



The Organization of Early Bilingual Mental Lexicon in Light of a Picture-Naming Task

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Abstract. The past decades have witnessed a growing interest in the study of L2 mental lexicon. Word association studies have indicated changes in the pattern of associative responses with an increase in age and maturity of the respondents (Cook 1996, Gósy 2005). While younger children tend to produce syntagmatic associations (which form sequential links with the stimulus words, e.g., *dog-bark*), older children are likely to produce a higher proportion of paradigmatic responses (which fall into the same grammatical class as the stimulus word, e.g., *dog-cat*). The present pilot study examines these lexical relations in the responses provided by Hungarian-Romanian kindergarten aged children during a picture naming task. The main hypothesis was that not only age but the grammatical class of the stimulus words would also affect the quantity of the syntagmatic and paradigmatic answers. A very high percentage (over 80%) of paradigmatic answers was recorded in case of animal pictures (nouns as prompt words) and a higher percentage (over 90%) of syntagmatic answers in the case of action pictures (verbs as prompt words). This clearly demonstrates that even in the case of young children the grammatical class of the stimulus words influences the organization of their mental lexicon (Navraicsics 2007).

Keywords: bilingual mental lexicon, early childhood

1. Introduction

The study of the mental lexicon belongs to the field of psycho- and neurolinguistics and as such it is defined as the internalized knowledge of properties of words. If we think about bilingual language development, which is

understood as a complex process then the definition of the bilingual mental lexicon becomes even more complex.

Nowadays, there is convincing evidence coming from neurolinguistic studies that a bilingual's languages are stored close to each other. On the basis of available research, Paradis (2004) claimed that the bilingual mental lexicon consists of one conceptual framework linked to two language subsystems within one mind. The conceptual system is a set of all non-verbal and language independent concepts, developed through experience and later through acquired languages. It serves both languages in a bilingual mind.

In the context of psycholinguistic research focus has been on lexical access and retrieval procedures as well as on the organization or functional architecture of the bilingual mental lexicon, mostly through different word association tests. The target groups have been mainly children older than 6 years of age, adolescents and adults. To date, however, less attention has been paid to the internal organization of early childhood's mental lexicon. By the term 'early' I am referring to the age of 2.5 and onwards as this is the point when children expand their vocabulary at a much faster rate. As more words are acquired, they work out where each one fits in and narrow down the domain formerly covered by over-extensions (Clark & Clark 1977).

The general conclusion of earlier word association tests carried out on young children was that they tend to produce syntagmatic associations and older ones are likely to provide a higher proportion of paradigmatic responses. This shift from syntagmatic to paradigmatic may differ from language to language. For example, it seems that in the case of native English speakers this transfer ends around the age of 7 (Berko Gleason & Bernstein Ratner 1998). The same shift seems to be true for bilingual children (Navracscics 2007).

In syntagmatic relations the stimulus word and the response go together in a syntactic structure. For example, if the stimulus word is *dog*, and the answer to it is *bark*, they form a predicative clause together, while with a response such as *big* the result would be a subordinate clause. The associative answer might be a whole syntagma, a shorter or a longer one, depending on individual differences (e.g., *This dog is scary*).

In paradigmatic relations the stimulus word and the response are to some degree grammatically substitutable for each other and they belong to the same grammatical class. For example, if to a stimulus word such as *dog* the response is *cat*, they are paradigmatically related words as both of them are nouns.

Taking into consideration the fact that I am analyzing young children's answers, it is noteworthy to mention a third type relation, namely the associative or idiosyncratic one. In this category "peculiar answers" can be found, where there is no logical relationship between the response and the stimulus word. As these types of responses are not meaning-related, they most often elicit some particular

experience or feeling (e.g., *sister-summer*, *yellow-father*), and according to Clark & Clark (1977: 479), they “may be of interest to the psychiatrist”.

2. Aim

This study aims to challenge the above-mentioned general assumptions with regard to the organization of young children’s mental lexicon, by addressing the following research questions:

- Is age the most important factor that influences the proportion of syntagmatic and paradigmatic associative answers in test situations?
- How and to what extent does the grammatical class of the stimulus words affect the response types?
- Is the distribution of syntagmatic/paradigmatic answers similar in the two different languages (in the case of bilinguals)?
- Is there a preference for one of the languages when providing one or the other type of answers?
- Does the language of the wider linguistic environment affect this distribution in any way?
- Are the words of the two mental lexicons linked to a shared conceptual store? Is there interference between the two languages, or are there translation equivalents in the two languages during the test?

3. Methodology

3.1. The participants and their bilingualism

The main subjects were 6 bilingual children (age group 3 to 4) who have acquired Hungarian or Romanian as L2 since a very fragile age, both in authentic communicative situations and through formal instruction in the kindergarten. The control group was formed by 6 monolingual Hungarian children from Hungary. The bilingual participants’ distribution on the basis of their dominant language:

Romanian (L1)- Hungarian (L2)	Hungarian (L1)- Romanian (L2)
4 children (attending a nursery with Hungarian as the language of instruction)	2 children (attending a nursery with Romanian as the language of instruction)

The bilingual subjects, as early bilinguals, have the opportunity to acquire not only the formal aspects of the two languages (sounds, words, meaning relationships), but at the same time they are also learning to use these languages as tools for understanding and manipulating the world around them. Therefore, the two languages are essential ingredients of the children’s socialization processes.

Hoffmann (1991: 35) points out that “early bilingualism will, in most cases, be the natural, ascribed sort, especially in the case of the pre-school child”.

It is noteworthy to mention that the above groups are producing a specific type of bilingualism called “bilingualism in the minority and majority language” (Vančóné 2009: 139). The successful development in the two languages depends on exposure, consistency, perceived need and social support from both majority and minority communities. In those families where a minority language is spoken by one or both of the parents, the aim is very often to introduce the two languages to the child from birth. Many parents consider that when the child is older the input from the weaker language may be too one-sided, too limited in register and style for the two languages to develop on the same level.

Researchers interested in the differential processing routes in children’s bilingual lexicon have suggested that in the case of early bilinguals there are stronger representations at output, therefore, this type of bilingualism might shed the best light on the internal organization of the early mental lexicon. This is the reason why early bilingual children were chosen as subjects of the present pilot study.

It is important to highlight the fact that children participants of this study (both Hungarian- and Romanian-dominant ones) live in a Romanian town where Hungarians constitute the majority of the local population, therefore, they are more prone to the influence of the Hungarian language outside of kindergarten in their everyday life and in their interactions with peers. The dominant language of the bilingual environment as a factor that might influence language choice during the task will be taken into account in the analysis.

3.2. The method

The task

In order to learn about the organization of our subjects’ internal lexicon, in the present study, the picture naming paradigm was employed. The advantage of using picture naming is that the investigator has a high degree of control over the target word to be produced. It is unquestionable that this task requires not only linguistic work, but also visual and semantic interpretation. Nevertheless, it is well known that “young children are excellent readers of pictures, and so picture naming seems a suitable research tool for exploring their vocabulary knowledge” (Masterson et. al. 2008: 379).

The stimuli

The stimuli were 30 black and white animal and action pictures. The sources were the LAPP Picture Collection (Lőrík et al. 1995) and the Peabody Picture Vocabulary Test-III (Dunn & Dunn 1997). As stimulus words, these were

classified into two grammatical classes: nouns (15 pictures of animals) and verbs (15 pictures of basic activities).

The design and procedure

All the bilingual children were in bilingual speech mode (Grosjean 1988) as they were speaking to an experimenter who shared their languages. They were greeted and instructed in both Hungarian and Romanian. (It was pinpointed that they may provide their answers in any of the two languages):

“I will show you some pictures. Your job is to name each of them. You should always wait and listen for my question first. If there are any pictures you do not know the name of, or cannot remember, or that you are unsure of, just say ‘pass’. Just say the first thing that pops into your mind in any of the languages.”

All participants were seen individually in a quiet room, with only the tester and the subject present. The 360 answers were voice-recorded and transcribed, and then analyzed with the Microsoft Excel Program.

The stimuli were presented in two sets: first the pictures of animals, then, after a 5 minutes break the ones illustrating basic activities. Each set of stimuli were preceded by the orienting question formulated in Hungarian and Romanian, as it follows:

- In the class of the animal pictures:
“*Mi ez? / Ce este?*”
‘What is this?’
- In the class of the basic-activities pictures:
“*Mit csinál? / Ce face?*”
‘What is he/she doing?’

In each set of stimuli the pictures were held up for a maximum of 5000ms in the following order:

- Animals: *dog, mouse, snake, crab, turkey, grasshopper, spider, seal, panda, lizard, rhino, eagle, deer, stag-beetle, swallow*
- Activities: *sitting, opening, combing, skiing, raking, laughing, falling, cutting, consulting, planting, taking photos, hammering, signalling, lifting, serving*

4. The results of the picture-naming task in light of the proportion of syntagmatic/paradigmatic answers

As presented in Charts 1 and 2, a very high percentage of paradigmatic answers was recorded for nouns as prompt words, both for the bilingual (88%) and for the monolingual group (93%). Most of these answers are lexical equivalents of the illustrated concept. For example, for ‘snake’ as the prompt word all the answers were the Hungarian *kígyó* or the Romanian *șarpe*; for ‘dog’ as the prompt word the answers were *kutya/kutyus* and *câine/cățeluș* (where the second term is characteristic of children’s language: ‘doggie’). Some animal pictures as stimuli attracted more subordinate and superordinate semantic categories of the represented concept. For the picture of the ‘swallow’ the bilingual group provided in both languages the hyponyms (*fecske/rândunică*, which mean ‘swallow’) and the hyperonyms (*madár/pasăre*, which mean ‘bird’) of the represented concept. The word ‘bird’ as a general term and its subcategories such as ‘rooster’ and ‘hen’ were listed when the picture of the ‘turkey’ was presented (*kakas/cocoș, tyúk/găină*). The picture of the ‘rhino’ attracted meronyms both in Hungarian and Romanian (*szarv/corn*, which mean ‘horn’). However, the monolingual group had greater overall accuracy than the bilingual group. Their accuracy was greatest in the presence of the precision in defining the illustrated concepts mainly with hyponyms.

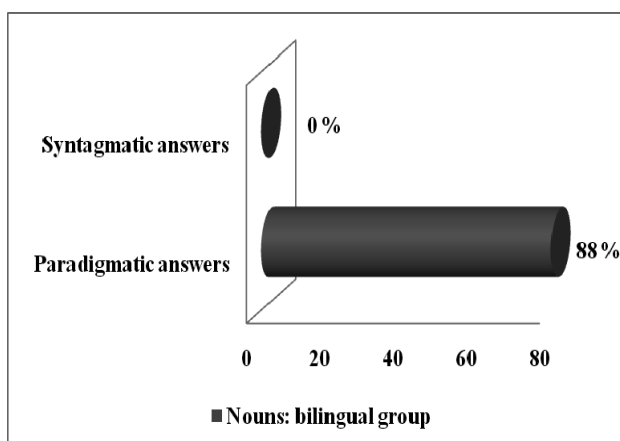


Chart 1. The distribution of the lexical relations in the bilingual children’s answers. Prompt words: nouns

The reason for the smaller percentage of the bilingual children’s paradigmatic answers lies in the fact that they tended to give more “I don’t know” answers where they could not find the correct lexical term for a picture (11% of “I don’t know” answer for the bilingual group and 7% for the monolingual one).

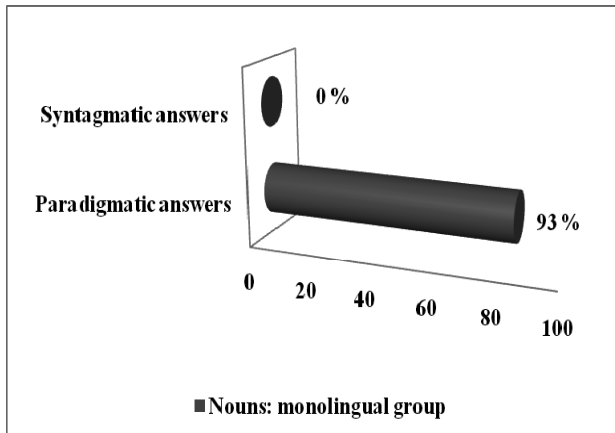


Chart 2. The distribution of the lexical relations in the monolingual children's answers. Prompt words: nouns

It is noteworthy that none of the 180 animal picture namings indicated a syntagmatic relationship with the denoted concept, and only one bilingual child provided an idiosyncratic answer (when he saw the picture of the 'seal', he said "UFO", by this activating his associative memory).

Charts 3 and 4 show similarly high percentages for verbs used as prompt words but this time in favor of the syntagmatic relationships in children's picture-naming: 96% for the bilingual group and 91% for the monolingual one.

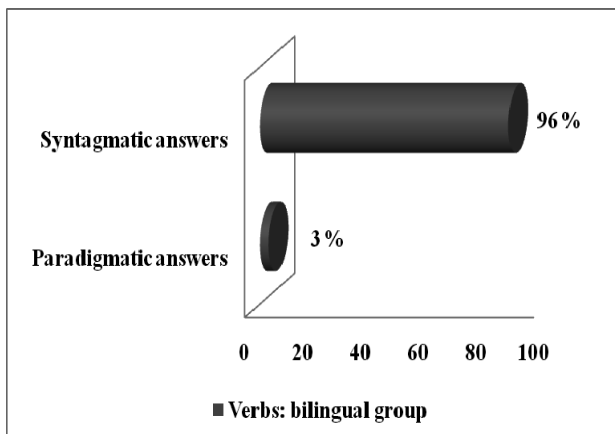


Chart 3. The distribution of the lexical relations in the bilingual children's answers. Prompt words: verbs

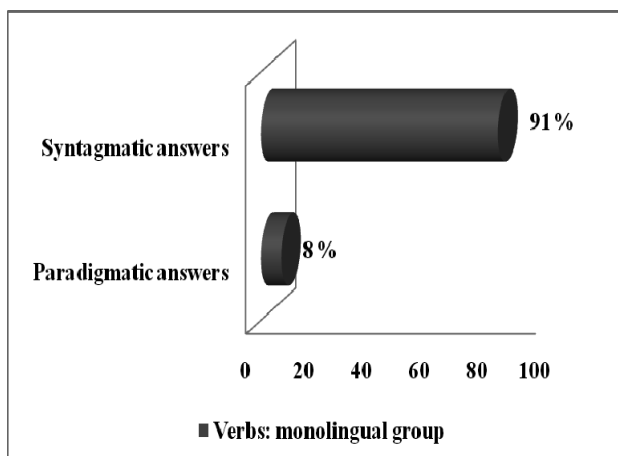


Chart 4. The distribution of the lexical relations in the monolingual children's answers. Prompt words: verbs

This result may be explained by the different nature of the pictures denoting actions: in comparison with the ones that represent animals, which are static, these ones are more dynamic and show different objects, tools or elements of nature near the person who is performing the activity. Probably this is why I found two different end points in the children's answers:

(a) They simply denoted the person or one of his/her main characteristics, thus forming a predicative or a subordinate clause with the represented concept: e.g., when they were shown a picture of a girl sitting, and therefore the prompt word itself was the verb 'sitting', most of the children said *kislány* (Hungarian) or *fetiță* (Romanian), which means '(little) girl' in both languages. As a result, they formed predicative clauses with the concept represented in the picture: *a kislány ül* (Hungarian)/*fetița stă* (Romanian), which both mean 'the girl is sitting'.

(b) The children's answers were whole syntagms, which in some cases were short and simple like the above mentioned example of 'the girl is sitting', and at other times were more detailed such as *a szomorú kislány ül* (Hungarian), which means 'the sad girl is sitting'.

The percentage of paradigmatic answers for verbs as stimulus words is relatively low for both groups of children: 3% for the bilingual group and higher, 8% for the monolingual group. This result reflects the fact that the monolingual children are somehow more confident when naming concrete actions, while the bilingual ones are less sure of themselves and tend to describe the details rather than find a specific verb in their mental lexicon. For example, when the prompt verbs were *gereblyél/greblează* ('raking'), *fényképez/fotografiază* ('taking a

photo'), the monolingual children provided the expected verbs as paradigmatic answers, while the bilingual ones named the persons performing the action: *bácsi/nene* ('man'), *fiú/băiat* ('boy'), again forming mostly syntagmatic answers rather than paradigmatic ones.

5. The results of the picture-naming task in light of the proportion of L2 answers

Having analyzed the language choice in bilingual children's answers, we can see that in most cases the Hungarian language was the starting point. On average, the bilingual subjects said many more words in Hungarian, and the two Hungarian-dominant children did not provide any Romanian answers despite the fact that they attend a nursery with Romanian as language of instruction. On the other hand, the Romanian-dominant children, whose L2 is Hungarian, provided Hungarian picture namings for both nouns and verbs as prompt words; therefore, their answers require further analysis.

In the case of nouns as prompt words, 22% of the Romanian-dominant bilingual children's paradigmatic answers were provided in Hungarian, some of which appeared in both languages as lexical equivalents, e.g., *patkány/șobolan* ('rat'), *sas/vultur* ('eagle'), *szarvas/cerb* ('deer'). In the case of verbs as prompt words, when naming pictures representing actions, 48% of syntagmatic answers came in their L2 (Hungarian).

The higher percentage (78%) of paradigmatic answers provided in their native language (Romanian) for the animal pictures demonstrates the fact that they still rely more on their L1 mental lexicon when needing concrete names while the much higher proportion of Hungarian syntagmatic answers for action pictures lets us conclude that they use the L2 terms more confidently when the pictures allow some sort of description and they can search in their L2 mental lexicon more freely.

6. Conclusion

In my research, even though I deliberately chose the youngest age group attending kindergarten, their age did not influence the proportion of the lexical relationships in their picture naming. It seems more appropriate to assume that the organization of young children's mental lexicon is influenced just as much by the grammatical class of the prompt words, as with adults (Navracsics 2007); thus, nouns attract paradigmatic answers and verbs syntagmatic ones. In the case of nouns (as prompt words) none of the answers reflected syntagmatic relationship with the denoted concepts although we might have expected this kind of answers taking in consideration the results and conclusions of earlier studies in this field. In this class the use of hyponyms, hyperonyms and meronyms as paradigmatic

answers suggests that children as young as age 3 and 4 do have the ability to organize their mental lexicon in a sophisticated way. These types of hierarchical and asymmetrical word categories could not be found in the case of the action pictures. When the subjects were asked “What is he/she doing in the picture?” both groups (bi- and monolingual) provided significantly less verbs as answers. Since they were not able to provide the synonyms or antonyms of the actions represented in the pictures, the majority of the tested children preferred the syntagmatic answers in this category.

The results revealed the often reported noun advantage in children’s language acquisition. The internal organization of the tested children’s mental lexicon illustrated very clearly that there are representational and processing differences between nouns and verbs. The semantic representations of verbs have traditionally been considered to be more complex than those of nouns. Concrete nouns, being labels of objects in the world, exist independently of other word categories, and they are, therefore, organized predominantly in relation to one another. Verbs, on the other hand, by virtue of their argument structure, always entail reference to related nouns. Since the debate about noun and verb acquisition is still unsettled, further study of this problem is needed among young Hungarian-Romanian bilingual children.

As the bilingual children, especially the Romanian-dominant ones, provided answers in both languages (with a higher percentage of syntagmatic relations in their L2 answers), we may conclude that bilingual children rely on the mental lexicon of both languages, and the two language subsystems are linked to the same conceptual system. They are able to give answers in L1 and in L2 (very often as lexical equivalents of the same concept) and the higher or lower percentage of some of their L1 or L2 language choices may well be dependent on factors like individual experience and exposure to specific words in those languages.

The dominant language of the tested children’s wider environment (in this case Hungarian) seemed to have a considerable influence on their language choice. We may assume that the opposite would be true for children who live in towns with a bigger Romanian majority population, where most probably Hungarian-dominant bilingual children display a higher level of proficiency in Romanian. All the conclusions remain to be tested against further evidence.

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