

Does First Language Affect Second Language Reading and Vice Versa?

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Resumen

The present article is centred on exploring the influence that first language exercises when reading in a second language and vice versa. Therefore, research examining cross-linguistic activation found in reading cognates and interlingual homographs will be presented and the importance of sentential context and phonology will be carefully examined. Finally, the article will consider research analysing the effects of Chinese-English bilinguals or the influence that a morphosyllabic language can exercise when reading an alphabetical language and vice versa.

Palabras clave: bilingual lexical access, cognates, homographs, alphabetical, morphosyllabic reading, word recognition, bilingualism, cross-linguistic effects.

Title: To What Extent Does First Language Affect Second Language Reading and Vice Versa?.

Abstract

The present article is centred on exploring the influence that first language exercises when reading in a second language and vice versa. Therefore, research examining cross-linguistic activation found in reading cognates and interlingual homographs will be presented and the importance of sentential context and phonology will be carefully examined. Finally, the article will consider research analysing the effects of Chinese-English bilinguals or the influence that a morphosyllabic language can exercise when reading an alphabetical language and vice versa.

Keywords: bilingual lexical access, cognates, homographs, alphabetical, morphosyllabic reading, word recognition, bilingualism, cross-linguistic effects.

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During the last decades a lot of research has been done on visual word recognition. Understanding how readers access the meaning of a string of letters has been intriguing psycholinguists for the last few years. Nevertheless, very little is known about bilingual reading. Moreover, discerning how bilinguals access meanings of words in two languages and how they become activated have been focus of extensive studies and much debate.

Recent studies consistently maintain that lexical access in bilinguals is nonselective, in other words, when a bilingual reader confronts a string of letters the orthographic, semantic and phonological representations of both the target and the non-target languages get unavoidably co-activated (e. g., Brysbaert & van Wijnendaele, 2003; De Brujin, Dijkstra, Chwill & Schriefers, 2002; Dijkstra, Grainger & van Heuven, 1999; Dijkstra & van Heuven, 2002; Lemhöfer & Dijkstra, 2004; Lemhöfer, Dijkstra, Schriefers, Baayen, Grainger & Zwitserlood, 2008; Marian, Spivey & Hirsch, 2003; Nakayama & Archibald, 2005; Schwartz & Kroll, 2006; van Assche, Duyck, Hartsuiker & Diependaele, 2009; van Heuven, Schriefers, Dijkstra & Hagoort, 2008; van Wijnendaele & Brysbaert, 2002). Nevertheless, although bilinguals are able to maintain both languages separate, it is evident that cross-language interferences between the first language (L1) and the second language (L2) occur, sometimes even without bilinguals noticing them (e. g., Dijkstra, Timmermans & Schriefers, 2000). However, to what extent does L1 affect the reading of L2 and vice versa? Although this question still remains without a clear and certain answer, a lot of research has been done on bilingual visual word recognition to complete the picture of how the brain of a bilingual reader works.

Hence, in this essay I will argue that bilingual visual word recognition is nonselective and thus, L1 exerts a pervasive influence on L2 reading. Therefore I will discuss some of the current studies in the area supporting this idea. This essay aims to provide a general idea of the extent to which L1 influences L2 reading and vice versa. Thus, first a number of studies concerning words in isolation will be briefly described. Secondly, the often disregarded role of sentential context in visual word recognition will be addressed. Thirdly, recent research considering the role of phonology in bilingual reading

will be discussed. In addition, the implications of having alphabetically unrelated languages when reading will be described. Finally, a brief summary of the major methodological problems encountered in bilingual experiments will be discussed. The Bilingual Interactive Model (BIA) and its extension BIA+ proposed by Dijkstra and van Heuven (2002) are beyond the scope of this essay (for a summary see Dijkstra and van Heuven(2002).

BILINGUAL RECOGNITION OF WORDS IN ISOLATION: THE CASES OF COGNATES AND INTERLINGUAL HOMOGRAPHS.

A wide range of different studies supporting the nonselectivity of bilingual visual word recognition have been based on cognates (i. e. words sharing meaning and orthographic form in different languages) to prove cross-language interference (e. g., an English-Spanish cognate is *film*) (e. g., Duyck et al. 2007). Therefore, if L1 lexical representation of a cognate gets co-activated while reading in L2 and vice versa, the bilingual reader, compared to the monolingual reader, would respond faster to cognates (e. g., Dijkstra et al. 1999; Duyck et al., 2007). Several experiments conducted in the area showed consistent results. Faster recognition of cognates was observed (e. g., Libben & Titone, 2009). Moreover, Marian et al. (2003) conducted a series of eye-tracking and brain imaging studies which supported these results. According to their data, even in monolingual contexts in which only one language is required to accomplish a particular task, bilingual readers simultaneously map the acoustic-phonetic input into the lexical items of both languages in bilingual processing. These results are supported by other studies (e. g., Grainger, 1993; Lemhöfer & Dijkstra, 2004; van Hell & de Groot, 2008).

Hence, they all showed faster reading and recognition processes for bilinguals. Thus, van Assche et al. (2009) noticed that the bilingual reading in L1 is affected by the facilitatory effect produced by the knowledge of an L2. This facilitatory effect is due to the fact that when a bilingual reads a word in one language its orthographic, phonological and semantic representations of all the known languages get activated (van Assche et al., 2009).

In addition, Libben and Titone (2009) found different cognate facilitation effects regarding the proficiency level of the bilinguals in the series of eye-movement experiments. While less proficient bilinguals showed the predicted facilitatory effect, proficiency bilinguals showed a reduced cognate effect. Moreover, Duyck and van Assche (2007) reported the facilitatory effects considering L1 and L3 cognates found by Lemhöfer, Dijkstra and Michel in 2004 which addresses the cumulative character of the cognate effect.

An example of these experiments is that conducted by Lemhöfer and Dijkstra (2004). They used both Dutch-English cognates and interlingual homographs, that is to say, words that although they present the same orthographic representation differ in meaning across languages (e. g., *spot* means “mockery” in Dutch), to examine to what extent L1 and L2 lexical representations overlap regarding semantics, orthographical form and even phonology when reading. The results showed facilitatory effects for both cognates which share identical orthographic representation across languages and non-identical cognates (Lemhöfer & Dijkstra, 2004). Thus, this raises the issue of how cognates and noncognates might be represented in the bilingual brain. It can be argued that each language has a lexical representation sharing the same conceptual node and since they are both co-activated when reading, they will send feedback to the orthographic representation which is partially or completely shared by the cognates, which will facilitate their recognition (e. g., Libben & Titone, 2009). Nevertheless, it is worth mentioning that Lemhöfer and Dijkstra (2004) suggest that the possibility of both sharing the same representation can be also viable.

Regarding interlingual homographs, interference was observed (e. g., Lemhöfer & Dijkstra, 2004). Moreover, Dijkstra (2002) found evidence that bilingual readers could not ignore the effects of the non-target language. These results are being supported by current studies in the area, for example in the studies recently conducted by Libben and Titone (2009), who explained that since false friends do not bear the same meaning and thus, they do not share the same conceptual node, they are more difficult to recognise. Therefore, it is consistently agreed that interlingual homographs present different but possibly overlapping orthographic representations (e. g., Dijkstra, 2002). Furthermore, Swartz and Kroll (2006) obtained different results regarding the different proficiency of bilinguals. The more dominant L1 meanings shadowed the recognition of L2 interlingual homographs in less proficient bilinguals. In contrast, possibly due to their practice with L2 and their ability to maintain both languages separated, more proficient bilinguals may not activate the meaning of the nontarget language.

BILINGUAL VISUAL WORD RECOGNITION IN THE SENTENCE CONTEXT

Much of the research conducted on visual word recognition has considered words in isolation disregarding its ecological validity. Since the bilingual reader will commonly encounter words within meaningful contexts, it seems to be necessary to analyse the influence of sentential context in bilingual lexical access. In fact, as van Hell and Dijkstra (2002) have pointed out, “the bilingual [. . .] is conceived as a system that acts in context and continuously interacts with and adapts to linguistic and non-linguistic contextual factors” (p. 209). Therefore, the following section will examine to what extent a meaningful context sentence can influence bilingual lexical access and activation.

As research on visual word recognition has consistently shown, the monolingual reader considers the semantic and syntactic information provided by the sentential context to facilitate the lexical access and processing of subsequent expected words within a sentence (e. g., Duyk & van Assche, 2007; Morris, 1994; Schwartz & Kroll, 2006). In addition, Libben and Titone (2009) stated that sentential context has a key role in the lexical ambiguity resolution. Moreover, van Hell and de Groot (2008) have pointed out that variations in the context can affect the lexical access of the word.

Moreover, recent research in the bilingual domain predicts that similar strategies are followed by bilingual readers (e. g., Dussias & Cramer Scaltz, 2008; Duyk & van Assche, 2007, Grainger, 1993). It is worth mentioning that when a bilingual reader is confronted with a letter string, its orthographic, semantic and phonological representations of both the target and the non-target languages get unavoidably activated (e.g., Lemhöfer et al., 2008; van Heuven et al. 2008). Therefore, if the bilingual reader can resort to the linguistic information provided by the context he/she will efficiently restrict his/her lexical search to one language (e. g.,Duyk & van Assche, 2007; van Assche et al., 2009; van Hell & de Groot, 2008).

Thus, van Hell and de Groot (2008) tested the effects of low and high constraining context effects on the recognition of concrete and abstract cognates and noncognates in Dutch-English bilinguals. The participants were involved in a forward (i. e. from L1 to L2) and backward (i. e. from L2 to L1) translation task, in which they were expected to translate the target word (e. g. *captain* is an example of concrete cognate) which was either preceded by a high constraint sentential context (e. g., *the best cabin of the ship belongs to the “captain”*) and low constraint sentences (e. g., *the handsome man in the white suit is the “captain”*). The data showed that cognate facilitation disappeared when presented after a high constraint sentence, but remained in a low constraint context, therefore suggesting that sentential context is not sufficient for speed up lexical selection in bilinguals. These conclusions support the data obtained by for example, Schwartz and Kroll (2006) and Duyk et al. (2007).

Libben and Titone (2009) have recently conducted an eyetracking experiment to test the sentential influence on the bilingual word recognition. French-English bilinguals were presented cognates, interlingual homographs and control words within low and high semantic constraint contexts. The results were generally similar to those obtained in previous studies. In fact, The data showed facilitation and inhibition in low constraint sentences for cognates and interlingual homographs respectively. Moreover, in high constraint context the cognate facilitatory effect and interlingual homograph interference disappeared. These data contrast with that obtained by Schwartz and Kroll (2006) which did not show any interlingual homograph interference, perhaps due to the lack of specification of word frequency (Libben & Titone, 2009).

De Brujin et al. (2001) and Van Assche et al. (2009) have recently concluded that the bilingual reader does not consider the linguistic information of the context to limit lexical access. Since even when words appeared integrated within a meaningful context, parallel activation of both languages occurred. These findings coincide on those obtained by Dijkstra and van Heuven (2002) who consistently concluded that the sentential information of the word does not constitute “a strong selection constraint on bilingual word recognition” (p. 187)

Considering the disregarded role of phonology in bilingual visual word recognition

Dijkstra et al. (1999) noticed that the important role that phonology performs in bilingual reading has been often disregarded by the studies on bilingual visual word recognition. In addition, regarding the remarkable importance that phonology exercises in monolingual silent reading (e. g., Brysbaert & van Wijnendaele, 2003; Jared, Levy and Rayner , 1999), Jared and Szucs (2002) underlined the importance of discerning to what extent the bilingual can activate phonological representations when reading.

According to monolingual literature, readers combine the phonological route to meaning (i. e. the reader access to meaning through his/her knowledge of letter-phoneme correspondances to activate the phonological representation) and the direct route (i. e. the reader accessed meaning directly through word) to discern the meaning of the string of words (e. g. Jared et al., 1999). In addition it is worth mentioning that as readers improve their reading skills, they change from the phonological route to the direct route (Jared et al., 1999). This may be analogous to the reading strategies used by early and

late bilinguals. It can be predicted that less proficient bilinguals would rely more on the phonological route and more proficient bilinguals may access meaning directly through the string of words.

In addition, Jared and Szucs (2002) investigated the degree of phonological activation of the nontarget representation. French-English bilinguals were asked to name interlingual homographs with low frequency in the target language (i. e. English, their L2) and high frequency in L1. The results showed that when the bilingual is reading in L1, little activation of L2 representations were observed, possibly due to its remarkable dominance. Nevertheless, important phonological interference of L1 was found in L2 reading. In other words, the bilingual reader was unable to ignore activated L1 phonological representations when reading in L2. This may be due to the low proficiency in L2 of the participants tested, since specially during the early stages of L2, L1 seems to shadow bilingual reading (e. g., Brysbaert, van Wijnandaele & Duyck, 2002). In addition, it is worth mentioning that the occurrence of this interference seems to be restricted to interlingual homographs which bear exact orthographic-phoneme correspondences (Jared & Szucs, 2002).

Moreover, van Wijnandaele and Brysbaert (2002) conducted a research to test the degree of phonological priming in bilingual word recognition. French-Dutch and Dutch French bilinguals were involved in naming task to measure naming latencies. The results obtained showed that bilinguals could not ignore the phonological representations of the nontarget language when naming in both L1 and L2.

Furthermore, Brysbaert et al. (2002) have shown similar homophonic priming effect in L1 and L2, which implies that the phonological representations of both languages are equally activated. Thus, the recognition of target homophone French word (e. g., *faim*) was facilitated if preceded by the phonologically related word (e. g., *fain*) than if paired with control prime (e. g., *faic*).

Thus, there is recent evidence which supports the importance of phonology in bilingual word recognition (e. g. Brysbaert & van Wijnandaele, 2003; Brysbaert et al., 2002; Jared & Szucs, 2002; van Wijnandaele & Brysbaert 2002). Moreover, according to Dijkstra, et al. (1999), bilinguals apply the spelling-to-sound conversion rules of both languages simultaneously when processing lexical representations in the target language. In addition, according to van Wijnandaele and Brysbaert (2002) the letter-sound correspondences between L1 and L2 are mastered and start exercising influences on the letter-sound mappings of the native language.

ORTHOGRAPHICALLY UNRELATED LANGUAGES.

The orthographic depth of languages (i. e. how spelling is mapped into sounds), differentiates *shallow languages*, i.e. in which the sound of a word is discerned from its spelling and thus, visual word recognition does not involve the lexicon (e. g. Spanish), and *deep languages* which involves the use of lexical information (e.g. English) (Lemhöfer et al., 2008)

When both languages of a bilingual share the same alphabet they are more likely to have many similar letter-sound correspondences. Therefore, it is assumed that the bilingual reader will use these already existing letter combinations in L1 and apply them to the L2 reading (e. g., Brysbaert et al., 2002). Nevertheless, language specific letter signs will complete L1 correspondences and may interfere with the processing of words in L1 (e.g., Lemhöfer et al., 2008). Nevertheless, the article of Brysbaert et al. (2002) poses interesting questions regarding bilingual reading: How the bilingual reader processes a non-alphabetically related second language? How an alphabetically experienced brain (e.g. in English) responds to the reading of for example Chinese, a morphosyllabic language?

Perfetti et al. (2007) has recently addressed these and other questions analysing the results provided by ERP and fMRI studies considering Chinese-English bilinguals. It is worth mentioning that Chinese bears a morphosyllabic written system, thus Chinese characters, unlike English, correspond to syllables rather than phonemes (Perfetti et al., 2007). Hence, the phonological assembly system used by English readers in which graphemes can activate phonemes simultaneously does not seem applicable to readers of morphosyllabic languages. Thus, Chinese readers appear to follow a threshold process of phonology in which phonology can be only activates when orthographic recognition has been completed (Perfetti et al., 2007). In addition, since Chinese characters are connected to both meaning and phonology, Chinese readers need to retain the orthography rather than relying on phonology while meaning is retrieved (Perfetti et al., 2007). Accordingly, Perfetti et al. (2007) found that the Chinese brain seems to accommodate the script demands of characters by recruiting right hemisphere visual areas that are suited by the spatial analysis required by the characters. Moreover, they also showed that Chinese-English bilinguals may use frontal Chinese L1 areas for English. Thus, Chinese reading mechanisms can be used by English readers but not vice versa.

CONCLUSION

In conclusion, according to Lemhöfer et al. (2008) the cross-linguistic interaction of L1 and L2 is to some extent limited as only measurable effects of co-activation is found with cognates. Nevertheless, there seem to be further areas involved in bilingual word recognition which consistently show important cross-lingual influences between L1 and L2. The different studies addressing bilingual word recognition have been traditionally centred on isolated words (e. g. cognates, interlingual homographs). In fact, cross-lingual interferences were shown and this was used as consistent evidence to support the nonselective character of bilingual lexical access. Nevertheless, recent research on bilingual reading aims to provide a more natural and realistic picture of word recognition. Thus, a few studies have considered the influence that sentential context and phonology exercises in bilingual reading. In addition, the implications of bilingual reading have been addressed when the two languages contain different alphabets (e.g. Chinese-English). Finally, a few methodological problems and their consequences have been briefly described.

Further research in the bilingual visual word recognition should continue considering sentential context in future experiments. Therefore, the disciplines of visual word recognition and sentence comprehension should collaborate in order to provide a real picture of bilingual reading with consistent ecological validity. In addition, as it has been mentioned in this essay, phonology seems to occupy an important and often disregarded role in bilingual visual word recognition. Therefore, as many scholars in the field of bilingual visual word recognition have noticed, it is necessary to determine to which extent phonological interacts with semantic and orthographic levels (Dijkstra et al., 1999; van Heuven, Dijkstra & Grainger, 1998). Moreover, the field of linguistics also seems to be necessary in this field. The scope of languages selected for the experiments in visual word recognition should consider linguistically different languages in order to provide a more consistent and real view on how the bilingual brain works. Finally, as Lemhöfer and Dijkstra (2004) stated further research is needed regarding homographic cognates (e. g. *pan*, meaning [bread] in Spanish is an example of an Spanish-English homographic cognate), as the most part of the studies on visual word recognition have centred on interlingual homophones.

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