



Modeling Bilingual and Multilingual Lexicon and the Role of Interlanguage Transfer

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Abstract: The present study is aimed to investigate the issue of how a human stores and access the knowledge of two or multiple language based on three models of bilingual and multilingual mental lexicon and to discuss the characteristics of interlanguage transfer found in bilingual and multilingual speakers. These three models are the models proposed by [1, 2, 3]. The important characteristics of these three models and the issue of interlanguage transfer will be studied using documentary research method. The documents were analyzed using content analysis method. The data were analyzed in terms of language components included in the explanation, relations among language components, and interlanguage transfer. revealed and discussed. The characteristics of the selected models were discussed in terms of language components and relations among language components. In addition, the role of interlanguage transfer in the development and acquisition of second language, third language, and multiple languages will be also identified.

Keywords: *Multilingual, models, language components, language transfer*

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I. INTRODUCTION

According to the present global situation, there is the increase of bilingual and multilingual speakers and most of global citizen does not speak only one language as native language, the investigation of bilingual and multilingual speakers has been more concentrated and is proposed by different theories and models from various fields.

In linguistics field, the phenomena of bilingual and multilingual speakers are one of important and distinguished issues. The phenomena of bilingual and multilingual speakers are interested in both theoretical and applied linguistics. This is because most of countries in the World become bilingual and multilingual countries [4]. According to World Economic Forum [4], top 10 of the most multilingual countries are Papua New Guinea with over 839 living languages, Indonesia with over 707 living languages, Nigeria with over 526 living languages, India with over 454 living languages, United States with

over 422, China with over 300 living languages, Mexico with over 289 living languages, Cameroon with over 281 living languages, Australia with over 245 living languages, and Brazil with over 229 living languages. In addition, [5] mentioned that bilingual population is half of the world population.

Most of the research also point out the benefits and advantages of bilinguals and multilinguals as compare to monolinguals such as cognitive development [6], delaying Alzheimer disease [7], and improving learning and world understanding abilities [8].

The present study is interested to investigate the issue of how a human stores and access the knowledge of two or multiple language, which is mentioned to as the study of mental lexicon. This is because the issue of how a human stores and access the knowledge of two or multiple language is a core concept of bilingual and multilingual study and is a fundamental notion underlying characteristics and benefits of bilinguals and multi-

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linguals. Regarding to previous studies [9, 10, 11, 12], there are different definitions of mental lexicon. However, the fundamental concept is that mental lexicon is the cognitive system, which language specific knowledge is internally represented. A language speaker must have this knowledge before s/he can use a language.

However, [13, 14, 15] proposed that bilingual and multilingual language knowledge and cognition cannot be investigated with monolingual perspective and methods; for instance, a question of whether the first, second, and additional languages of multilinguals can reinforce one another.

The study of how languages are stored and accessed in bilingual and multilingual speakers will concentrate on interaction of language knowledge between two or more languages, effect and change of the interaction, and factors related to bilingualism and multilingualism.

Therefore, the recent study will focus on the models of multilingual speakers proposed by [1, 2, 3]. Then, the multilingual speakers' interlanguage transfer, which is the most frequently observed phenomena will be finally discussed. The issue of interlanguage transfer will focus on how first language and second languages interfere with each other.

II. RESEARCH METHODOLOGY

Documentary research method was used in the present study. Books and research papers concerned the models of multilingual speakers proposed by [1, 2, 3] were collected. All documents were published in English language. To obtain the data, the documents in a university library were collected.

The documents were analyzed using content analysis method. The documents selected were analyzed in terms of language components included in the explanation, relations among language components, and interlanguage transfer. Finally, the data was summarized and discussed based on bilingual and multilingual phenomena.

III. RESULTS

A. The Model of Levelt (1993)

One of early models of multilingual mental lexicon is a model proposed by Levelt [1]. However, Levelt's model focuses on an explanation of mental lexicon based on language speaking rather based on the other language activities as writing, reading, and listening. Based on Fig1, Levelt's model of multilingual mental lexicon consists of six components, which work together as linear activation until a human can produce an output as language speaking.

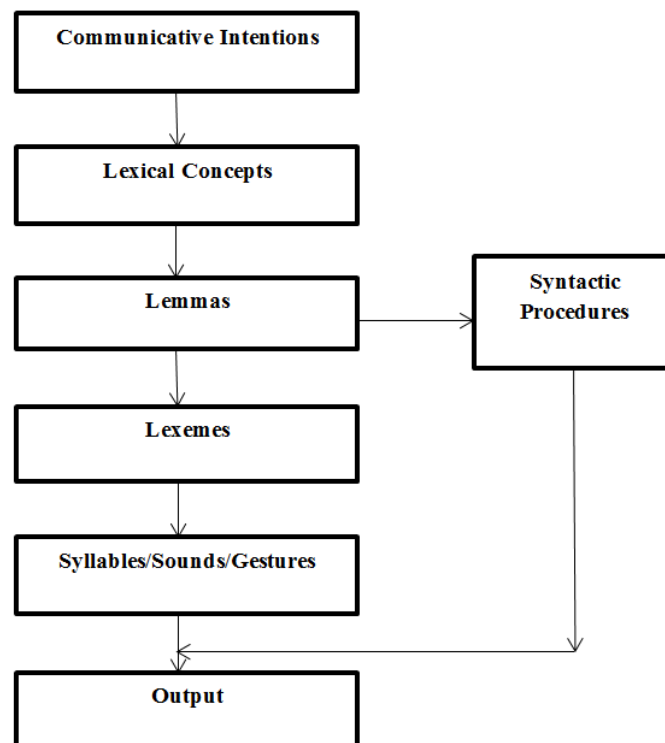


Fig. 1. Levelt's speaking model [1]

Regarding to Fig 1, rather than communicative intentions, which is not language representative, the component of lexical concept is the highest level of the model. The linguistic activation will start from the level of lexical concepts. The lexical concept component will include the concepts in human knowledge and communication such as the concept of being a tree, a man, a house, and so on. While a speaker has a concept, which s/he would like to communicate, the level of lexical concept will activate the following components as lemmas, syntax, lexemes, and syllables/sounds/gestures, orderly.

According to the activation of lemmas, the meaning of the concepts in which a speaker would like to communicate will be matched with the lemmas, which is an abstract conceptual form. With this procedure, the lemma, which is highly matched with the meaning of concepts will be selected. Based on this activation, this model allows that words, which share semantic features from different languages will be connected through the conceptual system.

After the highly matched lemma is selected, the activation of syntactic procedures and the activation of lexeme will be occurred parallel. The syntactic procedures will be activated via the selected lemmas and the activation of lexeme will be activated as the following

procedure after the activation of the level of lemmas.

Then, the activation of the level of lexeme will be followed by the activation of the level of syllables/sounds/gestures. Levelt [1] proposed that the syllabary is the system of word forms, especially syllables. The syllables, which are shared by subsets for different languages will represent as connection between subsets and between languages. Regarding to this activation, the appropriated syllables/sounds/gestures of selected lemmas are activated in order to proceed to the output level.

Based on the output level, a speaker will produce an output such as speaking or the other language communicative forms.

The next model, which will be illustrated is the model of De Bot [2], which provides an alternative explanation of multilingual speech production.

B. The Model of De Bot (2008)

According to De Bot's model [2] (as in Fig 2), there are three components related to speech production in multilingual speakers. These components are conceptual characteristics, the syntactic properties, and the form of the elements including sounds, syllables or gestures. The interesting feature of De Bot's model is that in each component, there are language specific subsets.

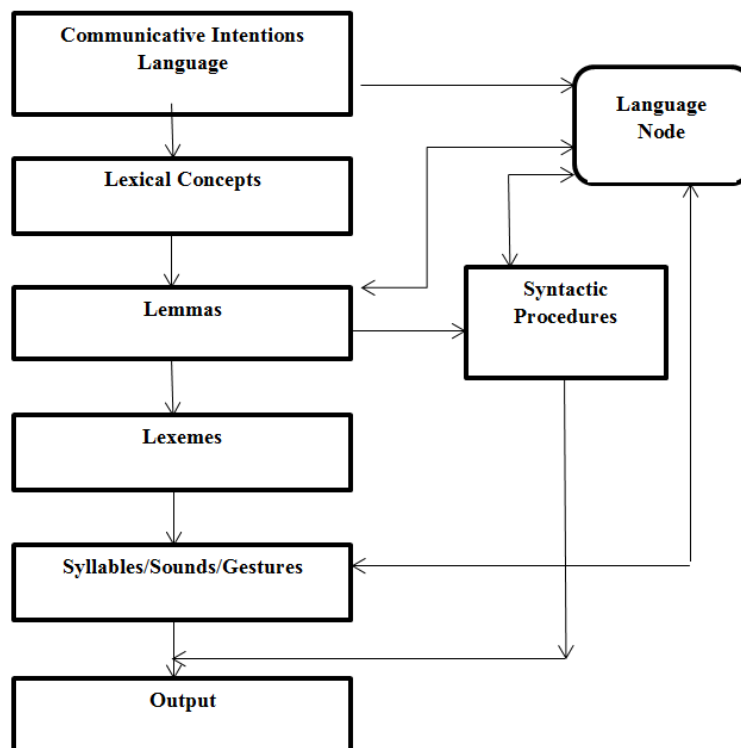


Fig. 2. Multilingual processing model [2]

For example, if a speaker knows English and French languages, there are English language subsets and French language subsets included in the components of conceptual characteristics, the syntactic properties, and the form of the elements. Additionally, if a speaker knows English, French, and Chinese languages, there are English language subsets, French language subsets, and Chinese language subsets included in the components of conceptual characteristics, the syntactic properties, and the form of the elements. With the feature of language specific subsets, the model allows for the explanation of the overlapping between language similarities among different languages.

Regarding to this model, there is the feature of language node. When a speaker uses a specific language, a linguistic node of the language, is produced by speakers, will be selected and activated. In addition, overlapped elements between a produced language and the other languages, which a speaker acquired will be activated. For instance, when a bilingual speaker produces first language, an overlapped element in second language will be also activated. Whereas, when a multilingual speaker produces second language, an overlapped element in either first language or third language will be also activated.

In the next section, the integration of dynamic system theory to the explanation of multilingual model will be illustrated. The model of multilingualism proposed by [3] will be introduced in the next section.

1) *Herdina & Jessner's the dynamic model of multilingualism*: The dynamic model of multilingualism [3] is the implementation of dynamic systems theory in the model of multilingualism. The model is aimed to provide an explanation for the acquisition of multiple languages [16]. In this model, the explanation of multiple language acquisition is based on the feature of interdependent multilingual language systems. Regarding to this model, the growth of each acquired language is not linearly developed. Thus, third language can be faster and better acquired rather than second language.

In addition, this model also gives an importance to the change of quality in language learning process and learner variation. The roles of quality in language learning process and learner variation are included in the model in order to explain multilingual learning process. For instance, a person can learn and communicate using third language efficiently rather than using second language if the quality of third language learning is better than the quality of second language learning. In addition, there are various kinds of learner variation, which can influence the multilingual characteristics of a language user.

C. Interlanguage Transfer

Based on these three models, the phenomenon of interlanguage transfer is investigated at different levels of language processing. The phenomenon of interlanguage transfer is transferring the feature of a language, which s/he acquires or uses to communicate to the acquisition and the activation of other languages, which s/he acquires or uses to communicate. The influence of interlanguage transfer can be occurred in different step of language acquisition and language communication.

In this section, the role of interlanguage transfer, which included in various theories and research examples will be illustrated and discussed. Rather than the explanation that the acquisition development of second-language, third-language, and multiple languages shares the same learning process, there is another assumption that acquisition development second-language, third-language, and multiple languages do not share the same procedure [17, 18]. This later view provides the explanation that there is a new learning procedure in the development of second-language, third-language, and multiple languages acquisition and there is the role of different language acquisition influencing interlanguage transfer.

One of the exemplar theories, which included the influence of different language acquisition in the explanation of second-language and third-language acquisition is the study of [19]. Regarding to Cenoz and Valencia [19] and [20], learners of a third language or multiple languages will have linguistic and cultural knowledge of at least two languages. As a result, the assumption is that the knowledge, which the learner has acquired of the second language, is available to be implied in the learning of third and further language learning. In addition, the explanation further focuses on the influence of learner's prior second language knowledge on the cognitive and linguistic adaptation process in their language learning. These theories, which include the role of second and third language in the investigation of language transfer will provide different explanation from the traditional explanation of language transfer, which is restricted to the transfer from the native language [21].

Furthermore, the notion of language transfer is also investigated in psycholinguistic field and examined in mental processing [22]. Based on psycholinguistic and mental processing study, language transfer crucially concentrates on transferring from their native language to the foreign language [19, 23, 24].

In conclusion, the study and investigation of the role of language transfer on the acquisition of multiple languages has been begun to be important and concentrated in the field of psycholinguistics and related fields.

This phenomenon is referred to as interlanguage transfer by [25] as “the influence of one L2 (using the broad sense of this term) over another”. In addition, the investigation of bilingualism and multilingualism should carefully concentrate on the influence of interlanguage transfer in providing research design and data explanation.

IV. DISCUSSION

Based on the model of Levelt in 1993, the explanation focuses on speaking skill. The storage and access of language knowledge are explained into six components consisting of communicative intentions, lexical concepts, lemmas, lexemes, syllables/sounds/gestures, and syntactic procedure. The activation among these six components is linear way. Thus, the model of Levelt is argued that the model was proposed in a linear way and it is not clear how the language information are organized and procedures [2]. This led to the development of the other models as proposed by De Bot in 2008.

The model proposed by De Bot [2] attempts to include language knowledge of different specific languages as subsets. For instance, there are first language, second language, and third language subsets. These subsets are included based on three components as conceptual characteristics, syntactic characteristics, and forms. According to De Bot [2], there is a mechanism that specific language subset will be selected during the activation and the activation is not necessary to be linear. This is because this model allows the activation of overlapped elements between a produced language and the other languages, which a speaker acquired will be activated. Whereas, when a multilingual speaker produces first language, an overlapped element in either first language, second, or third language will be also activated.

Whereas, the model of [3] concentrated on the nature of dynamic development of first, second, and third language activation. This dynamic characteristics is not mentioned in Levelt’s model [1]. The dynamic way is a distinguished feature of the model. The model proposed that multilingual competence is dynamic, which involves changes and variation in the acquisition and the use of language. Eventually, monolingual speakers’ language proficiency is also dynamic; however, multilingual speakers’ language proficiency is more obviously dynamic. The explanation implied that language proficiency of first language is not necessary to be better than language proficiency of second and third languages. In addition, language proficiency of third language might be better than language proficiency of first and second languages. This implied that considering the dynamics of the multilingual language system can be criticized in

terms of the non-linear view of language system.

The explanation of these three models can be supplemented by the notion of foreign language development. Foreign language development is the process by which people learn a foreign language in addition to their native language(s). The term Foreign Language is used to describe the acquisition of any language after the acquisition of the mother tongue. The language to be learned is often referred to as the "Target Language" or "TL", compared to the Native Language, "NL", referred to as the "Source Language" or SL. Foreign language acquisition may be abbreviated FLA. It was discovered that there is a developmental sequence of acquisition for foreign language learners which precludes the early learning of certain items.

It has long been recognized that different languages have different sets of speech sounds. As a result, a FL learner would often encounter sound segments in FL which NL does not have [26, 27, 28]. The previous studies attempted to gain insight how FL sound system develops and how this development is shaped by linguistics. For example, [29] investigated the location of the voice onset time boundary for the English and Spanish voiced and unvoiced labials [b] and [p] among Puerto Rica children and adolescents learning English. The results demonstrated gradual shift from the location of the Spanish boundary to the location of the English boundary in both the perception and production of the sound.

Furthermore, the explanation and implication of the interlanguage transfer and related factors with these three models can be extended. Interlanguage transfer and related factors is a complicated phenomenon. There are different kinds of transferring and various factors.

According to the study of interlanguage transfer types, there are different types of interlanguage transferring proposed by the previous investigation. For instance, [30] revealed a study of a Canadian first language speaker, who can speak three foreign languages as Spanish, English, and Italian, spoke Italian language. The results were implied that there are two types of interlanguage transfer as full and partial lexical interlanguage transfer. Firstly, full lexical interlanguage transfer is phenomena, which an entire word of the previous acquired language was used in the production of the later acquired language. For instance, a word of first language was used in the production of second or third language. Secondly, partial lexical interlanguage transfer is phenomena, which morphological feature of the previous acquired language was partially used in the production of second or third language. The results were implied that phonological similarity or difference among speaker’s languages provides

the influence on types of interlanguage transfer and how lexical knowledge of a particular language is selected during speaking.

Additionally, there are more types of language transfer proposed by different work. For example, [31] revealed that there is a reverse transfer, which there is a transfer from knowledge of second language to first language production.

The examples of research on related factors are the role of first language and age differences. First, the role of first language is an important factor in second language performance. The role of first language towards the second language is also explained by the contrastive analysis of first language and second language [32]. This hypothesis is an attempt to predict the areas of difficulty that learners experienced, and eliminate the chance of error from comparing and contrasting among languages. As the learner's second language proficiency grows, first language influence will become less powerful. Second, the factor of age differences predicts that children can develop language better than adults can. There has been a lot of considerable research on the effect of age such as the study of [33, 34]. According to [35], the age factor has different influence on different aspects of language. For instance, children can develop speaking and listening ability better than teens and adults; whereas, teens and adults can develop morphology and syntax better than children.

V. CONCLUSION

According to the above models, the investigation of language storage and access in bilingual and multilingual people can be extended in various aspects such as the related linguistic and non-linguistic factors. The examples of related linguistic factors are different linguistic levels as forms (speech and written language), conceptual features, syntactic features, and overlapping or different features of first and second language. The example of related non-linguistic factor is age of language users.

The interesting issues in the study of interlinguistic influence in second language and multiple language acquisition have been focused in various aspects of studies such as the study of transferring types in multiple language acquisition, the facilitation and inhibition of interlanguage transfer, and the roles of interlanguage transfer in the cognitive system e.g., [17, 18, 23, 36]. These issues can be deeply investigated in the multilingual people with different kinds and levels of native language, second language, or multiple language acquisition and proficiency.

In addition, the understanding of how human

learns, stores, and process the knowledge of multiple languages and how human produces these languages is not only important in the linguistic discipline, it is also interrelated with the other disciplines such as education, psychology, neurosciences, and even computer sciences. The limitation of the present work is that the examples proposed here can not include all of aspects of multiple language storage and access and interlanguage transfer. This is because these phenomena were complicated and can be investigated in various dimensions.

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