Bilingual Language Mixing: Why Do Bilinguals Code-Switch?

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Abstract

Bilingual speakers often code-switch from one language to another, especially when both languages are used in the environment. This article explores the potential theoretical explanations for this language behavior, the costs and benefits associated with language switching, and the role of language dominance in the direction of the switch. In short, code switching follows functional and grammatical principles and is a complex, rule-governed phenomenon. Although significant progress has been made in understanding the psycholinguistics of code switching, research is needed to examine the cognitive mechanisms underlying the bilingual's ability to integrate and separate two languages during the communicative process.

Keywords

bilingualism; code switching; bilingual cognition

Although much has been written on how bilinguals organize their two languages in memory, little is known about why bilinguals mix their two languages during the communicative process. Code switching, or language mixing, occurs when a word or a phrase in one language substitutes for a word or phrase in a second language (Li, 1996). For example, consider the sentence, "Dame una hamburguesa sin LETTUCE por favor" ("Give me a hamburger without LETTUCE please"). The word "lettuce" replaces the Spanish word ("lechuga"). Why is the word "lettuce" chosen instead of the correct Spanish word? Given the speed with which spoken language occurs, and the cognitive resources required during the comprehension and integration of different linguistic factors (e.g., phonological, grammatical, and semantic information), one would expect bilinguals not to switch languages, especially if retrieving a word from a second language takes more time than retrieving a word or concept from the same language. Why do bilinguals code-switch?

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LANGUAGE PROFICIENCY

One of the most frequent explanations of why bilinguals code-switch is that they do it to compensate for lack of language proficiency. The argument is that bilinguals code-switch because they do not know either language completely. Not surprisingly, when asked about their code switching, Spanish-English bilinguals are quick to point out their "lack of formal knowledge" in Spanish and English (cf. Grosjean, 1982).

One major weakness of this view is that it does not allow for the possibility that code switching is due to failure to retrieve the correct word. This inability to remember is reminiscent of the classic tip-of-the-tongue (TOT) phenomenon, in which people are sometimes unable to remember information that they know. For example, one of us experiences this every time he tries to remember the Spanish word for *estimate* ("presupuesto"). The reason for the difficulty is not that he does not know the correct word, but that he does not use this word frequently. Switching to English makes it easier and faster to retrieve the word. Thus, code switching may be a problem of retrieval affected by a combination of closely related factors such as language use and word frequency.

A second problem with this view is that it cannot explain the finding that code switching is governed by a grammatical structure. For example, Spanish and English differ in relation to how adjectives are used. In English, the adjective precedes the noun (e.g., "I want a green tomato"). In Spanish, the noun precedes the adjective (e.g., "quiero un tomate verde"). Spanish-English language switching can occur between an adjective and a noun only if the adjective is placed according to the rules of the language of the adjective (Lederberg & Morales, 1985). Thus, the sentence "Pete wants a VERDE motorcycle" would be incorrect because the adjective should follow the Spanish grammatical structure.

A third problem concerning this hypothesis is that the notion of language proficiency is not clearly defined. Do reading and writing take precedence over spoken language? Most language proficiency tests consider written language the determining variable. However, it is not clear whether reading and writing language skills should take precedence over spoken language. This reliance on reading and writing is problematic because most bilinguals receive their formal education in one language although a majority of their personal interactions take place in the other language. When their reading and writing abilities are tested in both languages, the language in which they received more formal education will usually fare better. For example, Spanish-English bilinguals in south Texas typically receive their formal education in English, and most of their personal interaction and communication with other bilinguals takes place in Spanish or in both languages. When their reading and writing abilities are tested, these bilinguals appear less fluent and less proficient in Spanish. This disparity is not due to their lack of knowledge of Spanish, but due to a differential in usage.

Finally, the notion that people code-switch as a strategy in order to be better understood is another plausible alternative. Some ideas are better communicated in one language than another. For example, the Spanish word "cariño" implies a combination of liking and affection. Neither of these English words alone truly conveys the meaning of the Spanish word. Thus, two Spanish-English bilinguals conversing in English would achieve a greater level of understanding by using this Spanish word if they wanted to refer to this concept.

IS CODE SWITCHING A TIME-CONSUMING PROCESS?

A general finding in the bilingual literature is that sentences containing code-switched words take longer to read and comprehend than monolingual sentences. In a classic study, French-English bilinguals read both monolingual and mixed-language passages. Sentences in the monolingual condition were entirely in English or French. In the mixed-language condition, the code-switched words were haphazardly in English or French, with some passages favoring the English and others favoring the French grammatical structure. When bilinguals answered questions about passages they read silently, no differences were found between the code-switched and the monolingual sentences. However, when the participants read the sentences aloud, they were slower to read the mixed-language passages than the monolingual ones (Kolers, 1966). Although these findings have been challenged on methodological grounds, these results have been replicated using other methodologies.

Why is code switching a time-consuming process? Macnamara and Kushnir (1971) proposed that a "two switch mechanism" determines which of the bilingual's two mental lexicons will be "on" or "off" during the course of language processing. They viewed the input switch as functioning at lower levels of perception and the output switch as a higher-order mechanism that is under the bilingual's voluntary control and responsible for the selection of the language used in producing speech.

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According to this model, the input switch is responsible for selecting the appropriate lexicon to be employed during the comprehension of a sentence. Although this switch is automatic and beyond voluntary control, it takes an observable amount of time to operate. Thus, during the presentation of a spoken sentence, if the acoustic signal matches English, this switch selects the English linguistic system to process the sentence. One important assumption is that once the English linguistic system is "turned on," the Spanish linguistic system is "turned off." Because both linguistic systems cannot be active simultaneously, the processing of code-switched material is slowed down.

How is the input switch triggered? Macnamara and Kushnir (1971) suggested that this mechanism relies on the distinctiveness of the linguistic code of each language. Thus, before selecting the appropriate lexicon, the bilingual analyzes the incoming acoustic signal at the lowest perceptual level possible (i.e., the phonetic level). Other researchers have suggested that the input switch may be regulated by a continuous monitoring system that remains active during language processing. However, recent findings suggest that this input mechanism may function only when bilinguals know what language to expect and when they are given enough time to activate the appropriate language.

Current research is more concerned than previous studies with studying the on-line processing of spoken language and identifying some of the factors influencing the recognition of code-switched words. For instance, the English language allows both consonant-consonant (CC) and consonant-vowel (CV) clusters at the beginning of a word (e.g., "flight" vs. "bear"). Chinese, in contrast, allows CV clusters but lacks CC clusters. Li (1996) found that this difference in phonological structure affected Chinese bilinguals' processing of English code-switched words: They took longer to recognize English code-switched words containing CC initial clusters than those containing CV initial clusters. Other important factors reported to influence the recognition of code-switched words include context (e.g., semantic context), phonetics (e.g., whether the code-switched word is pronounced according to the phonetics of the first or second language), and homophonic overlap (e.g., whether there are words that are pronounced similarly) across the two languages. Discussing whether or not code switching is a time-consuming process, Li argued that when experimental studies utilize the appropriate methodology and take into consideration some of these factors, the results show that recognizing code-switched words is no different from recognizing monolingual words.

BILINGUAL MEMORY MODELS

An important limitation of the research on code switching is the lack of models from which to generate testable research hypotheses. Currently, some investigators are addressing this issue utilizing models that propose a bilingual structure composed of separate but interconnected language-specific lexicons (i.e., mental dictionaries) and a conceptual memory store that contains information about how the world works (e.g., Kroll & Stewart, 1994). An important issue for these models is the extent to which the lexicons and the general store are interconnected.

Other models explain bilingual memory by referring to specific features of various word types (e.g., De Groot, 1993). These models emphasize the relationships between words across languages. Concrete words (e.g., "house") are more likely than abstract words (e.g., "faith") to share a number of semantic features across languages; therefore, concrete words will have similar meaning across languages. Because abstract words overlap less, they are more likely to have language-specific meanings. To date, these models have been most successful in explaining findings from studies involving word translation and differences between abstract and concrete words. Unfortunately, these models cannot be easily extended to explain the process involved in code switching across languages.

However, certain connectionist, or network, models that assume many language-processing activities occur simultaneously deserve special mention. The bilingual model of lexical access (Léwy & Grosjean, 2000) was designed to simulate the ongoing processes that occur during the recognition of a code-switched word. This model relies on the assumption that during the course of spoken-language recognition, the incoming signals activate phonemes, which in turn activate words. How the phonemes and words from the appropriate language are recognized depends on the preceding context and the phonological structure of the language. Thus, according to these models, the bilingual's two languages can be activated or deactivated to different degrees depending on the similarities or differences between the two languages under consideration (e.g., Li, 1996).

LANGUAGE DOMINANCE

One important shortcoming of most models and general accounts

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of bilingualism is that they rely on the assumption that the bilingual's first language has special status. Some models (e.g., Kroll & Stewart, 1994) depict the first-language lexicon as bigger and containing more information than the second-language lexicon. As a consequence, the first language is always accessed faster, and is always the primary language. Given this argument, one would expect that code switching would take place only when the bilingual is speaking the second language. That is, bilinguals would experience more first-language interference as they communicate in their second language than second-language interference as they communicate in their first language. This would be because of their limited knowledge of their second language. Although this may be the case for beginning bilinguals, Spanish-English bilinguals in south Texas report more English interference when they communicate in Spanish, and little or no interference from Spanish when they communicate in English. In other words, these bilinguals code-switch more when they communicate in Spanish than when they use English.

Are these observations supported by research? In a recent study, Spanish-English bilinguals listened to English sentences (e.g., "It is difficult to admit that a WAR sometimes brings profits") and their Spanish translations. Immediately after the critical word (e.g., "war" or "guerra") in each sentence, the participants named a visually presented English or Spanish target word that was either related ("peace," "paz") or unrelated ("light," "luz") to the critical word. The results showed that bilinguals were faster to name English target words while listening to Spanish sentences than to name Spanish words while listening to English sentences. Also, when listening to English sentences, bilinguals retrieved English words faster than Spanish words, as expected. In fact, participants were faster to retrieve English than Spanish words in all conditions—even when listening to Spanish sentences (Heredia, 2000a). These results suggest a reliance on the second language rather than the first language. They seem somewhat counterintuitive if we assume that the bilingual's first language is the reference, or base, language. If Spanish were the bilinguals' base language, they should have been faster to access words in Spanish than in English. Likewise, they should have been faster to access Spanish words than English words as they listened to English sentences.

How can these results be explained? We suggest that after a certain level of fluency and frequency of use is attained in a second language, a language shift occurs and the second language behaves as if it were the bilingual's first language. In other words, the second language becomes more readily accessible than the first language, and the bilingual comes to rely more on it. Other studies have had similar findings (e.g., Altarriba, 1992, 2000; Heredia, 1997), lending support for this interpretation.

What is the mechanism underlying this language shift? One possibility is that it is due to frequency of language usage. That is, regardless of which language a bilingual learned first, perhaps the more active (dominant) language determines which lexicon is accessed faster (Heredia, 1997). Consider the case of most Spanish-English bilinguals in the United States. Although their first language is Spanish, they obtain most of their formal education in English. Likewise, many of their everyday interactions involve English. As a result, the words and concepts of English become more readily accessible than the words and concepts of Spanish. An implication of this interpretation is that during early stages of bilingualism, when bilinguals tend to rely more on their first language, their code switching would mostly involve intrusions from their first language as they communicate in their second language. However, as the second language becomes the dominant language, their code switching would tend to consist of intrusions from the second language as they communicate in their first language. In short, we suggest that language dominance plays an important role in how bilinguals access their two languages. We argue that bilingual lexical representation is not a static but a dynamic representational system in which the first language can fall in strength, while the second language becomes the dominant language.

CONCLUSIONS AND FUTURE DIRECTIONS

The research we have reviewed suggests that language accessibility may be the key factor in code switching. Bilinguals switch languages whenever a word in a base language is not currently accessible. At issue is whether or not this switch is time-consuming. Although some evidence suggests that language switching is strategic and occurs only when bilinguals have enough time to select the appropriate lexicon, empirical research is needed to clarify the linguistic as well as the psycholinguistic factors influencing this language switch.

Although significant progress has been made in formulating models of bilingual memory, it is unclear how these models can be applied to code switching. Theoretical work is needed to explain how the bilingual's two linguistic systems interact. For example, why is it that bilinguals experience interference

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across languages while processing them, and, simultaneously, have the ability to keep the languages separate? Is the input switch a viable construct? Theories explaining how languages are integrated and how they remain separate should provide the foundation for research on how switching occurs in normal, spoken language.

Finally, applied research (e.g., Altarriba & Santiago-Rivera, 1994) has revealed that code switching is often used strategically in counseling settings, as clients choose to speak in a second language when trying to distance themselves from emotional events. Because the first language is often associated with a broader range of emotions than the second language, language switching becomes a defense mechanism. Further research should address how code-switching techniques might provide an effective means of directing the access of information from memories of different emotional content.

Recommended Reading

Altarriba, J., Kroll, J.F., Sholl, A., & Rayner, K. (1996). The influence of lexical and conceptual constraints on reading mixed-language sentences: Evidence from eye fixations and naming times. *Memory & Cognition*, *24*, 477–492.

Grosjean, F. (1988). Exploring the recognition of guest words in bilingual speech. *Language and Cognitive Processes*, *3*, 233–274.

Myers-Scotton, C. (1993). *Social motivation for code switching: Evidence from Africa*. Oxford, England: Clarendon.

Note

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References

Altarriba, J. (1992). The representation of translation equivalents in bilingual memory. In R.J. Harris (Ed.), *Cognitive processing in bilinguals* (pp. 157–174). Amsterdam: Elsevier Science.

Altarriba, J. (2000). Language processing and memory retrieval in Spanish-English bilinguals. *Spanish Applied Linguistics*, *4*, 215–245.

Altarriba, J., & Santiago-Rivera, A.L. (1994). Current perspectives on using linguistic and cultural factors in counseling the Hispanic client. *Professional Psychology: Research and Practice*, *25*, 388–397.

De Groot, A.M.B. (1993). Word-type effects in bilingual processing tasks: Support for a mixed-representational system. In R. Schreuder & B. Weltens (Eds.), *The bilingual lexicon* (pp. 27–51). Amsterdam: John Benjamins.

Grosjean, F. (1982). *Life with two languages: An introduction to bilingualism*. Cambridge, MA: Harvard University Press.

Heredia, R.R. (1997). Bilingual memory and hierarchical models: A case for language dominance. *Current Directions in Psychological Science*, *6*, 34–39.

Heredia, R.R. (2000, May). *Bilingual lexical access and code-switching*. Paper presented at the Fifth Conference on Applied Linguistics, Universidad de Las Américas, Puebla, Mexico.

Kolers, P. (1966). Reading and talking bilingually. *American Journal of Psychology*, *3*, 357–376.

Kroll, J.F., & Stewart, E. (1994). Category interference in translation and picture naming: Evidence for asymmetric connections between bilingual memory representations. *Journal of Memory and Language*, *33*, 149–174.

Lederberg, A.R., & Morales, C. (1985). Code switching by bilinguals: Evidence against a third grammar. *Journal of Psycholinguistic Research*, *14*, 113–136.

Lévy, N., & Grosjean, F. (2000). *Bilingual model of lexical access: A connectionist model of bilingual spoken word recognition*. Unpublished manuscript, Laboratoire de traitement du langage et de la parole, Université de Neuchâtel, Neuchâtel, Switzerland.

Li, P. (1996). Spoken word recognition of code-switched words by Chinese-English bilinguals. *Journal of Memory and Language*, *35*, 757–774.

Macnamara, J., & Kushnir, S. (1971). Linguistic independence of bilinguals: The input switch. *Journal of Verbal Learning and Verbal Behavior*, *10*, 480–487.

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