

Research Paper

Language Selection in Bilingual Speakers: A Multidisciplinary Approach

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Abstract

Language selection in bilinguals is a multidimensional phenomenon. This paper aimed to adopt a multidisciplinary approach to investigate language selection in bilingual speech production. The present paper first reviews the sociolinguistic aspects of bilingual language choice, moves on to investigate the notion of language choice presented in the models of bilingual language production and comprehension, views different factors through a single window into the bilingual language selection, and finally examines language choice in dialogue. In this study, I examined neurolinguistics, psycholinguistic, and sociolinguistic models of bilingual language production in order to provide a better understanding of bilingual language selection. When language choice is formulated, information about language is included in the preverbal message at the conceptual level in order to channel the preverbal message into the intended language. This study suggests that as bilingual language selection is highly affected by the context, language tag specification is formulated outside the language system and the output is sent to the conceptualizer level where it is included in the preverbal message. Language cues may have various values depending on the linguistic context. In a bilingual mode or a dense (heavy) switch context, the value of language cues is not very high. I propose that information about language choice at the higher level of processing, language membership information, and language nodes at the lower level of processing construct a language information network that regulates bilingual language processing. Language selection in dialogue settings is also discussed. The present study suggests that bilinguals may not formulate a language choice for every utterance they produce during a course of dialogue or when there is a language history between the two participants.

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1 Introduction

Both bilinguals and monolinguals map the intentions to speak onto language at the conceptual level (Carota et al., 2009). While both groups of speakers consider the same choices (e.g., dialectical or stylistic choices), only bilingual speakers decide whether the utterance will be in language A or unilingual in language B (see La Heij, 2005). De Houwer (2006) assumes that for every utterance a bilingual speaker produces, he or she decides whether it will be unilingual in language A, unilingual in language B, or mixed, in which elements from the two languages are combined. Thus, as Kroll et al. (2006) state, at least one critical respect that differentiates bilingual planning for speaking from monolingual planning is that a bilingual speaker must select the language of production. In fact, only a bilingual speaker needs to determine which language is most appropriate for the conversation (Paradis, 2004).

Bilingual speakers make language choices based on several factors such as *with whom*, *about what*, and *where* and *when* a speech act occurs (Bhatia & Ritchie, 2004). A huge body of research (e.g., Giles & Johnson, 1981; Gumperz & Hymes, 1972) demonstrates that language choice in bilingual speakers is not a neutral means of communication (Sachdev et al., 2013) and has an important role in bilingual verbal behaviour. According to Wei (2013) through language choice speakers “maintain and change ethnic-group boundaries and personal relationships, and construct and define self and other” (p. 43). For Walters (2005) language choice is a significant determinant of social identity. The researcher assumes that bilingual language production consists of various choices among different social identity

options, participants, settings, topics, and discourse patterns, all of which highly depend on language choice. For many bilinguals, intimate settings such as home, neighbourhood, or familiar people like close friends most probably activate the dominant or the primary language, while less familiar contacts activate the other language (Walters, 2005).

Children as young as one year and three months old who grow up based on the one person one language input strategy, have been reported to use language A exclusively with monolinguals of language A, and language B with monolinguals of language B (Sinka & Schelleter, 1998). As De Houwer (2006) puts it, this linguistic behaviour indicates children’s high sensitivity to the addressees’ language choice. Children’s ability to accommodate such language choices indicates a level of sociolinguistic and pragmatic development that is usually not observed in their monolingual peers until at least a year later. The researcher assumes that bilingual children learn which type of utterances they can use or they should use in what situation “through language socialization practice in the family” (p. 784).

The present paper first reviews the sociolinguistic aspects of bilingual language choice, moves on to investigate the notion of language choice presented in the models of bilingual language production (e.g., Green, 1986; Hartsuiker & Pickering, 2008; de Bot, 1992, 2004; Walters, 2005) and comprehension (e.g., Dijkstra & Van Heuven, 2002), views different factors as a single window into the bilingual language selection, and finally examines language choice in dialogue. Bilingual language choice in a dialogue setting has hardly been discussed. Moreover, the present study, to my

knowledge, is the first to investigate language choice in bilinguals from different disciplines.

2 Literature Review

2.1 Bilingual language selection as a social issue

Bilingual language choice has been discussed in several sociolinguistic studies. Fishman (1965) identifies three factors as the determinants of bilingual language choice. The first controlling factor is “group membership”. By using appropriate language, a bilingual speaker identifies herself/himself with a different group to which he/she belongs, is willing to belong, and from which he/she seeks acceptance. It is not surprising to find that a bilingual selects different languages in different situations. For example, a government functionary in Brussels generally prefers to speak standard French in the office, standard Dutch at the club near his home, and a “distinctly local variant of Flemish” (p. 95) when he is at home. He might use a mix of French and Dutch when addressing a French-Dutch speaker. This situation might “be replaced by any one of some others such as Romansch, Standard German, and Schwyzertüsch in some parts of Switzerland. Thus, the main aim of adopting such a convergence strategy is the speakers’ desire to achieve approval from another, namely, the social networks to which she/he is believed to belong (Sachdev et al., 2013).

Social category memberships are sometimes negotiated during bilingual interaction through the accommodation process (Sachdev et al., 2013). Bourhis (1994) reports an example of this in bilingual Montreal in a Canadian community where Anglophones (English

speakers in countries where other languages are also spoken) perceive Francophone much more favourably when the Francophone converges toward English rather than in French, and also vice versa. Both interlocutors use each other’s weaker language to communicate. Their linguistic behaviour demonstrates that speakers might use mutual language convergence as a strategy to improve ethnic harmony. It is not even uncommon to find, for instance, that speakers of High German (German) might choose to speak Swiss German rather than High German in German-speaking states (cantons) in Switzerland, however, they may be understood very well when they speak High German. Selecting Swiss German helps the speaker be more integrated into the Swiss community. As Sachdev and Giles (2004) put it, the more similar speakers are to their interlocutors, the more they will like or respect each other and the more social rewards they can expect.

A second regulating factor that affects bilinguals’ language choice is the “situation” (Fishman, 1965). Speakers’ linguistic behaviour may be affected by the immediate context and the presence of participants. Situational factor refers to the fact that one of the languages of a bilingual speaker is more suited to certain participants, and social groups than the other language (Bhatia & Ritchie, 2004). “Situation” might impose certain regularities in bilinguals’ language choice on certain social occasions. One of the situations that affects language choices is where a monolingual speaker is among the participants. In this situation, a bilingual speaker selects the language that the monolingual knows. Selecting a language that the monolingual participant cannot speak might be an indicator of disrespect

for the monolingual speaker. Such linguistic behaviour of bilinguals shows “a mutual understanding of the obligations and rights of participants” (Bhatia & Ritchie, 2004, p. 339).

Sometimes, including or excluding an individual among the participants from a conversation affects a bilingual’s language choices. This kind of situation arises when a monolingual speaker is among the addressees. In order to exclude an addressee among the addressees from the conversation, bilinguals might choose the unshared language. For example, when Mazandarani-Persian bilinguals (Mazandarani is a local language spoken across the Caspian Sea in northern Iran) have guests who do not know Mazandarani, they might select to speak Mazandarani to talk about the shortage of items (e.g., food). In such a situation, language choice strategy serves to exclude an individual addressee from a conversation.

Some other non-linguistic factors have also been recognized to play roles in bilingual language choices. Among them are religion, occupation, the content of discourse, gender, and ethnicity (see Grosjean & Li, 2013 for a discussion about factors that determine choice). Walters (2005) classifies them into the intrapersonal factors that determine language choices. For example, according to Backus (2004), there is a firm link between religion and language choices among Turkish bilingual speakers. Turkish bilinguals have been reported to use Turkish exclusively in mosques.

I assume that for many situations bilingual speakers decide among four language choice options, unilingual in language A, unilingual in language B, using both languages for communication but

each typically with different speakers (see Green & Abutalebi, 2013 for dual language context), or a mix of the two languages. Their choices are affected by external sociocultural factors such as the addressee, (the addressees’ language proficiency, the addressees’ attitude toward language mixing), and the conversational situation. This is because sociopragmatic knowledge affects language production at different levels from intention to speak to articulation. Fishman (1965) speculates that “proper usage, or common usage, or both” (p. 67) determine that only one of the co-available languages will be chosen by particular interlocutors in a particular situation. I assume that based on such variables (i.e., the proper usage, common usage, or both) a bilingual speaker might also recognize that a mixing of the two languages might be appropriate for a given occasion. When a speaker recognizes that her/his addressee does not have a negative attitude toward language mixing or code-switching, she/he is encouraged to use a mix of the two languages. In contrast, when a bilingual speaker finds that even one of the addressees does have a negative attitude toward language mixing, she/he might not use language mixing. The idea that sometimes mixing of languages is preferred in some contexts is in line with Green’s (2011) assumption that in some situations where a speaker is permitted, he uses the mixing of languages because of “the behavioural ecology of bilingual speakers” (p. 1) does affect the processes of language control. The interactional context determines whether there must be a stronger control over the language-not-in-use or a weaker control suffices. A weaker language control (open control mode) permits language mixing (see Green & Abutalebi, 2013; Green & Wei, 2014).

2.2 Language Selection in Models of Bilingual Language Production and Perception

As language choice is one of the most important characteristics of bilingual speech production, the way how it is achieved needs to be determined in a model of bilingual language production. Several models of bilinguals' speech production discussed language choice in bilinguals. Green's (1986, 1998) inhibitory control (IC) model posits a language tag for each lemma. The model holds that producing a word in a particular language requires the intention to do so to be included in the conceptual representation (Green, 1998). The model suggests that each lemma in the mental lexicon has an associated tag for L1 or L2. All other lemmas in the language share the same associated tag. The selection mechanism, thus, operates on language tags that are associated with lemmas (Green, 1998). According to the IC model, the activation of the language tag together with the conceptual information about the intended language leads to the selection of a relevant lemma. Moreover, language task schema targets the language tags to suppress competitors. In Persian-German bilinguals, for instance, when Persian is selected as the base language, the language tag corresponding to the other language (here, German) is inhibited. Green (1998) assumes that language tag is just one cue that allows speakers to control output. The model suggests that output is controlled by suppressing (inhibiting) lemmas with inappropriate tags. Thus, according to the model, the availability of language tag together with suppressing (inhibiting) lemmas with

inappropriate tags allows speakers to control language output.

Concerning the conceptualizer operation in the case of language differences (e.g., the distance difference in English and Spanish) de Bot (1992) makes some assumptions: the preverbal message includes "all the possible relevant information for all possible languages" (p. 8). Accordingly, one way to include information about language selection "is to label parts of the message according to the language" (de Bot & Schreuder, 1993, p. 201). The Vbl (verbalizer) receives language information from the preverbal message. In order for the preverbal messages to be lexicalized, they are required to be divided into chunks. Each of the chunks is labelled depending on the value of the language cue (de Bot & Schreuder, 1993). There are, however, some arguments with respect to the suggestion. As the researchers state, in some settings the mixing of the two languages can be done almost at random; or sometimes when bilinguals encounter a lexical problem, they may use words from their L1 as a compensatory strategy (de Bot & Schreuder, 1993). In this situation, they use words from their L1, however, they are aware that the interlocutor is monolingual. Accordingly, a bilingual's language processing may not always follow from the initial language selection. Moreover, de Bot (1992) suggests that one possibility about which part of the language system is responsible for selecting the base language is to assume that "the knowledge component is involved in this choice: it contains a discourse model, a list of limiting conditions for the speech which is to be generated, however, the role of the knowledge component is not very clear" (p. 7).

In his study, de Bot (2004) proposed that the intention of speaking in a specific

language originates from the conceptual level, however, it is relayed to both the information in the preverbal message and the language node. In other words, information on the language to be used comes from two different sources: from the lexical concepts and the language node. de Bot (2004) suggests that the problem with the earlier proposal (de Bot & Schreude, 1993) is that “all information about language choice has to be included in some form in the preverbal message” (de Bot & Schreuder, 1993, p. 201) is that some aspects of production such as “deliberately speaking with a foreign accent” appears to be difficult to control in such a way. The language node system can control language choice at the lower level of production. The language node will inform the relevant components including the syntax, lemma, and word form (de Bot, 2004). Thus, language membership information might be available at multiple levels: conceptual, syntactic, lemma, and word form. “The language node conveys information about language selection both from the conceptual level to lower level components and between components at these lower levels” (de Bot, 2004, p. 29).

In some models of bilingual language production (e.g., Hartsuiker & Pickering, 2008) and comprehension (e.g., Dijkstra & Van Heuven, 2002) language nodes are the main determinants of language selection. As far as I am aware, the greatest role to the language nodes was given by Dijkstra and Van Heuven (1998, 2002). In Dijkstra and Van Heuven’s (2002) Bilingual Interactive Activation (BIA) model, all the word nodes are connected to language nodes. According to the model, in German-English bilinguals, for instance, activated word nodes (e.g., Zug meaning dog) send activation on to the relevant language node (here, German language

node). Activated language nodes also “send inhibitory feedback to all word nodes” (Dijkstra & Van Heuven, 2002, p. 177) in the other language (here, English). The language nodes, thus, collect activation from lexical items in the language they represent and suppress active words in the other language. In BIA model (Dijkstra & Van Heuven, 1998) language nodes have four primary functions: a) they function as language tag for each individual item in order to identify to which language an item belong; b) collect activation from words within a language. Based on the model, language nodes function as linguistic representations in the first two functions; c) they function as a “language filter (rather than an all-or-none language switch)” that modulates language activation; d) language nodes collect information from outside the language system (the linguistic context) for example information about participants’ expectations with respect to the appropriate language. The researchers assume that in the last two functions language nodes serve as non-linguistic functional mechanisms.

Based on the model, language nodes have both linguistic and non-linguistic functions (Dijkstra & Van Heuven, 1998). However, Dijkstra and Van Heuven (2002) indicate that combining all these aspects (linguistic and non-linguistic) in one mechanism is too ambitious. This led the researchers to restrict the functions of language nodes to “language membership representations, Being just representations, the language nodes can no longer function as language filters ... nor as collectors of non-linguistic contextual pre-activation” (p. 186).

The same account holds for Hartsuiker and Pickering’s (2008) integrated model of

syntactic representation. The model that is an extension of Roelofs (1992) and Hartsuiker et al. (2004) models postulates a language node for any lexical items. Accordingly, each lemma node (e.g., eat) is linked to one language node (e.g., English) (Purmohammad, 2009; 2015a). Remember that in Green's (1998) IC model, the language nodes are equivalent to language tags. In Hartsuiker and Pickering's (2008) integrated model of syntactic representation, items are tagged for the languages (e.g., Persian, German) by linking, for instance, to "Persian" or "German" language nodes respectively. In this model, some nodes are inherently activated. Whereas the verb node is inherently activated whenever a verb such as "think" is activated, some nodes are not. For example, *Sleep* is linked to both the past tense and the present tense nodes. Whenever "slept" is used, the past tense node is activated along with the lemma *sleep* (Pickering & Branigan, 1998). Accordingly, the language node must be inherently activated when a word (e.g., Zimmer) is activated. Whereas Hartsuiker and Pickering's (2008) model is explicit about the functions of the combinatorial node, featural node, and category node (see Pickering & Branigan, 1998 for discussion), it is not explicit about the function of language nodes. In a personal communication (p.c.) with Hartsuiker, he referred me to the notion of language node proposed in Dijkstra and Van Heuven

(2002). It seems that the model applies the same language node account as proposed in Dijkstra and Van Heuven (2002).

Walters (2005) proposed the Socio-Pragmatic Psycholinguistic Processing (SPPL) model. The SPPL model has socio-pragmatic roots. The researcher states that the main aim of proposing the SPPL model was to account for various source of socio-pragmatic information in bilingual language production and integrate it with psycholinguistic aspects of bilingualism. In the SPPL model, there are seven sources of information. Two modules (language choice and affective) are assumed to run vertically because they have interactions with other sources of information. This indicates that language choice and affective information are available at every level of speech production. The central foci of the SPPL model are the language choice module and its interaction with the other sources of information (Walters, 2005). In Figure 1, the left-to-right direction of the two-headed arrows shows that the language choice module provides the following LI and L2 information to bilinguals "(1) in the construction of identity, (2) in the choice of where to speak, and in preferences for interlocutors and genres, (3) in the formulation of an intention, (4) in the retrieval of concepts and words, and, finally, (5) in the articulation of an utterance" (p. 11).

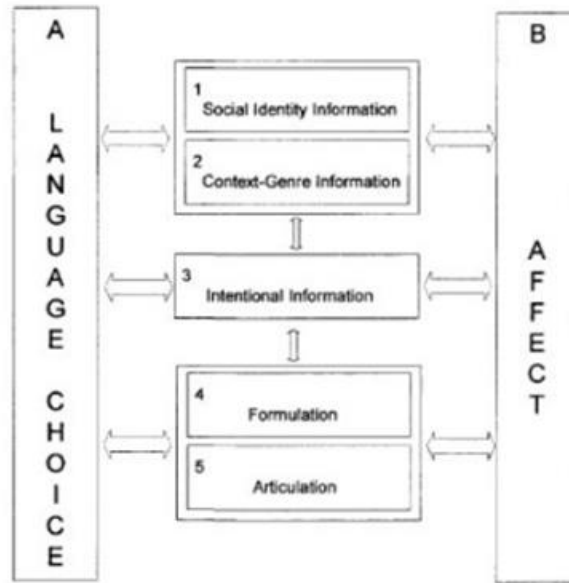


Fig.1. The Sociopragmatic Psycholinguistic processing Model(SPPL). Adapted from Walters(2005:93). *Bilingualism: The Sociopragmatic-Psycholinguistic Interface.* Lawrence Erlbaum Associates, Inc., Publishers.

The language choice module selects, regulates, and retrieves information from the internal components and integrates them with the speaker’s language choices. In the SPPL model, a language choice component makes language tags available at a different level of speech production including the conceptual, lemma, and lexemic levels of representation. Walters (2005) assumes that while the language choice module selects and retrieves elements from the two languages including features of identity, genre, morphosyntax, phonology, lexis, and discourse, in other accounts of language choice (e.g. Albert & Obler, 1978; Poulisse, 1997) especially in Green’s (1986) account in which language tag is responsible for language choice, the function of language choice is limited to the lexicon only. Thus, concerning the function of language choice, the principal difference between the SPPL model and other approaches (e.g.

Albert & Obler, 1978; de Bot, 1992; de Bot & Schreuder 1993; Green, 1986, 1998; Poulisse, 1997) is that whereas in SPPL model the language choice module runs vertically, hence is functioning at every stage of bilingual language production and supplies that information to the identity, pragmatic, morphosyntactic, phonological, lexical, contextual, and discourse information components, in the other approaches the verbalizer at conceptualizer level is responsible to assign information about the language (Walters, 2005). As stated above, in their earlier account of language choice information, de Bot and Schreuder (1993) assumed that “all information about language choice has to be included in some forms in the preverbal message” (p. 201). Walters (2005) argues that in de Bot and Schreuder’s (1993) account, even data at the phoneme and syllable levels of processing require the verbalizer to

determine the language to phonemes and syllables. Thus, the researcher assumes that “there is no resolution to this problem in a framework where all the work for language specification is carried out by the verbalizer” (p. 85).

3 Discussion

The present paper first reviewed the sociolinguistic aspects of bilingual language choice, moved on to investigate the notion of language choice presented in the models of bilingual language production (e.g., de Bot, 2004; Green, 1986; Hartsuiker & Pickering, 2008, 1992; Walters, 2005) and comprehension (e.g., Dijkstra & Van Heuven, 2002), viewed different factors through a single window into the bilingual language selection, and finally examined language choice in dialogue. Bilingual language choice in a dialogue setting has hardly been discussed. Moreover, the present study, to my knowledge, is the first to investigate language choice in bilinguals from different disciplines. Bilingual language choice has been discussed from different disciplines including sociolinguistics (e.g., Fishman, 1965; Walters, 2005), neurolinguistics (e.g., Green, 1986, 1998), and psycholinguistics (e.g., de Bot, 2004, 1992; Dijkstra & Van Heuven, 2002; Hartsuiker & Pickering, 2008). The results from the studies reviewed above suggest that one of the two languages needs to be selected as the base language for any linguistic context. Including language choice information in the preverbal message (de Bot, 1992; Green, 1986) provides an elegant solution for how the intended concept is channelled to a specific language of a bilingual speaker. According to Treffers-Daller (2009), most bilingual researchers agree that the decision to select one language as the base

language of dialogue increases the likelihood that lemmas belonging to that language receive more activation (see Kootstra et al., 2020). As discussed, findings from sociolinguistic studies of bilingualism demonstrated that factors of different natures affect bilingual language choice. Language selection is, thus, something more than a mere selection of one of the two languages. As Paradis (2004) puts it, language selection is an awareness of membership, an outcome of metalinguistic knowledge rather than an unconscious process.

As noted above, some models (e.g., Hartsuiker & Pickering, 2008; Dijkstra & Van Heuven, 2002) postulate that language nodes are responsible for language selection. There might be two problems with respect to the “language node” account especially if it is considered the main determinant of bilingual language choice. The first problem is that it does not explain the language-mixing phenomenon as the most frequent phenomenon in bilingual speech production (Paradis, 2004). As stated above, I assume that bilingual language choice includes four options, unilingual in language A, unilingual in language B, using both languages for communication but each typically with different speakers (see Green & Abutalebi, 2013 for dual language context), or a mix of the two languages. Because in some linguistic contexts, especially in a dense code-switching context (Green 2018; Green & Abutalebi, 2013) where the partners know the two languages and the speaker is aware that his or her partner does not have a negative attitude toward language mixing, he or she decides to use the mixing of the two languages (see Beatty-Martínez et al., 2020). As Green (2018) states, bilinguals use their two languages in different ways

due to the interactional context. Therefore, any language control mechanism must be able to enable different patterns of language use. The assumption that language choice information also includes language mixing permits us to provide an account for a wider range of bilingual linguistic behaviour such as code-switching and translation. However, language nodes may not account for language mixing (see Purmohammad et al., 2022; Purmohammad, 2015a, 2015b).

A second problem that concerns the language node may be that the language information is available very late for language processing (see Dijkstra & Van Heuven, 2002), especially too late to direct the preverbal message to the intended language. As Dijkstra and Van Heuven (2002) put it, language nodes are not able to “enforce language selective lexical access from the very beginning of word recognition” (p. 177). The same problem holds for the word production process because in order to decide which language must be selected as the language of conversation, language processing is required to reach the lemma level. It should be noted that although language nodes, to which all the lemma nodes of a given language are linked, are not responsible for language choice formulation; they have a facilitatory role for an intended message to be channelled to a certain language of a bilingual speaker.

In this model, language nodes are responsible for inhibiting active non-target language words. For example, in the case of a German-Persian bilingual, at the lemma level, a German word activates the German language node, and this language node feeds activation back to all German words and suppresses all words from the Persian lexicon. Thus, it is unclear what

mechanism directs language processing from the conceptualizer level to the intended lemma level in which lexical items of individual language are to be accessed. This account speculates that the language of a given utterance and inhibiting words from the other language is determined only after the first item is selected, because the language nodes collect activation from their respective lexicon, and inhibit words in the other lexicon. Moreover, no top-down inhibitory mechanism is postulated in BIA.

In BAI+ the function of language nodes is limited to membership representations. It should be mentioned that whereas important modifications have been made with respect to the functions of language nodes in BIA+ model, one existing problem is that language information is available very late for language processing, usually too late to direct the preverbal message to the intended language. Language cues cannot be assigned at the very late stage of language processing.

Green (1986, 1998) proposed that tag specification is “part of the conceptual representation” (p. 71). The IC model holds that producing a word in a particular language requires the intention to do so to be included in the conceptual representation. The model also suggests that each lemma in the mental lexicon has an associated tag for both L1 and L2. The activation of language tag together with the conceptual information about the intended language leads to the selection of a relevant lemma (Green, 1998).

As discussed above, for many situations bilingual speakers decide among four language choice options, unilingual in language A, unilingual in language B, using both languages for communication but each typically with different speakers (see

Green & Abutalebi, 2013 for dual language context), or a mix of the two languages. Grosjean (1982, 1985, 2008) also introduces language mode which is “the state of activation of bilinguals’ languages and language mechanism and language processing mechanism at a given point in time” (Grosjean, 2008, p. 39). On this account, bilingual speakers’ linguistic behaviour is presented in two separate contexts: when they are speaking to monolingual speakers and when they are speaking to bilingual speakers. In the monolingual mode, bilinguals activate one language to much greater degree and suppress the other language (but never totally) and in bilingual speech mode, they select one of the languages as the base language, activate the other language, and “calls on it from time to time in the form of code-switches and borrowings” (p. 38). Thus, a bilingual speaker may select the bilingual mode for a given situation. It seems that Green’s (1986) notion of “language tag” (that will be discussed in detail in this section) is not explicit about the language mixing choice. Accordingly, if language specification determines which language to be selected, in the case where a bilingual speaker selects to use a mix of the two languages, there must be a “switch tag” rather than a “language tag” available in the preverbal message.

Paradis (2004) assumes that the means of selection needs not be different from that used by a unilingual speaker to select formal-register words rather than baby-talk words. According to the researcher, if speaking one language rather than another requires that a bilingual speaker provides a language tag at the preverbal message as proposed in Green (1998), then a similar tag seems to be necessary for unilingual speakers to select lexical “items from among their various registers” (p. 112)

from among within-language synonyms. Paradis suggests that the selection mechanism between the two languages needs not be different from that operates within each language. He proposed a direct-access hypothesis in Paradis (2004). According to the hypothesis, the intended language is accessed without the need for a language tag in the preverbal message to first identify which language is to be selected. The same process as used by unilingual speakers suffices to account for a bilingual’s selection of lexical items, structures, or pronunciation, allowing them to select to speak in unilingual mode (Grosjean, 1985) or to freely mix the two languages. There is a strong link between Paradis activation threshold hypothesis and the direct-access hypothesis. The activation threshold mechanism leads bilingual lexical access not to need a language tag. The activation threshold hypothesis supports the idea that the intended language is accessed directly without the need for a language tag. Accordingly, when one language is selected rather than another, automatically the activation threshold of the non-selected language is raised. In other words, the activation threshold of its competitor (the other language) is raised. This leads the preverbal message to direct to the intended language without the need for a language tag (Paradis, 2004, 2009).

In personal communication, (p.c.) David Green presented more details about the notions of “tag specification”. According to the researcher, there are different ways in which the notion of a tag might be specified and implemented and what its actual sense might be. Language tag might not reflect formally defined languages such as “German” or “Farsi” but other aspects of language use: the language speakers use to their relatives or on this

occasion: what is key is that there is a functional way to distinguish the languages where those languages are distinguished within a given language community (the behavioural ecology of the speaker).

I assume that the major problems proposed by some researchers (e.g., Paradis, 2004) with respect to the notion of tag specifications may be resolved by the above explanation. For example, Paradis (2004) assumes that if speaking one language rather than another requires that a bilingual speaker provides a language tag at the preverbal message as proposed in Green (1998), then the same tag seems to be necessary for unilingual speakers to select “lexical items from among their various registers” (p. 112), from among within-language synonyms. According to Green (p.c.), as the function of tag specification is broader than selecting formally defined languages “German” or “Farsi”, even speaking one language demands tag specifications which include information about which register or style is appropriate concerning a given context. “Some form of tagging may also be used to label vocabulary or structures associated with particular “registers” or styles of speech within a language” (Green, 1986, p. 217).

In the SPPL model proposed by Walters (2005) the language choice module runs vertically, hence functions at every stage of bilingual language production including the conceptual, lemma, and lexemic levels of representations, and supplies that information to the identity, pragmatic, morphosyntactic, phonological, and lexical information components. As stated above, in SPPL model the problem that the language choice module might have is that it is too big to be included in bilingual language processing. Moreover,

combining all these aspects in one single module is probably too ambitious, because the language choice module needs to interact with several sources of information that are different in nature including a) formulation, for the retrieval of concepts and words and access to the morphosyntactic information, b) articulation for phonology, c) intentional information for speakers’ intention to speak, and d) social identity information for features of identity, style, and genre. The language choice module in the SPPL model selects, regulates, and retrieves information from the internal components and integrates them with the speaker’s language choices. More importantly, in this model, the way the language choice module interacts with such a different source of information is unclear.

Regarding the language choice mechanism, there are still some points that need to be clarified. First, since language choice is mainly a function of speakers’ metalinguistic knowledge, and is highly affected by several non-linguistic factors (topic, interlocutor, situation, group membership, etc.), I assume that language choice is preliminarily formulated outside the bilingual language system; while distinct, there is a close interaction between the language system and the metalinguistic, and sociopragmatic knowledge (Paradis, 2004; Rickheit et al., 2008). Green (p.c.) assumes that there is debate about where the intention to speak in a particular language is formulated because it must make use of the linguistic context. I suggest that language choice is not formulated in the conceptualizer (i.e., in the language system) because selecting a specific language to speak is not an inherent function of the conceptualizer at the conceptual level. While language choice is

formulated outside the language system, the output of tag specification formulation is sent to the conceptualizer where it is included in the preverbal message. As Costa (2005) states, the decision of which language to use to convey the intended message is based on different types of information that have little to do with the lexical system.

Second, language cue (tag specification) has various values depending on several linguistic and non-linguistic factors (de Bot, 1992; de Bot & Schreuder, 1993). The relative value of such language cue depends on which language mode the bilingual is expecting to experience (Grosjean, 1985, 2008). In bilingual settings, the value of such language cue is not very high. This permits bilinguals to switch between the two languages. One question that arises is why while sometimes the value of the language cue is high, bilinguals use words from the other language. This may be because some words from the other language have lower activation threshold levels (Paradis, 1993, 2004). Moreover, when the topic of conversation changes (e.g., a bilingual speaks about a topic that relates to the other language) or when a new addressee enters the conversation, people may use words from the other language regardless of what language cue was included in the preverbal message, because such a situation might increase the activation level of the words in the other language

Third, recent studies revealed that language membership information at the lower level of processing from both the lexical and the sub-lexical level facilitates language processing (Kesteren et al., 2012). This suggests that language information is also available at the lower levels of production. For example, Lemhöfer et al. (2011) report that both native and non-

native speakers used bigram (e.g., English bigram wh) at the morpheme boundary as a cue during reading Dutch compound words. Participants were faster to respond in compound words that included such orthotactic cues. In other words, participants used the orthographic parsing cues in order to direct higher-level processes. According to Kesteren, et al. (2012), sub-lexical and lexical information sources could potentially codetermine the language membership of a specific word. Studies (e.g., Dijkstra & van Heuven, 2002; Poulisse & Bongaerts, 1994) showed that lexically orthographic or lexically phonological representations are connected to particular “language membership” representations or tags that indicate the language to which a lexical item belongs. The results from Kesteren, et al. (2012) study indicate that sub-lexical language membership information (e.g., the words’ orthographic representations in the two languages of bilinguals) “could be used to speed up bilingual identification processes or decision making” (p. 2131). Interestingly, Vaid and Frenck-Mestre (2002) report that French-English bilinguals were more sensitive to the orthographic cues for their second language than their first language. The idea that language membership information is also available at the lower level of processing is consistent with de Bot and Schreuder's (1993) account that it is unlikely that “Vbl specifies the language for each individual phoneme or sound which clearly cannot be the case” (p. 205). The account that some information about language exists at the lower levels through language membership information and language nodes provides an elegant solution to the problem proposed by Walters (2005). As stated above, Walters (2005) argues that in de Bot and Schreuder's (1993) account, even data at

the phoneme and syllable levels of processing require the verbalizer to determine the language to phonemes and syllables. Thus, the researcher assumes that “there is no resolution to this problem in a framework where all the work for language specification is carried out by the verbalizer” (p. 85). Thus, a distinction is made between language membership information and language node at the lower level of the processing; however, both facilitate bilingual language processing.

Finally, I assume that a language cue does not need to be included in the preverbal message for every sentence that bilinguals produce during a course of the dialogue. The automaticity existing in dialogue affects bilingual speech production to a great extent. Language choice mechanism may be formulated at the very early stage of language production in dialogue settings, but there is no need for interlocutors to select a language for any dialogue turn. Considering the fact that in most exchanges “inter-turn intervals are extremely close to 0 ms” (Garrod & Pickering, 2009, p. 300), speakers may not decide to speak in one language rather than the other language for every dialogue turn. In other words, like other aspects of language production (e.g., word selection) language choice mechanism also undergoes automaticity in dialogue. As Code (1994) states “much of our speech activity is not under ongoing, moment-to-moment control, with each segment being individually planned and sequentially executed. It would be physiologically impossible for us to produce speech with the rapidity and the proficiency that we can if we had to plan and perform each segment individually” (p. 137). Speakers’ linguistic behaviour is affected by

interlocutors during the course of the dialogue. (see Broersma et al., 2020; Garrod & Pickering, 2007, 2009; Pickering & Garrod, 2004, 2006, for the priming effect, and interactive alignment). de Bot (p.c.) agrees that in conversation there is no language choice needed at a high level. The researcher goes on further and states that “a deeper question is whether bilinguals need to choose between languages at all”. De Bot (p.c.) states that “I now believe that we have a repertoire of situation-specific utterances that may include words from different languages but is extracted in this form. When I am in an English-speaking environment I use English words or utterances because that is what I have learned is appropriate. The selection is not at the utterance level; it is the setting that leads to specific utterances”. Thus, de Bot no longer endorses his statements on language choice which were presented in his influential papers (1992, 2004). In line with de Bot, I assume that bilinguals do not have to decide which language to use for every communication. In cases where they need to formulate language selection, it follows from the processing discussed above.

Thus, since the bilingual speech production system is indeed dynamic (Hermans et al., 2011) and is affected by several linguistic and non-linguistic factors, “bilingual language selection” should not also be viewed as an all-or-nothing phenomenon. The linguistic context determines whether “language selection” needs to be formulated at a higher level. During the course of the dialogue, the interlocutors do not need to determine a choice for every utterance they produce as a function of the alignment processes and automaticity. When there is a language history between the participants (see Grosjean & Li, 2013),

bilinguals use their “repertoire of the situation” to communicate with each other. I know a couple, M and N, in Switzerland. M is a Mazandarani-Persian bilingual and his wife is an Azeri Turkish-Persian bilingual. As I am a Mazandarani-Persian bilingual, and given that in our first meeting in 2013, we both had a positive attitude toward speaking in Mazandarani, M and I decided to communicate in the Mazandarani language. We still keep on communicating in the Mazandarani language. Thus, based on the language history, I do not need to formulate language choice for every communication with M. However, whenever his wife is present, I use Persian in order to include her in the conversation. As speaking with M in Persian is not what I normally do, language choice may be needed to be formulated at a high level.

4 Conclusion

I assume that language choice is formulated outside the bilingual language system but the output of tag specification formulation is sent to the conceptualizer where the information about language is included in the preverbal message. Language information including information about language choice (at the higher level of processing), language membership information, and language nodes (at the lower level of processing) construct a language information network during bilingual language processing. The intention to use a particular language is, thus, relayed to both the system at the higher level of processing which produces lexical concepts, and the language node (de Bot, 2004). The idea that some information about language exists at the lower levels through language membership information and language nodes provides an elegant solution to the

problem proposed by Walters (2005) that in de Bot and Schreuder’s (1993) account, even data at the phoneme and syllable levels of processing require the verbalizer to determine the language to phonemes and syllables. When a specific language is selected, the language node at the lower level will inform all corresponding components in which syntactic or form information is required to be selected. Thus, a link is made between the information on language at the higher level and the language nodes and language membership information at the lower level of language processing (lemma and lexeme levels). In other words, the language choice information included in the preverbal message (de Bot, 1992; Green, 1986, 1998) together with language nodes and language membership information from the sub-lexical structure of lexical items (e.g., English bigram *wh*) (Kesteren et al., 2012) and phonological representations regulate bilingual language processing. Lastly, I proposed that there is no need to include information on language choice for every utterance during a course of dialogue or when there is a language history between the two participants.

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