we</i> (30%) <i>they – feminine</i> (15%) <i>0</i> (10%)	<i>we</i> (35%) <i>people</i> (8%) <i>friends</i> (7%) *PRONOUN	<i>0</i> (25%) <i>he</i> (25%)
<i>hers</i>	<i>his</i> (50%) <i>0</i> (8%) <i>mine</i> (4%)	<i>his</i> (32%) <i>0</i> (15%) <i>she</i> (6%) <i>mine</i> (6%)	<i>0</i> (30%) <i>house</i> (25%) <i>your</i> (15%)
<i>outside</i>	<i>inside</i> (30%) <i>0</i> (8%) <i>to home</i> (8%) <i>world</i> (8%)	<i>inside</i> (36%) <i>0</i> (12%) <i>house</i> (7%) <i>freedom</i> (7%)	<i>0</i> (80%)
<i>these</i>	<i>they</i> (35%) <i>those</i> (30%) <i>0</i> (29%)	<i>those</i> (60%) <i>0</i> (14%) *PLURAL	<i>0</i> (30%) <i>that</i> (15%)

Table 1. Single language tests

The data collected give evidence of how the grammatical words are stored when single languages (L1, L2 or L3) are involved in the lexical activation:

- lexical connections are apparent in metalinguistic comments observed in L1 and L2 (word category, grammatical characteristics), however, no comments of the kind are made in L3 test
- L1 and L2 tests: a high percentage of paradigmatic associations (synonyms and antonyms) is observed
- L2 test: examples of syntagmatic associations (collocations), it shows that function words are being acquired as chunks (contextually)
- a high percentage of zero answers (0) in the case of grammatically complex words (e.g. *although* and *if*), i.e. not semantically transparent when decontextualised and grammatically marked
- a high percentage of zero answers in the case of L3 test in general, except for the highly frequent pronoun *she*, whose meaning is transparent, even out of context
- mostly conceptual links are being activated, except for the grammatically complex items: *although* and *if*, which seem to be perceived by the subjects as such.

## 4.2. Mixed language tests

Stimulus word	Test: L1 → L2	Test: L2 → L1	Test: L1 → L3	Test: L3 → L1
<i>she</i>	T (45%) he (15%)	T (50%) he (15%) woman (8%)	T (30%) he (25%) woman (12%)	T (25%) he (12%)
<i>although</i>	T (80%) 0 (15%)	T (60%) *CONDIT.	0 (50%) T (10%)	0 (80%) *CLAUSE
<i>and</i>	T (80%) or (10%)	T (65%) as well (10%)	T (50%) 0 (16%)	0 (30%)
<i>if</i>	T (80%) 0 (15%)	T (80%) *CONDIT. (10%)	0 (29%) T (15%) *CONDIT. (12%)	T (40%)
<i>into</i>	T (45%) from (10%)	T (60%) in (15%)	0 (20%) T (18%)	T (25%) inside (25%)
<i>they</i>	T (75%) we (10%)	T (70%) 0 (12%)	T (20%) friends (15%) we (12%) 0 (12%)	she (25%)(T?) he (25%)
<i>hers</i>	T (75%)	T (65%) 0 (15%) his (4%)	T (30%) 0 (15%)	T (30%) 0 (12%)
<i>outside</i>	T (80%) inside (10%)	T (30%) inside (10%) 0 (10%)	0 (30%) T (10%)	0 (70%)
<i>these</i>	they: (50%) T (15%) 0 (15%)	T - fem. (30%) T - masc. (30%) 0 (15%)	0 (30%) they (25%)	T (20%) 0 (20%)

Table 2. Mixed language tests (a)

The mixed language tests in which L1 is being activated either as input (stimulus) or output (response), the following can be observed:



- metalinguistic comments are made but few, and only in case of L2 and L3 stimulus word, which might mean that the subjects activate their metalinguistic awareness in the cases when languages learnt (foreign languages) are concerned but not the mother tongue
- the highest percentage of metalanguage is used in response to the *if* item, which can be assumed to be grammatically complex and opaque
- a high percentage of zero answers in response to grammatically complex words may mean that the subjects either attempt to activate conceptual links but fail or are not metalinguistically conscious
- mostly lexical links are being activated (translation equivalences) with the exception of highly frequent pronoun *she* and *they* (acquired at the early stages of learning), which are semantically transparent and do not require a context.

In the tests where the mother tongue of the subjects was eliminated, the data demonstrate:

Stimulus word	Test: L2 → L3	Test: L3 → L2
<i>she</i>	T (70%) he (10%) woman (10%)	T (50%) they (30%) (T?)
<i>although</i>	0 (30%) if (30%)	0 (50%)
<i>and</i>	T (90%) but (10%)	also (30%) 0 (30%)
<i>if</i>	T (50%) 0 (12%)	0 (30%) when (30%)
<i>into</i>	T (35%) 0 (12%)	in (50%) inside (30%)
<i>they</i>	T (80%)	she (30%) (T?) they (30%)
<i>hers</i>	T (50%) 0 (20%)	T (80%)
<i>outside</i>	T (30%) 0 (25%)	0 (80%)
<i>these</i>	T (70%) 0 (20%)	this (50%) T (30%)

T – synonym (single lg tests) or translation (mixed lg tests)

• PRONOUN, etc. – metalinguistic comment made by the subject

Table 3. Mixed language tests (b)

- absence of metalinguistic comments, which is surprising, especially in the case of L3 which constitutes the subjects' recent learning experience (through formal metalinguistic instruction)
- most of the responses are either translations (T) or zero answers, which indicates that the lower language competence implies a longer association/retrieval processes which under the time constraint fail to bring about any response
- very few conceptual links are observed (again for *she* and *and* items, semantically transparent), in the majority of cases, lexical links are being activated.

### 4.3. Comments

On the basis of the data obtained by means of association tests, the tentative answers to the research questions can be supplied:

- (a) types of links activated by the subjects during an automatic retrieval of the grammatical words: dominance of lexical connections made via translation or conscious metalinguistic comments, observed in the case of frequent but grammatically complex items
- (b) types of associations: no form focused associations are present in the data; predominance of the paradigmatic associations in all languages (synonyms and antonyms); frequent syntagmatic associations (collocations) in L2 test (transfer of training: function words taught in phrases); translation equivalents as most frequent responses in grammatically complex items; high percentage of zero answers (compared with content words retrieval; G a b r y ś , 1999: 8)
- (c) factors affecting the type of retrieval: apart from the factors mentioned earlier such as language proficiency or language dominance, it seems that the degree of semantic transparency activates conceptual links, while grammatical complexity activates lexical links, often in a form of consciously made metalinguistic comment
- (d) other observations: in terms of word categories, it can be observed that in paradigmatic associations, stimulus words of one word category yield responses of the same kind, i.e. pronouns are associated with pronouns, prepositions with prepositions etc., which is true of both single language tests and mixed ones. What is more, in some cases the subjects mix languages (code switch), however, the responses produced are still within the same category. It can be tentatively concluded that grammatical words are stored within the boundaries of the same grammatical categories, which is different from content words' retrieval in the case of which word category boundaries are more flexible (G a b r y ś , 1999).

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