

論文

Will Bilinguals Ever Be Able to Perform Word- and Sentence-Level Language Processing Like Native Speakers of English?*

三 浦 隆 行

MIURA Takayuki

Abstract

Overall proficiency of the second language (L2) varies among bilinguals due to various factors. This paper seeks to assemble evidence from previous studies on whether bilinguals will ever demonstrate L2 language processing at word and sentence levels which is similar to that of native speakers of the L2. It ends with a task which may enhance accuracy of syntactic processing among L2 learners, which is one of the conditions that can contribute to their L2 native-like language processing.

Keywords

Bilingual Language Processing, Nativelikeness, Morphology, Semantics, Syntax

1. Introduction

The number of bilinguals is estimated to be more than 50% of the world population (Crystal, 1997; Fabro, 1999; Grosjean, 1982) and could even be as high as 80% (Porch & de Berkeley-Wykes, 1985). There are limitations, however, with the calculation of bilingual people in that there has not been a precise definition of who can be considered bilingual person and level of proficiency in languages a person has to achieve to be considered bilingual (Roux, F. et al., 2004). A definition of bilinguals employed by many researchers is the one postulated by Haugen (1953), namely that bilinguals are individuals who are fluent in one language but who “can produce complete meaningful utterances in the other language (p. 7),” and the researchers suggest in their definition of bilinguals that bilinguals are individuals who have varying degrees of proficiency in both languages (Hakuta, 1986; Macnamara, 1967; Mohanty & Perregaux, 1997; Valdés & Figueroa, 1994). In accordance with the level of proficiency, type of context, length of using the L2, bilingual people have been classified in thirty-seven different ways as, e.g., *achieved bilingual* (same as late bilingual); *ambilingual* (same as balanced bilingual); *compound bilingual* (someone whose two languages are learnt at the same time, often in the same context); *vertical bilingual* (someone who is bilingual in a standard language and a distinct but related language or dialect) (Wei, 2000, pp. 4-5). Hence, it appears to be unambiguously plausible that there has been no consensus about how bilinguals are defined because outcomes of the bilinguals’ proficiencies are diverse and they seem to be influenced by the frequency of use of the L2 (e.g., *recessive bilinguals* who feel difficulty either speaking or writing, or both due to lack of use), and degree of balance between the two languages (e.g., *semilinguals* who have insufficient knowledge of either language or *maximal* and *minimal bilinguals* who are competent like a native speaker in two or more languages or who have little knowledge of the L2 respectively) (*ibid.*).

As shown above, not all bilinguals are necessarily regarded as able to use the L2 as native users do. Age is one of the factors which influences the degree of proficiency in the L2 (e.g., Birdsong, 1999). In the second language acquisition research, Long (1990) suggests that a native-like accent is not achieved by learners who start learning the L2 after the age of six and it is very difficult for them to acquire a native-like command of grammar. On the contrary, Scovel (1988) shows somewhat different evidence that the critical period to

acquire a native-like pronunciation is around twelve years old. Flege, Munro, and MacKay (1995) demonstrate the effect of the age of arrival on the rate of accentedness of Italian-English bilinguals who immigrated to Canada between the ages of two and twenty-three, noting that the earlier they moved to Canada, the less accented they were perceived.

There have been various arguments as to whether bilinguals achieve a native-like competence in the L2, for example, since it has been found that only 6% of the late L2 learners can achieve a native-like pronunciation (Flege, Munro, & MacKay, 1995), whereas Flege, Frieda, and Nozawa (1997) and Flege, MacKay, and Piske (2002) indicate that children who immigrated to Canada at an early stage in life still showed a detectable accent. With these results, Ioup (2008, p. 48) concludes that it is unlikely for late learners to acquire native-like pronunciation. The definition of native-likeness given by Birdsong (2005, p. 120) is that of L2 learners' performance that falls within the range of native control subjects (some studies employ stricter criteria, such as performance within a standard deviation above or below natives' means). He demonstrates that various experimental studies have shown that it is not impossible for late learners of L2 to attain a native-like proficiency. He points out, however, that the previous studies that have attempted to reveal a native-like command among L2 learners have problems with their subject sampling. He states that the L2 learner sample should not be different from the sample of counterparts (natives) in terms of education level and chronological age and subject sampling should be administered at random to obtain varying degrees of native-likeness in the sample (p. 121). He further mentions that an unscreened sample allows for safer generalisation of observed incidences of native-likeness to broader populations (Birdsong, 2004, p. 92). Hence, it is important to take these points into consideration and the present paper follows these principles when mentioning research findings on bilinguals.

In the following sections, various recent research studies which have made use of brain imaging apparatuses will be illustrated to argue that bilinguals can process words and sentences in a native-like way under certain conditions.

2. Bilingual word processing

A connectionist model that hypothesises that word processing is initiated bottom-up and non-

selectively so that when one of the two languages of bilinguals is used the other is also activated is the Bilingual Interactive Activation Model (BIA) suggested by Van Heuven, Dijkstra, & Grainger (1998) and Dijkstra, Grainger, and Van Heuven (1999). The BIA model presupposes that non-selectivity (both languages are activated) extends to orthographically similar letter strings in any of the languages the bilingual reads (Kroll & Dussias, 2004, p. 171). For example, when a Dutch-English bilingual reads the word *room* in English, there are activations not only in similar-looking English words (e.g., *roof*, *boom*), but also in similar-looking Dutch words, including the word *room* itself, which happens to be an interlexical homograph which means “*cream*” in Dutch (p. 172). There have been many recent studies that investigated the claim that if the access to the lexicon is language specific, bilinguals should perform no differently on words that share properties across the two languages than on those that do not (*ibid.*).

These studies looked at the processing of interlingual homographs, words that share lexical form but not meaning (e.g., Von Studnitz & Green, 2002), cognates, words that share both lexical form and meaning (e.g., Van Hell & Dijkstra, 2002), and cross-language neighbours, words belonging to a cohort of words that look like the target word but in the non-target language (e.g., Jared & Kroll, 2001). Dijkstra, Van Jaarsveld, and Ten Brinke (1999) conducted three studies consecutively to explore the effects of different task demands and language intermixing (English and Dutch). As a result, they argued that the predictions of the BIA model were supported in that the orthographical features shared in both languages influenced task performance (i.e., the bilinguals’ decision about whether what they saw was a real English word or not) in spite of whether the task required attention to one language only (Kroll & Dussias, 2004, p. 173). However, the subjects in their studies were university students of Dutch who had learned English as a foreign language for at least six years and used English regularly during their study, furthermore, their English language proficiency was not assessed and indicated in the article. Therefore, it appears undoubtedly apparent that the subjects in their study were affected by the L1 (Dutch), i.e., they were unable to control the L1 when processing in the L2. This shows that the subjects were less proficient bilinguals at the time of the experiment because it has been said that a greater control of the L1 is required when using the L2 for less proficient bilinguals, and proficiency is one of the factors

which affects the levels of activation of different languages (Rayner & Ellis, 2007, p. 43). Their studies demonstrate, however, that word recognition among less proficient bilinguals is not comparable with that of natives and they are far from native-like.

In Costa and Santesteban's (2004) language switching tasks (between L1, Spanish or Korean, and L2, Catalan or Spanish) at word-level, it was found that highly proficient bilinguals do not show asymmetrical switching costs. This has been supported by studies using event-related brain potentials (ERPs) which compared electrical activities of L2 learners when given tasks in which they were asked to produce participles in written form and judge the acceptability of sentences which included target nouns in plural forms, where these stimulus forms (participles and plural nouns) were regarded as morphologically complex words. The results show that highly proficient L2 learners indicated a two-phase ERP pattern with the same early anterior negativity as was seen in the native speaker control (Hahne, Mueller, & Clahsen, 2006). It is suggested that L2 processing of morphologically complex words can be native-like and can shift towards automatised among highly proficient L2 learners (Clahsen & Felser, 2006c).

To sum up, there might be some possibilities for bilinguals, especially those with a high proficiency, to process the L2 words in a native-like way at different levels, such as in the perception and production of morphologically complex words. More needs to be explored on the question as to whether bilinguals process words phonologically (i.e., perception and articulation), or in different circumstances (e.g., where they are required to do lexical decision and production, either in written or spoken form successively) as well as native counterparts do.

3. Bilingual sentence processing

The primary concern about whether bilinguals process sentences as natives do has been investigated in terms of semantic and syntactic processing. Weber-Fox and Neville (1996) investigated semantic and syntactic processing during reading among proficient Chinese-English bilinguals who had started learning the L2 at the ages of 1-3, 4-6, 7-10, 11-13, and after 16 years. The results show, as for semantic processing, that the learners who were exposed to the L2 before age 11 indicated a remarkable similarity to the native speakers. As

for syntactic processing, marked qualitative differences were found, with learners exposed to English after age 16 consistently displaying the greatest differences in ERP patterns compared with those observed among native speakers. Hahne (2001) and Hahne and Friedrici (2001) observed with the same methodological tool similar ERP responses among proficient Russian L2 learners of German when listening to semantic and syntactic anomalous sentences. Their results suggest that the L2 learners did not process or integrate syntactic information into the existing phrase structure in the same way as native listeners did (Kroll & Dussias, 2004, p. 185). Clahsen and Felser (2006c) state that even late learners who acquired a second language around or after puberty can achieve native-like processing in some domains of grammar, however, the processing of complex syntax by adult learners continues to be non-native-like, even after many years of L2 usage and exposure (p. 564). Hence, the age of arrival, length of residence, age of onset of L2 learning and proficiency seem to affect the outcome of native-likeness in the L2, and the native-likeness limitedly appears in a certain grammatical processing (i.e., syntactic processing).

This phenomenon is explained by the shallow structure hypothesis (SSH) (Clahsen & Felser, 2006a, 2006b) a hypothesis argued by psycholinguists which points that sentence processing involves two different processing routes: full parsing, which provides a fully specified syntactic representation for an incoming string of words, and shallow parsing, which provides a less detailed representation based on lexical-semantic information, associative patterns and other surface cues to interpretation (e.g., Sanford & Sturt, 2002). On the assumption that full parsing is fed by the grammar, the SSH claims that the L2 grammar does not provide the type of syntactic information required to process nonlocal grammatical phenomena in native-like ways (Clahsen & Felser, 2006c, p. 565).

In the recent study, however, it has been revealed that comparable syntactic sentence processing in native and non-native readers of English exists (Kotz, Holcomb, & Osterhout, 2008). They mention, however, that difference in amplitude size, peak latency and distribution indicate that the processing of temporary syntactic ambiguity and syntactic anomaly may be influenced by subject variability as well as potentially different or additional cognitive mechanisms (p. 525). It is true that L2 comprehension requires greater computational effort than L1 comprehension as results from neuroimaging studies show

increased cortical activation for structurally difficult sentences in the L2 (Hasegawa, Carpenter, & Just, 2002). However, a few (behavioural) studies (Juffs, 2004; 2005) that have investigated the role of individual working memory differences in L2 sentence processing have reported small or no working memory effects (Clahsen & Felser, 2006c, p. 567).

To summarise, L2 learners do not have problems with all aspects of grammar but with the real-time computation of complex hierarchical representations (e.g., participles and plural nouns) (Clahsen & Felser, 2006c, p. 568). Hence, it might be acceptable to mention that bilinguals are able to process sentences in a native-like way *if* they meet conditions such as that they are early learners of the L2, highly proficient in the L2, and have significant exposure to the L2, even though these conditions do not necessarily guarantee that they would be able to achieve native-like processing at word and sentential levels.

4. Conclusion

This paper attempted to answer the following question, “*Can bilinguals ever expect to process words and sentences in a native-like way?*” by drawing on evidence from empirical, cognitive, psycholinguistic, and neurophysiological studies. Overall, an answer to the question would be that there are some possibilities that bilinguals could process the L2 at word and sentential levels as well as native speakers do if they try hard to meet some requirements. The requirements are high proficiency in the L2, early arrival in an English-speaking country, a lot of exposure to the L2, strong and automatic control of the L1, and frequent use of the L2. However, again, they are not the only factors that might facilitate bilinguals to be native-like speakers. There might be other features that are necessary to make that happen, such as environmental (e.g., school, work, home), motivational (e.g., to maintain the L2 for work (instrumental and extrinsic) and to maintain contact with people of the L2 (integrative)), as well as biological (e.g., maturation, also mental).

In order to obtain generalisable data on how bilinguals can become native-like, it is necessary to collect random samples and adjust their educational level and chronological age as pointed out by Birdsong (2005). It is also crucial to assess proficiency of both their L1 and L2 since proficiency in L1 is extremely vital as the development of L1 and L2 is interdependent (Harley, 2008, p. 155). One such study with early Spanish (L1)-Swedish (L2)

bilinguals by Bylund, Abrahamsson, and Hyltenstam (2012) demonstrated that maintenance of native-like L1 proficiency and language aptitude are indispensable for native-like performance, i.e., the ultimate attainment of L2. The participants' language proficiency was measured by grammaticality judgement tests (GJT) in both languages and language aptitude by the Swansea Language Aptitude Test (LAT, v.2.0; Meara, Milton, & Lorenzo-Dus, 2003). An earlier study by DeKeyser (2000) also shows a strong relationship between the grammatical analytical ability and language aptitude among participants who moved to the USA as adults and the author asserts that only the adults with above-average aptitude can eventually become near-native language users through explicit language learning.

Based on these findings, the following task is suggested to be integrated with English language classes with appropriate adjustments according to education levels, i.e., primary, secondary, and tertiary, considering DeKeyser's (2000) viewpoint that foreign language teaching guidelines that disprove explicit focus on form to academically oriented adult learners, who can cope with such analytical approach of linguistic structure, should be considered as inherently invalid.

Grammaticality judgement task on Flashcards

As shown by Bylund, Abrahamsson, and Hyltenstam (2012) that the accurate grammatical analytical skill is required for native-like performance, a GJT on Flashcards (NKO Ventures, LLC) can be developed and introduced in my upcoming classes as shown on Figure 1. On each side, a sentence which is either grammatical or ungrammatical and two choices, correct/incorrect are shown (answers for the upper and lower sides are *Incorrect* and *Correct* respectively, and one of the choices is left blank as there are only two possible answers). The winner is the one who has answered more questions correctly than her/his peer within a time limit of one minute (47 seconds left in the example).

Grammatical and ungrammatical sentences are drawn from Allen and Seidenberg (1999, p. 131) as they feature ten types of ungrammaticality indicated by an asterisk: (1) strict subcategorisation, e.g., *He came to my house at noon.* vs **He came my house at noon.*; (2)

Figure 1

A screenshot of examples of a grammaticality judgement task.

	Incorrect	Correct
I helped themselves to the birthday cake.		
Frank was expected to get the job.		
Correct	Incorrect	

particle movement, e.g., *She went up the stairs in a hurry.* vs **She went the stairs up in a hurry.*; (3) sub-aux inversion, e.g., *Did the old man enjoy the view?* vs **Did the old man enjoying the view?*; (4) empty elements, *Frank was expected to get the job.* vs e.g., **The job was expected Frank to get.*; (5) tag questions, pronoun agreement, e.g., *The little boy fell down, didn't he?* vs **The little boy fell down, didn't it?*; (6) left branch condition, e.g., *Which old man did you invite to the party?* vs **Which old did you invite man to the party?*; (7) gapless relatives, e.g., *Mary ate the bread that I baked.* vs **Mary ate the bread that I baked a cake.*; (8) phrase structure, e.g., *The paper was full of mistakes.* vs **The paper was full mistakes.*; (9) reflexive agreement, e.g., *I helped myself to the birthday cake.* vs **I helped themselves to the birthday cake.*; (10) tag questions, aux copying, e.g., *John is very tall, isn't he?* vs **John is very tall, doesn't he?*, which will explicitly give my students as many examples as possible to help them gain attention to grammaticality. This GJT should be given in class or as homework periodically with new sets of grammatical and ungrammatical sentences, some of which can be the students' own production as peer feedback has been proven to be effective in improving their language skills, e.g., writing (Kamimura, 2006) and speaking (Yeh, Tseng, & Chen 2019).

It is expected that the learners will be more conscious of the accuracy and even inaccuracy of grammar in what they read and listen to, and will revamp their grammatical accuracy when they speak and write in the L2. Needless to say, the effects of the task are to be empirically investigated in the future research.

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