LEXICAL ACCESS MODELS DURING LANGUAGE SELECTIVITY IN BILINGUAL SPEECH PRODUCTION

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İKİDİLLİ SÖYLEM ÜRETİMİNDE DİL SEÇİMİNDEKİ SÖZCÜKSEL ERIŞİM MODELLERİ

Öz


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Abstract

In this study, locus of language selectivity is discussed in terms of bilingual speech production. The issue of “Concept Selection Model” and “Inhibitory Control Model” is the focus of this study. Cognitive features behind language switching and language selection process will be presented. The main objective of this study is to explore whether the competition between languages to be chosen in a bilingual mind is determined at the time of conceptual level or at the time of lexical level. In other words, this paper aims to foster how bilingual individuals control their two different lexical systems. It proposes the differences between concept selection and inhibitory control mechanisms in terms of multiple levels of control mechanisms. These models are analyzed from the

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perspective of La Heij (2005) and Green (1998) and their experimental studies on these theoretical fields.

**Key Words:** Bilingualism, Concept Selection, Inhibitory Control, Lexical Access

1. **Introduction and Background**

Since the early 1990s, language selectivity, lexical selection and productive models have become increasingly popular with online research methods such as Stroop-translation tasks.

Language selection depends on some factors such as second language experience of the bilinguals, the demands of the production task and the activity of the nontarget language (Kroll, Bobb and Wodniecka, 2006). Finkbeiner et al. (2006) named this language selection process as “hard problem” because to achieve the simple goal of language production - such as naming a picture of an object- it is necessary to identify the object, understand and analyze its meaning map and finally, specify the phonology associated with that word. It means that this hard problem in bilingual lexical access is observed when translation-equivalents are activated at the same time and thus both lexical representations of these languages compete equally to be chosen for language selection. (Finkbeiner et al., 2006; Kroll et al., 2006). During this process, while some researchers propose that this hard problem has been solved before the production during preverbal message, other researchers propose that this problem only solved when the nontarget language has been suppressed by the target language.

In terms of language selection two types of theories have been proposed. First, lexical selection mechanism considers the activation levels of lexical nodes only in the target language and during this process bilingual mind does not activate nontarget language (Costa, miozzo and Caramazza, 1999). The other, the selection mechanism creates differences in the activation levels of both lexical nodes, in other words, bilingual mind sends more activation to the target language lexical nodes (Green, 1998).

Researchers who have carried out various experiments and studies on language selectivity and language switching (Bloem and La Heij, 2003; Costa et al., 1999; Costa and Santesteban, 2004; Green, 1998; Meuter and Allport, 1999) agree that cognitive process and high control mechanism are used during these activities. First, before explaining these
activities, it will be better to start studying the language selection with the procedure of monolingual and bilingual lexical access. La Heij (2005) states that lexical access in monolinguals and bilinguals can be seen as “complex access, simple selection”. He explains this term as “access is complex in the sense that preverbal message contains all the relevant information including the intended language” (p.302).

1.1. Monolingual and Bilingual Lexical Access

La Heij (2005) asserts that if there is a satisfactory model of lexical access in monolinguals, it is really easy to understand the bilingual lexical access. Recent investigations on monolingual language production have reflected the features of each of these processes and the time course over which it is easier to understand bilingual lexical access. On the other hand, some researchers propose that before the articulation process, the lexical selection takes place in the parallel way with conceptual, lexical and phonological process in other words; it occurs during preverbalization (Caramazza, 1997; Starreveld and La Heij, 1996). From the perspective of bilinguals, during speech production, separating two languages and selecting the appropriate words are the most important capabilities that they have. In that case, it should be questioned as to how the production of bilingual utterance takes place in the mind, and as to how it functions as control mechanisms. The answer to this question can be given only after the understanding of why bilinguals switch languages while they are speaking in a specific language. The language choice of bilinguals depends on their individual experiences, language production processes, the dominance of the non-target language and language proficiency levels of them (Kroll et al., 2006). In fact, bilinguals can be separated from monolinguals in that they must also select the language requirement of the production (Costa, 2005; La Heij, 2005). On the other hand, there is a critical respect that for a bilingual, language of production must also be selected, whereas for a monolingual speaker it is not (Kroll, Bobb and Wodniecka, 2006).

Levelt (1989) divides monolingual speech production into four groups: the first one is “message generation”; the second one “grammatical encoding”; the third one “phonological encoding” and the last one “articulation”. When we analyze the Levelt’s model above (blueprint of the speaker), it can be easily seen that when monolingual speakers of English verbalize a picture task (which is given them to name in their
own language), it appears to be an easy task. In fact, it is really complicated in a cognitive aspect. Schwieter (2007:1) puts it as “how competition between words in the lexicon is resolved is of central interest to psycholinguists”. From Levelt’s perspective, “when we show a picture of a cat to a monolingual English speaker, the picture would activate the appropriate concept (in the conceptualized component)”(p.23), after this concept has been established, the activation occurs in the lexical level which is full of related words such as dog, fluffy, mouse, bird, etc... (in the formulator component). Later, lexical selection starts and finally meaning of this word (cat) is chosen for the production (in the articulator component).

**Figure 1.** Blueprint of the Speaker (Levelt,1989:310)
In bilingual case, most concepts have more than one lexical item when translating words into a more dominant language. For Italian-English bilinguals, for instance, when a picture of a “table” was shown to name in one of their languages, both the lexical items “table” and “tavolo” will be activated in their mind. As Schwieter (2007) states, competition occurs both within the same language and between the languages. A bilingual will have to solve the competition that exists between the two candidates (table and tavolo) and then have to produce the word in the correct language.

As can be seen in the figure, when a bilingual encounters a picture of an object to name in another language, language cue of the target language is activated and symbolized at the same level with its conceptual features. According to some researchers, language switching or code-switching occurs exactly at this point.

**Figure 2.** A model of bilingual language production (adapted from Poulisse and Bongaerts, 1994 and Hermans, 2000). The model illustrates the case in which lexical access in production is assumed to be non-selective language.
La Heij (2005) intends to solve the problem of bilinguals selectively retrieving words from either their first or second language when both words express the same conceptual content by analyzing monolinguals facing a preverbal message. Poulisse and Bongaets (1994) have established a hypothesis that a language cue in the preverbalization process is used to produce words in the target language. Poulisse explains this model as: “conceptual information and the language cue work together in activating lemmas of the appropriate meaning and language. In other words, language is one of the features used for selection purposes” (Poulisse, 1997: 216). As mentioned above, there are many similarities between monolingual and bilingual lexical access process. In the process of lexical selection, two languages are handled by one mind at the conceptual and lexical levels and then it is assumed that situational information would proceed certain features at the semantic level with the direction of preverbalization process (Caramazza, 1997; Costa and Santesteban, 2004; La Heij, 2005; Scwieter, 2007; Poulisse and Bongaerts, 1994).

A bilingual mind has to process many words which are activated to select the best candidate. For example, the picture of the word “dog” basically activate certain semantic features such as four-legged, furry, animal, pet etc which activate the appropriate words they are describing. Later, other semantically related words (cat and gatto) have been activated however, at the time of choosing the right word; there are some proposals which are offered by some researchers. First of all, this selection occurs at the conceptual level or lexical level (Scwieter, 2007). In this study, the problem of this selection will be attempted to be solved by analyzing concept selection hypothesis of La Heij (2005) in terms of proficiency level of L2 and age of acquisition.

1.2. Lexical Access in terms of Language Selection Models

During the last decade, many different models on lexical access have been suggested. However two models on language selection and lexical access have still protected their places in this competition. One of them is the type of the models where researchers propose that both language aspects and lexical concepts have been activated and then they compete with each other to be produced. The other type of the model proposes that only target language concepts have been activated when it is mentioned to be produced.
Bilingual language production appears to be part of only a small first step of this production and lexical access. Levelt (1989) highlights that lexical access is the primary and vital level of cognitive process and it includes presentations of the words, selective attention, semantic memory and other executive functions. Therefore, as long as we understand how lexical access proceeds, we will have more information about cognitive process. Researchers and linguists today argue that bilingualism is not an unusual situation however it is a necessary situation. For this reason, bilingual or multilingual language production process should be handled along with monolingual language process.

As we mentioned before, earlier models of language production research on selection process are divided into two classes, and Levelt (1989) has gathered this process under two main headings:

1. Selection of conceptual knowledge (concept selection)
2. The choice of the word to be produced on the basis of activated words (lexical selection)

He also discusses two major features of bilingual lexical access:

1. The language which bilingual speaker wants to proceed is a part of the message which occurs during preverbalization which contains conceptual words.
2. The selection of the utterance depends on the activation level of the lexical representations and a simple process. In this respect, “complex access, simple selection” theory is against to the theory of “simple selection, complex access”.

In this process, the lexicon contains syntactic, semantic and phonologic features with words representations. (Kroll, Bobb and Wodniecka, 2006; Levelt, 1989; Muysken, 2000).

As a definition, the process that makes the connection between the idea [dog] and the word “dog” is referred to as lexical access (La Heij, 2005). In fact, lexical access can be seen as a small part of bilingual language production whereas articulation of the words from the lexicon matches exactly the communicative intention (Costa and Santesteban, 2005; La Heij, 2005). From the other perspective, lexical access is a microcosm of cognitive processing which involves semantic memory, selective attention, and mind-mapping structures (La Heij, 2005; Costa, 2005).
Like the model suggested by Poulisse and Bongaerts (1994), lexical access can be identified by the term of “complex access, simple selection” which is contrasted with recent proposals stating “simple access, complex selection”. In terms of achieving the goal of naming a picture of an object, identifying an object, understanding its meaning, producing the appropriate words and specifying the phonology is associated with the word itself (Schwieter, 2007; La Heij, 2005). In terms of complex access of lexicalization, the main goal of this study can be presented as identifying the locus and mechanism of language selection. As a result, in the light of lexical access models which emphasize conceptual or lexical process we present an experimental study which tests response latencies in word translation task on conceptual area.

1.2.1. Concept Selection Model (La Heij, 2005)

The presence of Concept Selection Hypothesis is discussed with reference to the connectionist Selective Attention Model (SLAM) of Phaf Van der Heijden, and Hudson (1990) (La Heij, 2005). Like CSM, SLAM has been introduced as a model in which there are three processing levels to simulate tasks: a) an early mapping level; b) a feature level (a form module, a position, a colour module); c) a response level (p.296). The Concept Selection Model argues that speech production does not undergo any inhibitory mechanism to produce the target language, as it says that bilinguals make use of a complex set of higher linguistic cues (La Heij, 2005). As mentioned above, since these language cues are present in preverbal message, an abstract tool in which there is a language cue allows lexicalization and target language lexicon appears to produce. La Heij (2005) has modelled his theory of CSM from Poulisse and Bongaerts (1994) and he expresses the following statement:

“First, the language in which the bilingual intends to speak is in the form of a “language cue”-part of a complex preverbal message that contains all conceptual, pragmatic and affective characteristics of the word to be retrieved. Second, the actual selection of a word is a relatively simple process mainly based on the activation levels of the lexical representations (p.290)”.
Besides, researchers who support Concept Selection Hypothesis express the following steps to name an object: First, the visual processing of the object supply the activation of a representation in the conceptual system and at that time, the object and its features are recognized such as its smell, taste, and function and so on. Later, the conceptual information about the object that the speaker wants to produce is activated and finally, the speaker is ready to produce this concept which is called as concept selection (Costa and Santesteban, 2004; La Heij, 2005).

As it is illustrated in the figure, picture naming in L2 is facilitated by the picture of "CHAIR". For the bilingual speaker, not only the intended word, but also the semantically related words in both languages are activated. However, speaker selects only one word from this set of candidates for further processing. As La Heij (2005) has emphasized, lexical selection is based on a complex message happening in preverbalization process which consists of all relevant information to arrive at the correct word. Finally, lexical selection can be a simple process for the bilingual who selects one word from the set of all activated words.
The Concept Selection Hypothesis states that the message in preverbalization ensures that activation levels of the translation equivalents are lower than the target language word itself. In other words, the language cue which is responsible for providing the target language provides higher level when we compare it with the non-target language. Under this assumption, language selectivity occurs at conceptual level in which competition between languages is eliminated and activation proceeds to the lexical level (La Heij, 2003; Schwieter, 2007). For instance, when the picture of a word is given to an English-Italian bilingual speaker to produce that word in English, also some Italian words are activated, however; the English ones are chosen and considered in the lexical selection process. This is not due to any inhibitory control but due to the fact that this problem is solved in preverbal message process and the to-be-produced word is determined before lexical process.

The most discussed model among the models on bilingualism, production of the utterance, lexical access and language selection is the one which is proposed by La Heij (2005) called “Concept Selection Model”. This model proposes that selecting one language or one lexical item while producing an utterance is very difficult process. According to him the problem is already solved at the conceptual level. Schwieter and Sunderman (2008), explain the hypothesis of La Heij as the selection of target lexicon occurs before lexical access that is at the conceptual level (preverbalization).

1.2.2. Inhibitory Control Model (Green, 1998)

Green’s Inhibitory Control Model (1986,1998) is not concentrated by the conceptual level. In this model each lexical item includes a “language tag” at the lexical level, and lexical access is mediated by inhibitory control models (Schwieter and Sunderman, 2008). Contrary to Concept Selection Hypothesis, this model does not include a preverbal message and language tag allows the words to demonstrate which language they belong (Schwieter, 2007).

This model is against to language specific models because it favors non-specific language selection (Lucht,2011). The main idea of this model is to select one language during lexical process without pressure of non-target language. That is, non-target language must be inhibited during the target language production. Costa and Santesteban (2004) suppose that...
inhibition is reactive and is used after the lexical nodes of the non-target language are activated from the semantic system.

Basically, lexical selection would proceed as follows: 1) the semantic system sends activation to the lexical nodes of both languages; 2) based on language tags, the non-target words are suppressed; and 3) the amount of suppression is adjusted to be proportional to the level of activation (i.e., the more activation that is sent to the non-target language, the more inhibition will be needed) (Schwieter, 2007: 22).

There is an asymmetrical system size between the L1 and L2 and on this respect, more inhibition is applied to the L1 when the L2 is the language of production and less inhibition is applied to the L2 system when the L1 is the language to be produced (Costa & Santesteban, 2004; Costa, 2005; Costa, Santesteban, & Ivanova, 2006; Schwieter, 2007; Schwieter & Sunderman, 2008). Meuter and Allport (1999) carried on an experiment to investigate language switching of bilingual speakers who are asked to name aloud the lists of Arabic numbers (from 1 to 9). The experimental group had to name the numbers according to the background colors. That is, if the number is blue, they had to name it in L1, if the number is red; they had to name it in L2. The trials in the experiment were divided into switch and non-switch trials. A non-switch trial showed a response in the same language as the immediately preceding trial however, a switch trial showed a response from another language. As already supposed, naming trials in switch were slower than in non-switch trials and switching cost was larger for L1 than for L2. In other words, to switch from L2 to L1 was more costly than switching from L1 to L2 (see also Costa and Santesteban, 2004). As Green (2003) emphasizes “the intention to speak one language rather than another leads to the raising of the activation threshold of the other language system but not to its total inhibition” (p.13). Contrary to this, speaking one language reduces the activation threshold of components in the system. Activating and deactivating language systems allows bilinguals to achieve different language modes (Grosjean, 1985a, 1997; cited in Green, 2003).
1.3. Conclusion

This paper has addressed the question of how bilingual individuals control the use of their lexical access. Language-specific and non-specific models have been analyzed. In this respect, especially Concept-Selection Model by La Heij (2005) and Inhibitory Control Model by Green (1986, 1998) have been expressed. Future research must continue to address the variability of these two different mechanisms by the help of experimental study. Furthermore, additional research should be conducted on the levels of bilingual individuals on L2 and if this is the case, what factors (i.e., age, age of language acquisition, language proficiency and multilingualism etc.) contribute to such fixation or selection.

References


